BLM

Jarbidge Field Office, Idaho



Jarbidge

Draft Resource Management Plan
and
Environmental Impact Statement

Volume 2: Chapters 4-5



U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

NATIONAL SYSTEM OF PUBLIC LANDS

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It is the mission of the Bureau of Land Management to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

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CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

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Environmental Consequences

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4.1. INTRODUCTION

This chapter describes the environmental consequences, also referred to as "impacts" or "effects," of implementing the alternatives described in Chapter 2 by presenting the likely direct, indirect, and cumulative impacts on resources, resource uses, special designations, and social and economic features. Each management action that is expect to impact a specific resource, resource use, special designation, or social or economic feature is analyzed. Where data are limited, professional judgment is used to project environmental impacts. Professional judgment is based on observation, experience, analysis of conditions, and responses in similar areas.

The scope of the impact analysis presented in this chapter is commensurate with the level of detail of the actions presented in Chapter 2 and the availability and/or quality of data necessary to assess impacts. Current conditions in the planning area, as described in Chapter 3, serve as the baseline for characterizing impacts from the alternatives.

The impact analysis is designed to show relative differences in the alternatives as they pertain to specific resources, resource uses, special designations, and social and economic features and is not intended to predict the exact amount, timing, or location of effects that could occur should the alternative be selected for implementation.

It is important to note that identification of an alternative as Preferred is not equivalent to identification of the Proposed Alternative in the Proposed Resource Management Plan (RMP)/Final Environmental Impact Statement (EIS). The Proposed RMP will reflect changes or adjustments to the Preferred Alterantive based on coments received on the Draft RMP/EIS, new information, or changes in BLM policies or priorities and could include objectives and actions described as portions of other analyzed alternatives. The BLM has the discretion to select an alterantive in its entirety or to combine aspects of the various alternatives presented in this Draft RMP/EIS to develop the Proposed RMP/Final EIS.

4.1.1. How to Read this Chapter

The Omnibus Public Lands Management Act of 2009 (OPLMA) contains Wilderness and Wild and Scenic River (WSR) designations and transportation management that affect the planning area. Management described for the No Action Alternatives and all action alternatives in the Draft RMP/EIS for Wilderness Study Areas (WSA) and WSR suitable segments would be consistent with management for the newly designated Bruneau-Jarbidge Rivers Wilderness and designated WSRs. With several minor exceptions described in the errata sheet at the front of Volume 1, the areas within the Bruneau-Jarbidge Rivers Wilderness and designated WSRs were formerly within WSAs and WSR suitable segments prior to their designation. The discussion in this chapter of potential impacts from management of WSAs does not reflect or quantify the distinction between WSAs and the Wilderness. The discussion in this chapter of potential impacts from management of non-WSA lands with wilderness characteristics does not include lands released from wilderness review under OPLMA that have wilderness characteristics. The discussion in this chapter of potential impacts from management of WSRs is not affected by the change in designation from suitable to designated.

In addition, management described in the No Action Alternative of the Draft RMP/EIS for transportation and travel is not consistent with the Act; however, transportation and travel management for the action alternatives would be consistent. The implications of this to the impact analysis are described in the errata sheet at the front of Volume 1.

The Proposed RMP/Final EIS will incorporate the designations and management direction contained in the Act.

Chapter Organization

Chapter 4 is organized into five general categories: Tribal Rights and Interests, Resources, Resource Uses, Special Designations, and Social and Economic Features. These categories are further subdivided and ordered by the sections identified in Chapter 2. Each section describes impacts **to** that specific resource, resource use, special designation, or social and economic feature, **from** management actions described in Chapter 2. For example, in the *Water Resources* section, the impacts **to** water resources **from** management identified in Chapter 2 are discussed. The impacts from Chapter 2 management actions in the *Water Resources* section are only discussed in terms of their effects to water resources. Similarly, the impacts **from** management actions in the *Water Resources* section of Chapter 2 on other resources, resource uses, special designations, or social and economic features are found under *Impacts from Water Resources Actions* in those sections. For example, in the *Fish* section, impacts **from** water resources management actions identified in Chapter 2 to fish are described.

Each Resource, Resource Use, Special Designation, or Social and Economic Feature section addresses the impacts **to** a resource, resource use, special designation, or social and economic feature. Each section discusses analysis methods, direct and indirect impacts, and cumulative impacts. Under the *Direct and Indirect Impacts* heading, the discussion is divided into subsections that contain the impact analysis **from** management actions described in Chapter 2, organized by their Chapter 2 subject heading.

Analysis Methods

This subsection identifies the indicators and rationale for their selection, methods, and assumptions used in the analysis. The indicators are intended to be quantitative where possible, to allow for clearer comparisons among alternatives. For example, many resources, resource uses, and special designations use impact indicators expressed in acres. The Chapter 2 sections for which management was analyzed in each Chapter 4 section were selected based on the likelihood for substantial impacts or because they were identified as planning issues through internal and external scoping. An explanation is also provided for the Chapter 2 sections that contain management that is not expected to result in any effects or change and, therefore, was not analyzed. Assumptions were developed based on the Jarbidge RMP Interdisciplinary Team (ID Team) knowledge of resources, resources uses, special designations, and social and economic features in the planning area. These assumptions should not be construed to confine or redefine management contained within alternatives and were used to allow a comparison of impacts resulting from the alternatives.

Acres used in the alternatives are approximate and serve for comparison and analytic purposes only. Data from Geographic Information Systems (GIS) have been used to develop acreage calculations and are rounded to the nearest 1,000 acres, unless finer distinction is needed for comparison purposes. Readers should not infer that they reflect exact measurements or precise calculations.

Direct and Indirect Impacts

This subsection contains the environmental analysis for each section. It is organized by the Chapter 2 sections that contain management expected to impact the resource, resource use, special designation, or social and economic feature being analyzed. To avoid repetition, the analysis is framed in terms of **impacts to the specific resource, resource use, special designation, or social and economic feature from management actions in Chapter 2**. For example, in the *Water Resources* section, the impacts to water resources from management in Chapter 2 are discussed. The management actions in the *Water Resources* section of Chapter 2 are only discussed in terms of their effects on water resources. **The impacts from management actions in the *Water Resources* section of Chapter 2 on other resources, resource uses, special designations, or social and economic features can be found in those sections** (e.g., impacts of management actions for water resources on fish is found in the *Fish* section). The analysis is presented for each alternative.

The detailed analysis begins with the analysis of management actions specified in each alternative for the resource, resource use, special designation, or social and economic feature being addressed. For example, the *Impacts from Water Resources Actions* section addresses impacts **to** water quality and quantity **from** management actions specified under each alternative in the *Water Resources* section of Chapter 2. The analysis then addresses the effects on that resource, resource use, special designation, or social and economic feature from management in the Chapter 2 sections identified in the *Methods and Assumptions* subsection. For example, the *Water Resources* section addresses impacts to water resources from management actions in the *Upland Vegetation, Wildland Fire Ecology and Management,* *Livestock Grazing*, *Recreation*, *Transportation and Travel*, *Areas of Critical Environmental Concern*, and *Wilderness Study Areas* sections of Chapter 2.

The impact analysis for resources focuses on impacts to that resource, while the impact analysis for resource uses focuses on the effects on opportunities to engage in the uses, not on that use's effects on the environment. For example, the impact analysis in the *Livestock Grazing* section analyzes the range of opportunities to graze livestock on public lands. Effects of livestock grazing on natural resources, such as vegetation and water quality, are addressed in the resource sections (e.g., *Vegetation Communities* and *Water Resources*). The impact analysis for special designations focuses on the impacts to the values for which they were designated. The analysis for social and economic features addresses effects or changes to the social setting and economic conditions in the planning area and region.

Following the detailed analysis, a summary of indirect and direct effects for each alternative is presented. Alternatives are contrasted and compared, and impacts and change are characterized with the impact intensities identified and discussed below.

Cumulative Impacts

This subsection contains the cumulative impact analysis for each section. It identifies the past, present, and reasonably foreseeable actions included in the analysis and then presents a summary of the cumulative impacts by alternative. The following past, present, and reasonably foreseeable actions are analyzed for cumulative impacts.

Population Growth

In south-central Idaho and northern Nevada, the population is expected to grow between 10% and 20% over the life of the plan, based on historical population growth rates. This growth will result in increased pressures on the environment. The general trend of increasing human population would increase activities in and adjacent to the planning area, resulting in an increased demand for recreation, travel, and land use authorizations. Cumulative impacts could include regional haze and air pollution from vehicle emissions, commercial and industrial operations, and increased human-caused wildland fires.

Impacts from population growth cumulatively affect the following resources and are analyzed in those sections:

- Air Quality
- Wildland Fire Ecology and Management

Military Use

Systematic military use in the planning area began in 1943 with the establishment of Mountain Home Air Force Base and the withdrawal of 420,000 acres in the planning area for use as an aerial bombing range. The base was briefly deactivated at the end of World War II, only to be reactivated in 1949. In 1963, the Saylor Creek Range was reduced to its present size of approximately 110,000 acres, and the remaining public lands reverted to management by the Bureau of Land Management (BLM). In 1998, an additional 12,000 acres in the planning area were withdrawn to create the Juniper Butte Range. The Juniper Butte Range contains populations of slickspot peppergrass.

The Saylor Creek Range and Juniper Butte Range are currently used by the United States Air Force (USAF) as well as the Idaho Air National Guard, naval aviation units from other bases in the western United States, and military training units from other countries. Since live ordnance is no longer used at either range, the current and future impacts to soil resources and noxious weeds and invasive plants are related to use of routes in the planning area for transport of vehicles, equipment, and personnel to and from the ranges. BLM also provides the military with fire suppression assistance for wildland fires within the ranges under cooperative agreement. In the event of multiple ignitions, fire suppression priorities within the planning area could be modified to provide suppression assistance.

Impacts from military use cumulatively affect the following resources and are analyzed in those sections:

- Soil Resources

- Upland Vegetation
- Special Status Plants
- Noxious Weeds and Invasive Plants
- Cultural Resources

Water Resources

Consumptive and non-consumptive water uses have occurred since the turn of the 20th century and include livestock watering, crop irrigation, hydroelectric power generation, fish hatcheries, reservoirs, and other impounded waters for recreational and private irrigation water. These uses have placed increasing demand on surface water resources in and adjacent to the planning area. The result of historic water uses is that, of the 316 miles of perennial stream in the planning area, 117 miles of stream in Idaho (12 stream segments) and 34 miles of stream in Nevada (three stream segments) are 303(d) listed for impaired water quality. All but one of these streams are occupied by special status aquatic species. The allocation of surface water rights is managed by the Idaho Department of Water Resources (IDWR) and the Nevada Division of Water Resources (NDWR). Surface water management has direct impacts to habitats on BLM-managed streams, but is not under BLM discretion or authority.

Streamflow alteration occurs on numerous streams in the planning area and includes diversions for cropland irrigation on private land and large hydroelectric facilities on the Snake River. Redband trout habitat has been fragmented into isolated stream reaches on Federal, State, and private land in and adjacent to the planning area. The impacts of diverting surface flows and dewatering of streams that drain into special status aquatic species habitats are expected to increase as the demand for surface and groundwater resources for consumptive and non-consumptive uses continue in the future. Streamflow alterations in the Snake River have similar effects to Snake River white sturgeon (white sturgeon) and Snake River snails and their habitats.

Impacts from water resource actions cumulatively affect the following resources and are analyzed in those sections:

- Fish
- Special Status Fish and Aquatic Invertebrates

Upland Vegetation

Public lands in and adjacent to the planning area have been treated in the past to reduce the amount of sagebrush through chaining, railing, herbicides, and plow-and-seed projects to increase forage for livestock. Treatments in the BLM Burley and Shoshone Field Offices (FOs) have reduced acreages of annual communities and established primarily native grassland and non-native perennial communities. Vegetation treatments, including seeding grasses and removal of sagebrush by burning, herbicides, or mechanical means for forage production, have also occurred on State and private lands in and adjacent to the planning area. Some vegetation treatments will continue on adjoining BLM and Forest Service lands to address juniper encroachment, to rejuvenate aspen, or to achieve other objectives. Burning or spraying on private rangeland would continue to reduce sagebrush and maintain or increase forage for livestock.

Vegetation treatments of annual or other vegetation communities for fuels reduction and native shrubland restoration, including prescribed fire, seeding of perennial vegetation, or planting shrubs, are expected occur on adjacent Federal lands. These treatments would occur as they have in the past, both reactively following wildland fire and as proactive treatments. Vegetation treatments, including seeding grasses and removal of sagebrush by burning, herbicides, or mechanical means for forage production, are expected to continue to occur on State and private lands in and adjacent to the planning area. Treatments such as planting sagebrush and bitterbrush are being implemented to help restore big game winter range in the planning area and Shoshone and Burley FOs.

Impacts from upland vegetation management actions cumulatively affect the following resources and are analyzed in those sections:

- Upland Vegetation

- Wildlife
- Special Status Wildlife

Riparian Areas and Wetlands

Riparian areas and wetlands are focus areas for many uses and, as a result, have been locally degraded over time. Factors contributing to current riparian condition include livestock grazing, recreational uses, road construction and use, wildland fire and fire suppression, increases in the amount of noxious weeds and invasive plants, and the diversion of surface water. All of these factors have reduced Habitat Condition (HC) ratings over time and are expected to continue to influence riparian condition in the future. Activities on Federal, State, and private land will continue to influence HC and proper functioning condition (PFC) ratings on the public land. As human population increases over time, the use of surface and groundwater water that support riparian areas is expected to increase.

Impacts from riparian area and wetland management actions cumulatively affect the following resources and are analyzed in those sections:

- Fish
- Special Status Fish and Aquatic Invertebrates

Wildlife

In the late 1980s and early 1990s, the Nevada Department of Wildlife (NDOW) transplanted elk on the Humboldt-Toiyabe National Forest. The herd has grown substantially and NDOW management objectives include maintaining 2,000 to 2,500 elk post harvest for the hunt units that include the Nevada portion of the planning area. A few hundred elk migrate north to the southern and central parts of the planning area for the winter. Elk numbers in the southern and central part of the planning area appear to be increasing. The conversion of habitat from sagebrush steppe to grassland favors elk over mule deer in the planning area. An increasing elk population could lead to conflicts with mule deer winter range as there is potential competition for space and forage resources. However, the potential for conflict between elk and other wildlife is low given current elk densities. State wildlife agencies may transplant or augment other wildlife species to meet State wildlife management objectives. Beaver, elk, California bighorn sheep (bighorn sheep), sharp-tailed grouse, pheasant, and game fish have been moved in or adjacent to the planning area in the last two decades.

Impacts from wildlife management actions cumulatively affect the following resources and are analyzed in those sections:

- Wildlife
- Special Status Wildlife

Special Status Species

Several wide ranging species [i.e., Greater sage-grouse (sage-grouse), pygmy rabbit, mountain quail, ferruginous hawk, Columbia spotted frog – Great Basin population] that occur in the planning area have been petitioned to the United States Fish and Wildlife Service (FWS) for listing under the Endangered Species Act of 1973 (ESA) over the past 15 years. Several other species (e.g., spotted bat, prairie falcon, Brewer’s sparrow, sage sparrow, and others) are presently categorized as Idaho BLM Sensitive Species and may be of enhanced concern in the future. Listing of any of these species is projected to result in some changes in management to aid in recovery of the species and their habitat. Conservation measures adopted through consultation with FWS or via statewide or local conservation planning efforts would likely include habitat restoration or improvement or seasonal restrictions and avoidance periods.

Impacts from special status species management actions cumulatively affect wildlife and are analyzed in that section.

Noxious Weeds and Invasive Plants

Noxious weeds and invasive species are expected to be spread to the planning area from other locations through motorized vehicles; wind; water; disturbance corridors such as roads, trails, livestock driveways, and fuel breaks; livestock; humans; and wildlife. While State laws mandate treatment of noxious weeds on all Federal, State, and private lands, past levels of treatment have been inadequate for control or eradication. Untreated Federal, State, and private lands have been a seed source for noxious weeds and invasive plants.

Treatments that reduce invasive annual grasses in the planning area and the Shoshone and Burley FOs are expected to help reduce fire spread and size in the long term as well as reduce the spread of invasive plants and noxious weeds. Noxious weeds and invasive plants will continue to be spread to public lands by vehicles, wind, water, disturbance corridors, livestock grazing, and, to a lesser extent, wildlife. Untreated populations of noxious weeds on Federal, State, and private lands will continue to be a seed source of invasive species and noxious weeds.

Impacts from noxious weed and invasive plant management actions cumulatively affect the following resources and are analyzed in those sections:
- Upland Vegetation
- Riparian Areas and Wetlands
- Fish
- Special Status Fish and Aquatic Invertebrates
- Special Status Wildlife
- Wildland Fire Ecology and Management

Wildland Fire and Fire Suppression

In the past two decades, the frequency of wildland fires has increased. Since 1987, over two million acres of public land have burned in the area comprised by the BLM Jarbidge, Burley, Bruneau, Shoshone, and Wells FOs; the Morley Nelson Snake River Birds of Prey National Conservation Area (NCA); the South Hills Unit of the Sawtooth National Forest; and the Jarbidge Ranger District of the Humboldt-Toiyabe National Forest. Other Federal, State, and private lands have also burned during this period. Of the total, about 49% of acres have burned more than once and 15% have burned three or more times. The origin of these fires includes human-caused and natural ignitions that occur on Federal, State, and private lands and frequently cross ownership boundaries as the fire progresses.

In the past decade, portions of the Jarbidge, Shoshone, Burley, and Wells FOs have experienced several large wildland fires. Some large areas have burned repeatedly, hindering progress toward restoration or rehabilitation of shrublands. These fires have resulted in the conversion of well over 1,500,000 acres of sagebrush-steppe guild habitat to grassland in the BLM Jarbidge, Bruneau, Burley, Shoshone, and Wells FOs and the Humboldt-Toiyabe National Forest. Continued large wildland fire will further reduce and fragment sagebrush steppe habitat and reduce or eliminate habitat connectivity for some wildlife species. Some private lands have had prescribed fires to reduce shrubs.

The increased occurrence of noxious weeds and invasive plants provides finer fuels that more readily burns than native perennial vegetation. Increased human access due to increases in motorized recreation use in remote areas poses an increased risk for wildland fire starts in uplands and riparian areas. The occurrence and frequency of wildland fires and the need for fire suppression and fuels treatments to reduce wildland fire severity are expected to increase over the life of the plan.

As the incidence of wildland fire increases, the need for suppression activities also increases. Actions to suppress wildland fires, such as retardant drops, diverting surface flows, and back-burning to reduce fuels and slow the progression of fires, all can influence water quality, water quantity, and riparian condition.

Impacts from wildland fire ecology and management actions cumulatively affect the following resources and resource uses and are analyzed in those sections:
- Air Quality
- Soil Resources
- Water Resources
- Upland Vegetation
- Riparian Areas and Wetlands
- Fish

- Wildlife
- Special Status Plants
- Special Status Fish and Aquatic Invertebrates
- Special Status Wildlife
- Noxious Weeds and Invasive Plants
- Wildland Fire Ecology and Management
- Cultural Resources
- Livestock Grazing
- Transportation and Travel

Wild Horses

The National Wild Horse and Burro Program is currently facing management challenges. Because wild horses have virtually no natural predators, their herd sizes can double about every four years. As a result, the agency must remove thousands of animals from rangelands each year to ensure that herd sizes are consistent with the land's capacity to support them. Adoption of these removed wild horses has declined in recent years because of higher fuel and feed costs. Unadopted wild horses are placed in long-term holding facilities to live out the rest of their lives. The number of wild horses in long-term holding facilities and the costs associated with maintaining them in these facilities keeps increasing. However, funding levels for the National Wild Horse and Burro Program are not keeping up with these costs; as a result, the available funding is not sufficient to support both the necessary removals and the costs of the holding facilities. Until this issue is resolved, it is likely that less funding will be available for removing excess wild horses from the range. For the purposes of this analysis, it is assumed that this will result in less frequent wild horse gathers in the Saylor Creek Herd Management Area (HMA) and higher demand for areas to house excess wild horses besides the long-term holding facilities currently being used.

Impacts from wild horse management actions cumulatively affect wild horses and are analyzed in that section.

Wilderness Characteristics

Both the BLM and Forest Service have inventoried Federally managed lands within and adjacent to the planning area for wilderness characteristics per the Wilderness Act of 1964, with varying levels of management guiding resources and uses that occur on these lands. There are three WSAs in the planning area, two of which cross the planning area boundary (175,000 acres total); these have been managed under the *Interim Management Policy for Lands under Wilderness Review* (IMP; BLM Handbook H-8550-1) since their inventory in 1981. Within the Humboldt-Toiyabe National Forest, the Jarbidge Wilderness (160,000 acres) has been managed for its wilderness values since it was designated in 1964. Also within the Humboldt-Toiyabe National Forest, three Inventoried Roadless Areas (19,000 acres) were identified in 1984 and are managed for roadless values.

Impacts from wilderness characteristics actions cumulatively affect the following resource and special designation and are analyzed in those sections:

- Non-WSA Lands with Wilderness Characteristics
- Wilderness Study Areas

Livestock Grazing

Prior to 1934, livestock grazing on Federal lands was unregulated. The Taylor Grazing Act established a permit system and authorized the development of allotment fences and water systems. Unrestricted livestock grazing has been attributed as a causative factor in the introduction and spread of invasive plants, including cheatgrass (Billings, 1994). Until the passage of the National Environmental Policy Act of 1969 (NEPA), impacts of livestock grazing use and development of livestock-related facilities were not required to be methodically analyzed. Adjacent BLM and Forest Service lands beyond the planning area share a similar history.

Livestock grazing would continue on Federal, State, and private lands throughout the life of the plan. Livestock numbers are expected to remain stable or slightly increase on State and private lands. Historic livestock grazing practices had fewer restrictions than current livestock management. Livestock grazing on Federal and State land would continue to influence water quality and PFC ratings where allotment infrastructure does not limit livestock access across land ownership boundaries. State grazing lands, managed by the Idaho Department of Lands (IDL) and the Nevada Division of State Lands, and private lands are subject to State law requiring control of noxious weeds. State law does not extend to control of invasive plants. State grazing lands and private lands are generally not subject to laws or regulations that require consideration and protection of cultural resources.

Impacts from livestock grazing management actions cumulatively affect the following resources and resource uses and are analyzed in those sections:

- Climate Change
- Soil Resources
- Water Resources
- Upland Vegetation
- Riparian Areas and Wetlands
- Fish
- Wildlife
- Special Status Plants
- Special Status Fish and Aquatic Invertebrates
- Special Status Wildlife
- Noxious Weeds and Invasive Plants
- Cultural Resources
- Livestock Grazing

Recreation

Dispersed recreation activities including all-terrain vehicle (ATV), utility vehicle (UTV), and off-road motorcycle riding; hunting; fishing; camping; driving for pleasure; and boating have been popular in the planning area for decades. There have been a limited number of whitewater recreators on the Snake River and lower Jarbidge and Bruneau Rivers. Murphy Hot Springs, Indian Hot Springs, and other geothermal springs in the lower Bruneau Canyon have also been used by recreators. Over the last 10 years, recreational use has increased as a result of the technological advancements in transportation, especially the development of ATVs, UTVs, and off-road motorcycles. As local human populations increased and these vehicles became increasingly available to the general public, the number of recreators using BLM-managed lands also increased. Access routes related to range and right-of-way (ROW) developments and motorized recreation have increased substantially over the last 20 years. Recreators began to pursue more remote locations for outdoor recreational experiences. With population growth in the region, outdoor recreation use of the public lands is expected to increase. Such an increase would likely lead to heavier use of existing sites as well as the spread of dispersed use into less heavily used areas.

Areas with concentrated recreation use that do not have focused recreation management would experience degradation to natural resources (e.g., soil, vegetation, water quality) and conflicts with resource uses as demand increases and recreation technology changes. It is expected that changes in technology could result in new forms of recreation that are not in existence today and may evolve into major recreation issues during the life of the plan. Use of new recreation technology would need to be consistent with management for Special Recreation Management Areas (SRMAs) in those areas.

Impacts from recreation management actions cumulatively affect tribal rights and interests as well as the following resources and are analyzed in those sections:

- Water Resources
- Fish
- Special Status Fish and Aquatic Invertebrates
- Cultural Resources
- Recreation

Transportation and Travel

Access routes related to range and ROW developments and motorized recreation have increased substantially over the last 20 years. Recently revised travel management plans on adjacent or nearby Federal lands are restricting motorized travel on more Federal land to address a variety of resource concerns. As a result, visitors are discovering travel opportunities in the planning area, where large areas are uncrowded and most of the area is still designated as open to cross-country motorized vehicle use. The changes in travel management plans on adjacent planning units coupled with an increasing human population are expected to result in more travel uses in the planning area over time. Motorized recreational use is expected to be a large component of the expected increased travel use. Travel within the planning area related to permitted or authorized uses as well as for recreational purposes are expected to increase as public land users pursue a variety of uses and activities. The demand for access to BLM-managed lands is expected to continue to pose a risk to water quality in riparian areas and wetlands in the future.

Impacts from transportation and travel management actions cumulatively affect the following resources and resource uses and are analyzed in those sections:

- Soil Resources
- Water Resources
- Upland Vegetation
- Riparian Areas and Wetlands
- Fish
- Wildlife
- Special Status Plants
- Special Status Fish and Aquatic Invertebrates
- Special Status Wildlife
- Noxious Weeds and Invasive Plants
- Paleontological Resources
- Livestock Grazing
- Recreation
- Transportation and Travel

Land Use Authorizations

Land use authorizations include a wide variety of public land uses granted under a ROW, lease, or permit. Historically, there were relatively few ROWs on BLM-managed land in the planning area, but over time the number has increased on BLM-managed land as well as on State and private lands. These include a variety of relatively small-scale uses such as ROWs for roads or powerlines to private residences, pipelines, ditches, canals, and irrigation diversions. ROWs for large-scale land uses include high-voltage transmission lines, power substations, communication sites, irrigation water pumping stations, and airstrips. There currently is one proposal for a high-voltage transmission line in the northern part of the planning area (Gateway West) and two proposals to the north (Mountain States Transmission Intertie [MSTI]) and the east (Southwest Intertie Project [SWIP]) of the planning area.

Existing developments in the planning area include the Williams and Chevron natural gas pipelines and numerous large and small Idaho Power transmission lines. Past utility-related authorizations, particularly transmission lines, have affected soil resources in the northern portion of the analysis area. Past actions affecting future ROWs include planning decisions made for lands within and adjacent to the planning area.

Wind energy development is an increasing use on lands in the planning area. There are two small wind energy projects on private land in the northern part of the planning area along the Snake River, two proposed for construction on private land (near Black Mesa and Fossil Gulch), and one proposal on Federal, State, and private land west of Salmon Falls Reservoir (China Mountain). There also is one approved wind energy development project on public land east of the planning area (Cotterel). Up to 170 wind turbines are proposed for China Mountain wind project. In addition, the project is expected to require approximately 29 miles of improved roads, 41 miles of new roads, and 15 miles of overhead powerlines.

This project would also need one or more sources of gravel, at least one concrete batch plant, maintenance and operation buildings, transfer stations, and a high-voltage transmission line from China Mountain to the existing high-voltage transmission line east of Salmon Falls Creek.

Impacts from land use authorizations cumulatively affect tribal rights and interests as well as the following resources and resource uses and area analyzed in those sections:

- Soil Resources
- Water Resources
- Riparian Areas and Wetlands
- Fish
- Wildlife
- Special Status Fish and Aquatic Invertebrates
- Special Status Wildlife
- Noxious Weeds and Invasive Plants
- Wild Horses
- Paleontological Resources
- Cultural Resources
- Livestock Grazing
- Recreation
- Transportation and Travel
- Land Use Authorizations

Land Tenure

The continued loss of public land through land tenure transactions would diminish tribal rights and interests by impeding or eliminating tribal access and use of disposed lands. Planning documents for BLM-managed lands adjacent to the planning area identify lands that remain available for a variety of land tenure transactions, including sale, exchange, and R&PP lease.

Impacts from land tenure management actions cumulatively affect the following and are analyzed in those sections:

- Tribal Rights and Interests
- Land Tenure

Minerals

A total of 251 oil and gas leases have been issued in the planning area, although no Federal mineral estate in the planning area is currently under lease. Recently, there has been renewed interest in oil and gas and geothermal development. In 2008, a request to offer parcels in the planning area for oil and gas leasing was filed for approximately 58,000 acres in the southeast corner of the planning area. Leasable minerals are a national priority for energy development and are expected to continue to be in demand for future development. If oil and gas or geothermal resources are identified in the planning area that are of producible quantity, additional demands on surface or groundwater resources can be expected.

Salable minerals such as gravel and decorative rock have historically been and are currently obtained from approved sites on the public land. Additional gravel and decorative rock sites are also located on State and private land, which have been and will continue to be used in conjunction with private land activities. Public demands for salable minerals are expected to increase in the future.

Historically, locatable mineral exploration and development occurred in the Jarbidge River Watershed and in portions of the Snake River. There are currently seven active mining claims in the planning area for Bruneau jasper and 12 active claims for gold. Public demand for locatable minerals is expected to increase in the future, although demand in the planning area itself is not likely to increase due to its low potential for occurrence of commercially viable deposits of locatable minerals.

Planning decisions made for lands in and adjacent to the planning area affect future mineral exploration and development.

Impacts from minerals management actions cumulatively affect the following resources and resource uses and are analyzed in those sections:

- Water Resources
- Riparian Areas and Wetlands
- Fish
- Wildlife
- Special Status Fish and Aquatic Invertebrates
- Special Status Wildlife
- Paleontological Resources
- Leasable Minerals
- Salable Minerals
- Locatable Minerals

Assumptions

Several general assumptions were made to facilitate analysis of potential impacts. The assumptions listed below are common to all resources, resource uses, special designations, or social and economic features. Other assumptions specific to particular resources, resource uses, special designations, or social and economic features are identified in those sections.

- The decisions of the RMP apply only to public lands managed by the BLM. They do not apply to inholdings or adjacent private, state, or other lands. Livestock grazing decisions apply to the Saylor Creek Range outside the Exclusive Use Area (EUA).
- BLM will have the funding and workforce to implement the selected alternative. All decisions for the alternatives would be completed as described in Chapter 2.
- The plan would be implemented over the next 15 to 20 years.
- Implementation of actions from any of the RMP alternatives would be in compliance with all valid existing rights, Federal regulations, BLM policies, and other requirements.
- Specific actions to be implemented under the direction of the RMP would be analyzed through the NEPA process, except for the issuance of leases for fluid minerals such as oil, gas, and geothermal resources. The Jarbidge RMP/EIS constitutes NEPA evaluation of fluid mineral leasing in the planning area. No ground-disturbing activities would result directly from the approval of the RMP.
- Because acreages were calculated using GIS technology and rounded, total acreage figures may vary slightly between sections. These variations are negligible and do not affect the analysis.
- Acreage figures and other numbers used in the analyses are approximate projections for comparison and analytic purposes only. Readers should not infer they reflect exact measurements or precise calculations.
- The discussion of impacts is based on the best available data. Knowledge of the planning area and professional judgment, based on observation and analysis of conditions and responses in similar areas, were used to infer environmental impacts where data are limited.
- Climatic patterns observed within the planning area over the past 50 years will continue throughout the life of the plan. The predictions from global climate change models have not been incorporated into the analysis because the models are not able to predict changes at the spatial scale of the planning area or the temporal scale of the RMP.
- Population in the Magic Valley and surrounding areas will continue to increase.
- Demand for recreational activities (both dispersed and concentrated), energy development, salable minerals, vegetation resources, and wildlife use (non-consumptive and consumptive) will increase in the planning area over time.
- Demand for leasable minerals in the planning area is not likely to change from the present as described in the Reasonably Foreseeable Development Scenarios (RFDS; Appendices U and V).
- Demand for locatable minerals in the planning area is not likely to change from present.
- Demand for salable minerals in the planning area is expected to continue, and once salable minerals in existing pits are exhausted, additional pits would be developed. There are currently 1,300 acres within the planning area being used for salable mineral operations of all types. Based on the anticipated demand in the No Action Alternative and Alternatives I, IV, and V, new pits are not

expected to exceed a total of 1,000 acres; even with the higher anticipated demand in Alternatives II and III, new pits are not expected to exceed a total of 2,000 acres under those scenarios.

- In order to analyze impacts in areas where land use authorizations and mineral development is likely to occur, potential development areas were defined. These areas were developed by taking into account areas with the physical characteristics (e.g., wind or mineral potential) and the allocations in Chapter 2 necessary for development. Further discussion on how these areas were created can be found in the *Land Use Authorizations* and *Minerals* sections.

Impact Terminology

Consistent terminology for characterizing impacts is used in this chapter. Qualifying terms referring to the intensity, scope (spatial extent), and duration of impacts will be used. Using the impact indicators as the primary criteria to determine whether beneficial or adverse impacts are predicted, the following terminology is used to characterize impacts.

Impact Types

- **Direct impacts** – Direct impacts occur at the same time and location where a management action or set of management actions take place.
- **Indirect impacts** – Indirect impacts occur later in time or in a different location as a management action or set of management actions, but are still reasonably foreseeable. Indirect effects may include effects related to changes in the pattern of land use, population density, or related effects on air and water and other natural systems, including ecosystems.
- **Cumulative impacts** – Cumulative impacts are impacts on the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes those other actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over time.

Impact Categories

- **Adverse** – The effect results in a decline in a resource, resource use, special designation, or social and economic feature when compared to current conditions or trends. Adverse effects to a resource are those that result in a decrease in the amount, extent, or quality of the resource. Adverse effects to a resource use are those that result in a decrease in the opportunity to engage in the use, either through a reduction in the area available for that use or an increase in the amount of restrictions on that use. Adverse effects to a special designation are those that result in a decrease in the amount, extent, or quality of the values for which the area was designated. Adverse effects to social and economic features result in a decrease in social and economic opportunities. The term “adverse” has a specific legal context with regard to ESA and the regulations for the National Historic Preservation Act of 1966 (NHPA; 36 CFR 800) that is typically used when discussing site-specific projects. The use of the term “adverse” in the Jarbidge RMP/EIS is not synonymous with the definition for either ESA or NHPA.
- **Beneficial** – The effect results in an increase in a resource, resource use, special designation, or social and economic feature when compared to current conditions or trends. Beneficial effects to a resource are those that result in an increase in the amount, extent, or quality of the resource. Beneficial effects to a resource use are those that result in an increase in the opportunity to engage in the use, either through an increase in the area available for that use or a decrease in the amount of restrictions on that use. Beneficial effects to a special designation are those that result in an increase in the amount, extent, or quality of the values for which the area was designated. Beneficial effects to social and economic features result in an increase in social and economic opportunities. Beneficial impacts are also qualified by how well they meet the resource goals and objectives.

Impact Intensity

The general guidelines used for establishing impact intensities are provided below:

- **Minor** – The effect is slight but detectable; there would be a small change (e.g., the impact to air quality from particulate matter generated by a prescribed fire for noxious weed control).

- **Moderate** – The effect is readily apparent; there would be noticeable change (e.g., the impacts to upland vegetation from management actions that result in the conversion of thousands of acres of annual community vegetation to native shrubland).
- **Major** – The effect is large and highly noticeable (e.g., reducing route density throughout the majority of the planning area is expected to have a major beneficial impact to special status wildlife species).

Each impact intensity level described above is not necessarily used in every analysis. Impacts to some resources, resource uses, special designations, and social and economic features do not need, or lend themselves to, all three levels of intensity definitions.

Spatial Extent

Where possible, impacts are characterized by a number of acres and general locations for where the impacts would occur. However, some analyses are more qualitative; for those situations, the following descriptors for the spatial extent of the impacts are used:

- **Localized** – The effect occurs at a specific site or within a relatively small area [e.g., within a specific area in a Vegetation Management Area (VMA)].
- **Extensive** – The effect occurs within a larger area, but not throughout the entire planning area (e.g., within an entire VMA).
- **Area-wide** – The effect occurs throughout all or most of the planning area (e.g., across multiple VMAs). This could include an effect to the majority of acres within the planning area or to a smaller number of acres scattered throughout the planning area.

Temporal Extent

- **Short-term** – The effect occurs for a short time after implementation of a management action. The effective time period is five years or less.
- **Long-term** – The effect occurs for an extended period after implementation of a management action. The effective time period is greater than five years.

4.1.2. Incomplete or Unavailable Information

The Council on Environmental Quality (CEQ) established implementation regulations for NEPA requiring 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 reasoned 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 Jarbidge RMP/EIS. Considerable effort was taken to acquire and convert resource data into the most useful format for the analyses conducted. This information came from BLM and outside sources.

4.1.3. Mitigation

Mitigation measures designed to avoid or reduce impacts are incorporated into the management actions of each alternative, as defined in Chapter 2. There are no separate or additional mitigation measures beyond the actions outlined in the alternatives; therefore, impacts identified in this chapter are unavoidable and would result from implementing the management actions and related mitigation.

4.1.4. Irreversible and Irretrievable Impacts

Section 1502.16 of CEQ regulations requires the discussion of environmental consequences to include a description of "…any irreversible or irretrievable commitment of resources which would be involved in the proposal should it be implemented." An irreversible commitment of resources refers to decisions impacting the use of nonrenewable resources. For example, extraction and processing of sand and gravel as part of an aggregate mining operation is considered an irreversible commitment of salable minerals because once the minerals are extracted and processed, they cannot be renewed within a reasonable timeframe. An irretrievable commitment of resources refers to decisions resulting in the loss of production or use of a resource. For example, a decision not to treat woodlands encroaching into adjacent grassland habitat results in the irretrievable loss of forage production from the grassland community. This action is not irreversible, because once a treatment is applied, the forage production of the grassland is restored.

The decision to select one of the five alternatives described in this Draft RMP/EIS does not constitute an irreversible or irretrievable commitment of resources because the decision does not authorize on-the-ground activities. Instead, decisions made in the selected plan serve to guide future actions and subsequent site-specific decisions. Following the signing of the Record of Decision (ROD) for the RMP, subsequent implementation plans (e.g., activity- or project-specific plans) will be developed and implemented by the BLM. Implementation requires appropriate project-specific planning, NEPA analysis, and BLM's final approval authorizing on-the-ground activities to proceed.

4.2. TRIBAL RIGHTS AND INTERESTS

Analysis Methods

Indicators

The following indicators were used for the analysis of impacts to tribal rights and interests:

- **Conditions of natural resources used by the Shoshone-Paiute Tribes and the Shoshone-Bannock Tribes for food, medicine, or ceremony** – Native plants and animals figure prominently in tribal subsistence economies and traditional medical and spiritual practice.

- **The physical integrity and setting of properties having religious or cultural importance to the tribes** – Many aboriginal archaeological sites, traditional cultural properties, and sacred and ceremonial sites, especially those recalled in oral histories, are important in contemporary tribal culture for the tangible connection they provide to tribal history and ancestral lifeways.

- **Accessibility of BLM-managed lands for the exercise of treaty rights or tribal interests** – Off-reservation rights and interests are generally tied to Federally managed lands. Management actions that affect the quantity, quality, or access to these lands also affect tribal rights and interests.

Methods and Assumptions

The purpose of this analysis is to ensure tribal rights and interests, as reflected in the indicators above, are adequately represented and considered in the selection of alternatives for the Jarbidge RMP. To that end, BLM has sought and obtained input from the Shoshone-Paiute Tribes and the Shoshone-Bannock Tribes through government-to-government consultation on public lands management issues of importance to the tribes.

Impacts to tribal rights and interests are difficult to quantify with precision because the management actions under consideration do not identify specific projects or exact locations where impacts may occur. In addition, tribal members are often reluctant to divulge sensitive information concerning places of religious and cultural importance for fear that exposure would result in impacts to the sanctity of such sites. Nevertheless, sufficient information is available on the types of public land resources used by the tribes, and the potential effects of BLM authorized actions on those resources, to evaluate the impacts of the alternatives on tribal rights and interests at the landscape scale of reference.

For this analysis, the footprints of management actions expected to impact tribal rights and interests are compared to the public land base in the planning area. The impacts to resources important to the tribes in turn impact tribal rights and interests. For that reason, impacts identified in the summary of direct and indirect impacts for each of the following sections was used to analyze impacts to tribal rights and interests instead of the specific management actions contained in those sections:

- *Upland Vegetation*
- *Fish and Wildlife*, including *Special Status Species*
- *Cultural Resources*

Management contained in the *Visual Resources* and *Land Tenure* sections is analyzed in detail as it would have direct and indirect impacts to tribal rights and interests. Management contained in the *Water Resources*, *Noxious Weeds and Invasive Plants*, *Wildland Fire Ecology and Management*, *Recreation*, *Transportation and Travel*, and *Land Use Authorizations* are not analyzed in detail because the effects are captured in the analyses for the sections identified above. Management in the remaining sections is not anticipated to impact resources of importance to the tribes.

The following assumptions were used when analyzing impacts to tribal rights and interests:

- Government-to-government consultation during implementation level planning would identify and address potential impacts to tribal rights and interests at the project level.

- The methods, assumptions, and results of the analyses contained in the *Upland Vegetation*, *Fish and Wildlife*, *Special Status Species*, *Cultural Resources*, *Visual Resources*, and *Land Tenure* sections are adequate and appropriate for use in the analysis of impacts to tribal rights and interests.
- Management actions that maintain or enhance native vegetation and fish and wildlife habitat would protect tribal rights and interests attached to those resources, while actions that degrade or reduce native vegetation or fish and wildlife habitat would diminish tribal rights and interests.
- Management actions that restrict surface development and disturbance generally protect natural and cultural resources associated with tribal rights and interests.

Direct and Indirect Impacts

Impacts from Tribal Rights and Interests Actions

Impacts from Management Specific to the No Action Alternative

The 1987 Jarbidge RMP provides no management actions, goals, or objectives specific to tribal rights and interests.

Impacts from Management Common to All Action Alternatives

Impacts to tribal rights and interests would be reduced, in relation to the No Action Alternative, through government-to-government consultation, consideration of the effects of BLM decisions on resources of importance to the tribes during project planning, protection of the physical integrity of sacred sites and continued tribal access to them, and collaborative management of traditional cultural properties.

Impacts to Tribal Rights and Interests from Impacts to Upland Vegetation

The desired acreage or percent composition of native vegetation (i.e., native grassland and native shrubland communities) and non-native vegetation (i.e., annual, non-native perennial, and non-native understory communities) vary by alternative and would be attained through a variety of treatments and use allocations. Native plant communities provide traditional foods and medicinal plants as well as habitat for large and small game animals of importance to the tribes. Non-native plant communities, including annual grasslands, often out-compete native plants and reduce available habitat for tribally important plants and wildlife. The analysis of upland vegetation communities examines the effects of noxious weeds and invasive plants, wildland fire, livestock grazing, and transportation and travel on native plants. The *Vegetation Communities* section of this chapter contains details concerning the specific indicators, methods, and assumptions used in the analysis.

Native vegetation communities have declined dramatically in southern Idaho since the late 1800s, due in large part to agricultural development; the establishment of cities, towns, and suburbs and their supporting transportation systems; and the effects of wildland fire, noxious weeds, and invasive plants. Livestock grazing has also played a role. In past decades, brush control projects were conducted and non-native seedings were established on public lands to bolster grazing capacity.

Impacts from Changes to Upland Vegetation in the No Action Alternative

Based on the analysis of impacts to vegetation communities, the No Action Alternative would result in the most acreage dominated by invasive annual vegetation and the lowest acreage of native shrubland communities of all the alternatives. This would result in the greatest reduction in habitat for plants and animals of importance to the tribes.

Impacts from Changes to Upland Vegetation in Alternative I

Alternative I would reduce the acreage of annual communities in comparison to the No Action Alternative and Alternative V, but would result in higher levels of annual communities than Alternatives II, III, and IV. Annual communities provide poor habitat for plants and animals of importance to the tribes. The acreage of shrubland communities, which provides favorable habitat for tribally important plants and animals, would be higher under this alternative than Alternatives II, III, and the No Action Alternative, but lower than Alternatives IV and V.

Impacts from Changes to Upland Vegetation in Alternative II

Alternative II would result in lower acreages of annual communities than the No Action Alternative and Alternatives I, III, V, but would also result in lower acreages of shrubland communities than all but the No Action Alternative. Much of the annual community acreage would be converted to non-native perennial grassland communities, which reduces habitat for plants and animals of importance to the tribes.

Impacts from Changes to Upland Vegetation in Alternative III

Alternative III would reduce the acreage of annual communities in comparison to the No Action Alternative and Alternatives I and V, but would result in higher levels of annual communities than Alternatives II and IV. Annual communities provide poor habitat for plants and animals of importance to the tribes. The acreage of shrubland communities, which provides favorable habitat for tribally important plants and animals, would be higher under this alternative than the No Action Alternative and Alternative II, but lower than Alternatives I, IV, and V.

Impacts from Changes to Upland Vegetation in Alternative IV (the Preferred Alternative)

Alternative IV would result in the lowest acreage of annual communities and the highest acreage of shrubland communities of all the alternatives. Management actions under Alternative IV would provide the largest amount of habitat for plants and animals of importance to the tribes.

Impacts from Changes to Upland Vegetation in Alternative V

Alternative V would reduce the acreage of annual communities in comparison to the No Action Alternative, but would result in higher levels of annual communities than Alternatives I, II, III, and IV due to reduced levels of active restoration. Annual communities provide poor habitat for plants and animals of importance to the tribes. The acreage of shrubland communities, which provides favorable habitat for tribally important plants and animals, would be higher under this alternative than the No Action Alternative and Alternatives I, II, and III, but lower than Alternative IV.

Impacts to Tribal Rights and Interests from Impacts to Fish, Wildlife, and Special Status Species

Hunting and fishing continue to play important roles in the overall subsistence strategy for many tribal members. BLM actions that affect fish and wildlife habitat also affect tribal rights and interests. The fish and wildlife analyses examine the effects of management associated with vegetation communities, water resources, noxious weeds and invasive plants, wildland fire ecology and management, livestock grazing, recreation, transportation and travel, land use authorizations, minerals, and Areas of Critical Environmental Concern (ACECs) on general fish and wildlife habitats. Refer to the *Fish and Wildlife* section for details concerning the specific indicators, methods, and assumptions used in those analyses.

Increased human use for commercial purposes and recreation, including cross-country motorized travel, has resulted in fragmented and degraded habitat for many plants and animals. The overall result has been a reduction in the quality and quantity of habitat available for tribally important plant and animal species over time.

Although all native plants and animals have a role in maintaining general ecological and spiritual health for the tribes, the status of some species is elevated by the primary role they play or played in traditional cultural and religious practices. In the planning area, two such species, Greater sage-grouse (sage-grouse) and bighorn sheep, are also on BLM's list of special status species. The analysis of impacts to the habitats of these species includes management actions associated with water resources, vegetation communities, noxious weeds and invasive plants, wildland fire, livestock grazing, recreation, transportation and travel, land use authorizations, land tenure, minerals, and ACECs. Refer to the *Special Status Species* section for details concerning the specific indicators, methods, and assumptions used in those analyses.

Impacts from Changes to Fish, Wildlife, and Special Status Species in the No Action Alternative

Based on the analyses in the *Fish* and *Special Status Fish and Aquatic Invertebrates s*ections, the No Action Alternative, along with Alternative II, would have the highest risk of impacts to the habitat for fish and special status aquatic species of all the alternatives. Analyses in the *Wildlife* and *Special Status Wildlife* sections indicate the No Action Alternative would result in a decline in habitat conditions for wildlife and special status wildlife compared to Alternatives I, III, IV, and V, but would be less impacting than Alternative II.

Based on these findings, the No Action Alternative would offer less protection for tribally important fish and wildlife resources, including sage-grouse and bighorn sheep, than all the alternatives except Alternative II.

Impacts from Changes to Fish, Wildlife, and Special Status Species in Alternative I

Alternative I would decrease the risk of impacts to fish and special status aquatic species compared to the No Action Alternative and Alternatives II and III, but would incur more risk of impacts than Alternatives IV and V. In addition, implementation of Alternative I would result in a minor decline in habitat conditions for wildlife and special status wildlife compared to Alternatives IV and V, but would provide less risk of habitat decline than the No Action Alternative and Alternatives II and III.

Overall, Alternative I would provide more protection for tribally important fish and wildlife resources than the No Action Alternative and Alternatives II and III, but less than Alternatives IV and V.

Impacts from Changes to Fish, Wildlife, and Special Status Species in Alternative II

Alternative II, along with the No Action Alternative, would have the highest risk of impacts to fish and special status aquatic species. The wildlife analyses indicate Alternative II would result in more decline in habitat conditions for wildlife and special status wildlife than any of the other alternatives.

Based on these findings, Alternative II would offer less protection for tribally important fish and wildlife resources, including sage-grouse and bighorn sheep, than all the other alternatives.

Impacts from Changes to Fish, Wildlife, and Special Status Species in Alternative III

Alternative III would decrease the risk of impacts to fish and special status aquatic species compared to the No Action Alternative and Alternative II, but would incur more risk of impacts than Alternatives I, IV, and V. In addition, implementation of Alternative III would result in a decline in habitat conditions for wildlife and special status wildlife compared to Alternates I, IV, and V, but would provide less risk of habitat decline than the No Action Alternative and Alternative II.

Overall, Alternative III would provide more protection for tribally important fish and wildlife resources than the No Action Alternative and Alternative II, but less than Alternatives I, IV, and V.

Impacts from Changes to Fish, Wildlife, and Special Status Species in Alternative IV (the Preferred Alternative)

Alternative IV-A would decrease the risk of impacts to fish and special status aquatic species compared to the No Action Alternative and Alternatives I, II, and III, but would incur slightly more risk of impacts than Alternatives IV-B (the Preferred Alternative) and V. In addition, implementation of Alternative IV-A would result in fewer impacts to habitat conditions for wildlife and special status wildlife than any of the other alternatives.

Alternative IV-B would decrease the risk of impacts to fish and special status aquatic species compared to the No Action Alternative and Alternatives I, II, III, and IV-A, but would incur slightly more risk of impacts than Alternative V. In addition, implementation of Alternative IV-B would result in fewer impacts to habitat conditions for wildlife and special status wildlife than the No Action Alternative and Alternatives I, II, III, and V, but slightly more impacts than Alternative IV-A.

Overall, Alternative IV-A would provide more protection for tribally important fish and wildlife resources than the No Action Alternative and Alternatives I, II, and III, and about the same as Alternative IV-B. Alternative IV-B would provide more protection for tribally important fish and wildlife resources than the No Action Alternative and Alternatives I, II, and III. Alternative IV-B would result in less favorable habitat conditions for fish and more favorable habitat conditions for wildlife than Alternative V but slightly less favorable conditions than Alternative IV-A.

Impacts from Changes to Fish, Wildlife, and Special Status Species in Alternative V

Alternative V would result in the least risk of impacts to fish and special status aquatic species compared to all the other alternatives. In addition, implementation of Alternative V would result in more improvement in habitat conditions for wildlife and special status wildlife than the No Action Alternative and Alternatives I, II, and III, but would provide less improvement than Alternative IV.

Overall, Alternative V would provide more protection for tribally important fish and wildlife resources than the No Action Alternative and Alternatives I, II, and III. Alternative V would result in the most favorable habitat conditions for fish of all the alternatives but more slightly less favorable habitat conditions for wildlife than Alternative IV.

Impacts to Tribal Rights and Interests from Impacts to Cultural Resources

Many of the same forces that impact tribally important natural resources also affect places of religious and cultural importance to the tribes. Prior to 1966 and passage of NHPA, cultural resources were rarely considered during Federal undertakings, and it was only in the 1990s, after amendments to NHPA and issuance of the Executive Memorandum of April 29, 1994, on Government-to-Government Relations with Native American Tribal Governments, Executive Order 13007 on sacred sites, and Executive Order 13175 on consultation and coordination with tribal governments, that tribal input was systematically sought to inform BLM decisions regarding effects to places of traditional religious and cultural importance to the tribes. Requirements to consider effects to traditional cultural properties and sacred sites apply only to Federal lands or Federally funded projects. Legal protections for cultural resources on State and private lands are less restrictive.

The management of traditional cultural properties and sacred sites, which may or may not include archaeological remains, is of great importance to the Shoshone-Paiute Tribes and the Shoshone-Bannock Tribes. Unlike sites of purely archaeological or historical interest, effects to traditional cultural properties and sacred sites cannot be mitigated through the recovery of scientific information. Potential physical and visual impacts to cultural resources from wildland fire, visual resource management, livestock grazing, recreation, transportation and travel, land use authorizations, and ACECs are analyzed in the *Cultural Resources* section, which details the specific indicators, methods, and assumptions used in the analysis.

Impacts from Changes to Cultural Resources in the No Action Alternative

Management associated with the No Action Alternative has a greater potential to impact the integrity of properties having religious or cultural importance to the tribes than all the alternatives except Alternative II.

Impacts from Changes to Cultural Resources in Alternative I

Alternative I management allocations and actions would have a lower potential to impact places of religious and cultural importance to the tribes than the No Action Alternative and Alternatives II and III, but would have a higher potential than Alternatives IV and V.

Impacts from Changes to Cultural Resources in Alternative II

Management allocations and actions in Alternative II would have the greatest potential to impact places of religious and cultural importance to the tribes of all the alternatives.

Impacts from Changes to Cultural Resources in Alternative III

Alternative III management allocations and actions would have a lower potential to impact places of religious and cultural importance to the tribes than the No Action Alternative and Alternative II, but would have a higher potential than Alternatives I, IV, and V.

Impacts from Changes to Cultural Resources in Alternative IV (the Preferred Alternative)

Management associated with Alternative IV-A would have a lower potential to impact places of religious and cultural importance to the tribes than the No Action Alternative and Alternatives I, II, III, and IV-B (the Preferred Alternative), but a higher potential than Alternative V.

Alternative IV-B allocations and actions would have a lower potential to impact places of religious and cultural importance to the tribes than the No Action Alternative and Alternatives I, II, and III, but a higher potential than Alternatives IV-A and V.

Impacts from Changes to Cultural Resources in Alternative V

Management allocations and actions in Alternative V would have the lowest potential to impact places of religious and cultural importance to the tribes of any of the alternatives.

Impacts from Visual Resources Management Actions

The tribes value visual resources for more than their aesthetic qualities; spiritual value is also important, especially for viewsheds associated with sacred sites. The natural or undisturbed quality of the viewshed is the key component of some important tribal ceremonies. Military over-flights from jet aircraft using USAF facilities at Saylor Creek Range and Juniper Butte Range are the primary source of noise impacts affecting traditional religious practices and ceremonies in the southwestern portion of the analysis area. Also, because natural landscapes are a critical component of many ceremonial sites, existing and proposed developments that disrupt the natural continuity of the viewshed would diminish the overall availability of suitable locations for traditional religious ceremonies.

Visual resource management (VRM) allocations that may affect the setting of places of religious or cultural importance to the tribes are analyzed by comparing the VRM Classes for each alternative against a landscape model of resources of importance to the tribes. The model includes key sage-grouse habitat, active sage-grouse leks, big game winter range, prominent buttes and ridges, all fish-bearing streams, springs, and the high cultural resource density zone as defined in the *Cultural Resources* section of Chapter 3. Table 4- 1 summarizes the impacts of VRM allocations and actions to tribal rights and interests.

Table 4- 1. VRM Allocations in Tribally Important Viewsheds by Alternative (Acres)

<table>
<tr><th rowspan="3">VRM Class</th><th colspan="7">Alternative</th></tr>
<tr><th rowspan="2">No Action</th><th rowspan="2">I</th><th rowspan="2">II</th><th rowspan="2">III</th><th colspan="2">IV</th><th rowspan="2">V</th></tr>
<tr><th>IV-A</th><th>IV-B</th></tr>
<tr><td>I</td><td>108,000</td><td>125,000</td><td>97,000</td><td>97,000</td><td colspan="2">123,000</td><td>98,000</td></tr>
<tr><td>II</td><td>109,000</td><td>175,000</td><td>5,000</td><td>5,000</td><td colspan="2">64,000</td><td>262,000</td></tr>
<tr><td>III</td><td>266,000</td><td>89,000</td><td>16,000</td><td>282,000</td><td>287,000</td><td>266,000</td><td>435,000</td></tr>
<tr><td>IV</td><td>383,000</td><td>478,000</td><td>748,000</td><td>482,000</td><td>393,000</td><td>414,000</td><td>71,000</td></tr>
</table>

Impacts from Management Specific to the No Action Alternative

The No Action Alternative would manage approximately 12% of lands associated with tribally important resources as VRM Class I, 13% as VRM Class II, 31% as VRM Class III, and 44% as VRM Class IV. With approximately 25% of these lands in the more restrictive VRM classes, this would result in fewer impacts to tribally important viewsheds than Alternatives II, III, and IV, but more than Alternatives I and V.

Impacts from Management Specific to Alternative I

Under Alternative I, over 14% of lands associated with tribally important resources would be managed as VRM Class I, 20% as VRM Class II, 10% as VRM Class III, and 55% as VRM Class IV. With approximately 35% of lands in the more restrictive VRM classes, Alternative I would result in fewer impacts to tribally important viewsheds than the No Action Alternative and Alternatives II, III, and IV, but more than Alternative V.

Impacts from Management Specific to Alternative II

Alternative II would manage approximately 11% of lands associated with tribally important resources as VRM Class I, less than 1% as VRM Class II, 2% as VRM Class III, and 86% as VRM Class IV. This alternative, along with Alternative III, places the fewest acres in the more restrictive VRM classes and the most, by far, in the least restrictive VRM class. Alternative II would pose the greatest risk of impacts to tribally important viewsheds of all the alternatives.

Impacts from Management Specific to Alternative III

Alternative III would manage approximately 11% of lands associated with tribally important resources as VRM Class I, less than 1% as VRM Class II, 33% as VRM Class III, and 55% as VRM Class IV. Along with Alternative II, this alternative allocates the least area to the most restrictive VRM classes. Alternative III would result in more impacts to tribally important viewsheds than the No Action Alternative and Alternatives I, IV, and V. Because it places substantially less land under the least restrictive VRM Class IV management, it would result in fewer impacts to tribally important viewsheds than Alternative II.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV would each manage approximately 14% of lands associated with tribally important resources as VRM Class I and 7% as VRM Class II. Alternative IV-A would manage 33% as VRM Class III and 45% as VRM Class IV, while Alternative IV-B (the Preferred Alternative) would manage 31% as VRM Class III and 48% as VRM Class IV. With approximately 22% of these lands in the more restrictive management classes, these alternatives would result in fewer impacts to tribally important viewsheds than Alternatives II and III, but more than the No Action Alternative and Alternatives I and V. Alternative IV-A would place fewer acres in the least restrictive VRM class than Alternative IV-B, posing the least risk of impacting tribally important viewsheds of the two alternatives.

Impacts from Management Specific to Alternative V

Alternative V would manage just over 11% of lands associated with tribally important resources as VRM Class I areas, just over 30% as VRM Class II, 50% as VRM Class III, and only 8% as VRM Class IV. With approximately 42% of these lands in the more restrictive VRM classes and the fewest acres allocated to VRM Class IV, Alternative V would result in fewer impacts to tribally important viewsheds than any of the alternatives.

Impacts from Land Tenure

Land tenure management has the greatest potential to impact tribal rights and interests because treaty rights and trust responsibilities are linked to Federal land ownership; the disposal of public land diminishes the land base available for tribal members to exercise off-reservation treaty rights and may decrease access to other public lands. Many resources of importance to the tribes passed from Federal to private ownership under a series of property laws including the Homestead Act of 1862, the Desert Land Act of 1877 (DLE), and the Carey Act of 1894 (CA). Over the last 140 years, the Federal government has transferred hundreds of thousands of acres of public land, once available for tribal use, to State and private ownership.

Along with the land went the natural and cultural resources they contained. Euro-American reliance on agriculture and water for irrigation resulted in the acquisition of many sites traditionally used by the tribes including prime fishing locations, hot springs, and winter campgrounds along the Snake River. Land tenure adjustments in the planning area over the last 20 years have been relatively minor, resulting in a net loss of approximately 4,000 acres of Federal land. Still, past land disposals have had the greatest effect on tribal rights and interests of any Federal actions, other than military.

For this analysis, the land tenure allocations for retention, exchange, and sale in each alternative are compared to the existing public land base. Table 4- 2 summarizes the impacts of land tenure actions on tribal rights and interests.

Table 4- 2. Land Tenure Zone Allocations by Alternative (Acres)

Land Tenure Zone [A]	Alternative					
	No Action	I	II	III	IV	V
Zone 1 (Retention)	1,302,000	1,109,000	953,000	1,109,000	1,129,000	1,279,000
Zone 2 (Potential for Exchange or R&PP Lease)	3,000	244,000	374,000	244,000	229,000	95,000
Zone 3 (Potential for Sale, Exchange, or R&PP Lease)	69,000	20,000	46,000	20,000	16,000	0

[A] Zone 1 includes No Action retention lands; Zone 2 includes No Action Zone T3; and Zone 3 includes No Action Zones T1, T2, and T4.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative would allocate less than 1% of the planning area to Land Tenure Zones T1 (sale only), T2 (sale or exchange), and T3 (exchange only), and 5% to Zone T4 (available for agricultural disposal). As a result, just over 5% of the public lands in the planning area would be available for disposal or transfer out of Federal ownership. Although the No Action Alternative has the most acres in the retention category, just under 95% or the planning area, it also makes the most acres available for outright sale or disposal under DLE and CA. In addition, the No Action Alternative is silent concerning tribal rights and interests while the action alternatives would make tribal interests a priority when considering disposals and acquisitions.

Impacts from Management Common to All Action Alternatives

Criteria for retention and acquisition under all action alternatives include lands specifically identified by the tribes as having special importance to tribal rights and interests. In addition, new applications for disposal of land through DLE or CA programs would not be accepted. These actions would reduce potential impacts to tribal rights and interests in comparison to the No Action Alternative.

Impacts from Management Specific to Alternatives I and III

Under Alternatives I and III, 81% of the planning area would be in Zone 1, 18% would be in Zone 2, and 1% would be Zone 3. Based on the amount of land available for disposal, Alternatives I and III would have more potential to impact tribal rights and interests than Alternatives IV and V and less potential than the No Action Alternative and Alternative II. Although the No Action Alternative has more land in the retention category, it also has substantially more land in the potential sale category.

Impacts from Management Specific to Alternative II

Alternative II would place just over 69% of public lands in Zone 1, while 27% would be in Zone 2, and just over 3% would be in Zone 3. This alternative would make more acres available for disposal than any of the alternatives and, in that sense, has the most potential to impact tribal rights and interests.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV would place 82% of public lands in Zone 1, while 17% would be in Zone 2, and 1% would be in Zone 3. This alternative would make less land available for disposal than Alternatives I, II, and III but more than the No Action Alternative and Alternative V. Alternative IV would have less potential to impact tribal rights and interests than any of the alternatives except Alternative V.

Impacts from Management Specific to Alternative V

Alternative V would place 93% of the planning area in Zone 1, while 7% would be in Zone 2. No lands would be in Zone 3. By retaining more public land and prioritizing tribal input in retention and acquisition criteria, this alternative would have the least potential to impact tribal rights and interests.

Summary of Direct and Indirect Impacts

Table 4- 3 summarizes the effects of the alternatives on tribal rights and interests. The ratings are based on the analyses summarized above. A rating of 1 indicates the lowest potential for impacts while a 7

indicates the highest potential for impacts. Ratings are for comparison purposes only and are not meant to be additive by alternative.

Table 4- 3. Summary of Impacts to Tribal Rights and Interests

Indicator	Alternatives						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
Impacts to Natural Resource Base							
Upland Vegetation	6	3	5	4	1	1	2
Fish	6	4	7	5	3	2	1
Wildlife	6	4	7	5	1	2	3
Impacts to Places of Religious and Cultural Importance							
Cultural Resources	6	4	7	5	2	3	1
Visual Resources	3	2	7	6	4	5	1
Impacts to Treaty Rights and Access							
Land Tenure	4	3	5	3	2	2	1

Impacts from the No Action Alternative

Overall, only Alternative II would result in more impacts to tribal rights and interests than the No Action Alternative. These impacts would be moderate and adverse.

The No Action Alternative would pose a higher risk of impacts to native upland vegetation of any of the alternatives and would be second only to Alternative II in impacts to fish and wildlife habitat. As a result, the No Action Alternative, along with Alternative II, would have more impact on the natural resource base used by the tribes than Alternatives I, III, IV, and V.

The cultural resources analysis indicates the No Action Alternative would result in more impacts to the physical integrity of cultural resources than any of the alternatives except Alternative II. The visual resources analysis concludes the No Action Alternative would result in fewer impacts to tribally important viewsheds than Alternatives II, III, and IV, but more than Alternatives I and V. The No Action Alternative would have a high risk for physical impacts but a moderate risk for visual impacts to properties having religious or cultural importance to the tribes.

The land tenure analysis indicates the No Action Alternative would pose greater risks to the future exercise of treaty rights and tribal interests, through potential disposal of public land, than all the alternatives except Alternative II.

Impacts from Alternative I

Overall, Alternative I would result in more impacts to tribal rights and interests than Alternatives IV and V, but less than the No Action Alternative and Alternatives II and III. These impacts would be minor, but adverse.

Alternative I would pose a higher risk of impacts to native upland vegetation than Alternatives IV and V, but would have a lower risk than the No Action Alternative and Alternatives II and III. Impacts to fish and wildlife habitat under Alternative I would be more than Alternatives IV and V, but less than the No Action Alternative and Alternatives II and III. As a result, Alternative I would have a moderate impact on the natural resource base used by the tribes.

The cultural resources analysis indicates Alternative I would result in more impacts to the physical integrity of cultural resources than Alternatives IV and V, but less than the No Action Alternative and Alternatives II and III. The visual resources analysis concludes Alternative I would result in fewer impacts to tribally important viewsheds than the No Action Alternative and Alternatives II, III, and IV, but more than Alternative V. Alternative I, then, would have a moderate risk for physical impacts but a low risk for visual impacts to properties having religious or cultural importance to the tribes.

The land tenure analysis indicates Alternative I would pose greater risks to the future exercise of treaty rights and tribal interests, through potential disposal of public land, than Alternatives IV and V, the same risks as Alternative III, and fewer risks than the No Action Alternative and Alternatives II.

Impacts from Alternative II

Overall, Alternative II would result in more impacts to tribal rights and interests than any of the alternatives. These impacts would be moderate and adverse.

Only the No Action Alternative would pose a higher risk of impacts to native upland vegetation than Alternative II. In addition, Alternative II would result in more impacts to fish and wildlife habitat than any of the alternatives. As a result, Alternative II, along with the No Action Alternative, would have more impact on the natural resource base used by the tribes than Alternatives I, III, IV, and V.

The cultural resources and visual resources analyses indicate Alternative II would result in more impacts to the physical integrity of cultural resources and to tribally important viewsheds than any of the other alternatives. Alternative II, then, would have the highest risk for physical and visual impacts to properties having religious or cultural importance to the tribes.

The land tenure analysis indicates Alternative II would pose greater risks to the future exercise of treaty rights and tribal interests, through potential disposal of public land, than any of the other alternatives.

Impacts from Alternative III

Overall, Alternative III would result in more impacts to tribal rights and interests than Alternatives I, IV, and V, but fewer than the No Action Alternative and Alternative II. These impacts would be minor, but adverse.

Alternative III would pose a higher risk of impacts to native upland than Alternatives I, IV, and V, but would have a lower risk than the No Action Alternative and Alternative II. Impacts to fish and wildlife habitat under Alternative III would be more than Alternatives I, IV, and V, but less than the No Action Alternative and Alternative II. As a result, Alternative III, in relation to the other alternatives, would have a moderately large impact on the natural resource base used by the tribes.

The cultural resources analysis indicates Alternative III would result in more impacts to the physical integrity of cultural resources than Alternatives I, IV, and V, but less than the No Action Alternative and Alternative II. The visual resources analysis concludes Alternative III would result in fewer impacts to tribally important viewsheds than the No Action Alternative, but more than Alternatives I, IV, and V. Alternative III, then, would have a moderately high risk for physical impacts and a high risk for visual impacts to properties having religious or cultural importance to the tribes.

The land tenure analysis indicates Alternative III would pose greater risks to the future exercise of treaty rights and tribal interests, through potential disposal of public land, than Alternatives IV and V, the same risk as Alternative I, and fewer risks than the No Action Alternative and Alternative II.

Impacts from Alternative IV (the Preferred Alternative)

Overall, Alternative IV would result in more impacts to tribal rights and interests than Alternative V, but less than the No Action Alternative and Alternatives I, II, and III. These impacts would be minor and beneficial.

Alternatives IV would pose the least risk of impacts to native upland vegetation of any of the alternatives. Impacts to fish habitat under Alternative IV-A would be higher than Alternatives IV-B (the Preferred Alternative) and V, but lower than all the other alternatives; impacts to fish under Alternative IV-B would be less than all the alternatives except Alternative V. Impacts to wildlife habitat under Alternative IV-A would be less than any of the other alternatives, while impacts under Alternative IV-B would be lower than all but Alternative IV-A. As a result, Alternative IV, along with Alternative V, would have the lowest impacts on the natural resource base used by the tribes.

The cultural resources analysis indicates Alternative IV-A would result in fewer impacts to the physical integrity of cultural resources than any of the alternatives except Alternative V, while Alternative IV-B would have the third fewest impacts. The visual resources analysis concludes Alternative IV-A would result in fewer impacts to tribally important viewsheds than Alternatives II, III, and IV-B, but more than the No Action Alternative and Alternatives I and V. Alternative IV-B would result in fewer visual impacts than Alternatives II and III, but more than the other alternatives. Alternative IV would have a low risk for physical impacts but a moderate risk for visual impacts to properties having religious or cultural importance to the tribes.

The land tenure analysis indicates Alternative IV would pose greater risks to the future exercise of treaty rights and tribal interests, through potential disposal of public land, than Alternative V, but fewer risks than the No Action Alternative and Alternatives I, II, and III.

Impacts from Alternative V

Overall, Alternative V would result in fewer impacts to tribal rights and interests than any of the alternatives. These impacts would be minor and beneficial.

Alternative V would pose a higher risk of impacts to native upland vegetation than Alternative IV-A, but less risk than the other alternatives. It would also result in the most potential for improvement in fish and fish habitat of all the alternatives. Impacts to wildlife habitat under Alternative V would be more than Alternative IV, but less than the No Action Alternative and Alternatives I, II, and III. As a result, Alternative V would have a low impact on the natural resource base used by the tribes.

The cultural resources analysis indicates Alternative V would result in the lowest level of impacts to the physical integrity of cultural resources of all the alternatives. The visual resources analysis concludes Alternative V would result in fewer impacts to tribally important viewsheds than any of the alternatives. Alternative V, then, would have the lowest risk for physical and visual impacts to properties having religious or cultural importance to the tribes.

The land tenure analysis indicates Alternative V would pose the least risk to the future exercise of treaty rights and tribal interests, through potential disposal of public land, of all the alternatives.

Cumulative Impacts

Past, Present, and Reasonably Foreseeable Actions

The analysis area for cumulative impacts to tribal rights and interests includes the planning area and surrounding portions of southern Idaho and northern Nevada. This section examines the effects of additive and interactive impacts that result when human activities are repeated over time and space.

Past, present, and reasonably foreseeable actions for the following resource uses cumulatively affect tribal rights and interests:

- Recreation
- Transportation and Travel
- Land Use Authorizations

These actions are described in detail in the *Introduction* to this chapter.

Summary of Cumulative Impacts

Cumulative Impacts for the No Action Alternative

Demands for use of public lands for energy development, recreation, and mineral materials are expected to increase with population growth in the region. With the additional expectation that travel management allocations for surrounding BLM offices will limit cross-country motorized vehicle use to relatively small play areas, such use in the planning area would likely increase due to the large open areas under the No Action Alternative. Energy corridors and wind energy developments would be likely to impact Federal, State, and private lands throughout the analysis area, thereby increasing impacts to native vegetation, fish and wildlife, traditional religious sites and associated viewsheds. This is true for all the alternatives.

In terms of cumulative impacts, the primary effect on tribal rights and interests would be the expected increase in cross-country motorized vehicle use. Such use would increase impacts to wildlife habitat and to places of religious and cultural importance to the tribes.

Cumulative Impacts from Alternatives I, III, and IV

With greater restrictions on cross-country motorized vehicle use under these Alternatives, motorized recreators may turn to State lands within the planning area or to adjacent public lands with fewer restrictions. Cumulative impacts from such use would probably be short lived since adjacent public lands either have already adopted restrictive travel plans or, due to National BLM policy, will soon move in that direction. Also, restrictions on the locations of wind energy developments may result in more use of suitable State and private lands or adjacent public lands with fewer restrictions.

With the above exceptions, implementation of Alternatives I, III, and IV is not expected to affect Federal, State, or private lands in the analysis area.

Cumulative Impacts from Alternative II

Alternative II would have the fewest restrictions on commercial use and development and could accommodate larger-scale wind energy projects or other commercial developments than the other alternatives. Large-scale developments that include combinations of Federal, State, and private lands are more likely under this alternative. This alternative also has the most potential to adversely affect tribal rights and interests through future reductions in the public land base related to land tenure transactions. The combination of direct, indirect, and cumulative impacts is expected to be highest under Alternative II.

Cumulative Impacts from Alternative V

Alternative V would place the most restrictions on land tenure transactions, commercial development and livestock grazing of all the alternatives. These restrictions could lead to increased developments on State and private lands, but tribal rights and interests are not attached to those lands. Although demands for public lands would continue throughout the region, cumulative impacts to tribal rights and interests should be lowest under this alternative.

4.3. RESOURCES

4.3.1. Air and Atmospheric Values

4.3.1.1. Air Quality

Analysis Methods

Indicators

The following impact indicator was used for the analysis of impacts to air quality:

- **The amount of particulate matter ($PM_{2.5}$ and PM_{10}) in the air** – The amount of particulate matter is a measurable indicator of whether the National Ambient Air Quality Standards (NAAQS) and Idaho Department of Environmental Quality (DEQ) air quality standards are met. Particulate matter consists of tiny particles of solid or liquid suspended in the air. $PM_{2.5}$ and PM_{10} are particles with diameters of 2.5 microns or less or 10 micron or less, respectively, and are two pollutants regulated by NAAQS. Other pollutants regulated by NAAQS such as sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, and lead (40 CFR Part 50) do not currently occur at measurable levels in the planning area. These pollutants are not predicted to be generated in substantial quantities from management actions. The planning area is currently in an attainment area for particulate matter (DEQ, 2008).

Methods and Assumptions

The primary air quality concerns in the planning area include smoke from wildland and prescribed fires and dust generation from activities associated with transportation and travel management and surface-disturbing vegetation treatments. **Impacts to air quality** from management in the following sections of Chapter 2 were analyzed in detail: *Air and Atmospheric Values*, *Upland Vegetation*, *Noxious Weeds and Invasive Plants*, *Wildland Fire Ecology and Management*, and *Transportation and Travel*. Impacts from management in the *Recreation* section were not analyzed in detail because the impacts were captured in the analysis of travel and transportation actions. Management from the remaining sections was not analyzed in detail because the management did not vary measurably between alternatives or impact the indicator for air quality.

Vegetation Communities/Noxious Weeds and Invasive Plant Species

Vegetation treatments using prescribed fire generate particulate matter. The total amount of particulate matter produced through prescribed fire is directly related to the total acres of vegetation treatments implemented under each alternative using prescribed fire. Total potential acres treated with prescribed fire were estimated for each alternative. Prescribed fire may be used as a tool with the following:

- Treatments in the Annual Vegetation Sub-Group (VSG)
- Treatments in the Non-Native Perennial VSG directed towards restoring Native Grassland VSG or Native Shrubland VSG
- Treatments in the Non-Native Understory VSG directed towards restoring Native Grassland VSG or Native Shrubland VSG or resulting in Non-Native Perennial VSG
- Fuel-break treatments in any VSG that results in unvegetated acres or Non-Native Perennial VSG

Total particulate matter emissions were calculated using a smoke modeling program[1] to determine rate of emissions. Emission rates were calculated based on vegetation type and the corresponding fuel model.

Particulate matter may also be produced through surface-disturbing mechanical treatments. The total amount of potential particulate matter produced from surface-disturbing mechanical treatments is directly related to the total acres of vegetation treatments implemented under each alternative that may use

[1] Simple Approach Smoke Estimation Model, Version 4.1.0 (Breyfogle & Ferguson, 1996; Sestak, 2002; Sestak & Riebau, 1988).

mechanical methods as a tool. Total potential acres treated by mechanical methods were estimated for each alternative. Any vegetation treatment that results in a change in VSG may include mechanical treatments as a tool.

Wildland Fire Ecology and Management

Vegetation treatments implemented through wildland fire ecology and management actions are addressed through the analysis of mechanical treatments and prescribed fire treatments under *Impacts from Upland Vegetation Actions* and *Impacts from Noxious Weeds and Invasive Species Actions* as the impacts from these actions would be the same.

Wildland fires are an integral part of ecosystem function, but air pollutants emitted by those fires can degrade air quality and cause human health effects and create regional haze impacts. Characterization of the effects of fires on ambient air quality is incomplete and difficult to quantify due to the lack of air monitoring stations in rural areas. Smoke plumes may degrade air quality locally during the period of time of smoke emission and several hours after combustion has ceased. These short-lived effects would likely be a nuisance, but may affect health and may result in localized violations of NAAQS. Smoke-related violations of the NAAQS are based on 24-hour and yearly averages and may not be a regulatory issue (USDA, 2002). Assumptions for the analysis of impacts to air quality from wildland fire ecology and management actions include the following:

- Particulate matter generated from wildland fire smoke is directly related to the size and frequency of wildland fires.
- Alternatives in which Fire Regime Condition Class (FRCC) is closest to the desired level (FRCC 1) would have less frequent fires. Successional Class (S-Class) similarity is used to correlate the potential for frequency of wildland fires.

Transportation and Travel Management

Vehicles traveling on dry, unpaved roads and trails generate fugitive dust, including particulate matter. A recent study indicates most of the particulate matter generated from motorized vehicles were in size classes greater than 2.5 microns and traveled less than 50 meters away from the point of generation. This observation is specific to soil conditions, weather, and vehicle types. The studies determined that spikes in particulate matter in excess of the NAAQS standard (150 micrograms per cubic meter [$\mu g/m^3$]) were common when vehicles were passing particulate monitoring stations (Padgett, et al., 2007).

Generation of particulate matter from vehicles travelling cross country can be predicted by the presence and size of areas designated as open to cross-country motorized vehicle use, limited to existing or designated routes or ways, or closed to motorized vehicle use. Assumptions for the analysis of impacts to air quality from transportation and travel management include the following:

- Areas open to cross-country motorized vehicle use would experience the highest levels of particulate matter with the particulate matter being more concentrated in open areas of smaller size.
- Areas open to cross-country motorized vehicle use would have an increased potential for particulate matter generated through wind erosion.
- Areas limited to existing or designated routes would experience particulate matter generation, but the effects would be spatially limited to approximately 50 feet from the route.
- Areas closed to motorized vehicle use would not experience impacts to air quality from motorized vehicle use.

Direct and Indirect Impacts

Impacts from Air Quality Actions

Impacts from Management Specific to the No Action Alternative

Federal and State air quality standards for $PM_{2.5}$ and PM_{10} would continue to be met, and the planning area would continue to be managed as a Class II Airshed. Impacts to adjacent areas sensitive to air quality would not be addressed.

Impacts from Management Common to All Action Alternatives

Similar to the No Action Alternative, Federal and State air quality standards for $PM_{2.5}$ and PM_{10} would continue to be met, and the planning area would continue to be managed as a Class II Airshed. In the action alternatives, impacts to adjacent areas sensitive to air quality would be addressed.

Impacts from Upland Vegetation Actions

Vegetation treatments that generate particulate matter impact air quality. Prescribed fire as a tool for vegetation treatments would produce smoke, which is a source of particulate matter. Vegetation treatments that use surface-disturbing mechanical methods may impact air quality by increasing the potential for particulate matter generated from wind erosion of the disturbed soil.

Impacts from Management Specific to the No Action Alternative

Prescribed fire would be allowed under the No Action Alternative as a tool for vegetation treatments. Particulate matter produced from prescribed fires would impact air quality and could exceed NAAQS for particulate matter during smoke production and several hours after burning ceases. The planning area usually experiences strong transport winds that tend to clear smoke from the area quickly; as a result, there would be little impact from prescribed fire smoke beyond a single burning period or day.

Mechanical treatments would continue to occur within the planning area. Surface-disturbing mechanical treatments may increase the potential for wind erosion until precipitation is of a duration and quantity to stabilize the soil or until vegetation growth stabilizes the soil. Since mechanical treatments are usually implemented in the fall, this period could be from one to six months or until early spring. The potential increase in wind erosion could result in an increase in particulate matter from wind-blown dust.

Impacts from Management Specific to Alternative I

Prescribed fire would not be allowed under Alternative I; therefore, no impacts to air quality from prescribed fire would occur. As a result, there would be no emissions of $PM_{2.5}$ and PM_{10} that would be produced through utilizing prescribed fire, resulting in less emission than any other alternative.

Mechanical treatments would potentially occur on 350,000 acres. Most mechanical treatments would occur during times with relatively high soil moisture, which would reduce the potential for fugitive dust. Mechanical treatments that create fugitive dust would be isolated to site-specific treatments spread over the life of the plan. Surface-disturbing mechanical treatments may increase the potential for wind erosion for the period of time until precipitation or vegetation growth stabilizes the soil. The potential increase in wind erosion could result in an increase in particulate matter from wind-blown dust localized to the area near the treatment. Alternative I would use mechanical treatments on more acres than Alternatives II and III, but fewer acres than Alternatives IV and V.

Impacts from Management Specific to Alternative II

Prescribed fire would be allowed under this alternative as a tool for vegetation treatments. Particulate matter produced from prescribed fires would impact air quality and could exceed NAAQS for particulate matter on a short-term basis, generally less than a few hours for each prescribed fire. The planning area usually experiences strong transport winds that tend to clear smoke from the area quickly; as a result, there would be little impact from prescribed fire smoke beyond a single burning period or day. Vegetation treatments that may include prescribed fire as a tool would occur on 73,000 acres of the Annual VSG and 32,000 acres of the Non-Native Understory VSG.

All potential prescribed fires throughout the life of the plan would result in total emissions of 1,867 tons of $PM_{2.5}$ and 2,474 tons of PM_{10} (Table 4- 4). This would be less than the total emissions for Alternative IV but more than the total emissions for Alternatives I, III, and V due to prescribed fire.

Table 4- 4. Total Particulate Matter Emissions from Prescribed Fire in Alternative II

VSG	Potential Prescribed Fire Acres through the Life of the Plan	Rate of $PM_{2.5}$ Emissions (tons/acre)	Total $PM_{2.5}$ Emissions (tons)	Rate of PM_{10} Emissions (tons/acre)	Total PM_{10} Emissions (tons)
Annual	73,000	0.019	1,387	0.026	1,898
Non-Native Understory	32,000	0.015	480	0.018	576
Total	**105,000**		**1,867**		**2,474**

Mechanical treatments would potentially occur on 105,000 acres. Most mechanical treatments would occur during times with relatively high soil moisture, which would reduce the potential for fugitive dust. Mechanical treatments that create fugitive dust would be isolated to site-specific treatments spread over the life of the plan. Surface-disturbing mechanical treatments may increase the potential for wind erosion until precipitation or vegetation growth stabilizes the soil. The potential increase in wind erosion could result in an increase in particulate matter from wind-blown dust localized to the area near the treatment. Alternative II would mechanically treat fewer acres than all other alternatives.

Impacts from Management Specific to Alternative III

Prescribed fire would be allowed under this alternative as a tool for vegetation treatments. Particulate matter produced from prescribed fires would impact air quality and could exceed NAAQS for particulate matter on a short-term basis, generally less than a few hours for each prescribed fire. The planning area usually experiences strong transport winds that tend to clear smoke from the area quickly; as a result, there would be little impact from prescribed fire smoke beyond a single burning period or day. Vegetation treatments that may include prescribed fire as a tool in each VSG include 66,000 acres of Annual, 2,000 acres of Non-Native Perennial, 2,000 acres of Non-Native Understory, 18,000 acres of Native Grassland, and 5,000 acres of Native Shrubland.

All potential prescribed fires throughout the life of the plan would result in total emissions of 1,664 tons of $PM_{2.5}$ and 2,232 tons of PM_{10} (Table 4- 5).This would be less than the total emissions for Alternatives II and IV, but more than the total emissions for Alternatives I and V due to prescribed fire.

Table 4- 5. Total Particulate Matter Emissions from Prescribed Fire in Alternative III

VSG	Potential Prescribed Fire Acres through the Life of the Plan	Rate of $PM_{2.5}$ Emissions (tons/acres)	Total $PM_{2.5}$ Emissions (tons)	Rate of PM_{10} Emissions (tons/acres)	Total PM_{10} Emissions (tons)
Annual	66,000	0.019	1,254	0.026	1,716
Non-Native Perennial	2,000	0.010	20	0.013	26
Non-Native Understory	2,000	0.015	30	0.018	36
Native Grassland	18,000	0.010	180	0.013	234
Native Shrubland	5,000	0.036	180	0.044	220
Total	**92,525**		**1,664**		**2,232**

Mechanical treatments would potentially occur on 278,000 acres. Most mechanical treatments would occur during times with relatively high soil moisture, which would reduce the potential for fugitive dust. Mechanical treatments that create fugitive dust would be isolated to site-specific treatments spread over the life of the plan. Surface-disturbing mechanical treatments may increase the potential for wind erosion until precipitation or vegetation growth stabilizes the soil. The potential increase in wind erosion could result in an increase in particulate matter from wind-blown dust localized to the area near the treatment. Alternative III would mechanically treat more acres than Alternative II, but fewer acres than Alternatives I, IV and V.

Alternative III would also create up to 11,000 acres of unvegetated fuel breaks throughout the planning area. Wind erosion on these treated areas could also create an increase in particulate matter affecting air quality. Impacts to air quality from unvegetated fuel breaks would only occur for this alternative.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Prescribed fire would be allowed under this alternative as a tool for vegetation treatments. Particulate matter produced from prescribed fires would impact air quality and could exceed NAAQS for particulate matter on a short-term basis, generally less than a few hours for each prescribed fire. The planning area usually experiences strong transport winds that tend to clear smoke from the area quickly; as a result, there would be little impact from prescribed fire smoke beyond a single burning period or day. Vegetation treatments that may include prescribed fire as a tool in each VSG include 73,000 acres of Annual, 131,000 acres of Non-Native Perennial, and 18,000 acres of Non-Native Understory.

All potential prescribed fires throughout the life of the plan would result in total emissions of 2,967 tons of $PM_{2.5}$ and 3,925 tons of PM_{10} (Table 4- 6). Alternative IV would have more total emissions of $PM_{2.5}$ and PM_{10} produced due to prescribed fire than any other alternatives.

Table 4- 6. Total Particulate Matter Emissions from Prescribed Fire in Alternative IV (the Preferred Alternative)

VSG	Potential Prescribed Fire Acres through the Life of the Plan	Rate of $PM_{2.5}$ Emissions (tons/acre)	Total $PM_{2.5}$ Emissions (tons)	Rate of PM_{10} Emissions (tons/acre)	Total PM_{10} Emissions (tons)
Annual	73,000	0.019	1,387	0.026	1,898
Non-Native Perennial	131,000	0.010	1,310	0.013	1,703
Non-Native Understory	18,000	0.015	270	0.018	324
Total	**222,000**		**2,967**		**3,925**

Mechanical treatments would potentially occur on 580,000 acres throughout the planning area over the life of the plan. Most mechanical treatments would occur during times with relatively high soil moisture, which would reduce the potential for fugitive dust. Mechanical treatments that create fugitive dust would be isolated to site-specific treatments spread over the life of the plan. Surface-disturbing mechanical treatments may increase the potential for wind erosion until precipitation or vegetation growth stabilizes the soil. The potential increase in wind erosion could result in an increase in particulate matter from wind-blown dust localized to the area near the treatment. Alternative V would mechanically treat more acres than any other alternatives.

Impacts from Management Specific to Alternative V

Prescribed fire would be allowed under this alternative as a tool for vegetation treatments. Particulate matter produced from prescribed fires would impact air quality and could exceed NAAQS for particulate matter on a short-term basis, generally less than a few hours for each prescribed fire. The planning area usually experiences strong transport winds that tend to clear smoke from the area quickly; as a result, there would be little impact from prescribed fire smoke beyond a single burning period or day. Vegetation treatments that may include prescribed fire as a tool include 38,000 acres of Annual VSG.

All potential prescribed fires throughout the life of the plan would result in total emissions of 722 tons of $PM_{2.5}$ and 988 tons of PM_{10} (Table 4- 7).This would be less than the total emissions for Alternatives II, III and IV but more than the total emissions for Alternative I due to prescribed fire.

Table 4- 7. Total Particulate Matter Emissions from Prescribed Fire in Alternative V

VSG	Potential Prescribed Fire Acres through the Life of the Plan	Rate of $PM_{2.5}$ Emissions (tons/acre)	Total $PM_{2.5}$ Emissions (tons)	Rate of PM_{10} Emissions (tons/acre)	Total PM_{10} Emissions (tons)
Annual	38,000	0.019	722	0.026	988
Total	**38,000**		**722**		**988**

Mechanical treatments would potentially occur on 409,000 acres throughout the planning area over the life of the plan. Most mechanical treatments would occur during times with relatively high soil moisture, which would reduce the potential for fugitive dust. Mechanical treatments that create fugitive dust would be isolated to site-specific treatments spread over the life of the plan. Surface-disturbing mechanical treatments may increase the potential for wind erosion until precipitation or vegetation growth stabilizes the soil. The potential increase in wind erosion could result in an increase in particulate matter from wind-blown dust localized to the area near the treatment. Alternative V would mechanically treat more acres than Alternatives I, II, and III, but fewer acres than Alternative IV.

Impacts from Noxious Weeds and Invasive Plants Actions

Vegetation treatments that generate particulate matter impact air quality. The impacts to air quality from noxious weed and invasive plant treatments utilizing prescribed fire or mechanical treatments were included in the analysis of impacts to air quality under *Impacts from Upland Vegetation Actions*. The potential for impacts to air quality from chemical treatments is analyzed in this section.

Impacts from Management Specific to the No Action Alternative

Noxious weed and invasive plant treatments that utilize the application of herbicides could impact air quality. Chemical application activities are subject to strict guidelines designed to reduce impacts by considering the timing and location of applications. Impacts to air quality from chemical treatments would be negligible.

Impacts from Management Common to All Action Alternatives

Chemical application for noxious weed and invasive plant treatments are allowed as a tool for each action alternative. Noxious weed and invasive plant treatments that utilize the application of herbicides could impact air quality; however, management actions common to all action alternatives would require adherence to laws, policy, and label instructions, which are designed to reduce impacts by considering the timing and location of chemical applications. Impacts to air quality from chemical treatments would be negligible for all action alternatives.

Impacts from Wildland Fire Ecology and Management Actions

Fuels or Emergency Stabilization and Burned Area Rehabilitation (ES&BAR) treatments that generate particulate matter impact air quality. Impacts to air quality from fuels and ES&BAR treatments utilizing prescribed fire or surface-disturbing mechanical treatments have been included in the analysis under *Impacts from Upland Vegetation Actions*. Impacts to air quality from fuels and ES&BAR treatments utilizing chemical applications would be the same as those resulting from the *Noxious Weeds and Invasive Plant* actions. As a result, these three types of treatments will not be discussed further in this section.

Wildland fires produce smoke, which is a source of particulate matter. There is also an increased potential following wildland fires for particulate matter to be generated from wind erosion of the disturbed soil. Impacts to air quality from wildland fire smoke would be directly related to the size and frequency of wildland fires. Most vegetation types within the planning area have experienced a higher fire return interval than expected compared to the historic fire regime. Alternatives that increase the number of acres of S-Class similarity could result in a return to historic fire return intervals, which would generally be longer than the current trend. As acres achieve S-Class similarity, the potential for frequent and large fire decreases, which would result in less wildland fire smoke.

Impacts from Management Specific to the No Action Alternative

Impacts to air quality from wildland fire smoke would not change from current conditions under this alternative. Prescribed fire is a minor factor in the planning area. Projects, such as pile burning and burning tumble weeds along fence lines, are small and infrequent. The particulate matter generated from these projects is negligible.

Impacts from Management Common to All Action Alternatives

No areas would be suitable for Wildland Fire Use; therefore, there would be no impacts from particulate matter produced through Wildland Fire Use.

Impacts from Management Specific to Alternative I

This alternative would achieve S-Class similarity on 844,000 acres (see the *Wildland Fire Ecology and Management* section). Therefore, Alternative I would potentially produce more particulate matter from wildland fire smoke than Alternative IV, but less than Alternatives II, III, and V.

Impacts from Management Specific to Alternative II

Alternative II would achieve S-Class similarity on 543,000 acres (see the *Wildland Fire Ecology and Management* section). Therefore, Alternative II would potentially produce more particulate matter from wildland fire smoke than the other alternatives.

Impacts from Management Specific to Alternative III

This alternative would achieve S-Class similarity on 724,000 acres (see the *Wildland Fire Ecology and Management* section). Therefore, Alternative III would potentially produce more particulate matter from wildland fire smoke than Alternatives I, IV, and V, but less than Alternative II.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV would achieve S-Class similarity on 916,000 acres (see the *Wildland Fire Ecology and Management* section). Therefore, Alternative IV would potentially produce less particulate matter from wildland fire smoke than for all other alternatives.

Impacts from Management Specific to Alternative V

Alternative V would achieve S-Class similarity on 754,000 acres (see the *Wildland Fire Ecology and Management* section). Therefore, Alternative V would potentially produce more particulate matter from wildland fire smoke than Alternatives I and IV, but less than Alternatives II and III.

Impacts from Transportation and Travel Actions

OHV use on unpaved surfaces generates dust and particulate matter in the air. Areas designated as open to cross-country motorized vehicle use also result in an increased potential for wind erosion. Wind erosion in these areas generates particulate matter in the air.

Impacts from Management Specific to the No Action Alternative

Because most of the planning area would continue to be open to cross-country motorized vehicle use, particulate matter could be generated from cross-country motorized vehicle use in almost all of the planning area; however, impacts would be dispersed and short term. Particulate matter generation would be most noticeable adjacent to and on established routes and roads and in popular cross-country riding areas, such as the 2,680 acre Hagerman-Owsley Bridge SRMA.

The potential for air quality impacts from particulate matter generated from wind erosion in areas open to cross-country motorized vehicle use is directly related to the amount of those areas in a severe or very severe wind erosion class. This alternative would have 198,000 acres open to cross-country motorized vehicle use in areas susceptible to wind erosion.

Because this alternative contains the most acres which are open to cross-country travel more particulate matter would be generated than all alternatives. These impacts would be localized within the open areas and would be short-lived. This alternative has the least amount of acres limited to designated routes or ways and would have the least amount of particulate matter generated from these routes. However, the impacts would be spatially limited to approximately 50 feet from the designated ways and routes (Padgett, et al., 2007). This alternative would have the fourth highest acreage closed to motorized vehicles but there would be no impacts to air quality in these areas.

Impacts from Management Specific to Alternative I

Particulate matter would be generated from motorized use designated ways and routes in most of the planning area, resulting in dispersed and short-term impacts. Particulate matter generation would be most noticeable immediately adjacent to established routes. In the proposed Deadman/Yahoo SRMA, 3,620 acres would experience relatively concentrated generation of particulate matter from motorized recreation activities. The high-use time period for motorized recreation in this area is from November to March when soil conditions are relatively moist and dust generation is diminished.

The potential for air quality impacts from particulate matter generated from wind erosion in areas open to cross-country motorized vehicle use is directly related to the amount of those areas that is in a severe or very severe wind erosion class. This alternative would have 1,380 acres open to cross-country motorized vehicle use in areas susceptible to wind erosion.

Because Alternative I contains more acres open to cross-country motorized vehicle use than Alternatives II and V, more particulate matter would be generated from this activity in Alternative I. Similar levels of particulate matter would be generated in Alternatives III and IV due to the similar amount of acres open to cross-country motorized vehicles. These impacts would be localized to the open area and would be short-lived. Because Alternative I contains more acres limited to designated routes or ways than the No Action Alternative and Alternatives III, IV, and V, more particulate matter would generated from travel on these routes and ways in this alternative. However, these impacts would be spatially limited to approximately 50 feet from the designated route and ways (Padgett, et al., 2007). Alternative I has the third highest acreage closed to motorized vehicles but there would be no impacts to air quality in these areas.

Impacts from Management Specific to Alternative II

Particulate matter would be generated from motorized vehicles traveling on designated routes and ways in most of the planning area, resulting in dispersed and short-term impacts. Particulate matter generation would be most noticeable immediately adjacent to established routes.

Because Alternative II contains the most acres limited to designated routes and ways, this alternative would generate the most particulate matter from travel on these routes and ways. However, these impacts would be spatially limited to approximately 50 feet from the routes and ways (Padgett, et al., 2007). Alternative II would have the least acres closed to motorized vehicle use; there would be no impacts in these areas. There are no areas open to cross-country motorized vehicle use.

Impacts from Management Specific to Alternative III

Particulate matter would be generated from motorized vehicles traveling on designated routes and ways in most of the planning area, resulting in dispersed and short-term impacts. Particulate matter generation would be most noticeable immediately adjacent to established routes. In the proposed Deadman/Yahoo SRMA, 3,570 acres would experience relatively concentrated generation of particulate matter from motorized recreation activities. The high-use time period for motorized recreation in this area is from November to March when soil conditions are relatively moist and dust generation is diminished.

The potential for air quality impacts from particulate matter generated from wind erosion in areas open to cross-country motorized vehicle use is directly related to the amount of those areas in a severe or very severe wind erosion class. Alternative III would have 1,340 acres open to cross-country motorized vehicle use in areas susceptible to wind erosion.

Because Alternative III contains more acres open to cross-country motorized vehicle use than Alternatives II and V, more particulate matter would be generated from this activity in Alternative III. Similar levels of particulate matter would be generated in Alternatives I and IV due to the similar amount of acres open to cross-country motorized vehicles. These impacts would be localized to the open area and short-lived. Because Alternative III contains more acres limited to designated routes and ways than the No Action Alternative and Alternatives I, IV, and V, more particulate matter would be generated from travel on these routes and ways in this alternative. However, these impacts would be spatially limited to approximately 50 feet from the designated route and ways (Padgett, et al., 2007). Alternative III has the fifth highest acreage closed to motorized vehicles but there would be no impacts to air quality in these areas.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Particulate matter would be generated from motorized vehicles traveling on designated ways and routes in most of the planning area, resulting in dispersed and short-term impacts. Particulate matter generation would be most noticeable immediately adjacent to established routes. In the proposed Deadman/Yahoo SRMA, 3,570 acres would experience relatively concentrated generation of particulate matter from motorized recreation activities. The high-use time period for motorized recreation in this area is from November to March when soil conditions are relatively moist and dust generation is diminished.

The potential for air quality impacts from particulate matter generated from wind erosion in areas open to cross-country motorized vehicle use is directly related to the amount of those areas in a severe or very severe wind erosion class. Alternative IV would have 1,340 acres open to cross-country motorized vehicle use in areas susceptible to wind erosion.

Because Alternative IV contains more acres open to cross-country motorized vehicle use than Alternatives II and V, more particulate matter would be generated from this activity in Alternative IV. Similar levels of particulate matter would be generated in Alternatives I and III due to the similar amount of acres open to cross-country motorized vehicles. These impacts would be localized to the open area and short-lived. Because Alternative IV contains more acres limited to designated routes and ways than the No Action Alternative and Alternative V, more particulate matter would be generated from travel on these routes and ways in this alternative. However, these impacts would be spatially limited to approximately 50 feet from the designated routes or ways (Padgett, et al., 2007). Alternative IV has the second highest acreage closed to motorized vehicles; there would be no impacts to air quality in these areas.

Impacts from Management Specific to Alternative V

Particulate matter would be generated from motorized vehicles traveling on designated routes and ways in most of the planning area, resulting in dispersed and short-term impacts. Particulate matter generation would be most noticeable immediately adjacent to established routes. In the proposed Deadman/Yahoo SRMA, 700 acres would experience relatively concentrated generation of particulate matter from motorized recreation activities. The high-use time period for motorized recreation in this area is from November to March when soil conditions are relatively moist and dust generation is diminished.

The potential for air quality impacts from particulate matter generated from wind erosion in areas open to cross-country motorized vehicle use is directly related to the amount of those areas in a severe or very severe wind erosion class. Alternative V would have 230 acres open to cross-country motorized vehicle use in areas susceptible to wind erosion.

Because Alternative V contains slightly more acres open to cross-country motorized vehicle use than Alternatives II, more particulate matter would be generated from this activity in Alternative V. These impacts would be localized to the open area and short-lived. Because Alternative V contains more acres limited to designated routes and ways than the No Action Alternative, more particulate matter would generated from travel on these routes and ways in this alternative. However, these impacts would be spatially limited to approximately 50 feet from the designated route or way (Padgett, et al., 2007). Alternative V has the highest acreage closed to motorized vehicles but there would be no impacts to air quality in these areas.

Summary of Direct and Indirect Impacts

Air quality would be impacted by management activities that produce smoke from wildland fires and prescribed fires and surface-disturbing activities that increase the potential for particulate matter. All action alternatives would result in fewer impacts to air quality than the No Action Alternative. This is primarily due to management actions that result in less wildland fire smoke or less particulate matter generated by motorized vehicles. These impacts, which would occur over the life of the plan, are summarized in Table 4- 8, which contains the potential totals generated over the life of the plan. Individual treatments or actions that generate particulate matter would be expected to occur infrequently. The impacts from a single treatment or action would likely not extend beyond a single prescribed fire burn period or significant wind event. Due to strong dispersal rates within the planning area, particulate matter is expected to disperse quickly with no long-term impact to the planning area or surrounding region.

Table 4- 8. Summary of Impacts to Air Quality by Alternative

	Alternative					
	No Action	I	II	III	IV	V
Potential $PM_{2.5}$ Emissions from Prescribed Fire (tons)	0	0	1,867	1,664	2,957	722
Potential PM_{10} Emissions from Prescribed Fire (tons)	0	0	2,474	2,232	3,925	988
Potential Particulate Matter from Wildland Fire - Acres Similar to S-Class Reference (as acres increase, potential for large and frequent fires decreases)	543,000	844,000	543,000	724,000	916,000	754,000
Potential Mechanical Treatments with Surface Disturbance-Generated Particulate Matter (Acres)	338,000	350,000	105,000	278,000	580,000	409,000
Unvegetated Fuel Breaks with Wind Erosion-Generated Particulate Matter (Acres)	0	0	0	11,000	0	0
Areas Open to Cross-Country Motorized Vehicle Use with OHV-Generated Particulate Matter (Acres)	1,062,000	3,620	0	3,570	3,570	700
Areas Open to Cross-Country Motorized Vehicle Use with Wind Erosion-Generated Particulate Matter (Acres of Severe or Very Severe Erosion Class)	198,000	1,380	0	1,340	1,340	230

Impacts to air quality for all alternatives would be short term and would not be expected to result in non-attainment for the planning area. Compliance with smoke management plans for the action alternatives would mitigate impacts to air quality within the planning area and nearby sensitive areas. The amount of particulate matter estimated for each alternative would not exceed NAAQS beyond a short-lived basis. Impacts to air quality from particulate matter generated by motorized vehicles in all alternatives would be negligible in exceeding long-term air quality standards. Impacts to air quality from surface-disturbing vegetation treatments would also be negligible toward exceeding long-term air quality standards, as these treatments generally result in the establishment of vegetation that reduces long-term wind erosion. Unvegetated fuel breaks identified in Alternative III may have minor localized impacts in the long term as these areas are managed to be void of vegetation and would be continuously susceptible to particulate matter generated by wind erosion.

Impacts from the No Action Alternative

The No Action Alternative would have the highest impact to air quality. This is due to the impact from particulate matter emitted by wildland fire. This alternative has no management actions that would increase the acres of S-Class Similarity to reduce the frequency of large fires; the current trend for fire would continue. Also, this alternative has the largest amount of acreage open to cross-country motorized use with expected use to be continuous over the life of the plan.

Impacts from Alternative I

Alternative I would have the least impact to air quality. This is due to the increase in S-Class Similarity which would decrease the frequency of large fires and the associated particulate matter. Since there is no prescribed fire, there would be no particulate matter generated. The acres open to cross-country motorized vehicle use is significantly less than the No Action Alternative; less particulate matter would be produced. Particulate matter generated from mechanical treatments would be seasonal and the level of generation would vary and may not occur on a continuous basis during the life of the plan.

Impacts from Alternative II

Alternative II would have the second highest impact to air quality after the No Action Alternative. This is due to the impact from particulate matter emitted by wildland fire. This alternative has no management actions that would increase the acres of S-Class Similarity to reduce the frequency of large fires; the current trend for fire would continue. While there are no areas open to cross-country motorized vehicles, this is off-set by the impact from prescribed fire which would also increase amount of particulate matter.

Impacts from Alternative III

Alternative III would have the third highest impact to air quality. This is due to the impact from particulate matter emitted by wildland fire. This alternative increases the acres of S-Class Similarity and would reduce the frequency of large fires, but less so than in Alternatives I, IV, and V. The amount of prescribed fire would also add to the amount of particulate matter more than the No Action Alternative and Alternatives I and V, at about the same level as Alternative II, and less than Alternative IV. This alternative is the only alternative which would generate particulate matter from fuel breaks; however, this minor impact would be localized due to the linear alignment and distribution pattern of the fuel breaks.

Impacts from Alternative IV (the Preferred Alternative)

Alternative IV would have the next to least impact to air quality. This is due to the largest increase in S-Class Similarity, which would reduce the frequency of large fires and associated particulate matter. This alternative would generate more particulate matter from prescribed fire and cross-country motorized vehicle activities than Alternative V, but this would be off-set by the reduction in large fires.

Impacts from Alternative V

Alternative V would have the fourth highest or third least impact to air quality. This is due to having the less particulate matter from prescribed fire than Alternatives II, III, and IV, and having less particulate matter from cross-country motorized vehicle activity than every alternative except Alternative II. More particulate matter would be generated from frequent large fire than in the No Action Alternative and Alternative II and a similar amount as Alternative III, which would off-set the impacts from prescribed fire and cross-country motorized vehicle activity.

Cumulative Impacts

Past, Present, and Reasonably Foreseeable Actions

Past, present, and reasonably foreseeable actions for the following resource and resource uses cumulatively affect soil resources:

- Population Growth
- Wildland Fire Ecology and Management

These actions are described in detail in the *Introduction* to this chapter.

In addition, the planning area has a history of good air quality. Management actions within the planning area have had a negligible impact to air quality within the planning area and surrounding region. No significant sources of non-particulate matter pollutants exist within the planning area. Sources of air pollutants from outside the area are generally urban areas. Due to the distance from sources of pollution and the effects of dispersion from atmospheric conditions, impacts to the planning area from outside sources are negligible. Future urban or commercial developments near the planning area that produce air pollutants could impact air quality.

Cumulative impacts to air quality within the planning area could be expected from development associated with population growth in south-central Idaho and wildland and prescribed fire management on adjacent Federally managed lands. In south-central Idaho and northern Nevada, the population is expected to grow between 10% and 20% over the life of the plan, based on historical population growth rates. This growth will result in increased pressures on the environment, including air quality. Cumulative impacts could include regional haze and air pollution from vehicle emissions, commercial and industrial operations, and increased human-caused wildland fires.

Wildland fire smoke may result in exceeding NAAQS for particulate matter. The seasonality of wildland fires creates the potential for wildland fires within the planning area contributing to regional haze from wildland fires throughout Idaho and surrounding states. Fire management practices are specified in the land use plans for adjacent Federal lands managed by the BLM (Bruneau FO, Burley FO, Shoshone FO, Four Rivers FO, and Wells FO) and the Forest Service (Sawtooth National Forest, Idaho and Humboldt-Toiyabe National Forest, Nevada). These Federal lands are managed to prevent wildland fires, and wildland fire suppression is emphasized in most areas.

Summary of Cumulative Impacts

Impacts to air quality from sources outside the planning area would be the same for all alternatives. None of the management actions proposed in the Draft RMP/EIS are expected to significantly contribute to regional air quality conditions. Particulate matter generated from management actions within the planning area would not exceed the yearly standards for NAAQS within the planning area or contribute to exceeding NAAQS within the adjacent region, including nearby non-attainment areas or Class I Airsheds. All alternatives provide for aggressive suppression of wildland fires so impacts to regional air quality from wildland fire smoke would be mitigated to the extent practical. No impacts from management actions associated with any alternative would result in non-attainment.

4.3.1.2. Climate Change

Analysis Methods

Indicators

The following impact indicators were used for the analysis of impacts to climate change:

- **Amount of methane (CH_4) emissions**
- **Amount of carbon dioxide (CO_2) emissions**

Ongoing scientific research has identified the potential impacts on global climate resulting from increases in man-made greenhouse gas (GHG) emissions, including CH_4 and CO_2, and changes in biological carbon sequestration due to land management activities. Through complex interactions on a regional and global scale, these GHG emissions and net losses of biological carbon sinks contribute to a net warming effect of the atmosphere, primarily by limiting the amount of heat energy radiated by the earth back into space. Some of the GHGs associated with each alternative and their activities will be naturally sequestered, while the balance of those GHG emissions will accumulate in the atmosphere.

Methods and Assumptions

Impacts to climate from management in the *Upland Vegetation, Wildlife, Special Status Species, Wildland Fire Ecology and Management, Livestock Grazing,* and *Leasable Minerals* sections of Chapter 2 were analyzed in detail. Management from the remaining sections of Chapter 2 was not analyzed in detail because the management did not vary measurably between alternatives or impact the indicators for climate change.

Climate change analyses are comprised of several factors, including GHG concentrations, land use management practices, and reflectivity of surfaces (albedo). The current state of the science prevents the association of any BLM action that contributes to changes in any of these factors with any specific climate-related environmental effects. As a consequence, impact assessment of specific effects of human activities on climate cannot be quantified. Climate change analysis for the purpose of this document is limited to accounting and disclosing of factors that may contribute to climate change, specifically factors that would affect the amount of CH_4 and CO_2 emissions.

For the purpose of this analysis, it is assumed the planning area contains two primary pools (sinks) of carbon: 1) the carbon contained within any belowground reservoirs of oil and gas and 2) the carbon produced within the planning area each year as accumulated vegetation biomass.

The carbon contained within belowground oil and gas reservoirs is assumed to have one of two fates over the course of the year:

- Remain in the belowground reservoir, or
- Removal from the belowground reservoir through oil and/or gas drilling and entering the atmosphere through combustion, primarily as CO_2, with lesser amounts as CH_4 (primarily due to venting) and nitrous oxide (N_2O; also due to combustion equipment).

The carbon produced each year as vegetation biomass is assumed to have one of three fates over the course of the year:

- Sequestration in the ecosystem, in the form of perennial plant biomass (e.g., roots, woody material) or soil organic carbon;
- Return to the atmosphere as carbon dioxide (CO_2), either through plant and animal respiration, decomposition of plant biomass, and especially through consumption of plant material in wildland or prescribed fires; or
- Return to the atmosphere as CH_4, through fermentation as rotting biomass or from the digestive system of ruminant[2] animals (i.e., enteric fermentation).

This very simple model of carbon fluxes is used only for analysis purposes to help discern whether and how any alternatives may affect GHG emissions; in reality, carbon fluxes in the planning area are much more complex, but there is no methodology to estimate every change to carbon fluxes that may result from management contained within the alternatives. This analysis focuses on whether actions contained within the alternatives would change the magnitude of any of these fluxes. CH_4 emissions are distinguished from CO_2 emissions because CH_4 has a much higher Global Warming Potential than CO_2, although it is removed from the atmosphere more rapidly. Global Warming Potential describes the ability of a unit of a given GHG to trap heat in the atmosphere compared to a unit of CO_2; by definition, the Global Warming Potential of CO_2 is 1. A given mass of CH_4 has 25 times the Global Warming Potential over a 100-year time period as the same mass of CO_2 in the same time period (Forster, et al., 2007), which means a given mass of CH_4 has 25 times the impact on climate change as the same mass of CO_2 over 100 years.

Based on the current state of the science and the limited information available in this planning document, most changes in the amount of GHG emissions, in surface albedo, and in carbon sequestration can only be addressed qualitatively. However, given adequate estimates of domestic livestock forage consumption by alternative, an estimate of potential changes in CH_4 emissions due to enteric fermentation by livestock can be made. Enteric fermentation is microbial fermentation that takes place in the digestive system of ruminant animals such as cattle and sheep and produces CH_4 as a byproduct. Even though manure is also a source of CH_4, it was not quantified in this analysis, because CH_4 emissions from manure are smaller than enteric emissions when livestock are not part of confined animal operations (IPCC, 2006). While wild ruminants such as deer, pronghorn, and elk also generate CH_4 emissions, these were not included in this analysis because the number of wild animals in the planning area under each alternative has not been quantified. In addition, the Intergovernmental Panel on Climate Change (IPCC) recommends that GHG inventories of enteric fermentation only consider emissions from animals under domestic management (IPCC, 2006).

The method for estimating CH_4 emissions from enteric fermentation in livestock follows the Tier 1 method described in the *IPCC Guidelines for National Greenhouse Gas Inventories* (IPCC, 2006). This method multiplies the number of livestock by an emission factor in kilograms (kg) of CH_4 emitted per head per year to yield the total amount of CH_4 emissions from enteric fermentation. This figure was then converted into teragrams (Tg) of CO_2 equivalents, or CO_2(e), the common unit by which to compare carbon emissions, by multiplying the total CH_4 emissions by its Global Warming Potential,[3] then multiplying by

[2] A ruminant animal is a mammal that digests plant-based food by softening it within the animal's first stomach, known as the rumen, then regurgitating the semi-digested material known as cud and chewing it again.
[3] The Global Warming Potential for CH_4 contained within the IPCC Second Assessment Report (GWP = 21; value contained in (Forster, et al., 2007)) is used in the analysis of impacts, as this was the value used in greenhouse gas

10^{-9} to convert from kg to Tg. The following assumptions were used to estimate CH_4 emissions from enteric fermentation for each alternative:

- Livestock forage needs throughout the year are not normally provided solely by BLM-managed lands. A study by Alevy et al. in Elko County, Nevada, estimated that one public land animal unit month (AUM) supports 2.21 AUMs at the ranch level (Alevy, et al., 2007) (see *Economic Conditions* section for more details). As a result, the number of AUMs that would result from implementation of each alternative[4] was multiplied by 2.21 to determine the total number of AUMs supported by the livestock grazing allocations in each alternative. For example, if management direction in an alternative would result in100 AUMs on BLM-managed lands for livestock, a total of 221 AUMs would be supported at the ranch level. This figure represents the maximum possible impact of the livestock grazing allocations; it likely overestimates the impact of alternatives as it assumes livestock would not have been grazed or fed elsewhere prior to being moved to or after being moved from the planning area in response to an increase or decrease in forage allocated for livestock.
- An AUM is defined as the amount of forage required to sustain one mature cow for one month. Therefore, this analysis assumes that one cow is supported for every 12 AUMs at the ranch level (see previous item). Continuing with the previous example, 221 AUMs at the ranch level would support 18.4 cows.
- Sheep and cattle do not have the same enteric fermentation emission factors; the sheep equivalent to one cow from a forage consumption perspective (5.2 sheep) produces about 20% less CH_4 than one cow (IPCC, 2006). However, because none of the alternatives would substantially change the relative proportion of sheep within the planning area and to illustrate the upper bounds of potential impacts, for the purposes of this analysis, all livestock are conservatively assumed to be cows.
- The enteric fermentation emission factor for North American non-dairy cattle contained within the *IPCC Guidelines for National Greehouse Gas Inventories* (53 kg CH_4 per head per year) reflects the amount of CH_4 emitted by cattle that would graze in the planning area (IPCC, 2006).

Direct and Indirect Impacts

Impacts from Upland Vegetation Actions

Upland Vegetation actions could affect the amount of carbon stored as woody material and roots and in soil organic matter; however, identifying the magnitude and direction of these changes would be speculative. While Native Shrubland and Non-Native Understory VSGs may appear to store more carbon than grass-dominated VSGs due to the presence of woody material, grassland communities can store as much total carbon when soil organic matter is included (Sharrow & Ismail, 2004).

CO_2 emissions due to plant respiration and decomposition are not expected to vary substantially between alternatives, as there is no evidence that *Upland Vegetation* actions would change the rates or total amounts of plant respiration and decomposition.

Overall, *Upland Vegetation* actions are not expected to substantially affect the amount of carbon returned to the atmosphere as CO_2 or the amount of carbon sequestered in woody plant material, roots, or soil organic matter.

Impacts from Wildlife and Special Status Wildlife Actions

Wildlife and *Special Status Wildlife* actions are not likely to substantially affect the amount of CO_2 emissions due to animal respiration or the amount of CH_4 emissions due to enteric fermentation.

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inventories for the United States and the State of Idaho, to which emissions from the planning area are compared under *Cumulative Impacts*.

[4] This reflects the number of AUMs that would be available for livestock based on the vegetation allocation and the areas available for livestock grazing by alternative, combined with the 2006 vegetation production data, the most recent year for which production data are available; this number also assumes that an alternative's vegetation treatment objectives will be reached. The AUM numbers used in the analysis are provided solely to assist the reader in comparing the effects of the alternatives and should not be construed to confine or redefine the management contained within the alternatives.

Impacts from Wildland Fire Ecology and Management Actions

Although *Wildland Fire Ecology and Management* actions could affect annual carbon emissions, the amount of carbon returned to the atmosphere as CO_2 each year through consumption of plant material in wildland fires for each alternative is inconclusive. Increased fire size or departure from Historic Fire Regimes (HFRs) could decrease the amount of carbon stored as plant or soil biomass by increasing the likelihood a given acre would burn in a particular year. However, decreased fire return intervals would also allow less biomass to accumulate between fires, reducing the amount of CO_2 released in a fire.

CO_2 emissions due to consumption of plant material in prescribed fires used as a tool for vegetation treatments could vary by alternative. As Alternative I does not allow the use of prescribed fire, no CO_2 emissions would occur due to this action. The remaining alternatives all allow the use of prescribed fire, and the potential acres treated using prescribed fire varies by alternative (see *Air Quality* section).

However, there may not be an overall increase in CO_2 emissions under any of these alternatives:

- If the prescribed fire burns vegetation that would have otherwise been sequestered in the ecosystem, overall CO_2 emissions for that year would increase.
- If the prescribed fire burns vegetation that would have otherwise been returned to the atmosphere that year as CO_2 through respiration, decomposition, or wildland fire, there is no effect on CO_2 emissions for that year.
- If the prescribed fire burns vegetation that would have otherwise been consumed by livestock and returned to the atmosphere as CH_4, overall emissions of CO_2(e) for that year would decrease as CH_4 has a much higher Global Warming Potential than CO_2.

Thus, the overall effect of wildland and prescribed fire on CO_2 emissions cannot be determined.

Impacts from Livestock Grazing Actions

Livestock Grazing actions could affect annual carbon emissions increasing or decreasing the amount of CH_4 emissions due to enteric fermentation.

Ruminant animals, including domestic cattle and sheep, produce CH_4 as a by-product of their normal digestive processes (i.e., enteric fermentation), which is expelled by the animal. The total amount of CH_4 emitted by livestock is related to many factors, including the kind and number of livestock, the type of production system, and the quantity and quality of feed (Steinfeld, et al., 2006). Livestock also generate CH_4 and to a lesser extent N_2O through manure. Livestock grazing can also affect other factors that influence climate change, including soil organic carbon (Ingram, et al., 2008), soil microbial communities (Radl, et al., 2007), and dust (Neff, et al., 2008). However, there are few studies on these interactions in the Great Basin; therefore, this analysis focuses solely on the production of CH_4 by enteric fermentation.

Table 4- 9 displays the effects of the allocations of vegetation production to livestock on emission of CH_4 produced through enteric fermentation.

Table 4- 9. Emissions of CH_4 through Enteric Fermentation from Cattle by Alternative (Tg of CO_2(e) per year)

AUM Estimate [A]	Alternative						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
Low	0.03	0.04	0.08	0.06	0.02	0.02	0.01
High	0.05	0.06	0.10	0.08	0.03	0.03	0.02

[A] Based on AUMs estimated to result from allocations to livestock and areas available for livestock grazing, based on 2006 vegetation production data; the AUM estimates are also based on the amount of vegetation available after upland vegetation objectives have been reached and assume that one public land AUM supports 2.21 AUMs at the ranch level (Alevy, et al., 2007).

Impacts from Management Specific to the No Action Alternative

Enteric fermentation from cattle supported by the allocation of vegetation production in the No Action Alternative would result in between 0.03 and 0.05 Tg of CO_2(e) per year. The No Action Alternative would maintain CH_4 emissions from enteric fermentation by cattle within the range of current levels.

Impacts from Management Specific to Alternative I

Enteric fermentation from cattle supported by the allocation of vegetation production in Alternative I would result in between 0.04 and 0.06 Tg of CO_2(e) per year. Alternative I would increase CH_4 emissions from enteric fermentation by cattle as compared to the No Action Alternative; however, the low estimate for CH_4 emissions would be within the range for the No Action Alternative.

Impacts from Management Specific to Alternative II

Enteric fermentation from cattle supported by the allocation of vegetation production in Alternative II would result in between 0.08 and 0.10 Tg of CO_2(e) per year. Alternative II would increase CH_4 emissions from enteric fermentation by cattle as compared to the No Action Alternative and Alternative I to levels approximately twice as high as either of those alternatives.

Impacts from Management Specific to Alternative III

Enteric fermentation from cattle supported by the allocation of vegetation production in Alternative III would result in between 0.06 and 0.08 Tg of CO_2(e) per year. Alternative III would increase CH_4 emissions from enteric fermentation by cattle as compared to the No Action Alternative and Alternative I, although not as much as in Alternative II.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Enteric fermentation from cattle supported by the allocation of vegetation production in Alternatives IV-A and IV-B would result in between 0.02 and 0.03 Tg of CO_2(e) per year. Alternative IV would decrease CH_4 emissions from enteric fermentation by cattle as compared to the No Action Alternative and Alternatives I, II, and III to levels approximately half to two-thirds as much as the No Action Alternative.

Impacts from Management Specific to Alternative V

Enteric fermentation from cattle supported by the allocation of vegetation production in Alternative V would result in between 0.01 and 0.02 Tg of CO_2(e) per year. Alternative V would decrease CH_4 emissions from enteric fermentation by cattle as compared to all alternatives to levels approximately one-quarter to one-third as much as the No Action Alternative.

Impacts from Leasable Minerals Actions

Although *Leasable Minerals* actions could affect annual GHG emissions, the potential for oil and gas discovery and development in the planning area is low (see Appendix U). In addition, potential GHG emissions under this RFDS cannot be quantified as the RFDS does not estimate potential production of oil or gas by volume. Thus, even though the alternatives vary in the acreage available for mineral leasing (see the *Leasable Minerals* section), the likelihood that any of the alternatives will result in a shift of carbon from those long-term carbon sinks to the atmosphere is low.

Summary of Direct and Indirect Impacts

Impacts from the No Action Alternative

Overall, the No Action Alternative would continue to have the same effects on annual CO_2 and CH_4 emissions as is currently occurring.

Impacts from Alternative I

Overall, Alternative I would result in the same to minimally higher levels of annual CH_4 emissions compared to the No Action Alternative. There is no evidence to suggest Alternative I would affect CO_2 emissions.

Impacts from Alternative II

Overall, Alternative II would result in a minor increase in annual CH_4 emissions compared to the No Action Alternative, the largest increase of all the alternatives. There is no evidence to suggest Alternative II would affect CO_2 emissions.

Impacts from Alternative III

Overall, Alternative III would result in a minimal to minor increase in annual CH_4 emissions compared to the No Action Alternative. There is no evidence to suggest Alternative III would affect CO_2 emissions.

Impacts from Alternative IV (the Preferred Alternative)

Overall, Alternative IV would result in the same to minimally lower levels of CH_4 emissions compared to the No Action Alternative. There is no evidence to suggest Alternative IV would affect CO_2 emissions.

Impacts from Alternative V

Overall, Alternative V would result in a minimal decrease in CH_4 emissions compared to the No Action Alternative, the largest decrease of all the alternatives. There is no evidence to suggest Alternative V would affect CO_2 emissions.

Cumulative Impacts

Past, Present, and Reasonably Foreseeable Actions

Because the scope of the causes and effects of climate change is global, the cumulative impacts analysis includes changes to factors affecting CO_2 and CH_4 emissions from enteric fermentation across the globe. However, because no direct or indirect effects on CO_2 emissions were detected for any of the alternatives, the cumulative impacts analysis only considers cumulative impacts of the alternatives on CH_4 emissions. In addition to considering cumulative impacts to CH_4 emissions from enteric fermentation at the global scale, the analysis also considers these impacts at the state and national scales as impacts to CH_4 emissions from the alternatives can be put into better context at these smaller scales.

Past, present, and reasonably foreseeable actions in Idaho, the United States, and across the globe that affect CH_4 emissions from enteric fermentation include CH_4 emitted from livestock outside the planning area, including livestock that graze on other BLM-managed lands, other Federal lands, State lands, and private lands. Emission estimates for 2005 are used in this analysis for the State and national levels as 2005 is the most recent year for which estimates are available at both the State and national level. CH_4 emissions from enteric fermentation in Idaho in 2005 were 3.19 Tg of CO_2(e) (Strait, et al., 2008), while emissions from enteric fermentation in the United States the same year were 124.5 Tg of CO_2(e) (EPA, 2008). The mean of the four estimates of annual global emissions from ruminants between 1990 and 2000 contained in the *Contribution of Working Group I to the Fourth Assessment Report of the IPCC* is used for the analysis at the global scale (Denman, et al., 2007); the estimate of CH_4 emissions from enteric fermentation across the globe is 1,732.5 Tg of CO_2(e) (Denman, et al., 2007). For the purposes of analysis, it is assumed that these emission rates will remain constant over the life of the plan.

To assess cumulative impacts, it is assumed that the Tg of CO_2(e) for the No Action Alternative are already incorporated into the global, national, and state estimates. The analysis calculates how the global, national, and state estimates would change under each alternative and what percent of the total CH_4 emissions from enteric fermentation results from livestock within the planning area. The high end of the estimates of Tg of CO_2(e) is used for this analysis in order to display the maximum estimate of how the alternatives may cumulatively affect CH_4 emissions from enteric fermentation.

Summary of Cumulative Impacts

Table 4- 10 displays cumulative impacts of the alternatives on CH_4 emissions through enteric fermentation.

Table 4- 10. Cumulative Impacts of CH_4 Emissions of through Enteric Fermentation from Cattle by Alternative (Tg of CO_2(e) per year)

Tg Co_2 Equivalents per Year	Alternative						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
Planning Area Total	0.05	0.06	0.10	0.08	0.03	0.03	0.02
State of Idaho							
Total	3.19[A]	3.20	3.24	3.22	3.17	3.17	3.16
% Due to Emissions in the Planning Area	2%	2%	3%	3%	1%	1%	1%
United States							
Total	124.50[B]	124.51	124.55	124.53	124.48	124.48	124.47
% Due to Emissions in the Planning Area	0.04%	0.05%	0.08%	0.06%	0.02%	0.02%	0.02%
Global							
Total	1,732.5[C]	1,732.51	1,732.55	1,732.53	1,732.48	1,732.48	1,732.47
% Due to Emissions in the Planning Area	0.003%	0.003%	0.006%	0.005%	0.002%	0.002%	0.001%

[A] Tg of CO_2(e) emitted in the State of Idaho in 2005; it is assumed that this figure includes emissions from the planning area for the No Action Alternative.
[B] Tg of CO_2(e) emitted in the United States in 2005; it is assumed that this figure includes emissions from the planning area for the No Action Alternative.
[C] Tg of CO_2(e) emitted each year globally between 1990 and 2000; it is assumed that this figure includes emissions from the planning area for the No Action Alternative.

Cumulative Impacts from the No Action Alternative

In the No Action Alternative, CH_4 emissions through enteric fermentation would remain at current levels. Emissions from livestock based in the planning area account for 2% of the State total, 0.04% of the national total, and 0.003% of the global total.

Cumulative Impacts from Alternative I

In Alternative I, CH_4 emissions through enteric fermentation would increase slightly compared to current levels. Emissions from livestock based in the planning area would still account for only 2% of the State total, 0.05% of the national total, and 0.003% of the global total.

Cumulative Impacts from Alternative II

In Alternative II, CH_4 emissions through enteric fermentation would increase slightly compared to current levels. Emissions from livestock based in the planning area would increase slightly to 3% of the State total, 0.08% of the national total, and 0.006% of the global total. Alternative II would have the most cumulative impacts on CH_4 emissions through enteric fermentation of all the alternatives. However, the relative scale of impact would still be negligible overall, especially if all GHGs and all sources of CH_4 were considered.

Cumulative Impacts from Alternative III

In Alternative III, CH_4 emissions through enteric fermentation would increase slightly compared to current levels. Emissions from livestock based in the planning area would still account for only 3% of the State total, 0.06% of the national total, and 0.005% of the global total.

Cumulative Impacts from Alternative IV (the Preferred Alternative)

In Alternative IV, CH_4 emissions through enteric fermentation would decrease slightly compared to current levels. Emissions from livestock based in the planning area would account for only 1% of the State total, 0.02% of the national total, and 0.002% of the global total.

Cumulative Impacts from Alternative V

In Alternative V, CH_4 emissions through enteric fermentation would decrease slightly compared to current levels. Emissions from livestock based in the planning area would account for only 1% of the State total, 0.02% of the national total, and 0.001% of the global total. Alternative V would have the fewest cumulative impacts on CH_4 emissions through enteric fermentation of all the alternatives. However, the relative scale of impact would still be negligible overall, especially if all GHGs and all sources of CH_4 were considered.

4.3.2. Geologic Features

Analysis Methods

Indicators

The following indicator was used for the analysis of impacts to geologic features:

- **Alterations to geologic features** – Alterations to geologic features would include complete or partial removal, relocation, defacement, or changes to structure of unique geologic features such as canyon walls, hoodoos, pinnacles, columns, arches, overhangs, cave entrances, and cave tunnels within the planning area. There is no severity threshold for these changes. Geologic formation resources are either maintained or experience a decrease in value if any alteration is realized.

Methods and Assumptions

Impacts to geologic features from management in the following sections of Chapter 2 were analyzed in detail: *Geologic Features*, *Non-WSA Lands with Wilderness Characteristics*, *Areas of Critical Environmental Concern*, *Wild and Scenic Rivers*, and *Wilderness Study Areas*. Impacts from management actions that would affect the Glenns Ferry Formation are analyzed in the *Paleontological Resources* section. Management from the remaining sections was not analyzed in detail because the management did not vary measurably between alternatives or impact the indicator for geologic features.

The geologic features included in this analysis are the canyon complexes associated with the Bruneau River, Jarbidge River and its East Fork, Buck Creek, and Lower Salmon Falls Creek. The entrances to known caves are also included. These identified areas total 33,000 acres.

Impacts to geologic features were quantified through a GIS analysis of the various allocations proposed by the alternatives. Management that allows surface-disturbing activities that would change or eliminate any of these geologic features would be considered to decrease the value of this resource. Likewise, management that restricts surface-disturbing activities will maintain these values.

Direct and Indirect Impacts

Impacts from Geologic Features Actions

Impacts from Management Specific to the No Action Alternative

The No Action Alternative manages geologic resources so that they are protected, maintained, or enhanced. This would maintain these resources.

Impacts from Management Common to All Action Alternatives

All action alternatives would protect geologic features. This would maintain these resources.

Impacts from Non-WSA Lands with Wilderness Characteristics Actions

Three of the seven areas identified as non-WSA lands with wilderness characteristics also contain land with geologic features, totaling 4,700 acres (Table 4- 11). The areas with these formations are Long Draw, Hole-in-the-Ground, and East Fork Jarbidge. Management to maintain wilderness characteristics in these areas would also maintain any geologic features present. Alterations to geologic features would be more likely to occur on these lands without management for existing wilderness characteristics because these features contribute to naturalness.

Table 4- 11. Acres Containing Geologic Features within Non-WSA Lands Managed for Wilderness Characteristics

Non-WSA Lands with Wilderness Characteristics	Alternative					
	No Action	I	II	III	IV	V
Long Draw	0	2,200	0	0	2,200	2,200
Hole-in-the-Ground	0	900	0	0	900	900
East Fork Jarbidge	0	1,600	0	0	1,600	1,600
Total	**0**	**4,700**	**0**	**0**	**4,700**	**4,700**

Impacts from Management Specific to the No Action Alternative and Alternatives II and III

These alternatives do not manage non-WSA lands with wilderness characteristics to maintain wilderness character. The existing geologic features, as a component of naturalness, would not have protection from alterations in this alternative because the lands would not be managed to preserve naturalness. Alterations would result in a decrease in value of geologic features.

Impacts from Management Specific to Alternatives I, IV, and V

Long Draw, Hole-in-the-Ground, and East Fork Jarbidge areas would be managed to maintain the existing wilderness characteristics. This would not allow for alterations to the identified geologic features that occur in these areas. This would maintain these geologic features because these lands would be managed to preserve their naturalness.

Impacts from Special Designation Actions

ACEC, WSA, WSR, and National Historic Trail (NHT) management would be complementary to the conservation of geologic features. Areas with geologic features and special designation management will be less likely to experience a decrease in value or loss of resources than areas without this management. This portion of the analysis focuses on ACECs, WSAs, and WSRs (Table 4-12), as the Oregon NHT does not overlap the area containing geologic features.

Table 4-12. Special Designations with Management that would Maintain Geologic Features by Alternative (Acres)

Special Designation	Alternative					
	No Action	I	II	III	IV	V
ACEC	30,000	30,000	0	21,000	30,000	31,000
WSA[A]	0	0	0	0	22,000	22,000
WSR	22,000	22,000	22,000	22,000	22,000	22,000
[A] Because WSAs are managed according to the *Interim Management Policy for Lands Under Wilderness Review* (IMP; BLM Handbook H-8550-1), which does not allow for impairment, alternatives are compared based on how the WSA would be managed if released from wilderness study by Congress.						

Impacts from Management Specific to the No Action Alternative

Under the No Action Alternative, ACEC designations would include 91% of the area identified to have geologic features. The management of ACECs to protect the important biological, cultural, scenic, and historic resources could indirectly maintain these geologic features.

If WSAs are released from interim management and returned to management under the existing land use plan, the No Action Alternative would no longer contain restrictions regarding alterations to the naturalness provided by geologic features.

Eligible, suitable, and designated WSR corridors contain 67% of the geologic formation area. Protective management of the qualifying Outstandingly Remarkable Values (ORVs) and tentative classification would maintain geologic features, particularly in those segments with geologic and scenic ORVs.

Impacts from Management Common to All Action Alternatives

The areas of geologic features that occur within WSA boundaries would be managed in accordance with the *Interim Management Policy for Lands Under Wilderness Review* (IMP), which would maintain these resources. Impacts relative to the release of WSA lands are analyzed specifically by individual alternative.

Impacts from Management Specific to Alternative I

Under Alternative I, ACEC designations would include 91% of the area identified to have geologic features. Impacts would be similar to the No Action Alternative, with slightly more acreage occurring within an ACEC.

If WSAs are released from interim management and returned to management under the existing land use plan, Alternative I would no longer contain restrictions regarding alterations to the naturalness provided by geologic features.

Management specific to Alternative I for eligible, suitable and designated WSR corridors would maintain geologic features.

Impacts from Management Specific to Alternative II

Under Alternative II, no ACECs would be designated. None of the acreage identified to have geologic features would have additional ACEC management that would maintain the geologic formation resources.

Impacts to geologic features from WSA management in Alternative II would be identical to Alternative I.

Alternative II would allow salable mineral development within eligible, suitable, and designated WSR corridors; however interim management for WSRs would prevent impacts from salabe mineral development.

Impacts from Management Specific to Alternative III

Under Alternative III, ACEC designations would include 63% of the area identified to have geologic features. Impacts would be similar to the No Action Alternative, but with fewer acres with geologic formation contained within an ACEC.

Impacts to geologic features from WSA management in Alternative III would be identical to Alternative I.

Management specific to Alternative III for eligible, suitable, and designated WSR corridors would maintain geologic features.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Under Alternative IV, ACEC designations would include 91% of the area identified to have geologic features. Impacts would be similar to the No Action Alternative, with slightly more acres with geologic features contained within an ACEC.

If released, WSA lands would be managed for their wilderness characteristics. This would be complementary to maintaining geologic features, as they are a component of naturalness. This would apply additional management to 68% of the area identified with geologic features.

Impacts to geologic features from WSR management in Alternative IV would be identical to Alternative I.

Impacts from Management Specific to Alternative V

Under Alternative V, ACEC designations would include 95% of the area identified to have geologic features. Impacts would be similar to the No Action Alternative, with more acres with geologic features contained within an ACEC.

Impacts to geologic features from WSA management in Alternative V would be identical to Alternative IV.

Impacts to geologic features from WSR management in Alternative V would be identical to Alternative I.

Summary of Direct and Indirect Impacts

Table 4-13 contains the percent of acres with geologic features that could experience alterations to those formations through management for the identified sections.

Table 4-13. Areas with Geologic Features that could Experience Alterations to Those Formations by Alternative (Percent)

Section	Alternative					
	No Action	I	II	III	IV	V
Wilderness Characteristics	100	86	100	100	86	86
ACEC	10	9	100	37	9	5
WSA	100	100	100	100	32	32
WSR	33	33	33	33	33	33

Impacts from the No Action Alternative

The No Action Alternative ranks fifth for management that would maintain geologic features. The direct impact that would contribute most to an alteration in geologic features for this alternative is the availability of area with geologic features for salable mineral development. Geologic features would be indirectly impacted by the absence of complementary management for released WSA lands. Management that would maintain geologic features in this alternative includes complementary ACEC management for 91% of the identified resources. While the likelihood of impacts to geologic features is low, management under the No Action Alternative provides an intermediate level of complimentary management, potentially allowing for the some disturbance; the effects of these disturbances (e.g., abrasions, small chips) are not expected to be noticeable or extensive. If noticeable impacts were to occur (e.g., major removal of rock material, destroying the geologic integrity of the feature), they would be major because the impacts would be permanent.

Impacts from Alternative I

Alternative I ranks third for management that would maintain geologic features. The potential for geologic features to be altered would be due mainly to the absence of complementary management for released WSA lands when compared to other alternatives. Management that would maintain geologic features in this alternative includes complementary ACEC management for 91% and management of wilderness character on 14% of the identified resources. If noticeable impacts were to occur (e.g., major removal of rock material, destroying the geologic integrity of the feature), they would be major because the impacts would be permanent.

Impacts from Alternative II

Alternative II ranks last for management that would maintain geologic features. Geologic features would be indirectly impacted by the absence of complementary management for non-WSA lands with wilderness character, ACECs, and released WSA lands. While the likelihood of impacts to geologic features is low, management under Alternative II provides the least complementary management, potentially allowing for the most disturbance; the effects of these disturbances (e.g., abrasions, small chips) are not expected to be noticeable or extensive. If noticeable impacts were to occur (e.g., major removal of rock material, destroying the geologic integrity of the feature), they would be major because the impacts would be permanent.

Impacts from Alternative III

Alternative III ranks fourth for management that would maintain geologic features. Geologic features would be indirectly impacted by the absence of complementary management for non-WSA lands with wilderness character and released WSA lands. Management that would maintain geologic features in this alternative would include complementary ACEC management for 63% of the identified resources. While the likelihood of impacts to geologic features is low, management under Alternative III provides an intermediate level of complementary management, potentially allowing for the some disturbance; the effects of these disturbances (e.g., abrasions, small chips) are not expected to be noticeable or extensive. If noticeable impacts were to occur (e.g., major removal of rock material, destroying the geologic integrity of the feature), they would be major because the impacts would be permanent.

Impacts from Alternative IV (the Preferred Alternative)

Alternative IV ranks first for management that would maintain geologic features. This alternative would have the highest proportion of complementary management of all alternatives for non-WSA lands with wilderness character, ACECs, and released WSA lands. While the likelihood of impacts to geologic features is low, management under Alternative IV provides a high level of complementary management, potentially allowing for the some disturbance; the effects of these disturbances (e.g., abrasions, small chips) are not expected to be noticeable or extensive. If noticeable impacts were to occur (e.g., major removal of rock material, destroying the geologic integrity of the feature), they would be major because the impacts would be permanent.

Impacts from Alternative V

Alternative V ranks second for management that would maintain geologic features. Impacts from management in this alternative would be similar to Alternative IV. However, the complementary ACEC management would be slightly higher in this alternative than Alternative IV. While the likelihood of impacts to geologic features is low, management under Alternative V provides a high level of complementary management, potentially allowing for the some disturbance; the effects of these disturbances (e.g., abrasions, small chips) are not expected to be noticeable or extensive. If noticeable impacts were to occur (e.g., major removal of rock material, destroying the geologic integrity of the feature), they would be major because the impacts would be permanent.

Cumulative Impacts

There are no past, present, or reasonably foreseeable actions that would affect geologic features in the planning area; therefore, cumulative impacts would be identical to direct and indirect impacts described above.

4.3.3. Soil Resources

Analysis Methods

Indicators

The following indicators were used for the analysis impacts to soil resources:

- **Acres affected by management actions on soils with erosion hazard ratings of medium or greater potential for water erosion and/or moderate or greater erosion potential for wind erosion** – Most acres within the planning area have medium potential for water erosion or moderate potential for wind erosion (see *Soil Resources* in Chapter 3, Table 3-2). Because there is overlap in the classifications, for analysis comparisons, acres for erosion potential categories are listed separately.

- **The amount and type of soil cover** – The amount and type of soil cover influence soil processes that include but are not limited to:
  - Soil erosion: Soil erosion is influenced by the amount of living or dead vegetation cover, biological soil crusts, and rock (Belnap, 2003; Pierson, et al., 2007). In general, as cover increases soil erosion potential decreases.

Soil nutrient and water cycling: Living and dead vegetation and biological soil crusts contribute soil nutrients through fixation and decomposition. Species diversity of biological soil crusts influences nutrient input. For example, some species that make up biological crusts fix atmospheric nitrogen and make it available for use by other plants. Shrubs such as sagebrush move water deep into the soil profile during rainfall events, and later actively transport water back to the upper soil profile during dry periods (Ryel, et al., 2003; Ryel, et al., 2002). Water transported back to the upper soil profile is then available for herbaceous plants and microbial processes that increase availability of soil nutrients (Ryel, et al., 2002). Cover and species diversity of biological soil crusts influence how water moves into the soil profile and retained within the profile (Belnap, 2003).

- **Soil bulk density** – Changes in soil bulk density result from activities that apply pressure to the soil surface. Soils have pores and interspaces that allow water to enter the soil profile. Decreases in number and size of pores and interspaces increases soil bulk density, which can result in lower water infiltration rates and increased surface runoff (Tate, et al., 2004). Changes in soil bulk density are influenced by a number of factors including soil moisture, soil texture, and surface organic matter (Abdel-Magid, et al., 1987; Laycock & Conrad, 1967; Tate, et al., 2004; Van Haveren, 1983), and the frequency or intensity of the disturbance (Adams, et al., 1981; Eckert, et al., 1979; Tate, et al., 2004). Recovery can take months to years, depending on environmental and soil factors (Prosser, et al., 2000; Stephenson & Veigel, 1987). Laycock and Conrad caution against concluding that increases in bulk density alone result in lower infiltration (Laycock & Conrad, 1967). Due to the variability in occurrence and effects of increased soil bulk density, only activities that consistently and repeatedly apply pressures that compact soils will be considered for this indicator.

Methods and Assumptions

Impacts to soil resources from management in the following sections of Chapter 2 were analyzed in detail: *Soil Resources*, *Upland Vegetation*, *Wildland Fire Ecology and Management*, *Livestock Grazing*, *Transportation and Travel*, *Land Use Authorizations*, and *Minerals*. Impacts from management in the *Special Status Species*, *Noxious Weeds and Invasive Species*, *Wild Horses*, and *Areas of Critical Environmental Concern* sections were captured in the analysis of sections that were analyzed in detail and, to avoid repetition, were not discussed separately. Management from the remaining sections was not analyzed in detail because the management did not vary measurably between alternatives or impact the indicator for soil resources. **Impacts from management actions for soil resources** can be found under *Impacts from Soil Resources Actions* in the *Land Use Authorizations*, *Leasable Minerals*, *Salable Minerals*, and *Locatable Minerals* sections.

Management actions were evaluated to determine which indicators would be affected and how. Quantitative data were not available for amount and type of soil cover and bulk density on the scale of the planning area. GIS data layers for soil erosion potential were used to evaluate potential impacts of management actions in areas with medium or greater potential for water erosion and moderate or greater potential for wind erosion. Where geographic locations for management actions were not specified, effects were estimated based on the proportion of the affected area relative to the proportion of potentially erodible soils within the planning area (see the *Soil Resources* section of Chapter 3, Table 3- 2).

The planning area overlaps four different soil surveys. Minor inaccuracies may be present in the GIS data, including precise boundaries of soil mapping units and associated data such as erosion potential classes. These errors are considered negligible at the planning area scale.

Major underlying assumptions used in the analyses are:

- Soils rated as medium or greater potential for water erosion and moderate or greater potential for wind erosion are more likely to erode than soils rated as having low potential for water erosion and slight potential for wind erosion.
- Management actions that designate areas as available for land use or open to mineral exploration and development have greater potential to impact soil resources than management actions that designate areas as unavailable or closed, due to potential for increased infrastructure and access

routes. However, actual impacts to soils may not be proportional to the size of the areas identified for potential designation or development.

Direct and Indirect Impacts

Impacts from Soil Resources Actions

Impacts from Management Specific to the No Action Alternative

Managing native perennial range to attain good ecological condition would influence the amount and composition of vegetation (Dyksterhuis, 1949; Joyce, 1993) and, therefore, would be expected to maintain or improve vegetation cover. This could indirectly maintain or reduce the potential for soil surface erosion and maintain or improve nutrient and water cycling over 811,981 acres (59%) of the planning area. Management actions in the No Action Alternative would generally maintain or improve the current condition of soils within the planning area.

Impacts from Management Common to the No Action and All Action Alternatives

Maintenance of perennial vegetation cover would protect the soil surface from water and wind erosion, and tend to maintain or improve soil nutrient and water cycling. Actions common to all alternatives would generally maintain the current condition of soils within the planning area.

Impacts from Management Common to All Action Alternatives

Actions common to all action alternatives provide direction to reduce impact to soils due to construction of management facilities, land treatments, road maintenance, transportation and travel, and management activities or authorized uses resulting in bare ground. These actions would generally maintain or improve the current condition of soils within the planning area over the long-term through project design, avoidance, or mitigation.

Impacts from Management Specific to Alternatives I, II, and III

Actions proposed under Alternatives I, II, and III would maintain or improve the current condition of soils within the planning area and would reduce long-term potential for erosion on 646,000 acres (47%) of the planning area.

Development and implementation of erosion control strategies for new land use authorizations, Special Recreation Permits (SRPs), and mineral exploration and development involving surface disturbance would reduce the potential for short- and long-term soil loss on 703,000 acres (51% of the planning area).

Impacts from Management Specific to Alternatives IV and V

Management actions proposed under Alternatives IV and V would require mitigation for impacts to soils with an erosion hazard rating of medium or greater for water erosion and moderate or greater for wind erosion. This would potentially reduce long-term impacts to soils on 1,325,000 acres (96%) of the planning area.

Under Alternatives IV and V, soil erosion strategies would also be developed and implemented for new land use authorizations, SRPs, and mineral exploration and development involving surface disturbance. These strategies would reduce the potential for short- and long-term soil loss over 1,336,000 acres (97%) of the planning area. Prohibition of surface disturbance from new land use authorizations, SRPs, and mineral exploration and development on slopes greater than 40% would eliminate potential impacts on 22,000 acres (2%) of the planning area. Alternative IV would therefore reduce soil erosion potential on more acres compared to the No Action Alternative or Alternatives I, II, and III.

Impacts from Upland Vegetation Actions

Vegetation communities influence soil stability, water infiltration, and nutrient cycling. Vegetation provides cover for soils, protecting them from the erosive forces of wind and water. Plant community species diversity and structural complexity influences the physical structure and ecological function of soil. Properties of soils under shrubs compared to adjacent interspaces have been well documented and were summarized by Chambers and others (Chambers, et al., 2007). Soils under shrubs tend to have lower bulk densities, higher nutrient levels, higher infiltration rates, increased water-holding capacity, larger populations of soil microorganisms, and higher rates of nutrient cycling. In plant communities where shrub mounds are interspersed with interspaces occupied by herbaceous plants and biological crusts, water and nutrients tend to run off or migrate from interspaces to soils under the shrub canopy, thus creating pockets of resource deposition (Eldridge & Rosentreter, 2004).

Alteration of plant communities, particularly conversion of native shrublands and grasslands to annual communities, might change water infiltration, nutrient cycling, soil biotic communities, and soil stability (Belnap, 2003; Belnap & Phillips, 2001; Belnap, et al., 2005; Booth, et al., 2003; Eldridge & Rosentreter, 2004; Hawkes, et al., 2006; Sperry, et al., 2006). The majority of the biomass in grasslands is produced by roots and soil microorganisms (Stanton, 1988). Invasion of cheatgrass into native plant communities increases root and litter biomass and homogenizes their distribution, which influences the composition of soil biotic communities and nutrient cycling (Belnap & Phillips, 2001; Belnap, et al., 2005). Changes in carbon and nitrogen cycles, as well as water infiltration following invasion by non-native annual grasses, are varied and influenced by soil texture, native plant community and cover, and invading species (Belnap, 2003; Ehrenfeld, 2003; Rawls, et al., 1989). Vegetation treatments such as prescribed burning; herbicide treatments; targeted grazing; or mechanical treatments including disking, harrowing, drill seeding, chaining, and brush beating may disrupt the soil surface and change or maintain vegetation communities. These treatments can influence soil erosion, soil physical properties, and soil biological communities. Table 4- 14 displays anticipated changes in acres of each VSG by alternative.

Table 4- 14. Changes in VSG Acres by Alternative (Acres)

VSG	Alternative					
	No Action	I	II	III	IV	V
Annual	-8,000	-44,000	-73,000	-66,000	-73,000	-38,000
Non-Native Perennial	+88,000	-44,000	+105,000	+72,000	-192,000	-192,000
Non-Native Understory	-59,000	-26,000	-32,000	-2,000	+67,000	+192,000
Native Grassland	+200	-213,000	no change	-194,000	-274,000	-179,000
Native Shrubland	-21,000	+327,000	no change	+180,000	+472,000	+217,000
Unvegetated	no change	no change	no change	+11,000	no change	no change

Impacts from Management Specific to the No Action Alternative

The No Action Alternative would increase the acreage of non-native perennial communities through conversion of annual communities and removal of shrubs in non-native understory communities (see *Impacts from Upland Vegetation Actions* in the *Upland Vegetation* section). Treatments to convert annual communities to perennial resulting in complete removal of existing vegetation would occur on less than 1% of the planning area (Table 4- 14). This would be accomplished following wildland or prescribed fire and in conjunction with chemical treatment or seeding perennial vegetation. Treatments would remove shrub overstory from non-native understory and native shrubland communities on about 6% of the planning area using prescribed fire or mechanical treatments.

Wildland fire or prescribed burning would be expected to result in short-term increase in soil surface erosion from water or wind due to removal of vegetation, litter, and remnant biological soil crusts. However, biological crusts are unlikely to be well-developed in annual communities due to high vegetation density and litter deposition (Hilty, et al., 2004; Ponzetti, et al., 2007). Prescribed fire could result in an increase in cheatgrass (Bradford & Laurenroth, 2006), which can subsequently alter soil nutrients (Ehrenfeld, 2003; Evans, et al., 2001; Sperry, et al., 2006), and water processes (Belnap, et al., 2005; Melgoza, et al., 1990). This effect would likely be short term, as the goal of treatment would be to establish perennial vegetation. Dominance of plant communities by perennial versus annual vegetation would provide more consistent cover of the soil surface and thus would reduce potential for soil loss by erosion. Conversion of annual to perennial communities would also improve soil nutrient and water cycling over sites dominated by cheatgrass, (Ehrenfeld, 2003; Evans, et al., 2001; Sperry, et al., 2006).

Herbicides used alone or in conjunction with fire to reduce cheatgrass cover and biomass would result in vegetation removal and a potential increase in soil surface erosion from water or wind. This effect would be short term if perennial vegetation is established subsequent to treatment. Herbicide treatment would leave vegetative litter on the ground to protect soils and is expected to have less impact to biological soils crusts than fire. Soil nutrient and water cycling would be expected to improve following replacement of annual communities with perennial communities.

Mechanical treatments, including but not limited to drill seeding, broadcast seeding with harrow or chaining, brush beating, mowing, and Dixie harrow, would result in soil surface disturbance, which could result in short-term increase for erosion potential. Interseeding methods could result in localized disturbance of the soil surface, including biological crusts, but would not likely increase potential for soil erosion in the short term since vegetation would be left on site.

Soil disturbances from brush beating and mowing would occur from removal of shrubby or herbaceous vegetation canopy and potentially result in increased erosion (Johnson, et al., 1980). However, deposition of dead vegetation would create a litter layer, which would provide some protection to the soil surface. Drill seeding, Dixie harrowing, and chaining result in disruption of the soil surface, although furrows created by drill seeding can reduce runoff and increase infiltration (Brown, et al., 1985). Soil impacts from rangeland drills can be reduced by the use of depth bands. In general, these types of disturbance disturb but do not eliminate remnant biological soil crusts and establishment of perennial vegetation can promote their recovery (Hilty, et al., 2004). The potential for soil erosion following mechanical treatments would decrease in the long-term due to increased cover of perennial vegetation.

Removal of shrub canopy can change spatial and temporal patterns in soil surface temperature, with greater temperature variation occurring in areas lacking shrub canopy (Hedrick, et al., 1966; Pierson & Wight, 1991). This could influence establishment and survival of organisms that live near the soil surface (Pierson & Wight, 1991). Removal of shrubs would alter soil water patterns by reducing canopy cover that absorbs raindrop impact and the abundance of soil pores that result from surface roots and soil invertebrates that facilitate water flow (Eldridge & Rosentreter, 2004). Over the long term, removal of shrubs can potentially increase soil erosion and soil bulk density and reduce below-surface structural and functional complexity. However, retention of perennial grassland communities, particularly those dominated by mid- to late-seral bunchgrasses, would provide cover for protection of surface soils (Eckert, et al., 1986) and have root systems that can facilitate maintenance of soil biotic communities as well as soil nutrient and water cycling (Chambers, et al., 2007).

Impacts from Management Common to All Action Alternatives

Management actions common to all action alternatives would generally maintain or improve conditions that contribute to soil surface erosion. Implementation of drought management guidelines would maintain or improve vegetation cover during drought conditions. Resting vegetation treatment areas from uses such as livestock and wild horse grazing and recreational use until treatment objectives are met and predicted to be sustainable would enhance vegetation cover and reduce short-term potential for soil surface erosion.

Impacts from Management Specific to Alternative I

Alternative I would increase the acreage of native shrubland through conversion of annual, non-native perennial, non-native understory, and native grassland communities (see *Impacts from Upland Vegetation Actions* in the *Upland Vegetation* section). This would be accomplished through use of multiple tools including chemical, mechanical, and biological treatments; seeding and planting, including interseeding existing perennial grassland or shrubland communities; and targeted grazing.

Treatments to convert annual communities to perennial grassland or shrubland communities would occur on about 3% of the planning area (Table 4- 14). The effects of burning, chemical, and mechanical treatments, including seeding and planting, would be similar to those described for the No Action Alternative. Biological treatments, such as the use of insect or fungal pests to control noxious weeds or invasive plants, would not likely result in large-scale, contiguous or simultaneous removal of plant biomass. Biological treatments would not result in increased surface erosion or soil bulk density.

Targeted grazing would result in localized removal of vegetation to reduce fine fuels as well as populations of noxious weeds and invasive plants. Vegetation removal would increase potential for soil erosion due to water or wind. Depending on soil moisture and texture, concentrated livestock use for targeted grazing could result in increased soil bulk density. Effects could be short-term if vegetation removal is followed by a maintenance treatment such as establishment of perennial vegetation. Repeated grazing treatments would result in long-term impacts.

Native shrubland would be restored on 24% of the planning area. This would be accomplished by aerial or mechanical seeding, or planting by hand or mechanical means. Aerial seeding would occur following other treatments including wildland fire, prescribed fire, chemical treatment, and/or mechanical seeding. Aerial seeding would not result in soil disturbance. Planting shrubs by hand or mechanical means would entail small-scale soil disturbance due to removal of existing vegetation and augering holes at individual shrub locations. Soil surface disturbance would be short term and would not likely increase potential for erosion. Over the long term, establishment of shrubs would diversify above- and below-ground structure and could result in lower soil bulk density and improved soil nutrient and water cycling.

Rehabilitating areas disturbed by project construction, maintenance, or removal with a diverse mix of vegetation would minimize soil erosion and protect soil surfaces from raindrop impact, thus reducing the potential for surface sealing and run-off. Prevention of soil loss coupled with re-establishment of species and structural diversity would tend to maintain or improve soil nutrient and water cycling.

Management to maintain or improve the cover of biological soil crusts in native grassland and shrubland communities would protect the soil surface over greater than half of the planning area from erosive processes and enhance nutrient cycling (Belnap, 2001; J. Belnap, et al., 2001; Evans & Lange, 2001; Warren, 2001a, 2001b).

Impacts from Management Specific to Alternative II

Alternative II would increase the acreage of non-native perennial communities through conversion of annual communities and removal of shrubs in non-native understory communities (see *Impacts from Upland Vegetation Actions* in the *Upland Vegetation* section). This would be accomplished through use of multiple tools including prescribed fire; chemical, mechanical, and biological treatments; seeding and planting, including interseeding existing perennial grassland or shrubland communities; and targeted grazing. Treatments to convert annual communities to perennial would occur on about 5% of the planning area (Table 4- 14). The effects of burning, chemical, mechanical (including seeding and planting), biological, and targeted grazing treatments would be similar to those described for the No Action Alternative and Alternative I.

Shrubs would be removed on about 2% of the planning area in the Non-Native Understory VSG. Effects of specific treatments would be similar to those described for the No Action Alternative and Alternative I, except herbicides could be utilized to kill shrubs in non-native understory communities. Dead sagebrush left in place would continue to provide some thermal insulation to the soil surface (Hedrick, et al., 1966). Since there would be no soil surface disturbance or removal or shrub roots, soil bulk density would not likely increase over the short term. Long-term impacts of shrub removal would be the same as those described for the No Action Alternative.

Rehabilitating areas disturbed by project construction, maintenance, or removal with grasses would minimize soil erosion and protect soil surfaces from raindrop impact, thus reducing the potential for surface sealing and run-off.

Impacts from Management Specific to Alternative III

Alternative III would increase the acreage of non-native perennial and native shrubland communities through conversion of annual and native grassland communities (see *Impacts from Upland Vegetation Actions* in the *Upland Vegetation* section). This would be accomplished through use of multiple tools including prescribed fire; chemical, mechanical, and biological treatments; seeding and planting; and targeted grazing. Treatments to convert annual communities to perennial communities would occur on about 5% of the planning area (Table 4- 14). The effects of burning, chemical, mechanical (including seeding and planting), biological, and targeted grazing treatments would be similar to those described for the No Action Alternative and Alternative I.

Shrubs would be removed on less than 1% of the planning area in the Non-Native Understory VSG utilizing prescribed fire, chemical, or mechanical treatments. Effects of specific treatments would be similar to those described for the No Action Alternative and Alternatives I and II.

Native shrubland would be restored on 13% of the planning area. Treatment effects would be similar to those described in Alternative I.

Vegetation on about 1% of the planning area would be removed to create unvegetated fuel breaks. This would be accomplished through use of prescribed fire, chemical, mechanical, or targeted grazing treatments. General effects of these treatments are described for the No Action Alternative and Alternative I. Complete lack of vegetative, litter, or biological crust cover would increase potential for formation of physical crusts resulting from raindrop impact on the soil surface. This would reduce infiltration and increase run-off. Lack of cover would also leave unvegetated fuel breaks vulnerable to water and wind erosion. Maintenance of unvegetated fuel breaks would require repeated treatment, which would magnify treatment effects and extend them from short term to long term. Therefore, repeated treatments to maintain unvegetated fuels breaks would result in long-term soil loss due to water and wind erosion, increased bulk density, and reduced infiltration. These effects, while long term, would be relatively small and localized on a landscape scale.

Effects of treatments on areas disturbed by project construction, maintenance, or removal to reduce wildland fire size and intensity would be dependent on methods and materials. The effects of potential treatments, including seeding to establish perennial vegetation and unvegetated fuel breaks, are described above.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV would increase the acreage of non-native understory and native shrubland communities through conversion of annual, non-native perennial, non-native understory, and native grassland communities (see *Impacts from Upland Vegetation Actions* in the *Upland Vegetation* section). This would be accomplished through use of multiple tools including prescribed fire; chemical, mechanical, and biological treatments; seeding and planting, including interseeding existing perennial grassland or shrubland communities; and targeted grazing. Treatments to convert annual to perennial communities would occur on about 5% of the planning area (Table 4- 14). The effects of burning, chemical, mechanical (including seeding and planting), biological, and targeted grazing treatments would be similar to those described for the No Action Alternative and Alternative I.

Shrubs would be restored on 39% of the planning area. Treatment effects would be similar to those described in Alternative I, but would cover the greatest area of all alternatives. Treatments to restore non-native understory to native shrubland communities would occur on about 1% of the planning area and could include chemical or targeted grazing treatments to remove or reduce non-native perennial grasses followed by interseeding native understory grasses and forbs. These treatments would result in short-term reductions in understory cover, including biological crusts, with increased potential for soil surface erosion. Targeted grazing could result in increased soil bulk density; however, these effects would be short term. Over the long term, establishment of diverse native shrubland communities would diversify above- and below-ground structure and could result in lower bulk densities and improve nutrient and water cycling.

Rehabilitating areas disturbed by project construction, maintenance, or removal with a diverse mix of native vegetation would minimize soil surface erosion. Reduction of soil surface erosion coupled with re-establishment of species and structural diversity would tend to maintain or improve soil nutrient and water cycling.

Management to maintain or improve cover of biological soil crusts would reduce soil surface erosion throughout the planning and improve nutrient and water cycling (Belnap, 2001; Jayne Belnap, et al., 2001; Evans & Lange, 2001; Warren, 2001a, 2001b).

Impacts from Management Specific to Alternative V

Alternative V would increase the acreage of non-native understory and native shrubland communities through conversion of annual, non-native perennial, and native grassland communities (see *Impacts from Upland Vegetation Actions* in the *Upland Vegetation* section). This would be accomplished through use of multiple tools including prescribed fire; mechanical and biological treatments; seeding and planting, including interseeding existing perennial grassland communities; and removal of grazing. Treatments to convert annual communities to perennial would occur on about 3% of the planning area (Table 4- 14). The effects of burning, mechanical (including seeding and planting), and biological treatments would be similar to those described for the No Action Alternative and Alternative I. Since chemical treatments would only be used as a last resort, it is expected that effects due to chemical treatments would be minor. Effects associated with removal of grazing are discussed under *Impacts from Livestock Grazing Actions*.

Shrubs would be restored on 30% of the planning area. Treatment effects would be similar to those described in Alternative I.

Effects of rehabilitating areas disturbed by project construction, maintenance, or removal with a diverse mix of native vegetation would be the same as those described for Alternative IV.

Effects of management to maintain or improve cover of biological soil crusts throughout the planning area would be the same as for Alternative IV.

Impacts from Wildland Fire Ecology and Management Actions

Wildland fire is a natural part of the ecosystem. Fire reduces or removes cover of vegetation, biological soil crusts, and litter, which can expose soil to erosion (Hester, et al., 1997; Hilty, et al., 2004; Johansen, 2001; O'Dea & Guertin, 2003; White & Loftin, 2000). Fire effects on soils are highly variable and dependent on both soil and vegetation characteristics. Vegetation recovery following fire depends on the fire severity, time of year, type of vegetation, and soil moisture (Wright, et al., 1979). Recovery of grasses may take one or more years (Wright, et al., 1979), while shrub communities and biological soil crusts may take a decade or more (Hilty, et al., 2004; Johansen, 2001). Erosion from wind or water following fire is expected to be higher in areas categorized with moderate or greater erosion hazard rating.

Soil heating can destroy organic matter in surface horizons, resulting in a collapse of soil structure which increases water erosion potential (DeBano, et al., 2005). Raindrops can detach particles of exposed soil increasing sediment in the runoff (Emmerich & Cox, 1992). Depending on several factors, including fire severity, type and amount of vegetation cover and soil organic matter, soil texture, and soil water content, fire can produce a water-repellant layer and increasing short-term potential for water erosion (Brown, et al., 1985; DeBano, et al., 2005; Emmerich & Cox, 1992; Rau, et al., 2005). Fire can also alter soil nutrient cycling. Effects can be highly variable and are dependent on fire, soil, and vegetation characteristics.

Fires in Critical Suppression Areas are expected to be smaller than fires in Conditional Suppression Areas. Smaller fires are expected to result in fewer acres prone to soil erosion from wind or water. Fire line construction causes localized soil erosion by removing vegetation and displacing soil. Repeated cross-country travel by suppression vehicles on the same path may lead to powdered soils and increase local erosion effects. Fire infrastructure (e.g., fuel breaks, water pipelines or fill areas, helipads, and other facilities) are expected to require access roads for maintenance, but the facilities may help reduce fire size and wildland fire impacts to soils. Table 4- 15 displays the erosion potential of lands within Critical Suppression Areas by alternative.

The effects of fuels treatments on soils, including targeted grazing, are described under *Impacts from Upland Vegetation Actions*.

Table 4- 15. Erosion Potential in Critical Suppression Areas by Alternative (Acres)

Erosion Potential	Alternative [A]					
	I	II	III	IV		V
				IV-A	IV-B	
Water Erosion Potential						
Medium	308,000	124,000	298,000	379,000	345,000	601,000
High	121,000	32,000	128,000	160,000	155,000	396,000
Wind Erosion Potential						
Moderate	260,000	86,000	263,000	343,000	323,000	723,000
Severe	66,000	44,000	66,000	68,000	68,000	95,000
Very Severe	4,000	4,000	4,000	4,000	4,000	4,000

[A] The No Action Alternative identifies the entire planning area as Full Suppression; because of the lack of prioritization within the planning area, impacts are most similar to those in Conditional Suppression Areas.

Impacts from Management Specific to the No Action Alternative

Under the No Action Alternative, the entire planning area would be under full suppression, with no prioritization for response in the event of multiple ignitions. Due to this lack of prioritization, the No Action Alternative increases risk of burning and short-term loss of vegetation cover in all vegetation types (see *Impacts from Upland Vegetation Actions* in the *Upland Vegetation* section). Vegetation removal by fire would increase risk of soil surface erosion, particularly in areas with medium or greater potential for water erosion and/or moderate or greater potential for wind erosion (Table 4- 15).

The No Action Alternative directs fire suppression to be conducted with the least surface disturbance possible, with new fire line construction as a last resort. The recommended practice of burning out from natural barriers or existing roads to suppress a wildland fire would potentially expose more soil to erosion than the construction of new fire line, as it usually results in almost complete removal of existing vegetation. Removal of vegetation for fire line construction would also increase potential for soil erosion. Limiting use of surface-disturbing equipment would reduce the depth of soil surface disturbance compared to hand construction of fire lines. This could reduce localized soil erosion due to fire line construction.

Suppression activities require multiple actions to initiate and sustain operations, including but not limited to use of established routes and potential cross-country travel for access and establishment and use of base camps or staging areas. Access routes can be impacted by repeated use by suppression vehicles resulting in increased erosion and soil bulk density.

Establishment and use of base camps or staging areas for large fires would reduce or remove cover of vegetation due to vehicle use and trampling by fire suppression personnel. The concentrated activity could result in short-term and small-scale increases in soil erosion and bulk density. These effects would remain until re-establishment of vegetation cover by rehabilitation or natural recovery, usually less than five years.

Under the No Action Alternative, new fuel breaks would be established and existing fuel breaks would likely be maintained. New fuel breaks would primarily be established through mechanical seeding as part of ES&BAR treatments. Methods for maintaining fuel breaks could include but are not limited to prescribed burning, mowing, brush beating, or Dixie harrow. Effects of these treatments are described for the No Action Alternative under the *Upland Vegetation Actions* above. Vegetated fuel breaks may not require maintenance every year.

Restriction of grazing following fire with or without seeding would increase the potential for vegetation recovery and/or establishment over the short term, and would reduce the amount of time that the burned area would have increased risk of soil erosion.

Impacts from Management Common to All Action Alternatives

Wildland fire management actions common to all action alternatives emphasize incorporation of BMPs for wildland and prescribed fire in BLM management activities. Guidance to minimize the width of control lines, prioritize use of existing roads prior to construction of new dozer lines, use of natural firebreaks and existing roads and trails to contain wildland fire in special designation areas, and restrictions on earth-moving equipment in WSAs would reduce potential for wind or water erosion in small-scale, linear areas.

Fuels management and ES&BAR management actions common to all action alternatives provide guidance to minimize treatment-related soil surface disturbance, which would reduce soil erosion potential. Guidance for rest of treated and burned areas from uses including livestock, wild horses, and recreation would increase the potential for vegetation recovery and seeding establishment and reduce the amount of time that the burned area has increased risk for soil erosion.

Impacts from Management Specific to Alternative I

Fire suppression priorities in Alternative I would protect soils with high potential for water erosion through protection of native plant communities in VMAs C and B. Alternative I would reduce risk of erosion due to vegetation cover removal on soils rated as severe to very severe potential for wind erosion through protection of Wildland Urban Interface (WUI) areas along the Snake River and the Middle Snake ACEC. Effects of fire suppression activities would be similar to those described for the No Action Alternative.

Construction, use, and maintenance of new roads to facilitate fire suppression would result in long-term increases in soil bulk density. The combination of road surface, ditches, and culverts would be expected to concentrate water flows and increase erosion. This impact would be expected to increase with slope and precipitation. Soils in areas with relatively flat slopes would be less likely to have water erosion compared to steeper slopes. Existing routes improved for fire suppression already have some increased soil erosion and bulk density. Improvements to roads, including but not limited to widening and installation of ditches and culverts, would result in impacts similar to those described for new roads.

Establishment of new water developments for fire suppression could result in some additional route construction for access and maintenance. Soil bulk density would be expected to increase under frequently used routes. Soil bulk density would also increase in areas around ponds or hydrants repeatedly accessed by fire suppression equipment such as water tenders and heavy engines. Actions to improve water access for fire suppression including modification of existing water pipelines for hydrant installation, enlarging ponds or reservoirs, and adding storage tanks would involve soil disturbance using heavy equipment. These actions would be small in scale but would result in some localized increases in erosion and soil bulk density.

Construction of new guard stations would result in small-scale disturbance due to excavation and construction activities. Establishment, use, and maintenance of access roads and parking areas would result in increased soil bulk density and potential increases in soil erosion. This disturbance would be negligible on a landscape scale.

Improved fire suppression abilities would be expected to reduce wildland fire size. Increases in soil erosion and bulk density resulting from these actions would be less compared to the impacts associated with large wildland fires. Restrictions on travel and transportation during vulnerable periods including hot, dry weather would reduce the potential for human-caused wildland fire and the resultant impacts to soils.

Approximately 11,000 acres (less than 1% of the planning area) of vegetated fuel breaks would be installed under Alternative I. Impacts of establishment and maintenance of fuel breaks are described for the No Action Alternative and are expected to be minor on the scale of the planning area.

Impacts from Management Specific to Alternative II

Fire suppression priorities in Alternative II would protect little of the area containing soils with high potential for water erosion. Alternative II would reduce erosion risk due to vegetation removal by fire on soils rated as severe to very severe potential for wind erosion through protection of WUI and perennial grassland areas along the Snake River.

The impacts of fire suppression activities and of increased fire suppression infrastructure in Alternative II would be similar to those described for the No Action Alternative and Alternative I. Lack of restrictions on travel and transportation during vulnerable periods including hot, dry weather could increase potential for human-caused wildland fire and the resultant impacts to soils.

Approximately 13,000 acres (less than 1% of the planning area) of vegetated fuel breaks would be installed under Alternative II. Impacts of establishment and maintenance of fuel breaks are described for the No Action Alternative. Impacts to soil are expected to be minor on the scale of the planning area.

Impacts from Management Specific to Alternative III

Under Alternative III, Critical Suppression Areas would contain about the same number of acres as Alternative I (Table 4- 15).

Fire suppression priorities in Alternative III would protect about the same amount of area containing soils with high potential for water erosion as Alternative I through protection of key sage-grouse habitat. Alternative III would reduce impacts from fire to soils rated as severe to very severe potential for wind erosion through protection of WUI and perennial grassland areas along the Snake River.

The impacts of fire suppression activities and increased fire suppression infrastructure in Alternative III would be similar to those described for the No Action Alternative and Alternative I. Impacts of building new helipads and airstrips would be similar to impacts of guard station construction. Impacts of airstrip maintenance would be similar to effects of maintaining vegetated fuel breaks, but on a smaller scale. Restrictions on travel and transportation during vulnerable periods including hot, dry weather would decrease potential for human-caused wildland fire and the resultant impacts to soils.

Approximately 25,000 acres (2% of the planning area) of vegetated fuel breaks and 11,000 acres (less than 1% of the planning area) of unvegetated fuel breaks would be installed under Alternative III. Impacts of establishment and maintenance of vegetated fuel breaks are described for the No Action Alternative. Impacts of fuel breaks are expected to be minor on the scale of the planning area.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Under Alternative IV-A, Critical Suppression Areas would contain more acres of soils with medium or greater potential for water erosion or moderate potential for wind erosion compared to Alternatives I, II, III, or IV-B. Acres in Critical Suppression Areas with severe or very severe potential for wind erosion would be the same as in Alternatives I, III, and IV-B (Table 4- 15).

Under Alternative IV-B (the Preferred Alternative), Critical Suppression Areas would contain more acres of soils with medium or greater potential for water erosion or moderate potential for wind erosion compared to the No Action Alternative or Alternative I, II, or III and slightly fewer acres compared to Alternative IV-A. Acres in Critical Suppression Areas with severe or very severe potential for wind erosion would be the same as Alternatives I, III, and IV-A (Table 4- 15).

Fire suppression priorities in Alternative IV would protect more acres of soils with high potential for water erosion than Alternatives I and III through protection of key sage-grouse habitat, native plant communities, and the Inside Desert and Jarbidge Foothills ACECs. Alternative IV would have similar protections to Alternatives I and III for soils rated as severe to very severe potential for wind erosion through protection of WUI areas along the Snake River.

The impacts of fire suppression activities and of increased fire suppression infrastructure in Alternative IV would be similar to those described for the No Action Alternative and Alternative I. Localized impacts due to building or improving water developments would be less under Alternative IV. Restrictions on travel and transportation during vulnerable periods such as hot, dry weather would decrease potential for human-caused wildland fire and the resultant impacts to soils.

Approximately 11,000 acres (less than 1% of the planning area) of vegetated fuel breaks would be installed under Alternative IV. Impacts of establishment and maintenance of fuel breaks are described for the No Action Alternative. Impacts of fuel breaks are expected to be minor on the scale of the planning area.

Impacts from Management Specific to Alternative V

Under Alternative V, Critical Suppression Areas would contain more acres of soils with medium or greater potential for water erosion or moderate to severe potential for wind erosion compared to the other action alternatives. Acres in Critical Suppression Areas with very severe potential for wind erosion would be similar to the other action alternatives (Table 4- 15).

Fire suppression priorities in Alternative V would protect almost all of the area containing soils with high potential for water erosion through protection of key sage-grouse habitat, native plant communities, and the Sagebrush Sea ACEC. Alternative V would protect a greater area compared to the other action alternatives for soils rated as severe for potential wind erosion through protection of WUI areas along the Snake River as well as the Sagebrush Sea ACEC.

The impacts of fire suppression activities and improvements to existing infrastructure would be similar to those described for the No Action Alternative and Alternative I. Localized impacts due to construction of new infrastructure would not occur under Alternative V. Restrictions on travel and transportation during vulnerable periods such as hot, dry weather would decrease potential for human-caused wildland fire and the resultant impacts to soils.

Approximately 7,000 acres (less than 1% of the planning area) of vegetated fuel breaks would be installed under Alternative V. Impacts of establishment and maintenance of fuel breaks are described for the No Action Alternative. Impacts of fuel breaks are expected to be minor on the scale of the planning area.

Impacts from Livestock Grazing Actions

Livestock grazing influences soil properties primarily through removal of vegetation and trampling. The effects of livestock use on soils are influenced by a variety of factors including season of use, soil moisture, soil texture, stocking rate, and location and density of concentration areas such as water or supplement sources or trailing areas (Hart, et al., 1993; Rawls, et al., 1989; Tate, et al., 2004; Van Haveren, 1983). Livestock use reduces plant cover, particularly cover of herbaceous plants, potentially increasing risk of soil erosion. Limited research has been conducted evaluating soil erosion relative to specific utilization (Giordanego, et al., 2003). Light to moderate utilization levels (less than 40%) for native grassland and shrubland are believed provide adequate protection of soil from water and wind erosion (Giordanego, et al., 2003; Holecheck, et al., 1998).

The effects of livestock use on biological soil crusts depend on soil texture, crust composition, patterns of seasonal moisture, season of use, and trampling intensity (Warren & Eldridge, 2001). In general, livestock trampling reduces biological soil crust cover (Anderson, et al., 1982; Beymer & Klopatek, 1992; Brotherson, et al., 1983; Warren & Eldridge, 2001), potentially increasing risk of soil erosion. Biological soil crusts are more susceptible to cover reductions due to livestock trampling during dry periods, compared to times when the crust is moist or frozen (Marble & Harper, 1989; Memmot, et al., 1998). Memmot and others found that winter grazing in south-central Idaho when soils are frozen or snow covered maintained biological soil crust cover, while spring and summer use decreased cover (Memmot, et al., 1998). Disturbance of biological soil crusts can change water infiltration patterns within plant communities and may alter nutrient and water cycling on a landscape scale (Belnap, et al., 2005). No known research evaluates specific utilization levels to maintain or increase biological soil crust cover or soil erosion. This relationship has primarily been evaluated by measuring biological soil crust cover at increasing distances from water sources. In general, crust cover is greater with increasing distance from water (Warren & Eldridge, 2001).

Changes in soil bulk density due to livestock grazing are influenced by several factors including soil texture, moisture, and organic matter content, as well as grazing intensity (Abdel-Magid, et al., 1987; Laycock & Conrad, 1967; Van Haveren, 1983) and time of year (Stephenson & Veigel, 1987). Livestock grazing when soils are moist may result in increased bulk density compared to grazing on the same soils when they are drier (Van Haveren, 1983). Patterns and intensity of use can change soil bulk density. Stocking at high rates could increase soil bulk density and reduce infiltration over low or moderate stocking rates (Abdel-Magid, et al., 1987). Soil bulk density is most affected at livestock concentration areas (Tate, et al., 2004), including watering and supplement locations.

The effects described above would not occur in areas unavailable for livestock grazing; these areas are displayed by erosion potential in Table 4- 16.

Table 4- 16. Erosion Potential in Acres Unavailable for Livestock Grazing by Alternative (Acres)

Erosion Potential	Alternative						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
Water Erosion Potential							
Medium	17,000	37,000	20,000	22,000	72,000	52,000	191,000
High	5,000	12,000	7,000	7,000	39,000	28,000	70,000
Wind Erosion Potential							
Moderate	10,000	28,000	15,000	16,000	94,000	63,000	164,000
Severe	9,000	15,000	9,000	10,000	11,000	11,000	44,000
Very Severe	400	1,000	400	500	700	700	9,000

The amount of vegetation removal and change in plant cover is related to the proportion of vegetation production allocated for livestock grazing and the acres available for livestock grazing. In this analysis, estimated AUMs, which incorporate both of these allocations, are used to compare the proportion of vegetation allocated for livestock in each alternative.

Impacts from Management Specific to the No Action Alternative

Under the No Action Alternative, 1,414,000 acres would be available and 51,000 acres would be unavailable to livestock grazing. Table 4- 16 displays the number of acres with medium to high water erosion potential and moderate to very severe wind erosion potential in these areas. Soils in areas unavailable for livestock use would tend to sustain vegetation cover for soil surface protection and would not have potential for increased erosion or soil bulk density associated with concentrated use areas or infrastructure.

Under the No Action Alternative, allocated AUMs would be dependent on production and would range from a minimum of 200,000 under current conditions to a maximum of 260,000, assuming vegetation objectives are achieved. Livestock use under the No Action Alternative would be expected to maintain or slightly increase current levels of soil erosion and bulk density. Authorization of Temporary Non-Renewable Authorizations (TNR) or increases in AUMs due to increased forage production could result in increased soil bulk density and decreased biological crust cover, which could increase risk of soil erosion. Management actions that incorporate wildlife forage and cover needs, or improve ecological condition to good or better, would tend to maintain or improve vegetation and biological crust cover and reduce potential for soil erosion. Grazing systems with consistent livestock use when soils are moist would result in greater potential for increased soil bulk density than systems where regular use by livestock occurs during dry periods. Livestock concentration areas, including water and supplement locations, holding areas, stock driveways, and fence lines would be expected to have higher soil erosion and bulk density compared to surrounding areas.

Increases in the miles of pipelines and fences and numbers of reservoirs, wells, or springs would result in increased density of linear disturbance and disturbed areas radiating from watering points. Installation and maintenance of pipelines results in linear disturbance resulting from burial and, unless pipelines are installed along existing roads, formation and maintenance of primitive roads through repeated use. Areas of new construction would have increased potential for soil erosion due to disruption of the soil profile for burial; roads used for maintenance would have increased soil bulk density and erosion potential due to repeated use. Fence construction does not result in the same degree of soil disturbance as pipeline construction, but primitive roads often form on one or both sides of the fence due to maintenance and other uses. Repeated use along fences due to maintenance and livestock trailing can also create linear disturbances that have increased soil bulk density and may be vulnerable to erosion.

Construction, installation, and maintenance of watering facilities including reservoirs, wells, troughs, and spring developments can result in both linear disturbance corridors due to access needs and a zone of disturbance that radiates out from the watering location (Brooks, et al., 2006; Lange, 1969; Rogers & Lange, 1971). Size of the impacted area depends on levels and consistency of use, but complete removal of vegetation and biological soil crusts can occur within a 50- to 100-foot radius of a watering site. These sites have high potential for long-term increased soil bulk density and erosion potential due to trampling and vegetation removal. Similar effects can be found at locations where salt or supplements are offered.

Actions that exclude livestock from reservoirs and springs and prohibit placement of salting, feeding, holding facilities, or stock driveways in riparian areas would reduce the potential for increased soil bulk density due to livestock trampling in wet conditions.

Impacts from Management Common to All Action Alternatives

Management actions for livestock grazing common to all action alternatives provide guidance and design criteria for implementation-level planning to reduce resource impacts. These actions would help maintain or improve vegetation cover and structure and would tend to reduce potential for increased soil surface erosion and bulk density.

Implementation of drought management guidelines would be expected to retain adequate vegetation cover to protect soils during periodic drought cycles. Implementation of guidelines in the Aquatic and Riparian Management Strategy (ARMS) and minimizing disturbance at developed springs would be expected to reduce the potential for increased soil bulk density due to livestock trampling in wet conditions.

Periodic spring or early summer grazing of big game winter range to improve browse could result in an increase in soil bulk density if use occurs during moist periods. Since this action would not likely occur yearly in the same areas, this effect is expected to be short term.

Impacts from Management Specific to Alternative I

Under Alternative I, 1,381,000 acres would be available and 84,000 acres would be unavailable to livestock grazing. More acres of soils with medium or greater potential for water erosion and moderate or greater potential for wind erosion would be unavailable for livestock use compared to the No Action Alternative (Table 4- 16). Effects of non-use would be the same as those described for the No Action Alternative. Livestock-related impacts to soils with high potential for water erosion and severe to very severe potential for wind erosion in Alternative I would be less than in the No Action Alternative due to increased acreage unavailable for grazing.

Under Alternative I, allocated AUMs would be dependent on production and would range from a minimum of 194,000 under current conditions to a maximum of 269,000, assuming vegetation objectives are achieved. Livestock allocations would be similar to those described for the No Action Alternative. However, since use would be allocated over about 3% less acreage in the planning area, impacts could be spread over a slightly smaller area. This effect would be minor on the scale of the planning area.

Livestock use under Alternative I would be expected to maintain current levels of soil erosion and bulk density. Authorization of TNR or increases in AUMs due to increased forage production could result in increased soil bulk density and decreased biological crust cover, which could increase risk of soil erosion. Fences added to protect reference areas would be in addition to fences used to facilitate livestock management. Livestock would likely trail along these fences, locally increasing soil bulk density in trailing areas.

Estimated utilization levels to achieve resource and use objectives of 30% to 40% for native communities and 40% to 50% for non-native communities are generally considered to be of moderate intensity (Holecheck, 1988; Holecheck, et al., 1998).Utilization at the upper end of the ranges would likely maintain current levels of soil erosion and bulk density; utilization at the lower end of the ranges or below would likely reduce impacts (Holecheck, et al., 1999). Biological soil crusts are more sensitive to livestock disturbance than vascular plants and would likely have higher cover and species diversity in native communities with lower utilization (Ponzetti & McCune, 2001; Rogers & Lange, 1971; Warren & Eldridge, 2001). Periodic heavy use (up to 70% every 5 years) in non-native communities would result in short-term increased soil bulk density and potential for wind and water erosion due to loss of vegetation, biological soil crust, and litter cover.

Likewise, targeted grazing treatments are proposed to occur in late spring and early summer to reduce fine fuels and other undesirable vegetation. Because livestock use is intensified during targeted grazing, vegetation and biological soil crust cover would be reduced. Depending on soil moisture and texture, targeted grazing would likely result in short-term increases in soil bulk density, with potential for long-term effects with yearly repeated treatments. Soils in areas that receive targeted grazing are potentially more vulnerable to water or wind erosion following treatment due to reduction of vegetation, biological soil crust, and litter cover. It is expected that areas treated with targeted grazing would be small and would not have major or long-term impacts at the planning area scale.

The number, type, and density of range infrastructure developments under Alternative I would be similar to the No Action Alternative; however locations could be modified to meet resource objectives. Effects of construction, installation, maintenance, and use of developments would be similar to those described for the No Action Alternative.

Removal or relocation of fences could result in short-term increases in soil erosion and bulk density due to motorized vehicle access for removal of posts, wire, and other components.

Impacts from Management Specific to Alternative II

Under Alternative II, 1,406,000 acres would be available and 59,000 acres would be unavailable to livestock grazing. Slightly more acres with soils with medium or greater potential for water erosion and moderate or severe potential for wind erosion would be unavailable for livestock use compared to the No Action Alternative, but less than for Alternative I (Table 4- 16). The number of acres unavailable to livestock grazing with very severe potential for wind erosion would be about the same as in the No Action Alternative and less than for Alternative I. Effects of non-use would be the same as those described for the No Action Alternative. Livestock-related impacts would occur on about the same number of acres of soils with medium or greater potential for water erosion and moderate or greater potential for wind erosion as the No Action Alternative and on more acres than Alternative I.

Under Alternative II, allocated AUMs would be dependent on production and would range from 352,000 under current conditions to a maximum of 479,000, assuming vegetation objectives are achieved. Increased allocations and anticipated increases in number and density of livestock infrastructure developments to support proposed allocations would likely result in increased soil erosion and bulk density throughout the areas available for grazing. Effects of construction, installation, maintenance, and use of developments would be similar to those described for the No Action Alternative, but would occur at a higher density within areas available to grazing.

Effects of TNR and targeted grazing would be similar to those described for Alternative I. Estimated utilization levels to achieve resource and use objectives of 40% to 50% for native communities and 50% to 60% for non-native communities are generally considered to be of moderate to high intensity (Holecheck, 1988; Holecheck, et al., 1998). Utilization at the upper end of the ranges would tend to reduce vegetation, biological soil crust, and litter cover and increase current levels of soil surface erosion and soil bulk density; utilization at the lower end of the ranges or below would be required to maintain static conditions (Holecheck, et al., 1999). It is expected that biological soil crust cover and species diversity would be reduced under moderate to high utilization (Ponzetti & McCune, 2001; Rogers & Lange, 1971; Warren & Eldridge, 2001). Periodic short-term heavy use (up to 70% every 5 years) is expected to have impacts similar to those described for Alternative I.

Impacts from Management Specific to Alternative III

Under Alternative III, 1,404,000 acres would be available and 61,000 acres would be unavailable to livestock grazing. More acres with soils with medium or greater potential for water erosion and moderate or greater potential for wind erosion would be unavailable for livestock use in Alternative III compared to the No Action Alternative or Alternative II, but less than in Alternative I (Table 4- 16). Effects of non-use would be the same as those described for the No Action Alternative. Livestock-related impacts would occur on slightly fewer acres with soils with medium or greater potential for water erosion and moderate or greater potential for wind erosion compared to the No Action Alternative and Alternative II and on slightly more acres than Alternative I.

Under Alternative III allocated AUMs would be dependent on production and would range from a minimum of 279,000 under current conditions to a maximum of 382,000, assuming vegetation objectives are achieved. Increased allocations compared to the No Action Alternative and anticipated increases in number and density of livestock infrastructure developments to support proposed allocations would likely result in increased soil erosion and bulk density throughout the areas available for grazing. Effects of construction, installation, maintenance, and use of developments would be similar to those described for the No Action Alternative. Effects of proposed allocations and infrastructure development would occur at a higher density within areas available to grazing compared to the No Action Alternative and Alternative I, but at a lower density compared to Alternative II. Effects of fence removal or relocation would be similar to those described for Alternative I.

Effects of TNR and targeted grazing would be similar to those described for Alternative I. Estimated utilization levels to achieve fire and resource objectives are 30% to 40% for native communities and 50% to 60% for non-native perennial communities. Effects of proposed utilization levels in native communities would be similar to those described for Alternative I; effects of proposed utilization levels in non-native communities would be similar to Alternative II. It is expected that biological soil crusts would have greater cover and species diversity in native communities with lower utilization. Periodic short-term heavy use (up to 70% every 5 years) is expected to have results similar to those described for Alternative I.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Under Alternative IV-A, 1,320,000 acres would be available and 145,000 acres would be unavailable to livestock grazing. More acres with soils with medium or greater potential for water erosion and moderate potential for wind erosion would be unavailable for livestock use compared to the No Action Alternative or Alternatives I, II, or III (Table 4- 16). Acres unavailable with severe or very severe potential for wind erosion would be greater than the No Action Alternative or Alternatives II or III, but less than for Alternative I. Effects of non-use would be the same as those described for the No Action Alternative. Livestock-related impacts would occur on fewer acres of soils with medium or greater potential for water erosion and moderate potential for wind erosion than for the No Action Alternative or Alternatives I, II, or III. Impacts would occur on about the same acreage of soils with severe or very severe potential for wind erosion as the No Action Alternative and Alternatives II and III, but on more acreage than Alternative I.

Under Alternative IV-B (the Preferred Alternative), 1,352,000 acres would be available and 113,000 acres would be unavailable to livestock grazing. More acres with soils with medium or greater potential for water erosion and moderate potential for wind erosion would be unavailable for livestock use compared to the No Action Alternative or Alternatives I, II, or III, but less than for Alternative IV-A (Table 4- 16). Acres unavailable with severe or very severe potential for wind erosion would be greater than the No Action Alternative or Alternatives II or III, but less than for Alternative I and similar to Alternative IV-A. Effects of non-use would be the same as those described for the No Action Alternative. Livestock-related impacts would occur on fewer acres of soils with medium or greater potential for water erosion and moderate potential for wind erosion than for the No Action Alternative or Alternatives I, II, or III, and on slightly more acres than Alternative IV-A. Impacts would occur on about the same acreage of soils with severe or very severe potential for wind erosion as the No Action Alternative and Alternatives II, III, and IV-A, but on more acreage than Alternative I.

Under Alternative IV-A, allocated AUMs would be dependent on production and would range from a minimum of 100,200 under current conditions to a maximum of 141,000, assuming vegetation objectives are achieved. Under Alternative IV-B, allocated AUMs would be dependent on production and would range from a minimum of 103,000 under current conditions to a maximum of 145,000, assuming vegetation objectives are achieved.

Decreased allocations compared to the No Action Alternative and anticipated decreases in number and density of livestock infrastructure developments needed to support proposed allocations could result in long-term decreased soil erosion and bulk density throughout the areas available for grazing. This effect would be more pronounced under Alternative IV-A compared to IV-B. Effects of construction, installation, maintenance, and use of developments would be similar to those described for the No Action Alternative. Effects of proposed allocations and infrastructure development would occur at a lower density within areas available to grazing compared to the No Action Alternative and Alternatives I, II, and III. Effects of fence removal or relocation would be similar to those described for Alternative I.

Effects of TNR and targeted grazing would be similar to those described for Alternative I. However, since TNR would not be allowed in pastures with greater than 25% native communities (by cover), excluding Sandberg/non-native areas, the proportion of landscape affected would be less than for the No Action Alternative or Alternatives I, II, or III. Periodic heavy use would not occur under Alternative IV. Therefore, impacts due to livestock use would be further reduced compared to Alternatives I, II, and III.

Estimated utilization levels to achieve resource objectives of 20% to 30% for native communities and 30% to 40% for non-native communities are generally considered to be of light intensity (Holecheck, 1988; Holecheck, et al., 1998). Utilization within these ranges, particularly at the lower end of the ranges or below would tend to reduce soil erosion and soil bulk density to maintain or increase of vegetation cover (Holecheck, et al., 1999). Light utilization levels proposed under Alternative IV would also tend to promote greater cover and species diversity for biological crusts (Ponzetti & McCune, 2001; Rogers & Lange, 1971; Warren & Eldridge, 2001).

Impacts from Management Specific to Alternative V

Under Alternative V, 1,156,000 acres would be available and 309,000 acres would be unavailable to livestock grazing. The greatest acreage of soils with medium or greater potential for water erosion and moderate or greater potential for wind erosion would be unavailable for livestock use compared to all other alternatives (Table 4- 16). Effects of non-use would be the same as those described for the No Action Alternative. Livestock-related impacts would occur on the least acreage with soils with medium or greater potential for water erosion and moderate or greater potential for wind erosion than for all other alternatives.

Under Alternative V allocated AUMs would be dependent on production and would range from a minimum of 50,000 under current conditions to a maximum of 98,000, assuming vegetation objectives are achieved. Decreased allocations and anticipated decreases in number and density of livestock infrastructure developments needed to support proposed allocations would likely result in long-term decreased soil erosion and bulk density throughout the areas available for grazing. This effect would be more pronounced under Alternative V than all other alternatives. Effects of construction, installation, maintenance, and use of developments would be similar to those described for the No Action Alternative, except there would be no impacts due to pipeline construction. Effects of proposed allocations and infrastructure development would occur at the lowest density within areas available to grazing compared to all other alternatives. Effects of fence removal or relocation would be similar to those described for Alternative I.

There would be no TNR, targeted grazing, or periodic heavy use under Alternative V. Therefore, impacts due to livestock use would be further reduced compared to all other alternatives.

The effects of estimated utilization levels would be similar to Alternative IV, except in the Sagebrush Sea ACEC where utilization levels of 10% to 20% would further reduce impacts to soils.

Impacts from Transportation and Travel Actions

Construction, use, and maintenance of roads, primitive roads, and trails increase soil bulk density. This reduces water infiltration, concentrates water flow, and increases runoff, resulting in localized areas of increased soil erosion by water (Adams, et al., 1981; Forman & Alexander, 1998; Gelbard & Belnap, 2003; Iverson, et al., 1981; Switalski, et al., 2004; Trombulak & Frissell, 2000). The effects increase with slope. Roadside depositions created by grading can modify soil nutrient and water cycling by changing soil depth, chemistry, and texture (Gelbard & Belnap, 2003).

Cross-country motorized vehicle use can result in increased soil erosion and bulk density, (Adams, et al., 1981; Eckert, et al., 1979; Iverson, et al., 1981). Tire tracks can concentrate water flow and can contribute to soil erosion (Eckert, et al., 1979), with greater effects when soils are wet (Adams, et al., 1981). Increased soil bulk density resulting from vehicle use may take several years to decades to recover once use is halted (Prosser, et al., 2000; Trombulak & Frissell, 2000).

Cross-country motorized vehicle use can decrease cover of biological soil crusts (Belnap & Eldridge, 2001). The effects of vehicle use depend on several factors including soil texture, soil moisture, soil chemistry, and crust composition. Belnap determined that as few as four passes with a slow-moving vehicle crushed biological soil crusts (Belnap, 2002). This can result in increased erosion and changes to nutrient and water cycles.

Impacts from Management Specific to the No Action Alternative

Travel Management Areas (TMAs) would not be created under the No Action Alternative. Since the majority of the planning area would be open to cross-country motorized vehicle use, this type of use would be expected to increase, and additional unplanned routes would be created by repeated use. This would result in a long-term increase in route density within the planning area.

Increased route density would increase the proportion of the planning area where soils have increased soil bulk density. Since the majority of the soils in areas designated as open to cross-country motorized vehicle use are classified as medium or greater potential for water erosion or moderate or greater potential for wind erosion (Table 4- 17), it is likely soil surface erosion due to vehicular use would increase over the planning area.

Table 4- 17. Erosion Potential by Travel Designation in the No Action Alternative (Acres)

Erosion Potential	Closed	Limited to Designated Routes	Limited to Designated Ways	Open
Water Erosion Potential				
Medium	3,000	146,000	28,000	675,000
High	1,000	44,000	38,000	353,000
Wind Erosion Potential				
Moderate	2,000	119,000	52,000	731,000
Severe	2,000	17,000	1,000	180,000
Very Severe	0	303	0	18,000

Impacts from Management Common to All Action Alternatives

Management actions common to all action alternatives provide guidance and protective mechanisms that would reduce impacts to soils due to route or use designations. The exception for cross-country vehicle travel to members of the Shoshone-Paiute or Shoshone-Bannock Tribes could contribute to continued use of some undesignated routes by the tribes. The impacts from use of undesignated routes by tribal members are expected to be minimal.

Impacts from Management Specific to Alternative I

Under Alternative I, less than 1% of the planning area would be open to cross-country motorized vehicle use, 93% would be limited to designated routes, 5% would be limited to designated ways, and 4% would be closed to motorized vehicle use. Most of the acreage with medium or greater potential for water erosion and/or moderate or greater potential for wind erosion would be within areas where travel is limited to designated routes (Table 4- 18).

Approximately 3,600 acres of the Deadman/Yahoo SRMA, contained within the Deadman/Yahoo TMA, would be designated open to cross-country motorized vehicle use. This relatively small area has a high density of motorized use, which would be expected to continue under the open designation. Most of the acreage designated as open has soils with medium or greater potential for water erosion and/or moderate or greater potential for wind erosion; however, this acreage is small on the scale of the planning area and the effects would be local and minor on that scale (Table 4- 18). Open designation would result in the continuation of unvegetated areas due to concentrated disturbance that would likely have increased levels of soil erosion and bulk density as compared to surrounding areas not available for cross-country motorized vehicle use.

Areas closed to motorized vehicle use in Alternative I would protect soils with medium or greater potential for water erosion and moderate or greater potential for wind erosion for six times more acres than in the No Action Alternative. These areas would be free of the impacts associated with roads and cross-country motorized vehicle use described for the No Action Alternative. Closure would allow vegetation and biological soil crust recovery and would result in a long-term decrease in soil erosion and bulk density. Almost half of the acres classified as having very severe potential for wind erosion are closed to motorized vehicle use (Table 4- 18).

Table 4- 18. Erosion Potential by Travel Designation in Alternative I (Acres)

Erosion Potential	Closed	Limited to Designated Routes	Limited to Designated Ways	Open
Water Erosion Potential				
Medium	23,000	797,000	31,000	3,000
High	7,000	391,000	38,000	400
Wind Erosion Potential				
Moderate	21,000	830,000	52,000	2,000
Severe	600	195,000	3,000	1,000
Very Severe	8,000	19,000	0	<100

Seasonal closures or restrictions on primitive roads, trails, and open areas would reduce potential for human-caused wildland fire and the resultant impacts to soils as described in *Impacts from Wildland Fire Ecology and Management Actions.*

Approximately 49% of the planning area would retain the current level of route density, primarily in the Devil Creek TMA. Most of the acreage in the Devil Creek TMA has soils with medium or greater potential for water erosion and/or moderate or greater potential for wind erosion (Table 4- 19). Since the focus of this TMA would be to balance livestock grazing management needs with restoration activities, it is anticipated that routes would continue to provide access to existing livestock facilities and existing routes could be modified or new routes could be created on establishment of new facilities. This would likely maintain current levels of soil erosion and bulk density. Actions that allow game retrieval within 300 feet of a designated route and access to camp sites within 25 feet of a designated route would potentially result in expansion of soil surface disturbance beyond the designated route corridor. These actions would result in low density disturbances adjacent to designated routes and could cause localized increases in soil erosion and bulk density and reductions in biological soil crust cover, especially with repeated use. Seasonal restrictions on vehicle use on primitive roads in the HMA from March through July could reduce impacts by eliminating some use when soils are moist. Exemptions to motorized vehicle restrictions that would allow cross-country motorized vehicle use would have effects similar to those described for No Action Alternative.

Route density is expected to decrease over approximately 48% of the planning area. This decrease would be focused in the Canyonlands, Jarbidge Foothills, and Snake River TMAs. Route reduction would tend to increase vegetation and biological soil crust cover over the long term, which would result in reduced soil erosion and bulk density. The impacts would be most prominent in the Snake River TMA, as it has the greatest proportion of soils prone to erosion (Table 4- 19).

Table 4- 19. Erosion Potential by TMA in Alternative I (Acres)

Erosion Potential	Canyonlands	Deadman/ Yahoo	Devil Creek	Jarbidge Foothills	Snake River
Change in Route Density	Decrease	Increase	No Change	Decrease	Decrease
Water Erosion Potential					
Medium	112,000	32,000	326,000	125,000	258,000
High	65,000	7,000	322,000	2,000	40,000
Wind Erosion Potential					
Moderate	136,000	15,000	534,000	48,000	172,000
Severe	5,000	22,000	41,000	12,000	121,000
Very Severe	0	4,000	<100	100	15,000

Impacts from Management Specific to Alternative II

Under Alternative II, none of the planning area would be open to cross-country motorized vehicle use, 93% would be limited to designated routes, 5% would be limited to designated ways, and 2% would be closed to motorized vehicle use. The lack of open designation would eliminate impacts described for that designation in Alternative I. Most of the acres with medium or greater potential for water erosion and/or moderate or greater potential for wind erosion would be within areas where travel is limited to designated routes (Table 4- 20).

The Bruneau and Jarbidge Canyons, which are physically restrictive to motorized transportation, would be closed to motorized vehicle use in Alternative I. This would protect soils with medium or greater potential for water erosion and moderate or greater potential for wind erosion in half the acreage of the No Action Alternative. The effects would be minimal at the planning area scale (Table 4- 20).

Table 4- 20. Erosion Potential by Travel Designation in Alternative II (Acres)

Erosion Potential	Closed	Limited to Designated Routes	Limited to Designated Ways	Open
Water Erosion Potential				
Medium	1,000	821,000	31,000	0
High	1,000	397,000	38,000	0
Wind Erosion Potential				
Moderate	2,000	850,000	52,000	0
Severe	<100	196,000	3,000	0
Very Severe	0	19,000	0	0

Most of the acreage in the Bruneau Desert TMA has soils with medium or greater potential for water erosion and/or moderate or greater potential for wind erosion. Impacts of increased route density within the Bruneau Desert TMA would be similar to impacts described for the No Action Alternative. Route density would be expected to remain the same in approximately 15% of the planning area, primarily within the Canyonlands TMA, to facilitate livestock grazing and mitigation for impacts to resources. Impacts within the Canyonlands TMA would be similar to those described for the Devil Creek TMA in Alternative I, and would only affect 16% of the soils with medium or higher potential for water erosion and 14% with moderate or higher potential for wind erosion (Table 4- 21). Unlimited motorized access off designated routes for game retrieval and within 100 feet of a designated route for camp site access in areas not closed to motorized use would result in impacts similar to those described in Alternative I, but would apply to most of the planning area. Exemptions to motorized vehicle restrictions that would allow cross-country motorized vehicle use would have effects similar to those described for the No Action Alternative. Route density would be expected to increase in about 85% of the planning area and primarily within the Bruneau Desert TMA to facilitate access for commercial uses.

Table 4- 21. Erosion Potential by TMA in Alternative II (Acres)

Erosion Potential	Bruneau Desert	Canyonlands
Change in Route Density	Increase	No Change
Water Erosion Potential		
Medium	740,000	112,000
High	371,000	65,000
Wind Erosion Potential		
Moderate	768,000	136,000
Severe	195,000	5,000
Very Severe	19,000	0

Impacts from Management Specific to Alternative III

Under Alternative III, less than 1% of the planning area would be open to cross-country motorized vehicle use, 93% would be limited to designated routes, 5% would be limited to designated ways, and 2% would be closed to motorized vehicle use. The effects of designated open areas in the Deadman/Yahoo SRMA, which coincides with the Deadman/Yahoo TMA, would be similar to those described for Alternative I. Most of the acreage with medium or greater potential for water erosion and/or moderate or greater potential for wind erosion would be within areas where travel is limited to designated routes (Table 4- 22). The effects of seasonal closures for wildland fire prevention would be similar to those described for Alternative I.

Areas closed to motorized vehicle use in Alternative III would be limited to the Salmon Falls Creek ACEC and the Bruneau and Jarbidge Canyons, which are physically restrictive to motorized transportation. Closed areas would protect soils with medium or greater potential for water erosion and moderate or greater potential for wind erosion in slightly more than half the acreage of the No Action Alternative. These closed areas are small and isolated, and effects at the planning area scale would be minimal (Table 4- 22).

Table 4- 22. Erosion Potential by Travel Designation in Alternative III (Acres)

Erosion Potential	Closed	Limited to Designated Routes	Limited to Designated Ways	Open
Water Erosion Potential				
Medium	1,000	818,000	31,000	3,000
High	1,000	397,000	38,000	400
Wind Erosion Potential				
Moderate	2,000	848,000	52,000	2,000
Severe	<100	195,000	3,000	1,000
Very Severe	100	19,000	0	<100

Route density would be expected to increase in about 2% of the planning area, including within the Deadman/Yahoo TMA to facilitate motorized recreational opportunities. Impacts of increased route density within the Deadman/Yahoo TMA would be similar to impacts described for Alternative I.

Route density would be expected to remain the same in about 98% of the planning area, primarily within the Devil Creek, Jarbidge Foothills, Snake River, and West Side TMAs. These TMAs would be managed to improve access and facilitate wildland fire prevention and suppression. Therefore, management might not increase route density, but could improve surface condition. Improvement of road condition could result in wider disturbance areas adjacent to roads due to increased maintenance, including mowing of roadside areas. This would increase potential for soil surface erosion from the roadbed and roadside due to maintenance of fuel breaks as described under *Impacts from Wildland Fire Ecology and Management Actions*. The Devil Creek TMA would have higher potential for water erosion and the Snake River TMA would have higher potential for wind erosion (Table 4- 23). Lack of motorized access off designated routes for game retrieval and limiting motorized access to camp sites to within 25 feet of a designated route would reduce off-road disturbance relative to the No Action Alternative and Alternatives I and II. Seasonal restrictions on vehicle use of primitive roads in the HMA from March through July could reduce vehicle impacts by eliminating some use when soils are moist. Exemptions to motorized vehicle restrictions that would allow cross-country travel would have effects similar to those described for the No Action Alternative.

Table 4- 23. Erosion Potential by TMA in Alternative III (Acres)

Erosion Potential	Deadman/ Yahoo	Devil Creek	Jarbidge Foothills	Snake River	West Side
Change in Route Density	Increase	No Change	No Change	No Change	No Change
Water Erosion Potential					
Medium	26,000	222,000	125,000	254,000	226,000
High	6,000	246,000	2,000	40,000	143,000
Wind Erosion Potential					
Moderate	14,000	372,000	48,000	164,000	305,000
Severe	16,000	34,000	12,000	123,000	15,000
Very Severe	3,000	<100	100	15,000	0

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Under Alternative IV, less than 1% of the planning area would be open to cross-country motorized vehicle use, 89% would be limited to designated routes, 5% would be limited to designated ways, and 5% would be closed to motorized vehicle use. The effects of open areas in the Deadman/Yahoo SRMA, which coincides with the Deadman/Yahoo TMA, would be similar to those described for Alternative I. Most of the acreage with medium or greater potential for water erosion and/or moderate or greater potential for wind erosion would be within areas where travel is limited to designated routes (Table 4- 24). Closed areas under Alternative IV would include the Bruneau and Jarbidge Canyons and non-WSA lands managed for their wilderness characteristics. The effects would be similar to those described for Alternative I for areas with moderate or greater potential for wind erosion. Areas closed to motorized vehicle use in Alternative IV would protect soils with medium or greater potential for water erosion over 10 times more acres than in the No Action Alternative.

Table 4- 24. Erosion Potential by Travel Designation in Alternative IV (the Preferred Alternative; Acres)

Erosion Potential	Closed	Limited to Designated Routes	Limited to Designated Ways	Open
Water Erosion Potential				
Medium	39,000	780,000	31,000	3,000
High	7,000	391,000	38,000	400
Wind Erosion Potential				
Moderate	24,000	826,000	52,000	2,000
Severe	4,000	191,000	3,000	1,000
Very Severe	100	18,000	0	<100

Lack of motorized access off designated routes for game retrieval and limiting motorized access to campsites to within 25 feet of a designated route would reduce off-road disturbance relative to the No Action Alternative and Alternatives I and II. Exemptions to motorized vehicle restrictions that would allow cross-country travel would have effects similar to those described for the No Action Alternative. Effects of seasonal closures for wildland fire prevention would be similar to those described in Alternative I.

Route density would be expected to increase in about 2% of the planning area, including within the Deadman/Yahoo TMA to facilitate motorized recreational opportunities. Impacts of increased route density within the Deadman/Yahoo TMA would be similar to impacts described for Alternative I. Route density would be expected to decrease in about 98% of the planning area, primarily within the Canyonlands, Devil Creek, Jarbidge Foothills, and Snake River TMAs. The effects of route reduction would be similar to those described for Alternative I but would occur over about double the area. The effects would be most prominent in the Devil Creek and Snake River TMAs, as these TMAs contain the greatest acres of soils prone to water or wind erosion (Table 4- 25).

Table 4- 25. Erosion Potential by TMA in Alternative IV (the Preferred Alternative; Acres)

Erosion Potential	Canyonlands	Deadman/ Yahoo	Devil Creek	Jarbidge Foothills	Snake River
Change in Route Density	Decrease	Increase	Decrease	Decrease	Decrease
Water Erosion Potential					
Medium	112,000	26,000	326,000	125,000	264,000
High	65,000	6,000	322,000	2,000	41,000
Wind Erosion Potential					
Moderate	136,000	14,000	534,000	48,000	172,000
Severe	5,000	16,000	41,000	12,000	127,000
Very Severe	0	3,000	<100	100	15,000

Impacts from Management Specific to Alternative V

Under Alternative V, less than 1% of the planning area would be open to cross-country motorized vehicle use, 89% would be limited to designated routes, none would be limited to designated ways, and 11% would be closed to motorized vehicle use. The effects of designated open areas in the Yahoo SRMA, which coincides with the Yahoo TMA, would be similar to those described for Alternative I but would be spatially reduced by about 80%. The effects would be negligible at the planning area scale. Most of the acres with medium or greater potential for water erosion and/or moderate or greater potential for wind erosion would be within areas where travel is limited to designated routes (Table 4- 26).

Table 4- 26. Erosion Potential by Travel Designation in Alternative V (Acres)

Erosion Potential	Closed	Limited to Designated Routes	Limited to Designated Ways	Open
Water Erosion Potential				
Medium	70,000	783,000	0	300
High	45,000	391,000	0	100
Wind Erosion Potential				
Moderate	77,000	828,000	0	100
Severe	7,000	193,000	0	200
Very Severe	100	18,000	0	<100

Closed areas under Alternative V would include WSAs, including inventoried ways, and non-WSA lands managed for their wilderness characteristics. The effects would be similar to those described for Alternative I; however, Alternative V would protect soils with medium or greater potential for water erosion on 24 times more acres compared to the No Action Alternative. For soils with moderate or greater potential for wind erosion, 18 times more acres would be protected compared to the No Action Alternative. The effects of seasonal closures for wildland fire prevention would be similar to those described for Alternative I.

Route density would be expected to increase in less than 1% of the planning area, primarily within the Yahoo TMA to facilitate motorized recreational opportunities. Impacts of increased route density within the Yahoo TMA would be similar to impacts described for Alternative I, but would apply to less than 10% of the area with increased route density in Alternative I.

Route density would be expected to decrease in about 99% of the planning area, primarily within the Devil Creek, Jarbidge Foothills, Snake River, and West Side TMAs. Route reduction in Alternative V would do the most of all the alternatives to facilitate reductions in soil erosion and bulk density, as it would affect most of the area with soils prone to erosion (Table 4- 27). Since the density of routes within the planning area would be reduced, lack of motorized access off designated routes for game retrieval and limiting motorized access to camp sites to within 25 feet of a designated route would reduce off-road disturbance to the greatest degree of all the alternatives. Application of motorized vehicle restrictions to lessees, BLM permit holders, and ROW holders would reduce the potential for cross-country travel to the greatest degree of all the alternatives and would eliminate most impacts associated with cross-country travel described in the No Action Alternative.

Table 4- 27. Erosion Potential by TMA in Alternative V (Acres)

Erosion Potential	Devil Creek	Jarbidge Foothills	Snake River	West Side	Yahoo
Change in Route Density	Decrease	Decrease	Decrease	Decrease	Increase
Water Erosion Potential					
Medium	222,000	125,000	278,000	226,000	2,000
High	246,000	2,000	46,000	143,000	500
Wind Erosion Potential					
Moderate	372,000	48,000	178,000	305,000	600
Severe	34,000	12,000	138,000	15,000	1,000
Very Severe	<100	100	18,000	0	200

Impacts from Land Use Authorizations Actions

Land use authorizations, including road ROWs, utility ROWs, and communication sites, typically have multiple components. These include infrastructure such as buildings, power transmission lines, meteorological towers, wind turbines, and access roads. Construction of infrastructure components typically includes road improvement for use by heavy equipment. Buried cable or pipelines would result in disturbance of soils from trenching as well as access roads. Authorizations could include clearing areas of vegetation around structures and gravelling to reduce fire and provide parking.

ROWs for roads, above-ground utility lines, buried utility lines or pipelines, or other linear facilities are highly variable regarding size of disturbance and type of access route. Installation and maintenance of utility lines results in linear disturbance resulting from construction of the utility line, formation and maintenance of primitive roads through repeated use, or construction and maintenance of improved roads. Areas of new construction would have increased potential for soil erosion due to loss of vegetative cover and increases in soil bulk density where heavy equipment is used. Roads used for maintenance would have increased erosion potential and bulk density due to repeated use. Installation of buried utility lines or pipelines would have increased erosion potential due to disruption of the soil profile for burial.

Impacts of wind energy developments to soils would include excavation for placement of meteorological towers, wind turbines, substation and maintenance facilities, power transmission lines, and construction, use, and maintenance of roads. Impacts to soils for construction, use, and maintenance of meteorological towers would be similar to those described for communication sites. Impacts to soils for construction, use, and maintenance of wind turbines, substation and maintenance facilities, and power transmission lines would also be similar but would be larger in scale. Specific impacts to soils would be analyzed in detail for individual projects. Impacts of construction, use, and maintenance of access roads would be the same as impacts described for ROWs above.

Maintenance of these structures requires at least one access route. Access routes may be graveled or of native surface, depending on the frequency, season, and type of maintenance needed. Effects of ROWs granted to provide access to Federal, State or private land are usually limited to construction, use, and maintenance of roads. Table 4- 28 and Table 4- 29 display soil erosion potential in the potential utility and wind development areas by alternative.

Table 4- 28. Erosion Potential in Potential Utility Development Areas by Alternative (Acres)

Erosion Potential	Alternative					
	No Action	I	II	III	IV	V
Water Erosion Potential						
Medium	46,000	42,000	47,000	42,000	41,000	32,000
High	25,000	25,000	25,000	25,000	25,000	24,000
Wind Erosion Potential						
Moderate	41,000	38,000	41,000	38,000	38,000	34,000
Severe	26,000	26,000	26,000	26,000	26,000	20,000
Very Severe	2,000	2,000	2,000	2,000	2,000	700

Table 4- 29. Erosion Potential in Potential Wind Development Areas by Alternative (Acres)

Erosion Potential	Alternative					
	No Action	I	II	III	IV	V
Water Erosion Potential						
Medium	127,000	44,000	133,000	44,000	44,000	29,000
High	17,000	11,000	17,000	11,000	11,000	9,000
Wind Erosion Potential						
Moderate	56,000	27,000	57,000	27,000	26,000	14,000
Severe	41,000	25,000	42,000	25,000	25,000	24,000
Very Severe	2,000	1,000	2,000	1,000	1,000	1,000

Impacts from Management Specific to the No Action Alternative

Under the No Action Alternative, the potential utility development area consists of 75,000 acres, 5% of the planning area. Most of this area has medium or greater potential for water erosion and/or moderate or greater potential for wind erosion (Table 4- 28). The potential utility development area could affect up to 39% of the area with soils in these erosion potential categories.

Under the No Action Alternative, the potential wind development area consists of 156,000 acres, 11% of the planning area. Most of this area has medium or greater potential for water erosion; about 63% has moderate or greater potential for wind erosion (Table 4- 29). The potential wind energy development area would affect up to 56% of the area with soils in these erosion potential categories.

Management direction in the No Action Alternative restricts new communication sites to existing locations as much as possible. This would reduce impacts to soils due to construction and maintenance activities. Placement of communication sites at new locations would likely require new access roads and pads. Impacts due to construction of new communication sites would be localized and would consist primarily of soil erosion in areas where vegetation is removed for access route construction or facility installation and increased bulk density due to access route construction, use, and maintenance.

Soil erosion impacts associated with authorized agricultural uses or trespasses would likely be small in size and have a negligible effect at the scale of the planning area.

Impacts from Management Common to the No Action and All Action Alternatives

BLM wind development program policies and best management practices (BMPs) would generally reduce the overall impacts to soils to some degree. For example, road removal would result in short-term disturbance due to ripping or recontouring, resulting in increased potential for soil erosion. Long-term effects of road removal would include decreases in soil erosion and bulk density due to re-establishment of vegetative cover (Switalski, et al., 2004).

Impacts from Management Common to All Action Alternatives

Management actions common to all alternatives would generally reduce impacts to soils by encouraging location of new ROWs and communication sites within existing disturbed corridors or sites. This would reduce the number of new access roads and pads and subsequently reduce soil erosion and bulk density impacts associated with those developments.

Impacts from Management Specific to Alternative I

Under Alternative I, the potential utility development area consists of 71,000 acres, 5% of the planning area. Most of this area has medium or greater potential for water erosion and/or moderate or greater potential for wind erosion (Table 4- 28). The potential utility development area would affect up to 38% of the area with soils in these erosion potential categories.

Under Alternative I, the potential wind development area consists of 60,000 acres, 4% of the planning area. Most of this area has medium or greater potential for water erosion and/or moderate or greater potential for wind erosion (Table 4- 29). The potential wind development area would affect up to 32% of the acreage with soils in these classifications. Impacts of wind energy developments to soils would occur on 39% of the geographic area. Wind energy would be encouraged in areas with annual grassland or non-native perennial grass communities. These areas have been altered by wildland fire or other disturbances, resulting in changes in vegetation composition, including biological soil crust cover, and plant community structure. This likely altered soil processes as described under *Impacts from Upland Vegetation Actions.*

The effects to soils resulting from activities associated with construction, use, and maintenance of communication sites and facilities authorized within ROWs would be similar to those described for the No Action Alternative, but could occur over a slightly smaller geographic area. Seasonal restrictions for construction or maintenance on land use authorizations tend to reduce impacts to soils during periods when soils would be moist or wet and more prone to compaction or rutting. However, repeated use during dry periods is still expected to increase soil bulk density in localized areas. These impacts are expected to be restricted to routes and infrastructure locations. At the landscape scale, the expected impact area for soils is minor.

Impacts from Management Specific to Alternative II

Under Alternative II, the potential utility development area consists of 77,000 acres, 6% of the planning area. Most of this area has medium or greater potential for water erosion and/or moderate or greater potential for wind erosion (Table 4- 28). The potential utility development area would affect up to 40% of the area with soils in these erosion potential categories. Impacts of utility corridor developments on soils could occur on more acres than in Alternative I.

Under the Alternative II, the potential wind development area consists of 162,000 acres, 12% of the planning area. Most of this area has medium or greater potential for water erosion and/or moderate or greater potential for wind erosion (Table 4- 29). The potential wind development area would affect up to 57% of the acreage with soils in these classifications. Impacts of wind developments to soils would occur on a slightly larger geographic area than in the No Action Alternative.

The effects of activities associated with construction, use, and maintenance of communication sites and ROWs on soils would occur over a slightly larger geographic area than the No Action Alternative.

Impacts from Management Specific to Alternative III

Under Alternative III, the potential utility development area consists of 71,000 acres, 5% of the planning area. Most of this area has medium or greater potential for water erosion and/or moderate or greater potential for wind erosion (Table 4- 28). The potential utility development area would affect up to 38% of the area with soils in these erosion potential categories.

Under the Alternative III, the potential wind development area consists of 60,000 acres, 4% of the planning area. Most of this area has medium or greater potential for water erosion and/or moderate or greater potential for wind erosion (Table 4- 29). The potential wind development area would affect up to 32% of the acreage with soils in these classifications.

The effects of activities associated with construction, use, and maintenance of communication sites and ROWs on soils would be the same as those described for Alternative I.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Under Alternative IV, the potential utility development area consists of 70,000 acres, 5% of the planning area. Most of this area has medium or greater potential for water erosion and/or moderate or greater potential for wind erosion (Table 4- 28). The potential utility development area would affect up to 38% of the area with soils in these erosion potential categories. Impacts would occur on slightly fewer acres than in Alternative I.

Under the Alternative IV, the potential wind development area consists of 59,000 acres, 4% of the planning area. Most of this area has medium or greater potential for water erosion and/or moderate or greater potential for wind erosion (Table 4- 29). The potential wind development area would affect up to 32% of the acreage with soils in these classifications.

The effects of activities associated with construction, use, and maintenance of communication sites and ROWs on soils would occur over a slightly smaller geographic area than in Alternative I.

Impacts from Management Specific to Alternative V

Under Alternative V, the potential utility development area consists of 59,000 acres, 4% of the planning area. Most of this area has medium or greater potential for water erosion and/or moderate or greater potential for wind erosion (Table 4- 28). The potential utility development area would affect up to 28% of the area with soils in these erosion potential categories. Impacts of utility corridor developments to soils would occur on the least number of acres of all the action alternatives.

Under Alternative V, the potential wind development area consists of 59,000 acres, 4% of the planning area. Sixty-six percent of this area has medium or greater potential for water erosion; 68% of the area has moderate or greater potential for wind erosion (Table 4- 29). The potential wind development area would affect up to 27% of the acreage with soils in these classifications.

The effects of activities associated with construction, use, and maintenance of communication sites and ROWs on soils would occur over a slightly smaller geographic area than in Alternative I.

Impacts from Minerals Actions

Surface occupancy for leasable, salable, and locatable mineral extraction would include some or all of the following developments and activities: removal of surface vegetation, alteration of landforms, construction of new or maintenance and use of existing transportation routes, heavy equipment operations, presence of personnel, overhead power lines, surface piping, access restrictions, and permanent structures. Applications would be subject to detailed analysis on a case-by-case basis.

Exploration activities would likely utilize existing roads but could require cross-country motorized travel. This would disturb vegetation in localized areas but would not likely result in increased erosion or bulk density unless locations are accessed repeatedly. Test well drilling would result in vegetation removal and disruption of soils for construction, use, and maintenance of facilities and roads. Areas of new construction, including improvement of primitive roads, would have increased potential for soil erosion due to loss of vegetative cover and increases in soil bulk density where heavy equipment is used. Access roads would have increased erosion potential and bulk density due to repeated use. Pads and access roads for unproductive, reclaimed test sites would have increased erosion potential for two to five years until establishment of seeded vegetation. Increased bulk density in heavily used areas could persist for several years.

Impacts from Management Specific to the No Action Alternative

Under the No Action Alternative, 358,302 acres, 26% of the planning area, would be open and have potential for oil and gas leasing (Table 4- 30). There would be no impacts to soils in areas closed to leasing or open with NSO. Areas open to mineral leasing utilizing surface occupancy would be more likely to have some level of soil surface disturbance that would result in increased soil erosion or soil bulk density due to activities associated with exploration, test well drilling, and field development. Effects associated with construction, use, and maintenance of facilities and roads would occur at a greater density over a larger acreage. The scale of impacts to soils with medium or greater potential for water and/or moderate or greater potential for wind erosion cannot be characterized due to lack of spatial specificity of potential leasing areas. However, the disturbed area would not necessarily be proportional to the size of the designated open area. Surface disturbance acreage associated with exploration and development activities would likely be much less than 1% of the planning area (Appendix U).

Under the No Action Alternative, 410,000 acres, 30% of the planning area, would be open and have medium to high potential for geothermal leasing (Table 4- 30). In areas closed to leasing or open with NSO, there would be no impacts to soils. Impacts for geothermal exploration and development and effects of seasonal restrictions would be similar to those described for oil and gas. The scale of impacts to soils with medium or greater potential for water and/or moderate or greater potential for wind erosion cannot be characterized due to lack of spatial specificity of potential development areas. However, the disturbed area would not necessarily be proportional to the size of the designated open area. Surface disturbance acreage associated with exploration and development activities would likely be much less than 1% of the planning area (Appendix V).

Table 4- 30. Leasable Mineral Allocations in Areas with Oil, Gas, or Geothermal Potential in the No Action Alternative (Acres)

Category	Allocation
Oil and Gas Allocations	
Closed	22,000
Open with NSO	41,000
Total Acres with No Impacts	**66,000**
Open	257,000
Open with Seasonal Restrictions	60,000
Total Acres with Impacts	**317,000**
Geothermal Allocations in Medium and High Potential Areas	
Closed	124,000
Open with NSO	24,000
Total Acres with No Impacts	**148,000**
Open	358,000
Open with Seasonal Restrictions	28,00
Total Acres with Impacts	**387,000**

Seasonal restrictions for potential oil and gas areas would tend to reduce impacts to soils during periods when soils would be moist or wet (October through June) and more prone to compaction or rutting. However, repeated use during dry periods is still expected to increase soil bulk density in localized areas. These impacts are expected to be generally restricted to routes and infrastructure locations.

Under the No Action Alternative, the acreage on which salable mineral development occurs is expected to increase from approximately 1,300 acres to approximately 2,300 acres over the life of the plan. Individual sites would have some level of soil surface disturbance that would result in increased soil erosion or soil bulk density due to vegetation removal and disruption of soils for construction, use, and maintenance of facilities and roads. Since affected areas are expected to be less than 100 acres each, impacts to soils are expected to be occur on less than 1% of the planning area

Under the No Action Alternative, 218,000 acres, 16% of the planning area, would be recommended for withdrawal from locatable entry. This would include acres in the Sand Point ACEC and in the vicinity of the Oregon Trail that are rated as having severe to very severe potential for wind erosion. Erosion potential would be locally reduced in these areas. About 84% of the planning area would have potential for some level of soil surface disturbance that would result in increased soil erosion or soil bulk density due to vegetation removal and disruption of soils for construction, use, and maintenance of facilities and roads. It is unlikely that disturbance would be proportional to the area open for development. Based on the lack of known, large, economically viable deposits and history of locatable mineral development in the planning area, impacts to soils are anticipated to occur on less than 1% of the planning area.

Impacts from Management Common to the No Action and All Action Alternatives

Management common to the No Action and all action alternatives promotes the use of existing sites for mineral deposits. This would reduce potential surface disturbance within the planning area and the need to develop access routes to new locations.

Impacts from Management Common to All Action Alternatives

Management actions common to all action alternatives would reduce erosion potential via requirements to recontour disturbed areas to match natural landforms or to a slope no greater than 3:1; stabilization of surface soils through seeding, mulching, and drainage; and diversion of runoff water onto areas with vegetation capable of filtering runoff, or pass through settling basins.

Impacts from Management Specific to Alternative I

Under Alternative I, 365,000 acres, 27% of the planning area, would be open and have potential for oil and gas leasing (Table 4- 31). There would be no impacts to soils in areas closed to leasing or open with NSO. Areas open to mineral leasing utilizing surface occupancy would be more likely to have some level of soil surface disturbance that would result in increased soil erosion and/or soil bulk density due to activities associated with exploration, test well drilling, and field development. The effects associated with construction, use, and maintenance of facilities and roads would occur at a greater density over a larger acreage. The disturbed area would not necessarily be proportional to the size of the designated open area. Surface disturbance acreage associated with exploration and development activities would likely be much less than 1% of the planning area (Appendix V).

Seasonal restrictions for potential oil and gas areas would tend to reduce impacts to soils during periods when soils would be moist or wet (October through June) and more prone to compaction or rutting. However, repeated use during dry periods is still expected to increase soil bulk density in localized areas. These impacts are expected to be generally restricted to routes and infrastructure locations.

Under Alternative I, 421,000 acres, 31% of the planning area, would be open and have medium to high potential for geothermal leasing (Table 4- 31). There would be no impact to soils in areas closed to leasing or open with NSO. Areas open to mineral leasing utilizing surface occupancy would be more likely to have some level of soil surface disturbance that would result in increased soil erosion and/or soil bulk density due to activities associated with exploration, test well drilling, and facility development.

Impacts from seasonal restrictions for geothermal exploration and development would be similar to those described for oil and gas. The disturbed area would not necessarily be proportional to the size of the designated open area. Surface disturbance associated with exploration and development activities would likely be much less than 1% of the planning area (Appendix V).

Under Alternative I, most of the planning area would be open for salable mineral development (Table 4-31); the acreage on which salable mineral development occurs is expected to increase from approximately 1,300 acres to approximately 2,300 acres over the life of the plan. Areas closed to this development would eliminate impacts on up to 45% of acreage of soils with medium or greater potential for water erosion and/or moderate or greater potential for wind erosion. Open areas would be more likely to have some level of soil surface disturbance that would result in increased soil erosion and/or soil bulk density due to vegetation removal and disruption of soils for construction, use, and maintenance of facilities and roads. However, the disturbed area is expected to be small relative to the designated open area. The effects are likely to be local and small in scale relative to the planning area.

Alternative I would recommend approximately 8% of the planning area for withdrawal from locatable mineral development (Table 4- 31). This would eliminate impacts due to construction, use, and maintenance of facilities and roads on up to 31% of the acreage of soils with medium or greater potential for water erosion and/or moderate or greater potential for wind erosion. Open areas would be more likely to have some level of soil surface disturbance that would result in increased soil erosion and/or soil bulk density due to vegetation removal and disruption of soils for construction, use, and maintenance of facilities and roads associated with locatable mineral development. However, the disturbed area is expected to be small relative to the designated open area. Effects are likely to be local and small in scale relative to the planning area.

Table 4- 31. Mineral Allocations by Erosion Potential in Alternative I (Acres)

Mineral Allocations	Total Acres	Water Erosion Potential		Wind Erosion Potential		
		Medium	High	Moderate	Severe	Very Severe
Leasable Mineral Allocations						
Potential Oil and Gas Areas						
Closed	15,000	7,000	300	1,000	5,000	1,000
Open with NSO	25,000	14,000	3,000	9,000	8,000	200
Acres with No Impacts	**40,000**	**21,000**	**3,300**	**10,000**	**13,000**	**1,200**
Open	240,000	148,000	27,000	75,000	94,000	13,000
Open with Seasonal Restrictions	100,000	70,000	11,000	32,000	13,000	100
Acres with Impacts	**340,000**	**218,000**	**38,000**	**107,000**	**107,000**	**13,100**
Potential Geothermal Areas						
Closed	115,000	9,000	400	1,000	8,000	1,000
Open with NSO	23,000	12,000	3,000	8,000	8,000	200
Acres with No Impacts	**138,000**	**21,000**	**3,400**	**9,000**	**16,000**	**1,200**
Open	385,000	261,000	44,000	171,000	127,000	17,00
Open with Seasonal Restrictions	13,000	10,000	3,000	9.000	3,000	0
Acres with Impacts	**399,000**	**271,000**	**47,000**	**180,000**	**130,000**	**17,00**
Salable Mineral Allocations						
Closed (No Impacts)	179,000	86,000	58,000	98,000	15,000	500
Open (Impacts)	1,194,000	766,000	379,000	806,000	184,000	18,000
Locatable Mineral Allocations						
Recommended for Withdrawal (No Impacts)	113,000	59,000	20,000	40,000	15,000	1,000

Impacts from Management Specific to Alternative II

Under Alternative II, 376,000 acres, 27% of the planning area, would be open and have potential for oil and gas leasing (Table 4- 32). Effects of oil and gas exploration, testing, and development would potentially occur over a slightly larger area than in Alternative I. This area would include increased acreage of soils with severe to very severe potential for wind erosion. Lack of seasonal restrictions would increase the potential for elevated soil erosion and bulk density during periods when soils would be moist or wet.

Under Alternative II, 432,000 acres, 31% of the planning area, would be open and have medium to high potential for geothermal leasing (Table 4- 32). Impacts for geothermal exploration and development would be similar to those described for Alternative I, but would potentially occur over a slightly larger area. This area would include increased acreage of soils with severe to very severe potential for wind erosion. Lack of seasonal restrictions would increase the potential for elevated soil erosion and bulk density during periods when soils would be moist or wet.

Under Alternative II, the area open for salable mineral development would be 107% of the acres open under Alternative I (Table 4- 32); the acreage on which salable mineral development occurs is expected to increase from approximately 1,300 acres to approximately 3,300 acres over the life of the plan. This would slightly increase the potential for effects to soils due to construction, use, and maintenance of facilities and roads relative to Alternative I. Areas closed to development would eliminate impacts on up to 21% of acreage of soils with medium or greater potential for water erosion and/or moderate or greater potential for wind erosion.

Alternative II would recommend 37% of the acreage recommended in Alternative I for withdrawal from locatable mineral development (Table 4- 32). This would eliminate impacts due to construction, use, and maintenance of facilities and roads on up to 11% of the acreage of soils with medium or greater potential for water erosion and/or moderate or greater potential for wind erosion. Potential for impacts to soils from locatable mineral development would be greater under Alternative II compared to Alternative I.

Table 4- 32. Mineral Allocations by Erosion Potential in Alternative II (Acres)

Mineral Allocations	Total Acres	Water Erosion Potential		Wind Erosion Potential		
		Medium	High	Moderate	Severe	Very Severe
Leasable Mineral Allocations						
Potential Oil and Gas Areas						
Closed	4,000	0	0	0	0	0
Open with NSO	17,000	11,000	2,000	3,000	8,000	400
Acres with No Impacts	**21,000**	**11,000**	**2,000**	**3,000**	**8,000**	**400**
Open	359,000	228,000	40,000	114,000	111,000	14,000
Open with Seasonal Restrictions	0	0	0	0	0	0
Acres with Impacts	**359,000**	**228,000**	**40,000**	**114,000**	**111,000**	**14,000**
Potential Geothermal Areas						
Closed	104,000	3,000	0	200	3,000	0
Open with NSO	16,000	10,000	2,000	3,000	8,000	400
Acres with No Impacts	**120,000**	**13,000**	**2,000**	**3,200**	**11,000**	**400**
Open	416,000	280,000	49,000	186,000	135,000	18,000
Open with Seasonal Restrictions	0	0	0	0	0	0
Acres with Impacts	**416,000**	**280,000**	**49,000**	**186,000**	**135,000**	**18,000**
Salable Mineral Allocations						
Closed (No Impacts)	94,000	32,000	40,000	54,000	3,000	0
Open (Impacts)	1,279,000	821,000	397,000	850,000	196,000	19,000
Locatable Mineral Allocations						
Recommended for Withdrawal (No Impacts)	42,000	18,000	3,000	7,000	9,000	400

Impacts from Management Specific to Alternative III

Under Alternative III, 376,000 (27% of the planning area) would be open and have potential for oil and gas leasing (Table 4- 33). The effects of oil and gas exploration, testing, and development and lack of seasonal restrictions would be similar to those described for Alternative II.

Under Alternative III, 431,000 acres (31% of the planning area) would be open and have medium to high potential for geothermal leasing (Table 4- 33). Impacts for geothermal exploration and development and lack of seasonal restrictions would be similar to those described for Alternative II.

Under Alternative III, the area open to salable mineral development would be 104% of the acreage open under Alternative I (Table 4- 33); the acreage on which salable mineral development occurs is expected to increase from approximately 1,300 acres to approximately 3,300 acres over the life of the plan. Areas closed to development would eliminate impacts on up to 36% of acres of soils with medium or greater potential for water erosion and/or moderate or greater potential for wind erosion. This would reduce potential impacts to soils to a greater extent than Alternatives I or II.

Alternative III would recommend for withdrawal from locatable mineral development 78% of the acreage recommended in Alternative I (Table 4- 33). This would eliminate impacts due to construction, use, and maintenance of facilities and roads on up to 21% of the acreage of soils with medium or greater potential for water erosion and/or moderate or greater potential for wind erosion. Potential for impacts to soils from locatable mineral development would be greater under Alternative III compared to Alternative I, but less than Alternative II.

Table 4- 33. Mineral Allocations by Erosion Potential in Alternative III (Acres)

Mineral Allocations	Total Acres	Water Erosion Potential		Wind Erosion Potential		
		Medium	High	Moderate	Severe	Very Severe
Leasable Mineral Allocations						
Potential Oil and Gas Areas						
Closed	5,000	800	0	0	800	0
Open with NSO	17,000	11,000	2,000	3,000	8,000	400
Acres with No Impacts	**22,000**	**11,800**	**2,000**	**3,000**	**8,800**	**400**
Open	359,000	227,000	40,000	114,000	111,000	14,000
Open with Seasonal Restrictions	0	0	0	0	0	0
Acres with Impacts	**359,000**	**227,000**	**40,000**	**114,000**	**111,000**	**14,000**
Potential Geothermal Areas						
Closed	105,000	4,000	0	200	4,000	0
Open with NSO	16,000	10,000	2,000	3,000	8,000	400
Acres with No Impacts	**121,000**	**14,000**	**2,000**	**3,200**	**12,000**	**400**
Open	415,000	279,000	49,000	186,000	134,000	18,000
Open with Seasonal Restrictions	0	0	0	0	0	0
Acres with Impacts	**415,000**	**279,000**	**49,000**	**186,000**	**134,000**	**18,000**
Salable Mineral Allocations						
Closed (No Impacts)	136,000	58,000	49,000	73,000	14,000	500
Open (Impacts)	1,237,000	795,000	388,000	831,000	186,000	18,000
Locatable Mineral Allocations						
Recommended for Withdrawal (No Impacts)	88,000	33,000	27,000	36,000	10,000	400

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Under Alternative IV, 353,000 acres, 26% of the planning area, would be open and have potential for oil and gas leasing (Table 4- 34). The effects of oil and gas exploration, testing, and development would potentially occur over a slightly smaller area than in Alternative I. Under Alternative IV, there would be lower potential for effects to soils with medium risk for water erosion, but higher potential for effects to soils with very severe risk for wind erosion.

Under Alternative IV, 428,000 acres (31% of the planning area) would be open and have medium to high potential for geothermal leasing (Table 4- 34). Impacts for geothermal exploration and development would potentially occur over a slightly larger area than in Alternative I. Under Alternative IV, there would be increased potential for effects to soils with very severe risk for wind erosion.

Under Alternative IV-A, the area open to salable mineral development would be 93% of the acreage open under Alternative I (Table 4- 34); the acreage on which salable mineral development occurs is expected to increase from approximately 1,300 acres to approximately 2,300 acres over the life of the plan. Areas closed to development would eliminate impacts on up to 67% of the acreage of soils with medium or greater potential for water erosion and/or moderate or greater potential for wind erosion. The effects of potential development would occur on a slightly smaller geographic area than in Alternative I. This would reduce potential impacts to soils to a greater extent than Alternatives I, II, or III.

Under Alternative IV-B (the Preferred Alternative), the area open to salable mineral development would be 95% of the acreage open under Alternative I (Table 4- 34); the acreage on which salable mineral development occurs is expected to increase from approximately 1,300 acres to approximately 2,300 acres over the life of the plan. Areas closed to development would eliminate impacts on up to 59% of the acreage of soils with medium or greater potential for water erosion and/or moderate or greater potential for wind erosion. The effects of potential development would occur on a slightly smaller geographic area than in Alternative I. This would reduce potential impacts to soils to a greater extent than Alternatives I, II, or III, but not as much as Alternative IV-A.

Alternative IV would recommend 126% of the acreage recommended in Alternative I for withdrawal from locatable mineral development (Table 4- 34). This would eliminate impacts due to construction, use, and maintenance of facilities and roads on up to 34% of the acreage of soils with medium or greater potential for water erosion and/or moderate or greater potential for wind erosion. Potential for impacts to soils from locatable mineral development would be less than for Alternatives I, II, and III.

Table 4- 34. Mineral Allocations by Erosion Potential in Alternative IV (the Preferred Alternative; Acres)

Mineral Allocations	Total Acres	Water Erosion Potential		Wind Erosion Potential		
		Medium	High	Moderate	Severe	Very Severe
Leasable Mineral Allocations						
Potential Oil and Gas Areas						
Closed	27,000	20,000	0	4,000	5,000	400
Open with NSO	25,000	13,000	4,000	9,000	8,000	300
Acres with No Impacts	**52,000**	**33,000**	**4,000**	**13,000**	**13,000**	**700**
Open	246,000	151,000	28,000	76,000	96,000	14,000
Open with Seasonal Restrictions	83,000	55,000	11,000	28,000	10,000	<100
Acres with Impacts	**327,000**	**206,000**	**38,000**	**104,000**	**106,000**	**14,000**
Potential Geothermal Areas						
Closed	108,000	6,000	100	600	5,000	200
Open with NSO	23,000	12,000	3,000	8,000	8,000	300
Acres with No Impacts	**131,000**	**18,000**	**3,100**	**8,600**	**13,000**	**500**
Open	392,000	264,000	44,000	172,000	129,000	18,000
Open with Seasonal Restrictions	14,000	10,000	3,000	9,000	4,000	0
Acres with Impacts	**405,000**	**274,000**	**47,000**	**181,000**	**133,000**	**18,000**
Salable Mineral Allocations						
Alternative IV-A						
Closed (No Impacts)	267,000	144,000	84,000	171,000	18,000	600
Open (Impacts)	1,107,000	708,000	353,000	733,000	182,000	18,000
Alternative IV-B						
Closed (No Impacts)	235,000	124,000	73,000	140,000	18,000	600
Open (Impacts)	1,138,000	729,000	364,000	764,000	182,000	18,000
Locatable Mineral Allocations						
Recommended for Withdrawal (No Impacts)	143,000	67,000	44,000	68,000	12,000	400

Impacts from Management Specific to Alternative V

Under Alternative V, 346,000 acres, 25% of the planning area, would be open and have potential for oil and gas leasing (Table 4- 35). The effects of oil and gas exploration, testing, and development would potentially occur on the smallest area of all the alternatives.

Under Alternative V, 422,000 acres, 31% of the planning area, would be open and have medium to high potential for geothermal leasing (Table 4- 35). Impacts for geothermal exploration and development would be similar to those described for Alternative I.

Under Alternative V, the area open to salable mineral development would be 99% the acreage open under Alternative I (Table 4- 35); the acreage on which salable mineral development occurs is expected to increase from approximately 1,300 acres to approximately 2,300 acres over the life of the plan. Effects due to open designation would be similar to the No Action Alternative. Areas closed to development would eliminate impacts on up to 53% of acreage of soils with medium or greater potential for water erosion and/or moderate or greater potential for wind erosion. This would reduce potential impacts to soils to a greater extent than Alternatives I, II, or III, but not as much as Alternatives IV-A or IV-B.

Alternative V would recommend 43% of the acreage recommended in Alternative I for withdrawal from locatable mineral development (Table 4- 35). This would eliminate impacts due to construction, use, and maintenance of facilities and roads on up to 19% of the acreage of soils with medium or greater potential for water erosion and/or moderate or greater potential for wind erosion. The effects of potential development would be similar to those described for Alternative I. Potential for impacts to soils from locatable mineral development would be greater under Alternative V compared to Alternatives I, III and IV, but less than Alternative II.

Table 4- 35. Mineral Allocations by Erosion Potential in Alternative V (Acres)

Mineral Allocations	Total Acres	Water Erosion Potential		Wind Erosion Potential		
		Medium	High	Moderate	Severe	Very Severe
Leasable Mineral Allocations						
Potential Oil and Gas Areas						
Closed	34,000	23,000	300	5,000	8,000	1,000
Open with NSO	24,000	13,000	3,000	9,000	8,000	200
Acres with No Impacts	**58,000**	**36,000**	**3,300**	**14,000**	**16,000**	**1,200**
Open	267,000	160,000	35,000	88,000	97,000	13,000
Open with Seasonal Restrictions	56,000	43,000	3,000	16,000	6,000	0
Acres with Impacts	**323,000**	**203,000**	**38,000**	**104,000**	**103,000**	**13,000**
Potential Geothermal Areas						
Closed	114,000	9,000	400	1,000	8,000	1,000
Open with No Surface Occupancy	23,000	12,000	3,000	8,000	8,000	200
Acres with No Impacts	**137,000**	**21,000**	**3,400**	**9,000**	**16,000**	**1,200**
Open	386,000	262,000	44,000	171,000	127,000	17,000
Open with Seasonal Restrictions	13,000	10,000	3,000	9,000	3,000	0
Acres with Impacts	**399,000**	**271,000**	**47,000**	**180,000**	**130,000**	**17,000**
Salable Mineral Allocations						
Closed (No Impacts)	190,000	96,000	55,000	95,000	20,000	2,000
Open (Impacts)	1,184,000	757,000	382,000	809,000	179,000	17,000
Locatable Mineral Allocations						
Recommended for Withdrawal (No Impacts)	48,000	22,000	3,000	8,000	12,000	1,000

Summary of Direct and Indirect Impacts

Table 4- 36 contains a summary of proposed management by alternative. Rankings on each line are intended to convey how well each alternative maintains or improves soil resource conditions based on the

indicators. Rankings are for comparison purposes only and are not meant to be additive by alternative. Alternatives were qualitatively rated for each Chapter 2 section based on the following criteria:

- *Soil Resources* – The ability to reduce potential for soil erosion and improve soil functions such as nutrient and water cycling
- *Upland Vegetation Communities* – The ability to reduce the potential for soil erosion and bulk density and improve soil functions such as nutrient and water cycling
- *Wildland Fire Ecology and Management* – Critical Suppression Areas and the ability to reduce soil impacts due to burning, suppression, and fuels reduction activities
- *Livestock Grazing* – The ability to reduce soil impacts due to livestock grazing activities and infrastructure
- *Transportation and Travel* – Anticipated route density within the planning area and ability to reduce soil impacts due to travel management designations
- *Land Use Authorizations* – Potential development and ability to reduce soil impacts due to construction, use, and maintenance of facilities and access for ROWs
- *Minerals* – Potential development for leasable, salable, and locatable minerals and ability to reduce soil impacts due to construction, use, and maintenance of facilities and access.

Impacts from the No Action Alternative

The No Action Alternative would do the least of all alternatives to reduce impacts to soil resources throughout the planning area. The No Action Alternative lacks specific actions that would be incorporated at the implementation level as design features, stipulations, or closures to manage for soils, and particularly soils with higher hazard ratings for water and wind erosion. Overall, the No Action Alternative would result in moderate adverse impacts over the short and long term.

Impacts from Alternative I

Alternative I was rated fourth overall for reducing impacts to soil resources. Management actions proposed under Alternative I tend to moderate impacts to soil resources while allowing for multiple uses. Alternative I would tend to maintain current conditions in the short term with minor beneficial impacts to soil resource conditions over the long term.

Impacts from Alternative II

Alternative II was rated sixth overall for reducing impacts to soil resources. Alternative II allows for the highest level of resource use and maintains the vegetation of the planning area in non-native perennial grasslands. This community type would be relatively stable and provide cover to reduce loss of surface soils. However, higher livestock grazing allocations as well as anticipated increased number and density of livestock facilities would tend to reduce cover and would compact soils in facility locations. Alternative II also allows for increased access for recreation, commodity use, and mineral extraction. Impacts associated with roads would tend to increase erosion potential; density of roads would increase the proportion of soils compacted by use. Overall, Alternative II would result in moderate adverse impacts on soil resource conditions over the long term.

Impacts from Alternative III

Alternative III was rated fifth overall for reducing impacts to soil resources. Management actions proposed under Alternative III focus primarily on creating conditions to improve fire suppression activities and reduce fire size. Less fire on the landscape would reduce negative impacts to soils, resulting in moderate beneficial impacts. The actions proposed under Alternative III would result in an increase in short- and long-term impacts resulting primarily from construction, use, and maintenance of roads and fire suppression facilities; creation and maintenance of fire breaks and fire-resistant plant communities; and use of livestock grazing to reduce fuels. Those actions would result in localized, major adverse impacts. Soil resources would also potentially be affected by higher levels of mineral development.

Table 4- 36. Summary of Impacts to Soil Resources by Alternative

Indicator	Alternatives						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
Soil Resources							
Soil Erosion Potential (1=lowest; 3=highest)	3	2	2	2	1		1
Improve Soil Function (1=highest; 3=lowest)	3	2	2	2	1		1
Upland Vegetation Communities							
Soil Erosion and Bulk Density Potential (1=lowest; 6=highest)	6	3	5	4	1		2
Improve Soil Function (1=highest; 6=lowest)	6	3	5	4	1		2
Wildland Fire Ecology and Management							
Soil Erosion and Bulk Density Potential (1=lowest; 7=highest)	7	4	6	5	2	3	1
Livestock Grazing							
Soil Erosion and Bulk Density Potential (1=lowest; 7=highest)	5	4	7	6	2	3	1
Travel and Transportation Management							
Soil Erosion and Bulk Density Potential (1=lowest; 6=highest)	6	3	5	4	2		1
Land Use Authorizations							
Soil Erosion and Bulk Density Potential (1=lowest; 6=highest)	3	2	4	2	2		1
Leasable Minerals – Oil and Gas							
Soil Erosion and Bulk Density Potential (1=lowest; 6=highest)	1	4	6	5	3		2
Leasable Minerals – Oil and Gas							
Soil Erosion and Bulk Density Potential (1=lowest; 6=highest)	1	2	6	5	4		3
Salable Minerals							
Soil Erosion and Bulk Density Potential (1=lowest; 6=highest)	6	4	6	5	1	2	3
Locatable Minerals							
Soil Erosion and Bulk Density Potential (1=lowest; 6=highest)	6	2	3	5	1		4
Note: Rankings on each line are intended to convey how well each alternative maintains soil resources. Rankings are for comparison purposes within a row only and are not meant to be additive by alternative.							

Impacts from Alternative IV (the Preferred Alternative)

Alternative IV does the most of all the alternatives to reduce impacts to soil resources throughout the planning area. Alternative IV contains specific actions that would be incorporated at the implementation level as design features, stipulations, and closures to manage for soils, and particularly soils with higher hazard ratings for water and wind erosion. Alternative IV-A would provide management to reduce soil impacts through upland vegetation treatments to restore native shrubland communities, fire management priorities that protect existing and restored native shrubland communities, reductions in livestock grazing allocations and facilities, and limits on travel and transportation allocations, land use authorizations, and mineral development. Impacts from Alternative IV-B (the Preferred Alternative) would be similar to Alternative IV-A, but would generally occur over a slightly larger geographic area. Alternative IV-B was rated second for reducing impacts to soil resources. While both Alternative IV-A and IV-B are expected to result in moderate adverse impacts in the short term due to vegetation treatments, in the long term, Alternative IV would have moderate beneficial impacts to soil resources.

Impacts from Alternative V

Alternative V was rated third overall for reducing impacts to soil resources. Alternative V would do less to restore native shrubland communities due to a more passive approach to vegetation treatments. While this would reduce short-term impacts to soils, long-term effects related to restoration of upland vegetation communities and soil function would cover a smaller geographic area compared to Alternatives IV-A and IV-B. Alternative V also contains greater potential for mineral development coupled with impacts of potential development areas to soil with higher erosion hazard ratings; however, these impacts would be localized. Overall, Alternative V would result in minor beneficial impacts to soil resources in both the short and long term.

Cumulative Impacts

Past, Present, and Reasonably Foreseeable Actions

Cumulative impacts to soil resources consist of incremental effects of the alternatives when added to other past, present, and reasonably foreseeable future actions. These effects can occur over a long period of time, resulting in the gradual changes in soil erosion potential and ecological function.

Because of similarities in soils and geology, the planning area and the following areas form the geographic boundary for the analysis of cumulative effects on soil resources: adjacent portions of BLM's Burley, Bruneau, Shoshone, and Wells (Nevada [NV]) FOs; the Snake River Birds of Prey National Conservation Area (NCA); the South Hills Unit of the Sawtooth National Forest; and the Jarbidge Ranger District of the Humboldt-Toiyabe National Forest. The area includes Federal, State, and private lands. The temporal scope of the analysis is approximately 20 years or the life of the plan.

Past, present, and reasonably foreseeable actions for the following resource and resource uses cumulatively affect soil resources:

- Military Use
- Wildland Fire Ecology and Management
- Livestock Grazing
- Transportation and Travel
- Land Use Authorizations

These actions are described in detail in the *Introduction* to this chapter.

Summary of Cumulative Impacts

Cumulative Impacts from the No Action Alternative

Past livestock grazing and wildland fires resulted in vegetation removal and, in some areas, replacement with annual or non-native perennial communities. This conversion has been extensive throughout the cumulative analysis area, particularly in areas where the elevation is less than 5,000 feet. Vegetation removal and change to annual or non-native perennial communities has altered the amount and type of soil cover causing increased risk of soil erosion. Livestock grazing, wildland fires, and associated impacts to soils are expected to continue within the planning area as well as adjacent Federal, State, and private lands. Under the No Action Alternative, frequency and scale of wildland fire is expected to occur at current or increased levels. High suppression priorities for ignitions on military ranges could shift suppression efforts away from BLM-managed lands within the planning area or adjacent Federal, State, or private lands in the event of multiple incidents. This could result in local or large-scale erosion. Removal of livestock from burned public lands would reduce the short-term potential for increased soil erosion and bulk density on those lands. Even though shifting use elsewhere could result in increased soil erosion or bulk density on other Federal, State, or private lands, this effect would be less than would be expected if burned areas were grazed.

Because most of the planning area would remain open to cross-country motorized vehicle use, users from surrounding areas with more restrictions (e.g., National Forests and the Snake River Birds of Prey

NCA) are expected to utilize the planning area. This is expected to maintain existing levels of soil erosion and bulk density and potentially introduce these impacts to previously unused areas.

Past and proposed future land use authorizations have occurred and could occur on adjacent Federal, State, and private lands. Effects to soils from facilities would be local to affected ownerships. However, construction, use, and maintenance of access routes for facilities on adjacent lands could be additive to those described and analyzed for the No Action Alternative. Cumulative effects from land use authorizations would be higher for the No Action Alternative than Alternatives I, III, IV, and V due to fewer restrictions on commercial development.

Cumulative Impacts from Alternative I

Past livestock grazing and wildland fires resulted in vegetation removal and, in some areas, replacement with annual or non-native perennial communities. This conversion has been extensive throughout the cumulative analysis area, particularly in areas where the elevation is less than 5,000 feet. Vegetation removal and change to annual or non-native perennial communities has altered the amount and type of soil cover causing increased risk of soil erosion. Livestock grazing, wildland fires, and associated impacts to soils are expected to continue within the planning area as well as adjacent Federal, State, and private lands. Under Alternative I, cumulative impacts related to wildland fire would be due to upland vegetation treatments and wildland fire management actions that would increase vegetation resilience and reduce fire size. This would potentially reduce spread of wildland fire to adjacent Federal, State, and private lands. Reduction of fire size would maintain vegetation cover, therefore decreasing potential for soil erosion by water or wind.

High suppression priorities for ignitions on military ranges could shift suppression efforts away from BLM-managed lands within the planning area or adjacent Federal, State, or private lands in the event of multiple incidents. This could result in local or large-scale erosion. Removal of livestock from burned public lands would reduce the short-term potential for increased soil erosion and bulk density on those lands. Even though shifting use elsewhere could result in increased soil erosion or bulk density on other Federal, State, or private lands, this effect would be less than would be expected if burned areas were grazed.

Under Alternative I, cumulative impacts related to wildland fire would be due to upland vegetation treatments and wildland fire management actions that would increase vegetation resilience and reduce fire size. This would potentially reduce spread of wildland fire to adjacent Federal, State, and private lands. Reduction of fire size would maintain vegetation cover, therefore decreasing potential for soil erosion by water or wind.

Alternative I would place travel management restrictions that would add to the acreage of areas closed and limited to designated routes within the cumulative analysis area. Restrictions in the planning area, however, may result in increased soil erosion and bulk density on adjacent Federal and State lands where cross-country motorized vehicle use is less restricted. Increased impacts to adjacent BLM lands would be short-term since the Bruneau, Burley, and Shoshone FOs are scheduled to prepare RMPs for their respective planning areas in the near future. Likewise, the Humboldt-Toiyabe National Forest has initiated their travel management planning process. According to current policy, travel and transportation allocations would substantially decrease the amount of areas open to cross-country motorized vehicle use.

Soil erosion potential and bulk density could increase throughout the region due to potential land use authorizations resulting in vegetation removal and construction, use, and maintenance of facilities and roads. Cumulative impacts to the planning area, however, should be less extensive under Alternative I compared to the No Action Alternative and Alternative II, which incorporate fewer restrictions on commercial development. This could shift impacts to adjacent Federal, State, and private lands.

Cumulative Impacts from Alternative II

Cumulative impacts to soil resources under Alternative II are expected to be similar to the No Action Alternative. Alternative II prioritizes the least acreage of all action alternatives for critical suppression and creates a landscape dominated by non-native perennial communities. While these plant communities are relatively resilient in the event of fire, fire management priorities would increase potential for fire spread to adjacent Federal, State, and private lands.

Although no areas would be open to cross-country motorized vehicle use, the impacts to soil resources would be larger in scale due to the expected increase in route density associated with commercial operations. As with Alternative I, the lack of cross-country motorized vehicle opportunities would likely shift current use to adjacent Federal or State lands with fewer restrictions.

Cumulative impacts to soil resources resulting from land use authorizations under Alternative II are expected to be similar to those described for the No Action Alternative.

Cumulative Impacts from Alternative III

Under Alternative III, cumulative effects of wildland fire management on soil resources are expected to be slightly greater than Alternative I. Increases in fire suppression infrastructure could reduce potential for spread to adjacent Federal, State, and private lands, but direct impacts to soils from roads and fuel breaks would be greater. Cumulative impacts related to travel and transportation actions and land use authorizations would be similar to Alternative I.

Cumulative Impacts from Alternative IV (the Preferred Alternative)

Under Alternative IV, cumulative impacts to soil resources due to wildland fire management are expected to be slightly less than Alternative I due to greater acreage prioritized for critical suppression. Cumulative effects of transportation and travel actions and land use authorizations would be similar to Alternative I.

Cumulative Impacts from Alternative V

Under Alternative V, potential cumulative impacts to soil resources due to wildland fire management would be lowest of all alternatives. Critical suppression priorities could reduce potential for spread to adjacent Federal, State, and private lands. Alternative V contains the most restrictive travel management allocations of all the alternatives. Therefore lack of cross-country motorized vehicle opportunities would likely shift current use and impacts to adjacent Federal or State lands with fewer restrictions. Likewise, Alternative V contains the least acreage identified for utility corridors and wind energy development projects. This could shift development and impacts from the planning area onto adjacent Federal, State, or private lands.

4.3.4. Water Resources

Analysis Methods

Indicators

The following indicators were used for the analysis of impacts to water resources:

- **Water quality and quantity in 303(d)-listed streams** – This includes water quality criteria for sediment, nutrients, and dissolved oxygen (DO). These indicators were selected because they are the criteria DEQ and Nevada Division of Environmental Protection (NDEP) use to determine if water quality is impaired and to ensure the protection of the beneficial uses of water including cold water fisheries, recreation, and agriculture. These water quality criteria are directly related to the functional condition of riparian areas and wetlands.

- **Riparian condition in 303(d)-listed streams with Proper Functioning Condition (PFC) data** – PFC ratings are based on hydrology, riparian vegetation, and the balance between erosional and depositional forces. Some of the factors upon which PFC ratings are based are also used for determining water quality impairment in the 303(d) designations. Therefore, any actions that improve riparian condition would also improve water quality of 303(d)-listed streams and promote the attainment of water quality standards for Idaho and Nevada. However, a rating of PFC is a minimal requirement for attaining State water quality standards (Appendix D) and often requires riparian development beyond PFC. Areas where 303(d)-listed streams are also rated as Priority 1 or 2 for riparian management indicate reaches where water quality and riparian function are both impaired.

- **Habitat condition for special status fish species in 303(d)-listed streams with Habitat Condition (HC) rating data** – HC ratings encompass streambank stability, streambank cover, stream substrate condition (including spawning fine sediments), water temperature (maximums for juvenile fish rearing), pool volume, pool quality, migration barriers, width-to-depth ratio, habitat complexity, and relative fish abundance. Some of the factors upon which HC ratings are based are also used for determining water quality impairment in the 303(d) designations. Therefore, any actions that improve habitat condition for special status fish species would also improve water quality of 303(d)-listed streams and promote the attainment of water quality standards for Idaho and Nevada. However, attaining State water quality standards often requires habitat conditions beyond a rating of functioning properly for fish (Appendix D). Areas where 303(d)-listed streams are also rated as Restoration Reaches for special status fish indicate reaches where water quality and habitat condition are both impaired.

Typically, impacts to water quality are tied to the management allocations by alternative. Each alternative represents a different management emphasis and may have a variety of management actions. Management actions have the potential to result in impacts to water resources if they directly, indirectly, or cumulatively change the quantity or quality of water resources within the planning area.

Methods and Assumptions

Impacts to water resources from management in the following sections of Chapter 2 were analyzed in detail: *Water Resources*, *Riparian Areas and Wetlands*, *Special Status Species*, *Wildland Fire Ecology and Management*, *Livestock Grazing*, *Recreation*, *Transportation and Travel*, *Minerals*, *Areas of Critical Environmental Concern*, and *Wild and Scenic Rivers*. Impacts from management in the *Fish* section were captured under *Impacts from Special Status Fish and Aquatic Invertebrates Actions* and, to avoid repetition, were not discussed separately. Management from the remaining sections was not analyzed in detail because the management did not vary measurably between alternatives or impact the indicator for water resources. **Impacts from management for water resources** can be found under *Impacts from Water Resources Actions* in the *Fish* and *Special Status Fish and Aquatic Invertebrates* sections.

The water resources analysis used the DEQ and NDEP stream layer for 303(d)-listed streams[5] to identify the stream miles that are listed as water-quality impaired. This list of 303(d) streams was paired with the GIS data layer for PFC data to identify their riparian condition. PFC data were collected using the guidance for assessing PFC for riparian areas, which can be found in *Riparian Area Management: A Users Guide to Assessing Proper Functioning Condition and the Supporting Science for Lotic Areas* (Prichard, et al., 1998). PFC is a qualitative assessment of the physical function of stream, wetland, lake, reservoir, and other areas associated with riparian-wetland vegetation. The 2006 riparian PFC data are summarized in the Aquatic and Riparian Management Strategy (referred to as “the ARMS” throughout this section; Appendix D). Information on the process used to generate miles of functional condition ratings and the validation with the fisheries HC data is included in the *Riparian Areas and Wetlands* and *Special Status Fish and Aquatic Invertebrates* sections.

The priority for riparian management focuses on riparian reaches that are functioning at risk (FAR) and non-functioning (NF) based on their PFC ratings. Priority 1 reaches include streams that are functioning at risk with no apparent trend (FAR-NA) or functioning at risk with a downward trend (FAR-DN). Priority 2 reaches include stream that are functioning at risk with an upward trend (FAR-UP) or are NF. The management objective for Priority 1 and 2 reaches is restoration toward PFC. Priority 3 reaches include streams that are already functioning properly; the management objective for Priority 3 reaches is to maintain them in their current condition.

Riparian reaches that are 303(d) listed and are also rated as Priority 1 and Priority 2 for riparian management were analyzed because they are areas where water quality and riparian conditions are

[5] 303(d)-listed streams are referred to throughout this section as “303(d) streams.”

impaired and are most likely to be affected by management actions. Areas that are functioning properly (Priority 3 reaches) are usually not a high priority for restoration because they are more resilient to land uses than FAR or NF reaches (Priority 1 and 2 reaches). Priority 3 reaches that are 303(d) listed are also analyzed because their 303(d) listing indicates water quality has not yet achieved State water quality objectives; these reaches would require further assessment to determine if the reason for impairment is within BLM discretion. The reason for the impairment may be related to actions in the upper portions of the watershed, or riparian condition may be moving toward but has not yet achieved water quality standards.

The priority for habitat management for special status fish species focuses on stream reaches that are functioning at risk and functioning in an unacceptable condition based on their HC rating. Restoration Reaches include streams that are functioning at risk or functioning in an unacceptable condition; as the name implies, the management objective of these reaches is restoration toward habitat that is properly functioning for fish. Conservation Reaches include streams that are functioning properly for fish; as the name implies, the management objective of these reaches is to maintain them in their current condition.

Streams that are 303(d) listed and are also Restoration Reaches for special status fish management were analyzed because they are areas where water quality and habitat condition are impaired and are most likely to be affected by management actions. Conservation Reaches are usually not a high priority for restoration because they are more resilient to land uses. However, Conservation Reaches that are also 303(d) listed indicates water quality has not yet achieved State objectives; as with the Priority 3 reaches, the impairment may be related to actions in the upper portion of the watershed, or habitat condition may be moving toward but has not yet achieved water quality standards.

Perennial stream miles were provided to establish a context for the miles of streams that have the potential to be affected by a specific land use allocation and to provide a relationship between the miles of streams available for a use relative to the miles of streams available for the use that have 303(d) and PFC data.

The primary concerns in the planning area regarding water resources are:
- Improvement and maintenance of water quality in 303(d)-listed streams, and
- Improvement and maintenance of water conditions favorable for meeting State water quality standards and the protection of beneficial uses.

For analysis purposes, the numbers in Table 4- 37 were used as a baseline for the water resources analysis.

Table 4- 37. Baseline Miles for Stream Types Addressed in this Analysis

Stream Type	Miles of Stream
Perennial Streams	316
303(d)-listed Streams	141 (132 in Idaho, 9 in Nevada)
303(d)-listed Streams with PFC Data	117
303(d)-listed Streams with HC Data	21

The following assumptions were made when conducting the impact analysis:
- The 303(d) designations are based on a broad-scale rating representative of an entire stream reach. Small components of 303(d)-listed streams may display conditions that are higher or lower than the overall reach rating.
- Perennial streams without condition data (i.e., PFC, HC, or 303(d) data) would be affected by management actions in a similar manner as streams with condition data.
- The PFC and HC evaluation processes consider factors that are also used for listing 303(d) streams. Actions that improve HC and PFC ratings would also improve the condition of 303(d)-listed streams and promote the attainment of State water quality standards.
- Although effects from management activities are largely mitigated by management direction, it was assumed that alternatives that emphasize active management have a higher risk for temporary and

short-term effects to water resources. The more management activities applied to a specific location, the greater the risk for short-term impacts to water quality. As active treatments are applied, measures are needed to mitigate potential effects. The application of mitigation measures would reduce the risk for impacts to water quality when implemented in a timely and effective manner. If the management action is to achieve recovery objectives, the short-term impacts would be off-set by the long-term improvements to water quality. The rate of improvement in HC ratings, PFC ratings, and water quality in 303(d)-listed streams using active restoration techniques would result in faster rates of recovery than using passive restoration techniques.

- Management actions in each alternative prescribe measures to maintain or improve riparian condition and protect water quality beneficial uses. Where mitigation, recovery measures, or BMPs are applied to surface-disturbing activities, the effects from any of the alternatives would be reduced, minimized, or eliminated. However, as levels of activity increase, the effectiveness of BMPs contained in Appendix E (referred to as BMPs throughout this section) at minimizing impacts to water quality would decrease. Alternatives that pose higher levels of surface-disturbing activities pose greater inherent risks to water quality than alternatives that have reduced levels of surface-disturbing activities. The DEQ and NDEP would support the BMPs defined in the *Idaho Agricultural Pollution Abatement Plan* developed with input from the Natural Resources Conservation Service (NRCS), Idaho Soil Conservation Commission, and IDL (Resource Planning Unlimited Inc., 2003b) , as well as grazing BMPs defined by NRCS, BLM, Forest Service, and IDL (Resource Planning Unlimited Inc., 2003a).
- Watershed conservation practices and the *Guidance for Developing Aquatic Conservation Strategies* (USDI, 2008) standards prescribe extensive measures to protect riparian and aquatic resources. When conservation measures are implemented and effective, adverse effects to these resources from management activities would be minimized or eliminated. However, as the level of activity increases, the risk that conservation practices would not be cumulatively effective also increases. Consequently, alternatives that propose greater levels of activity for various resources generally pose greater risk to aquatic and riparian resources.
- Implementation and effectiveness monitoring of BMPs generally does not involve water quality measurements. Systematic monitoring and adjustment of land management activities, where necessary, would ensure the highest possible level of BMP implementation and effectiveness to promote achieving water quality objectives in the absence of specific water quality measurements.
- The ARMS provides management guidance to improve instream habitat for special status aquatic species and riparian functional condition. Implementing the ARMS is an important component of improving water quality for 303(d)-listed streams because the 303(d) list identifies why the water quality is impaired and the ARMS identifies where instream (HC) and riparian (PFC) ratings are impaired as well as the priorities for restoring HC- and PFC-impaired streams. Compliance with the ARMS and application of BMPs in watersheds containing 303(d)-listed streams would ensure that no further water quality degradation occurs that would result in additional streams being 303(d) listed. Implementing the guidance in the ARMS would improve HC ratings, PFC ratings, and water quality in 303(d)-listed streams over the life of the plan. The rate of improvement in 303(d)-listed streams would depend upon the rate of improvement of PFC and HC values. PFC and HC values would need to be functioning properly for water quality in 303(d)-listed streams to achieve full compliance with State water quality standards.
- Natural disturbances such as wildland fire, windstorms, floods, and drought may result in impacts to water resources. These events, when not unduly influenced by management, are important to the diversity and complexity required for healthy aquatic systems. Natural events were not evaluated except where they are directly influenced by management activities such as uncharacteristic wildland fire.
- Noxious weed and invasive plant treatments would be conducted according to existing guidelines such as ESA-related biological opinions, conservation agreements, management plans for ACECs and other areas with special designations, and BLM policy regarding specific herbicides and biological controls. Compliance with these guidance documents, along with other current and future requirements that minimize the effects of the treatment of these species, would be implemented in a manner that would not directly or indirectly impact water quality.

- BMPs would be applied on all prescribed fires to prevent or minimize effects to water quality in all action alternatives. The effects of prescribed fire can be controlled through a burn plan, which would minimize impacts on water quality. The effects of prescribed fire on water resources are reduced as long as the fire remains under prescription. Fuels treatments would reduce fuel loading and the risk of wildland fire within the treatment area.
- The effects of wildland fire would be more severe than prescribed fire and could lead to water-repellent soil conditions and increased erosion and sedimentation if the fire occurs in riparian areas in a degraded condition. The potential for impacts to water resources would be increased in Conditional Suppression Areas.
- All alternatives would implement management strategies minimize the impacts to water resources from livestock grazing. All action alternatives would be managed to achieve riparian management objectives, which would limit impacts to water quality and protect beneficial uses. Livestock grazing on public lands would be administered with the intent of maintaining or improving water quality and protecting beneficial uses. Water quality in 303(d)-listed streams is most susceptible to impacts from livestock grazing.
- The ARMS and BMPs would be applied in all alternatives to reduce the amount of disturbance associated with recreational use. Some localized impacts would occur due to concentrated recreational uses. Monitoring would highlight areas in need of rehabilitation or relocation that would be prioritized for treatments to reduce recreational impacts to water resources. The level of recreational use is generally expected to increase over time, but may not vary appreciably between alternatives.
- All alternatives would apply the ARMS and BMPs to mitigate the effects of mining on the water resources. Mining in the vicinity of surface water is inherently disruptive, and short-term and long-term impacts to soil productivity, water quality, watershed conditions, channel stability, and local hydrology would still occur. The BLM has limited authority under the 1872 Mining Law and the Mining and Mineral Policy Act of 1970 to limit or restrict the exploration and development of locatable minerals.

Direct and Indirect Impacts

Impacts from Water Resources Actions

The Clean Water Act of 1972 requires restoration and maintenance of the chemical, physical, and biological integrity of the nation’s surface waters. The water quality standards for the State of Idaho are the benchmark standards DEQ uses to protect, maintain, or improve surface water resources in Idaho. These standards are designed to protect the beneficial uses of water including cold water fish, recreation, and agriculture. The indicators used by DEQ to identify 303(d)-listed streams include sediment, water temperature, streamflow alteration, and nutrients. These water quality indicators are similar to, but not all inclusive of, those used by NDEP to protect surface water resources in the State of Nevada (NDEP, 2005).

The planning area contains 132 miles of 303(d)-listed streams in Idaho and 9 miles in Nevada (141 miles total). A summary of the 303(d)-listed streams and the reasons for impairment are summarized the *Water Resources* section of Chapter 3 (Table 3-4). Many of the stream reaches that are currently 303(d) listed were not identified as water quality impaired in the 1987 Jarbidge RMP because the amendment to the Water Quality Act of 1987, which required states to develop non-point source management plan that included Total Daily Maximum Loads (TMDLs), had not been finalized. The TMDLs identify the water quality indicators that are impaired on the 303(d) list.

Impacts from Management Specific to the No Action Alternative

The management objective for water resources is to maintain or improve water quality in accordance with Federal and State standards. This alternative includes guidance to design and construct facilities to minimize adverse impacts to water quality, which would generally prevent degradation of water quality. The No Action Alternative does not include specific management guidance to improve water quality or identify areas where water quality is in need of improvement. The management guidance in the No Action Alternative is expected to maintain or slightly improve PFC ratings, which would maintain water quality in the current condition throughout the planning area in accordance with Federal and State standards. The No Action Alternative would not include the guidance in the ARMS for improving PFC ratings which would support attaining State water quality standards.

Impacts from Management Common to All Action Alternatives

All action alternatives include management direction to maintain or improve special status aquatic species habitats and riparian functional condition as outlined in the ARMS. The actions implemented to maintain or improve instream habitat for special status aquatic species and riparian condition would also improve water quality. Priority areas for improving water quality include Restoration Reaches and Priority 1 and Priority 2 reaches, because areas that are functioning properly (Priority 3 reaches and Conservation Reaches) are more resilient to land uses. Additional information on the management guidance to implement the ARMS and restoration priorities is provided in the ARMS and in the *Methods and Assumptions* sections in the *Special Status Fish and Aquatic Invertebrates* and *Riparian Areas and Wetlands* sections. Implementing the guidance in the ARMS would result in fewer impacts to water quality than the No Action Alternative.

All action alternatives would incorporate BMPs into management activities and authorized and allowed uses to reduce impacts to water quality. Existing authorized and allowed uses that are a factor in not meeting water quality standards would be modified to incorporate BMPs or suspended in order to improve water quality. A variety of watershed improvement projects would be implemented to reduce impacts to water quality including erosion control treatments, upland and riparian vegetation restoration treatments, and road improvements in Riparian Conservation Areas (RCAs). The short-term effects from these activities are expected to be offset by long-term improvements in water quality. These actions would comply with the ARMS and are expected to improve water quality over the life of the plan.

Impacts from Riparian Areas and Wetlands Actions

Riparian vegetation such as trees, brush, grasses, and forbs play an important role in building and maintaining productive streams. Trees and shrubs provide shade and streambank stability because of their massive root systems and dense canopy. Streamside vegetation needs to be vigorous and dense and to have enough species diversity that it can form layers over the ground. Each vegetative type (i.e., woody and herbaceous) plays an important role in forming and protecting the aquatic habitat (Platts, 1991). Water quality is directly influenced by streamside vegetation. Riparian vegetation reduces instream fine sediments and the intensity of solar radiation, assimilates nutrients, and moderates streamflows. These values are a component of PFC and 303(d)-listed stream designations. The miles of 303(d)-listed priority reaches are identified in Table 4- 38. Currently, 39 miles of Priority 1 reaches and 43 miles of Priority 2 reaches that are currently 303(d) listed are in need of improvement; 31 miles of 303(d)-listed Priority 3 reaches are already at PFC (Table 4- 38)

Table 4- 38. 303(d)-Listed Priority Reaches (Miles)

Priority Rating	Miles of 303(d)-Listed Priority Reaches	Percent of 303(d)-Listed Priority Reaches
Priority 1 and 2	86	73
Priority 3	31	27
Total	**117**	**100**

Additional information on the role of riparian vegetation in maintaining riparian condition and fish habitat can be found under *Impacts from Riparian Areas and Wetlands Actions* in the *Riparian Areas and Wetlands* and *Special Status Fish and Aquatic Invertebrates* sections. The objectives for riparian improvement that would determine rate of water quality improvement are included in the *Riparian Areas and Wetlands* section. The location and priorities for riparian restoration are included in the ARMS.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative includes direction to maintain or improve riparian habitat condition and identifies fish and riparian values as high priorities. Riparian and wetland habitat would have a high priority for protection and improvement according to BLM Manual 6700. Those management actions within floodplains and wetlands would include measures to preserve, protect, and, if necessary, restore their natural function. In general, the management guidance to avoid uses within the riparian buffer zone does not provide direction for improving or restoring riparian condition over the life of the plan. The conditions of the riparian areas in the planning area are summarized in Table 4- 82 in the *Riparian Areas and Wetlands* section. The No Action Alternative provides general guidance for wetlands in conjunction with riparian areas, but does not provide specific management direction for maintaining or improving wetland condition. The wetlands that have been assessed for lentic PFC are summarized in the *Riparian Areas and Wetlands* section of Chapter 3 (Table 3-4).

Impacts from Management Common to All Action Alternatives

All action alternatives would implement the ARMS to achieve riparian and wetland management objectives. The ARMS provides direction to maintain RCAs in good condition and outlines priorities for restoration and recovery based on the HC and PFC ratings. The ARMS would improve HC and PFC ratings, which would also improve water quality over the life of the plan. Additional information on the use of adaptive management to improve riparian and wetland condition is included in the *Riparian Areas and Wetlands* section.

The ARMS includes specific guidelines for improving wetlands under the guidance for Category 3 and Category 4 RCAs; it also includes guidance to apply the *Idaho Stream Channel Alteration Rules* (IDAPA 37.03.07) and to apply the *Grazing Management Processes and Strategies for Riparian-Wetland Areas* (Wyman, et al., 2006) to riparian areas and wetland conditions. Water quality in wetlands is expected to improve under all action alternatives as a result of implementing this management direction.

Impacts from Management Specific to Alternative I

In Alternative I, riparian management would result in 82 of 141 miles of 303(d)-listed streams (58%) moving toward or achieving PFC (303(d)-listed Priority 1 and 2 reaches). The 31 miles of 303(d)-listed Priority 3 reaches would require further assessment to determine if the reason for impairment is within BLM discretion. Alternative I is expected to have more improvement in water quality than the No Action Alternative and Alternative II, but less than Alternatives III, IV, and V. Riparian restoration actions could result in short-term, site-specific effects to water quality, but riparian condition and water quality would improve in the long-term.

Impacts from Management Specific to Alternative II

In Alternative II, riparian management would result in 82 of 141 miles of 303(d)-listed streams (58%) moving toward PFC instead of achieving PFC (303(d)-listed Priority 1 and 2 reaches). As a result, fewer miles would achieve water quality standards under Alternative II than the other action alternatives, but there would be more improvement in water quality than the No Action Alternative. Riparian restoration actions could result in short-term and site-specific effects to water quality, but riparian condition and water quality would be improved in the long-term.

Impacts from Management Specific to Alternative III

The effects of riparian actions on water quality in Alternative III are the same as described for Alternative I.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

The effects of riparian actions on water quality in Alternative IV are the same as described for Alternative I. The increased emphasis for active restoration could result in a greater risk of short-term impacts to water quality but is expected to have the fastest rate of improvement in 303(d)-listed streams than the No Action Alternative and other action alternatives.

Impacts from Management Specific to Alternative V

The effects of riparian actions on water quality in Alternative V are the same as described for Alternative I. The increased emphasis for passive restoration could result in a fewer short-term impacts to water quality, but slower rates of recovery for 303(d)-listed streams compared to the No Action Alternative and the other action alternatives. The passive restoration techniques could result in some riparian reaches having limited improvement where active techniques would be more effective in fully achieving PFC.

Impacts from Special Status Fish and Aquatic Invertebrates Actions

Managing streams to maintain and promote the biological needs of special status aquatic species directly influences water quality and quantity. Special status aquatic species require stable streams that are well vegetated, with low instream fine sediments and cool water temperatures for survival and reproduction (Appendix D). Shaded stream areas are the preferred habitats of juvenile salmonids (Platts, 1991). The quantitative HC ratings (instream) and the qualitative PFC ratings (riparian area) include components that are used for 303(d) designation of impairment. PFC is a minimal requirement for special status aquatic species habitat, and the attainment of State water quality standards often require development beyond an initial rating of PFC. The HC rating process goes beyond PFC by evaluating sediment, water temperature, fish abundance, and instream characteristics related to hydrological function (e.g., depth, maximum width, length, area, number/mile, and dominant substrate of pools). For this reason, the HC data can be used to validate the PFC ratings. The miles of 303(d)-listed streams with HC data and their associated HC ratings are summarized in Table 4- 39. Overall, 21 of 141 miles of 303(d)-listed streams (15%) have HC data and contain special status aquatic species (Table 4- 39); currently, 16 miles are in need of improvement, while 5 miles can be maintained in their current condition.

Table 4- 39. 303(d)-Listed Conservation and Restoration Reaches (Miles)

HC Rating	Miles of 303(d)-Listed Streams with HC Data	Percent of 303(d)-Listed Streams with HC Data
Conservation	5	24
Restoration	16	76
Total	**21**	**100**

Impacts from Management Specific to the No Action Alternative

The current management direction does not include direct guidance for improving water quality in the Snake River or any other perennial streams in the planning area. The No Action Alternative includes management guidance to protect the aquatic habitat of Sensitive and Candidate species in a portion of the Snake River below lower Salmon Falls Dam, which would provide some guidance for maintaining water quality. The 500-foot year round occupancy restrictions for oil and gas exploration and development would avoid impacts to water quality in streams containing special status aquatic species.

The No Action Alternative resulted in the instream habitat conditions for Interior Columbia River redband trout (redband trout) and Columbia River Basin bull trout (bull trout) summarized in Table 4- 116. The ARMS contains a summary of functional condition, limiting factors, and conservation and restoration priorities based on 2005 and 2006 stream survey data. This guidance would not be implemented in the No Action Alternative. There are 21 miles of 303(d)-listed streams that contain special status aquatic species and have HC data. Guidance in the No Action Alternative is expected to maintain or slightly improve water quality in these Restoration and Conservation Reaches.

The No Action Alternative does not provide guidance for uses with the potential to affect special status aquatic resources, such as livestock grazing, wildland fire management, recreation, travel and transportation, land use authorizations, or other mineral exploration or development. Although there is guidance for activities to be evaluated on a case-by-case basis, it is unclear how or when changes in management would be implemented. There is no specific guidance for managing these uses for special status aquatic species that would also maintain or improve water quality.

Impacts from Management Common to the No Action and All Action Alternatives

The No Action Alternative and all action alternatives include guidance to follow current conservation measures in biological opinions and letters of concurrence as outlined in Appendix D. This guidance would maintain or improve habitat conditions for aquatic species for which ESA consultation has been completed and would maintain or improve water quality in these occupied habitats.

Impacts from Management Common to All Action Alternatives

All action alternatives include management direction to maintain or improve special status fish and aquatic species habitats as outlined in the ARMS, including conservation and restoration priorities for managing their habitats. Implementation of the ARMS would improve HC and PFC ratings, which would also improve water quality over the life of the plan. All action alternatives would include the use of BMPs to maintain or improve habitat for special status aquatic species. Management for all special status aquatic species would be conducted according to current conservation plans, ESA consultation documents, and other strategies (Appendix H), which would also maintain or improve water quality.

Impacts from Management Specific to Alternative I

In Alternative I, special status species management guidance would result in 16 miles of 303(d)-listed Restoration Reaches having improved water quality due to restoration of special status aquatic species habitat (Table 4- 39). The 5 miles of 303(d)-listed Conservation Reaches, whose habitat condition would be maintained, would require further assessment to determine if the reason for water quality impairment is within BLM discretion.

Impacts from Management Specific to Alternative II

The impacts of special status aquatic species actions on water quality for Alternative II are the same as described for Alternative I.

Impacts from Management Specific to Alternative III

The impacts of special status aquatic species actions on water quality for Alternative III are the same as described for Alternative I.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

The impacts of special status aquatic species actions on water quality for Alternative IV are the same as described for Alternative I. The increased emphasis on active restoration could result in a greater risk of short-term impacts to water quality but is expected to have the fastest rate of improvement in 303(d)-listed streams of the action alternatives. The active restoration techniques would result in more Restoration Reaches achieving habitat objectives because active techniques would be more effective than passive techniques at restoring impaired reaches in the life of the plan.

Impacts from Management Specific to Alternative V

The impacts of special status aquatic species actions on water quality for Alternative V are the same as described for Alternative I. The increased emphasis on passive restoration could result in fewer short-term impacts to water quality and slower rates of recovery for 303(d)-listed streams of the other alternatives. The passive restoration techniques could result in some Restoration Reaches having limited improvement if active techniques would be more effective in achieving habitat objectives.

Impacts from Wildland Fire Ecology and Management Actions

Wildland fire can reduce water quality in the short term, but can improve water quality in the long term. The length of time for water quality to recover from the short-term effects of wildland fire is directly related to the rate of riparian recovery and the level of land uses in the impacted area. The areas of most concern in this analysis are those reaches of stream currently not at PFC that are 303(d) listed due to impaired water quality (i.e., 303(d)-listed Priority 1 and 2 reaches); these reaches are more at risk from additional impacts to water quality than 303(d)-listed Priority 3 reaches because of their reduced condition. Maintaining 303(d)-listed Priority 3 reaches at PFC and restoring 303(d)-listed Priority 1 and 2 reaches would promote the long-term objective of achieving or moving toward State water quality standards in the life of the plan.

Watersheds that burn more frequently than they did historically are more likely to have long-term reductions in water quality because riparian recovery does not achieve hydrological functions that would support State water quality standards. Low severity wildland fire can stimulate riparian vegetation, making it more vigorous over time and improving water quality as long as fires occur over longer intervals.

Critical Suppression Areas represent the highest suppression priority for reducing fire size and acres burned. Alternatives that include 303(d)-listed Priority 1 and 2 reaches and 303(d)-listed Restoration Reaches in Critical Suppression Areas would reduce the potential for impacts to water quality in these streams. Priority 3 reaches and Conservation Reaches may also be impacted by wildland fire, but these reaches are more resilient than the reaches that are in a reduced condition. Priority 1 and 2 reaches and Restoration Reaches are more at risk for high burn severity than Priority 3 reaches and Conservation Reaches. Conditional Suppression Areas, which represent areas of lower suppression priority based on the resource values and a desired fire role in the ecosystem, could result in unsuppressed wildland fire in an RCA, which could have short- and long-term effects to riparian areas and wetlands, which would be more pronounced in Priority 1 and 2 reaches.

The miles of 303(d)-listed priority reaches in Critical and Conditional Suppression Areas are summarized in Table 4- 40. Table 4- 41 displays 303(d)-listed streams and 303(d)-listed priority reaches by VMA. VMA B has the most miles of 303(d)-listed Priority 1 and 2 reaches of the four VMAs, while VMA A has the fewest.

Table 4- 40. 303(d)-Listed Priority Reaches in Critical and Conditional Suppression Areas by Alternative (Miles)

Priority Rating	Alternative [A]					
	I	II	III	IV		V
				IV-A	IV-B	
Critical Suppression Area						
Priority 1 and 2	44	18	37	55	46	86
Priority 3	24	14	22	27	24	31
Total	**68**	**31**	**59**	**82**	**70**	**117**
Conditional Suppression Area						
Priority 1 and 2	41	68	49	31	40	0
Priority 3	8	18	9	4	7	<1
Total	**49**	**86**	**58**	**35**	**47**	**<1**

[A] The No Action Alternative does not identify Critical or Conditional Suppression Areas

Table 4- 41. 303(d)-Listed Streams and 303(d)-Listed Priority Reaches by VMA

VMA	Miles of 303(d)-Listed Streams	303(d)-Listed Priority Reaches			
		Priority 1 and 2		Priority 3	
		Miles	Percent of 303(d)-Listed Streams	Miles	Percent of 303(d)-Listed Streams
A	16	4	25%	12	75%
B	45	33	73%	12	27%
C	28	14	50%	14	50%
D	53	31	58%	22	42%
Total	**142**	**82**	**58%**	**60**	**42%**

Fire suppression efforts can increase erosion rates when fire lines are constructed on steep slopes, erosive soils, or in RCAs. The removal of vegetation can also increase the speed with which overland flow reaches the channel network and the amount of surface water added to the channel. In the most extreme cases, the combination of these effects can increase peak flows in burned watersheds and result in channel adjustment. Surface-disturbing activities associated with fire suppression, as well as loss of surface vegetation due to wildland fire, can result in a decrease in effective ground cover, increase in sediment delivery to streams, and a reduction of water quality.

Fire suppression activities using Minimum Impact Suppression Tactics (MIST) are important for minimizing impacts to riparian areas containing bull trout. Site-specific mitigation, such as drafting water from streams in a manner that does not cause localized dewatering and avoiding fueling, staging, and other fire support activities in RCAs, would minimize the potential effects from fire suppression activities on bull trout occupied riparian areas.

Fuels treatments in the riparian area would have short-term impacts but potentially long-term improvements in riparian vegetation in Priority 3 reaches. Priority 1 and 2 reaches may not respond in a similar manner because they tend to burn with greater severity and take more time to recover. The guidance in the ARMS and BMPs would reduce the potential for fuels treatments to affect 303(d)-listed Priority 1 and 2 reaches and 303(d)-listed Restoration Reaches. Rest from uses such as livestock grazing and recreation would be an important component of RCA recovery after fuels treatments.

Prescribed fire and mechanical treatments are ways to manage fuel loads. By burning vegetation and organic matter on the soil surface, wildland fire can increase erosion rates and affect water quality. The effects of prescribed fire are less severe than wildland fire because the location and severity of the fire are controlled and erosion potential can be reduced. Prescribed fires allow for sediment-trapping buffers to be left around stream channels to reduce sediment delivered to the stream and risk to water quality. Also, prescribed fires are not typically used to burn an entire watershed, which minimizes the potential for changes in water yield and peak flow. Furthermore, the use of prescribed fire reduces the risk of uncontrolled, high-severity wildland fires that would otherwise burn through riparian areas and impact water quality.

A variety of mechanical, chemical, and manual methods could be used to restore vegetation and stabilize soils within burned areas. Some localized short-term effects to streams could occur, but these treatments are expected to reduce surface erosion in these areas.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative calls for full suppression of all new fires. Large wildland fires are expected to continue due to factors that are beyond human control (i.e., drought conditions, weather, and availability of flashy fuels). The current management provides limited direction for minimizing impacts to aquatic habitats, riparian areas, or water quality. This could result in short-term impacts to priority reaches and 303(d)-listed streams as a result of the wildland fire and fire suppression efforts.

Impacts from Management Common to All Action Alternatives

All action alternatives include using the guidance in the ARMS for wildland fire suppression in riparian areas and incorporating BMPs into BLM management activities and authorized uses. The potential for short-term impacts to riparian areas and wetlands would still occur as a result of wildland fire; however, the management guidance in the ARMS would reduce the potential effects from suppression and prescribed fire activities on riparian areas and wetlands. The guidance in the ARMS includes direction to adjust fire suppression activities to reduce impacts to instream HC and PFC ratings over the life of the plan, which would also reduce impacts to water quality of 303(d)-listed streams and promote the attainment of State water quality standards for Idaho and Nevada.

Impacts from Management Specific to Alternative I

Alternative I would rank fourth of the action alternatives for miles of 303(d)-listed Priority 1 and 2 reaches in Critical Suppression Areas (Table 4- 42), more than in Alternatives II and III but less than in Alternatives IV and V.

Table 4- 42. Streams Impacted by Critical and Conditional Suppression Areas in Alternative I (Miles)

Stream Type	Critical Suppression Areas	Conditional Suppression Areas
Perennial Streams	239	77
303(d)-Listed Streams	68	49
303(d)-Listed Priority 1 and 2 Reaches	44	41
303(d)-Listed Priority 3 Reaches	24	8

VMA C has the highest priority for wildland fire suppression during multiple ignitions in Alternative I, while VMA B has the second highest priority. VMAs B and C contain 73 miles of 303(d)-listed streams with PFC data, of which 47 miles are Priority 1 and 2 reaches (Table 4- 41); 303(d)-listed Priority 1 and 2 reaches in

Critical Suppression Areas in high-priority VMAs are least at risk from the effects of wildland fire. Alternative I would have the most miles of 303(d)-listed Priority 1 and 2 reaches in high-priority VMAs of all alternatives.

The use of local water sources for fire suppression would increase the number of water developments for fire suppression. The types of water development would include water storage tanks, draft sites, hydrants off pipelines, and enlarging stock water and surface water storage ponds. The general effects of diverting surface flows from streams would depend upon the amount of water used and the rate and time of year surface waters are diverted. These factors would locally reduce water quantity in streams with HC and PFC ratings and 303(d)-listed streams.

The use of impounded waters for fire suppression would likely have a minimal impact on streams and therefore are suitable sources of water for fire suppression. The use of flowing waters for fire suppression would have localized effects to riparian areas and wetlands. The development of new draft sites would have localized effects to streams if water is diverted during low flow conditions or at a rate that locally reduces surface flows. Water quality can also be affected where petroleum products are used to operate water pumps in RCAs.

Hydrants off pipelines could have a minor short-term effect on streamflow due to additional surface water being diverted from streams to accommodate fire suppression needs.

The use or expansion of stock water and other water storage ponds could be a concern for riparian areas and wetlands. Water storage impoundments can affect streams by altering streamflows, introducing sediments into stream channels, and locally reducing water quality. These changes in streamflow can have direct, indirect, and potentially long-term effects to downstream conditions. These impoundments can concentrate livestock in RCAs and increase grazing-related impacts to streams. Stock water ponds in upland areas would have less potential to affect RCAs but some alteration of surface flows may occur.

Road and stream crossing improvements would occur under this alternative. Road improvements to reduce response time for fire suppression in uplands could impact riparian areas. Sediment contributions can exceed the stream's ability to transport the additional fine sediments. Improving road surfacing, realigning roads away from riparian areas and wetlands, improving road drainage, or replacing damaged riparian vegetation would reduce sediment contributions to streams. Road improvements can have short-term impacts resulting in long-term improvements to HC and PFC ratings. This would promote the achievement of State water quality standards at the watershed scale.

Alternative I would have new roads constructed to facilitate wildland fire suppression. Segments of these new roads could be in RCAs, which would have localized effects to PFC ratings and water quality in 303(d)-listed streams. The effects of building new roads in RCAs would result in additional surface disturbance that would introduce sediment into riparian areas. These new roads would have the same effect to streams as existing roads, but would add to the amount of sediment introduced. Roads constructed in RCAs would use the guidance in the ARMS to reduce impacts to water quality. Priority 1 and 2 reaches and 303(d)-listed streams are at the most risk for further reductions in condition from new road construction because of their impaired condition. Short-term effects to PFC ratings and water quality in 303(d)-listed streams from fire suppression-related road improvements would occur, but long-term improvement would have to be anticipated to comply with the ARMS.

New roads in upland areas would likely have a minor effect on riparian areas as long as BMPs are used to minimize off-site surface erosion into RCAs. The new roads in upland areas could improve the response time for fire suppression and reduce the potential for RCAs to burn due to a large wildland fire, especially in VMAs B and D, which contain a large percentage of 303(d)-listed Priority 1 and 2 reaches. New roads in these VMAs are expected to result in fewer miles of Priority 1 and 2 reaches burned by wildfire.

Management guidance to improve stream crossings by upgrading undersized culverts or replacing culverts with bridges would result in short-term, localized disturbance to HC and PFC ratings, but would improve riparian/hydrologic function in the long-term due to restored riparian vegetation and hydrologic function. The guidance in the ARMS and BMPs would minimize these short-term impacts. Designing road crossings to allow for water withdrawals for fire suppression would eliminate additive impacts to streams from creating new water drafting sites.

New guard stations could be constructed under this alternative. Locating these facilities in upland areas where they do not pose a threat to RCAs or surface water is expected to avoid effects to HC ratings, PFC ratings, and water quality in 303(d)-listed streams. The construction and use of these facilities would result in soil and vegetation disturbance in upland areas that could be introduced into RCAs, but the potential for this is low under the guidance in the ARMS. The storage of petroleum products and other hazardous materials at these facilities would comply with the ARMS, the Clean Water Act, and other Idaho and Nevada State standards, which are expected to reduce the potential for these materials to impact water quality.

The impacts of targeted grazing to treat fuels are described in detail in the *Riparian Areas and Wetlands* section under *Impacts from Noxious Weeds and Invasive Species Actions*. Targeted grazing would be expected to increase impacts to RCAs, particularly in VMAs B and D, which contain the majority of 303(d)-listed Priority 1 and 2 reaches (64 miles) in the planning area. These potential impacts could be avoided if additional infrastructure is used to reduce livestock access to RCAs.

Impacts from Management Specific to Alternative II

Alternative II would have the fewest miles of 303(d)-listed Priority 1 and 2 reaches in Critical Suppression Areas of all alternatives (Table 4- 43). Therefore, it has the least likelihood of facilitating riparian restoration and water quality objectives of all alternatives with regard to wildland fire.

Table 4- 43. Streams Impacted by Critical and Conditional Suppression Areas in Alternative II (Miles)

Stream Type	Critical Suppression Areas	Conditional Suppression Areas
Perennial Streams	88	227
303(d)-Listed Streams	31	86
303(d)-Listed Priority 1 and 2 Reaches	18	68
303(d)-Listed Priority 3 Reaches	14	18

VMA A has the highest priority for fire suppression during multiple ignitions in Alternative II, while VMA B has the second highest priority. VMAs A and B contain 61 miles of 303(d)-listed stream with PFC data, of which 37 miles (61%) are Priority 1 and 2 reaches (Table 4- 41); 303(d)-listed Priority 1 and 2 reaches in Critical Suppression Areas in a high-priority VMA are least at risk from the effects of wildland fire. VMAs A and B have the fewest miles of 303(d)-listed Priority 1 and 2 reaches of the four VMAs. Therefore, giving VMAs A and B highest priority for suppression during multiple ignitions has the least likelihood of facilitating riparian restoration and water quality objectives of all alternatives.

Creating new and improving existing water developments, improving roads and stream crossings, building new roads in areas with limited access, and building new guard stations would have the same effects to water resources as described for Alternative I.

In Alternative II, prescribed fire, targeted grazing, and increased permitted livestock use would be used to reduce fuels. The effects from using targeted grazing for fuels treatments are similar to those described under *Impacts from Noxious Weeds and Invasive Plants Actions* in the *Riparian Areas and Wetlands* section. Prescribed fire has similar, but less pronounced, effects on the landscape as wildland fire because prescribed fires are planned ignitions and conducted according to specific project objectives (e.g., fire intensity, acreages, and weather conditions). The use of fire in riparian areas would reduce HC ratings, PFC ratings, and water quality in 303(d)-listed streams because the fire would remove riparian vegetation other than noxious weeds and invasive plants. The effects to woody riparian vegetation would be expected to be long-term (5 to 10 years) because woody riparian vegetation recovers more slowly than herbaceous riparian vegetation (Burton, 2005; Rieman & Clayton, 1997). Priority 1 and 2 reaches and 303(d)-listed streams are at more risk for prolonged reduction in condition from the use of prescribed fire in RCAs than streams that are functioning properly (Conservation Reaches and Priority 3 reaches).

Once the woody riparian vegetation has recovered, HC ratings, PFC ratings, and water quality may be improved compared to their pre-burn condition.

Impacts from Management Specific to Alternative III

There would be more fire suppression-related infrastructure under Alternative III than any of the other alternatives. Alternative III would have the second fewest miles of 303(d)-listed Priority 1 and 2 reaches in Critical Suppression Areas (Table 4- 44), fewer than Alternative I but more than Alternative II. Therefore, it has the second lowest likelihood of facilitating attainment or progress towards riparian and State water quality objectives of all action alternatives with regard to wildland fire ecology and management.

Table 4- 44. Streams Impacted by Critical and Conditional Suppression Areas in Alternative III (Miles)

Stream Type	Critical Suppression Areas	Conditional Suppression Areas
Perennial Streams	180	135
303(d)-Listed Streams	76	65
303(d)-Listed Priority 1 and 2 Reaches	37	49
303(d)-Listed Priority 3 Reaches	22	9

VMA B has the highest priority for wildland fire suppression during multiple ignitions in Alternative III, while VMA A has the second highest priority. VMAs A and B contain 61 miles of 303(d)-listed streams with PFC data, of which 37 miles (61%) are Priority 1 and 2 reaches (Table 4- 41). The effects would be the same as described for Alternative II.

There would be more infrastructure to increase water availability for fire suppression under this alternative than any of the other action alternatives; overall, Alternative III would have the most risk for reducing HC and PFC rating and water quality due to more of these activities being implemented than in other alternatives. The effects from water storage tanks, draft sites, hydrants off pipelines, and enlarging stock water and surface water storage ponds would be the same as in Alternative I. However, the development of new pipelines could have additional effects by reducing streamflows as additional water is removed from the stream.

Alternative III would have the greatest number of new roads and improvements to existing roads and stream crossings to facilitate fire suppression of any of the action alternatives and the greatest potential for a reduction in PFC ratings. The effects of improving existing roads and stream crossings and building new roads are similar to those described under Alternative I.

The effects of building new guard stations are similar to those described under Alternative I. New airstrips and helipads could be constructed under this alternative, and existing airstrips could be improved. It is expected this infrastructure would be located in upland areas where they do not pose a threat to RCAs or surface water to avoid effects to HC ratings, PFC ratings, and water quality in 303(d)-listed streams. The construction and use of these facilities would result in soil and vegetation disturbance in upland areas that could be introduced into RCAs, but the potential for this is low under the guidance in the ARMS. The storage of petroleum products and other hazardous materials at these facilities would comply with the ARMS, the Clean Water Act, and other Idaho and Nevada State standards, which are expected to reduce the potential for these materials to impact water quality.

In Alternative III, fuels treatments would occur at the landscape scale and would include increased permitted livestock grazing, targeted grazing, and prescribed fire. These fuels treatments would have similar effects to HC ratings, PFC ratings, and water quality in 303(d)-listed streams as described for targeted grazing in under *Impacts from Noxious Weeds and Invasive Plants Actions* in the *Riparian Areas and Wetlands* section and for prescribed fire in Alternative II. Fuels treatments in Alternative III would occur on more acres than in Alternative II, but fewer than in Alternatives I, IV, and V.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV-A would have the second most miles of 303(d)-listed Priority 1 and 2 reaches in Critical Suppression Areas (Table 4- 45), more than in Alternatives I, II, and III. Therefore, it is the second most likely to facilitate achieving or moving towards riparian and state water quality objectives of all alternatives for wildland fire.

Alternative IV-B (the Preferred Alternative) would have the third most miles of 303(d)-listed Priority 1 and 2 reaches in Critical Suppression Areas (Table 4- 45), more than in Alternatives I,II, and III but less than in Alternative IV-A. Therefore, it is the third most likely to facilitate achieving or moving towards riparian and state water quality objectives of all alternatives for wildland fire.

Table 4- 45. Streams Impacted by Critical and Conditional Suppression Areas in Alternative IV (the Preferred Alternative; Miles)

Stream Type	Critical Suppression Areas		Conditional Suppression Areas	
	IV-A	IV-B	IV-A	IV-B
Perennial Streams	262	262	53	53
303(d)-Listed Streams	100	88	41	54
303(d)-Listed Priority 1 and 2 Reaches	55	46	31	40
303(d)-Listed Priority 3 Reaches	27	24	4	7

VMA C has the highest priority for fire suppression during multiple ignitions in Alternative IV, while VMA D has the second highest priority. VMAs C and D contain 81 miles of 303(d)-listed streams with PFC data, of which 45 miles (56%) are Priority 1 and 2 reaches (Table 4- 41). Alternative IV would have the most miles of 303(d)-listed streams contained in high-priority VMAs and the second most miles of 303(d)-listed Priority 1 and 2 reaches. This alternative would rank second in reducing the likelihood that wildland fire would reduce condition of water resources.

As in the other action alternatives, there would be an increased emphasis on improving water sources, roads and stream crossings, and other infrastructure to enhance fire suppression. However, water development improvements would consist only of hydrants off pipelines and enlarging stock water and surface water storage ponds. The effects from these facilities are the same as those described for Alternative I. The effects of improving existing roads and stream crossings, constructing new roads and crossings, and building new guard stations would also be the same as described for Alternative I.

More acres of fuels treatments would occur in Alternative IV than any of the other alternatives. Not all of these acres would be in RCAs, but riparian areas and special status aquatic species habitats would be emphasis areas for fuels treatments. This alternative would have a greater likelihood for prescribed fire to reduce the HC and PFC ratings in the short-term, but improve water quality in the long term. Targeted grazing in RCAs would have the same effects to riparian areas as described for Alternative I, except there would be more acres of targeted grazing in Alternative IV and therefore a greater likelihood for impacts to HC ratings, PFC ratings, and water quality of 303(d)-listed streams. Targeted grazing in RCAs with reduced HC and PFC ratings would not support the achievement of the water quality objectives for 303(d)-listed streams.

Impacts from Management Specific to Alternative V

Alternative V would have the most miles of 303(d)-listed Priority 1 and 2 reaches in Critical Suppression Areas (Table 4- 46), more than all other alternatives. Alternative V is expected to be the most likely to facilitate achieving or moving towards riparian and State water quality objectives if conditions can be improved through passive techniques.

Table 4- 46. Streams Impacted by Critical and Conditional Suppression Areas in Alternative V (Miles)

Stream Type	Critical Suppression Areas	Conditional Suppression Areas
Perennial Streams	303	3
303(d)-Listed Streams	140	1
303(d)-Listed Priority 1 and 2 Reaches	86	0
303(d)-Listed Priority 3 Reaches	31	<1

As in Alternative I, VMA C has the highest priority for wildland fire suppression during multiple ignitions in Alternative V, while VMA B has the second highest priority. The effects of these fire suppression priorities are the same as described for Alternative I.

Critical Suppression Areas in the Sagebrush Sea ACEC would include 258 miles of the 316 perennial streams miles in the planning area. The suppression emphasis and tactics are expected to reduce the potential for wildland fire and fire suppression to affect HC ratings, PFC ratings, and water quality of 303(d)-listed streams, to the extent practical. The ARMS guidance would be used to reduce effects from fire suppression on streams. RCAs could be affected from suppression activities in localized areas when there is an urgent need to protect structures and public safety. Alternative V would have the least risk for impacts due to wildland fire and the most likely to achieve or facilitate the movement toward the HC, PFC, and State water quality objectives in Critical Suppression Areas.

Because the Sagebrush Sea ACEC is identified as a Critical Suppression Area and there would be no new road construction for wildland fire suppression in Alternative V, vehicle access could be limited in some watersheds containing 303(d)-listed Priority 1 and 2 reaches. The limited access could lengthen response time for fire suppression, which could result in more acres of Priority 1 and 2 reaches, Restoration Reaches, and 303(d)-listed streams burned by wildland fire. This would result in a short-term reduction in HC ratings, PFC ratings, and water quality but could result in improvements in HC ratings, PFC ratings and water quality in the long-term.

This alternative would have less fire suppression infrastructure and less watershed disturbance than any of the other action alternatives and would have the least potential to reduce water quality of any alternative due to these activities. Water developments would be maintained at their current levels, resulting in fewer disturbances to HC ratings, PFC ratings, and water quality of 303(d)-listed streams than the other alternatives. However, maintaining water availability at current levels could affect suppression response time and result in more acres burned by fire under more extreme conditions.

The effects of using prescribed fire for fuels treatments would be the same as those described for Alternative II.

Impacts from Livestock Grazing Actions

Livestock grazing can directly impact water infiltration into the soil due to trampling, soil compaction, and loss of vegetation cover on both upland and riparian sites. This can accelerate surface erosion and increase the amount of fine sediment and nutrients introduced to streams. Accelerated erosion results in an increase in erosion of surface fecal wastes, which can increase bacterial concentrations in streams through direct introductions to water or riparian areas. Water quality can be indirectly impacted by the increases soil runoff, erosion, and sediment delivery to adjacent riparian areas and streams. Impacts to water quality from livestock grazing are often greater in riparian areas due to livestock attraction to shade, water, and palatable vegetation. Grazing can result in increased fine sediment loads from streambank erosion, loss of riparian habitats by stream channel widening or degradation, and lowering of water tables through channel incision.

Grazing in riparian areas directly affects vegetation condition and instream habitat quality, which can also affect water quality and quantity in streams. The effects of livestock grazing on riparian areas are discussed under *Impacts from Livestock Grazing Actions* in the *Special Status Fish and Aquatic Invertebrates* and *Riparian Areas and Wetlands* sections. Monitoring and adaptive management can be used as a tool to reduce the impacts of livestock grazing on riparian areas and water quality (Williams, et al., 2007).

Long-term grazing can change the vegetation composition of some riparian sites. Loss of willows and deep-rooted vegetation makes streambanks more susceptible to water erosion (Appendix D). Also, grazing by livestock and wild ungulates reduces streambank stability through vegetation removal and streambank trampling, increases soil compaction, increases sediment inputs to streams, causes stream widening or down cutting, and often changes riparian vegetation. Stream widening and sedimentation can increase water temperatures and reduce water quality through mechanisms similar to these described under *Impacts from Wildland Fire Ecology and Management Actions*, but grazing impacts can be compounded by repeated yearly use of the same areas. Fencing streams to exclude livestock grazing is a widely used approach for restoring stream habitats (Platts, 1991).The improved riparian condition within fenced areas would also result in improved water quality. The rate of improvement in 303(d)-listed streams would depend upon the rate of improvement of HC and PFC ratings. The riparian vegetation component (PFC) is expected to improve more quickly than the instream hydrological components (HC). PFC and HC values would need to be functioning properly in order for water quality in 303(d)-listed streams to achieve full compliance with State water quality standards.

The amount of 303(d)-listed streams in areas available and unavailable for livestock grazing are summarized in Table 4- 47; however, the areas of most concern in this analysis are 303(d)-listed Priority 1 and 2 reaches accessible to livestock (Table 4- 48). Because PFC is a minimal requirement for attaining State water quality standards, any actions that improve PFC and HC would also improve the condition of 303(d)-listed streams and promote the attainment of State water quality standards for Idaho and Nevada. The miles of 303(d)-listed priority reaches in riparian reference areas are summarized in Table 4- 49.

Table 4- 47. 303(d)-Listed Streams Available and Unavailable for Livestock Grazing by Alternative (Miles)

Livestock Grazing	Alternative						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
Available	114	85	102	102	90	90	55
Unavailable	28	57	40	40	52	51	87

Table 4- 48. 303(d)-Listed Priority Reaches in Areas Available and Unavailable to Livestock Grazing by Alternative (Miles)

Priority Rating	No Action	I	II	III	IV		V
					IV-A	IV-B	
Available for Livestock Grazing							
Priority 1 and 2	71	47	60	60	49	50	32
Priority 3	26	22	26	26	24	24	11
Total	**97**	**69**	**85**	**85**	**73**	**74**	**43**
Unavailable for Livestock Grazing							
Priority 1 and 2	15	39	26	26	37	36	52
Priority 3	5	9	6	6	7	7	20
Total	**20**	**49**	**32**	**32**	**44**	**43**	**74**

Table 4- 49. 303(d)-Listed Priority Reaches in Riparian Reference Areas by Alternative (in Miles)

Priority Rating	Alternative					
	No Action [A]	I	II	III	IV	V
Priority 1 and 2	N/A	16	6	6	16	14
Priority 3	N/A	2	1	1	2	11
Total	**N/A**	**18**	**7**	**7**	**18**	**25**

[A] Riparian exclosures for the No Action Alterative were not available in GIS

Miles of perennial streams and Conservation and Restoration Reaches in areas available and unavailable for grazing and in riparian reference areas are summarized in the *Special Status Fish and Aquatic Invertebrates* section (Table 4- 122 and Table 4- 123).

Impacts from Management Specific to the No Action Alternative

The No Action Alternative would continue the current allocation of between 160,000 and 260,000 AUMs for livestock. There are 138 miles (44%) of perennial streams in areas available and 178 miles (56%) of perennial streams in areas unavailable to livestock grazing. The 114 miles of 303(d)-listed streams in areas available for livestock grazing (Table 4- 47) include 71 miles of 303(d)-listed Priority 1 and 2 reaches (Table 4- 48), while the 28 miles of 303(d)-listed streams in areas unavailable for livestock grazing include 15 miles of 303(d)-listed Priority 1 and 2 reaches. Stream reaches listed as 303(d) water quality impaired that are accessible to livestock grazing would continue to be at risk for impacts to water quality under this alternative if the impairment is due to livestock grazing. This alternative has the most miles of 303(d)-listed streams and 303(d)-listed Priority 1 and 2 reaches available for grazing of all the alternatives.

Approximately five riparian exclosures were created to exclude livestock under the No Action Alternative. These riparian exclosures are expected to continue to improve riparian condition over time.

Impacts from Management Common to All Action Alternatives

Livestock grazing in the planning area would comply with the management guidance in the ARMS. This guidance would be used in grazing authorizations and annual operating plans to adjust livestock grazing in riparian areas where HC and PFC ratings need improvement. The actions implemented to improve HC and PFC ratings are expected to improve water quality and promote the attainment of water quality objectives for Idaho and Nevada.

All action alternatives would allow livestock grazing using grazing use indicators. Grazing use indicators would include utilization on vegetation in riparian areas and streambank alteration, components of the HC and PFC rating. Adaptive management would be used to monitor grazing use indicators to meet resource and special designation objectives and follow *Idaho Standards for Rangeland Health and Guidelines for Livestock Management* (S&Gs).

Impacts from Management Specific to Alternative I

In Alternative I, 95 miles of perennial streams would be available and 221 miles would be unavailable for livestock grazing. The 85 miles of 303(d)-listed streams in areas available for livestock grazing (Table 4-47) include 47 miles of 303(d)-listed Priority 1 and 2 reaches (Table 4- 48), while the 57 miles of 303(d)-listed streams in areas unavailable for livestock grazing include 39 miles of 303(d)-listed Priority 1 and 2 reaches. Areas unavailable for grazing also include ten riparian reference areas, encompassing 19 miles of perennial streams and 18 miles are 303(d)-listed priority reaches (Table 4- 49); 16 of these miles are Priority 1 and 2 reaches. Water quality in stream reaches unavailable to livestock would be expected to improve if the reduced condition is due to livestock grazing. Some reaches may recover more quickly than others, but all would be expected to improve over time. Those reaches available to livestock grazing would be at risk of impacts from livestock; however, all grazed reaches would be managed to move riparian conditions toward goals and objectives outlined in the ARMS. Alternative I would have more miles of 303(d)-listed Priority 1 and 2 reaches in areas available to livestock grazing than Alternative V, but less than the other alternatives.

TNR authorization would comply with the ARMS, which would maintain or improve HC and PFC ratings and facilitate moving towards or achieving State water quality standards. Livestock have an increased tendency to eat woody vegetation late in the grazing season after the herbaceous vegetation has cured. Issuing TNR late in the grazing season would pose an increased risk to water quality where reduced condition is related to livestock grazing.

Alternative I would allow livestock trailing across the East Fork of the Jarbidge River to the Wilkins Island Allotment using riders to herd livestock. This use would continue to cause localized streambank alteration as livestock trail through the RCA in the East Fork of the Jarbidge River. However, this trailing occurs in the summer months when riparian banks are not saturated and less prone to shearing by hoof impacts. As a result, livestock trailing through the RCA and into the uplands would likely contribute some amount of fine sediment into the East Fork of the Jarbidge River over time as this area continues to be used for livestock trailing. This livestock trailing is expected to have short-term localized effects to water quality.

Impacts from Management Specific to Alternative II

In Alternative II, 121 miles of perennial streams would be available and 195 miles would be unavailable for livestock grazing. The 102 miles of 303(d)-listed streams in areas available for livestock grazing (Table 4- 47) include 60 miles of 303(d)-listed Priority 1 and 2 reaches (Table 4- 48), while the 40 miles of

303(d)-listed streams in areas unavailable for livestock grazing include 26 miles of 303(d)-listed Priority 1 and 2 reaches. Areas unavailable for grazing also include ten riparian reference areas, encompassing 7 miles of perennial streams, all of which are 303(d) listed as water quality impaired (Table 4- 49); 6 of these miles are Priority 1 and 2 reaches. The effects of livestock grazing in Alternative II on water quality in these streams would be the same as described for Alternative I. This alternative would allocate the largest amount of vegetation production for livestock grazing of all the alternatives.

In areas where Reserve Common Allotments are created, the guidance in the ARMS would be used to maintain or improve HC ratings, PFC ratings, and water quality in 303(d)-listed streams.

The effects of issuing TNR are the same as described for Alternative I. The effects of allowing livestock trailing across the East Fork of the Jarbidge River to the Wilkins Island Allotment using riders to herd livestock are the same as described for Alternative I.

Impacts from Management Specific to Alternative III

In Alternative III, the miles of perennial streams, 303(d)-listed streams, and 303(d)-listed Priority 1 and 2 reaches in for areas available and unavailable to livestock grazing and riparian reference areas are the same as described for Alternative II. There would be slightly fewer impacts from livestock grazing in Alternative III compared to Alternative II due to a lower percent of vegetation production allocated to livestock.

The effects of creating Reserve Common Allotments are the same as described for Alternative II. The effects of issuing TNR in riparian areas are the same as described for Alternative I. The effects of allowing livestock trailing across the East Fork of the Jarbidge River to the Wilkins Island Allotment using riders to herd livestock are the same as described for Alternative I.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

In Alternative IV-A, 103 miles of perennial streams would be available and 213 miles would be unavailable for livestock grazing. The 90 miles of 303(d)-listed streams in areas available for livestock grazing (Table 4- 47) include 49 miles of 303(d)-listed Priority 1 and 2 reaches (Table 4- 48), while the 52 miles of 303(d)-listed streams in areas unavailable for livestock grazing include 37 miles of 303(d)-listed Priority 1 and 2 reaches.

In Alternative IV-B (the Preferred Alternative), 104 miles of perennial streams would be available and 212 miles would be unavailable for livestock grazing. The 90 miles of 303(d)-listed streams in areas available for livestock grazing (Table 4- 47) include 50 miles of 303(d)-listed Priority 1 and 2 reaches (Table 4- 48), while the 51 miles of 303(d)-listed streams in areas unavailable for livestock grazing include 36 miles of 303(d)-listed Priority 1 and 2 reaches.

Areas unavailable for grazing in Alternative IV include ten riparian reference areas, encompassing 19 miles of perennial streams and 18 miles are 303(d)-listed priority reaches (Table 4- 49); 16 of these miles are Priority 1 and 2 reaches. The effects of livestock grazing in Alternative IV are the same as described for Alternative I except there are more miles of perennial streams and 303(d)-listed Priority 1 and 2 reaches in areas available for livestock grazing. This alternative would allocate a lower percentage of vegetation production to livestock than the No Action Alternative and Alternatives I, II and III. The active restoration emphasis for Alternative IV is expected to result in a variety of restoration activities to improve riparian condition and water quality in 303(d)-listed streams. It is expected that livestock would be temporarily excluded from these treatment areas until the restoration objectives have been achieved.

The effects of creating Reserve Common Allotments are the same as described for Alternative II. The effects of issuing TNR in riparian areas are the same as described for Alternative I.

Alternative IV would allow livestock trailing on existing roads to the Wilkins Island Allotment using riders to herd livestock. There would be fewer impacts to riparian areas from livestock trailing than in Alternatives I, II, and III because livestock tailing would occur on the road rather than across the riparian area.

Impacts from Management Specific to Alternative V

In Alternative V, 63 miles of perennial streams would be available and 253 miles would be unavailable for livestock grazing. The 55 miles of 303(d)-listed streams in areas available for livestock grazing (Table 4-47) include 32 miles of 303(d)-listed Priority 1 and 2 reaches (Table 4- 48), while the 87 miles of 303(d)-listed streams in areas unavailable for livestock grazing include 52 miles of 303(d)-listed Priority 1 and 2 reaches. Areas unavailable for grazing also include six riparian reference areas, encompassing 25 miles of perennial streams and 28 miles are 303(d)-listed priority reaches (3 miles are impaired due to flow alteration and are non-perennial; Table 4- 49); 14 of these miles are Priority 1 and 2 reaches.

The effects of livestock grazing in Alternative V would be the similar to those described for Alternative I except Alternative V would allocate the lowest percentage of vegetation production for livestock grazing of all the alternatives. The passive restoration emphasis for Alternative V is expected to result in a variety of restoration activities to improve riparian condition and water quality in 303(d)-listed streams. It is expected that livestock would be temporarily excluded from these treatment areas until the restoration objectives have been achieved.

Reserve Common Allotments would not be created in Alternative V; instead, forage on acquired land and in allotments where permits are relinquished or cancelled would be held for the life of the plan for wildlife habitat and watershed protection, increasing the likelihood for improvements in water quality.

TNR would not be issued in Alternative V; therefore, the impacts described for Alternative I would not occur. The effects of allowing livestock trailing on existing roads to the Wilkins Island Allotment using riders to herd livestock are the same as described for Alternative IV.

Impacts from Recreation Actions

Recreational uses in the planning area include activities such as driving, horseback riding, hiking, and camping. These recreational activities may cause a loss of ground cover from user-created roads and trails, trampling of vegetation, vegetation removal, and soil compaction within RCAs. These impacts may be similar in type, but of a different magnitude, than the impacts associated with livestock grazing or other public land uses. Increased surface erosion can be associated with heavily used hiking or horse trails and motorized recreation areas. High-use campsites may damage riparian vegetation resulting in reduced plant vigor and increased mortality. Streambank trampling, camping along the stream margin, fishing, and OHV use usually result in localized impacts to the water resources.

SRMAs address recreation impacts within a geographic area. The miles of 303(d)-listed priority reaches in SRMAs are summarized in Table 4- 50. The localized impacts to HC and PFC ratings and water quality in 303(d)-listed streams would likely be reduced in SRMAs because those areas would contain focused recreation management that complies with the ARMS. The more miles of streams with HC and PFC ratings and 303(d)-listed streams in SRMAs, the less risk of recreation impacts to reduce the condition of riparian, instream, and water quality indicators. The areas of most concern in this analysis are 303(d)-listed Priority 1 and 2 reaches whose impairment is due to recreation.

Table 4- 50. 303(d)-Listed Priority Reaches in SRMAs by Alternative (Miles)

Priority Rating	Alternative [A]				
	I	II	III	IV	V
Priority 1 and 2	30	0	0	6	0
Priority 3	18	2	2	4	1
Total	**48**	**2**	**2**	**10**	**1**

[A] SRMAs were not mapped so riparian condition could not be identified.

The miles of perennial stream and Conservation and Restoration Reaches included in each SRMA are provided in the *Special Status Fish and Aquatic Invertebrates* section (Table 4- 124 and Table 4- 125, respectively).

Impacts from Management Specific to the No Action Alternative

The No Action Alternative includes management direction for five SRMAs, but does not identify boundaries. No management actions identified in the No Action Alternative would reduce recreation impacts to water resources or improve water quality through adjustments in recreation use.

Impacts from Management Common to All Action Alternatives

All action alternatives would implement the ARMS, which includes management direction to reduce recreation-related impacts to 303(d)-listed streams. The ARMS includes guidance for reducing impacts from existing recreation sites and avoiding the construction of new recreation sites in RCAs unless PFC and HC objectives can be achieved. This is expected to improve HC ratings, PFC ratings, and water quality in 303(d)-listed streams over the life of the plan.

Impacts from Management Specific to Alternative I

The eight SRMAs allocated in Alternative I would include 190 miles of perennial streams. These SRMAs encompass 53 miles of 303(d)-listed streams, of which 30 miles are Priority 1 and 2 reaches (Table 4- 50) that would move toward or attain the water resources objective of meeting State water quality standards. This alternative would have the most miles of 303(d)-listed streams in an SRMA moving toward or attaining State water quality standards than any alternative.

The eight SRMAs would be designated to accommodate recreation while reducing impacts to water resources from these uses through increased management emphasis. Current use levels are expected to be maintained or increase the in these SRMAs over time. Monitoring recreation use would ensure that these impacts to streams would not increase to levels that impair water quality. This would ensure that water quality for 303(d)-listed streams would not be further reduced due to recreational uses. The localized recreation impacts to PFC ratings on 303(d)-listed streams would likely be reduced under this alternative due to SRMA management emphasis.

Impacts from Management Specific to Alternative II

The four SRMAs allocated in Alternative II would include 85 miles of perennial streams. The Little Pilgrim SRMA includes 2 miles of 303(d)-listed Priority 3 reaches. The SRMA is in a popular recreation area where recreation activity impacts the Snake River. The other three SRMAs in the alternative encompass less than 1 mile of 303(d)-listed Priority 1 and 2 reaches (Table 4- 50). Although the SRMAs generally do not overlap current PFC restoration priorities or 303(d)-listed stream segments, they would reduce the potential for impacts to water quality from future increases in recreational use. This alternative would have substantially fewer miles of 303(d)-listed streams in an SRMA moving toward state water quality standards than Alternative I (Table 4- 50). As a result, Alternative II would have more risk of reducing water quality than Alternative I.

Impacts from Management Specific to Alternative III

The six SRMAs allocated in Alternative III would include 87 miles of perennial streams. These SRMAs include 3 miles of 303(d)-listed streams, of which 2 miles are Priority 3 reaches (Table 4- 50). This alternative would have the same miles of 303(d)-listed priority reaches in SRMAs as Alternative II; as a result, the risk of reducing water quality is the same as in Alternative II.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

The five SRMAs allocated in Alternative IV would include 126 miles of perennial streams. These SRMAs include 6 miles of 303(d)-listed Priority 1 and 2 reaches (Table 4- 50). These 6 miles would be moving toward or attaining the water resources objective of meeting State water quality standards. This alternative would have more miles of 303(d)-listed Priority 1 and 2 reaches in SRMAs moving toward or attaining State water quality standards than Alternatives II and III, but less than Alternative I. The effects of designating SRMAs in Alternative IV are the same as described for Alternative I.

Impacts from Management Specific to Alternative V

Three SRMAs would be allocated in Alternative V and would include 76 miles of perennial streams. These SRMAs include 1 mile of 303(d)-listed streams, which is also a Priority 3 reach. Although the

SRMAs in Alternative V do not overlap with current PFC restoration priorities or 303(d)-listed stream segments, they would reduce the potential for impacts to water quality from future increases in recreational use. The effects of designating SRMAs in Alternative V are the same as described for Alternative I.

Impacts from Transportation and Travel Actions

Roads contribute substantial amounts of sediment to streams (Furniss, et al., 1991). Poorly planned, designed, located, constructed, or maintained roads can degrade fish habitat (see *Impacts from Transportation and Travel Actions* in the *Special Status Fish and Aquatic Invertebrates* section). Roads directly affect natural sediment and hydrologic regimes by altering streamflow patterns, sediment loading, sediment transport and deposition, channel morphology, substrate composition, water quality, and riparian conditions. Sediment is most frequently delivered to streams by drainage ditches leading directly to stream crossings, or by ditch relief pipes that discharge close to streams.

The level of risk to water resources associated with motorized uses is based on the relative amount of roads and trails open to cross-country motorized vehicle use. Areas open to cross-country motorized vehicle use have the highest risk to watershed resources due to the dispersed nature of the disturbance and the likelihood that activities are taking place in areas that are more susceptible to impacts from motorized uses such as riparian areas, wetlands, and areas with erosive soils. Cross-country travel increases the risk of impacts to streams. Over time, the number and length of cross-country routes is expected to increase in areas open to cross-country motorized vehicle use. This could result in an increase in human-related impacts to 303(d)-listed streams or locally inhibit the attainment of State water quality objectives.

Motorized use on designated routes poses less risk to watershed resources since use is occurring on an already-disturbed surface. Erosion and physical disturbance to stream channels can be addressed through design criteria, maintenance, and location. However, roads in RCAs impact HC and PFC ratings, which pose an increased risk for 303(d)-listed streams.

Areas closed to motorized use would have the least risk to water quality. However, roads closed to motorized use in RCAs can have continued long-term impacts to water quality if they are not reclaimed, although the impacts would be less than if the roads were still in use.

The areas of most concern in this analysis are Priority 1 and 2 reaches that are 303(d) listed due to their impaired water quality and are open to cross-country motorized vehicle use or limited to designated routes or ways. The miles of 303(d)-listed streams and 303(d)-listed priority streams by travel designation are summarized in Table 4- 51 and Table 4- 52, respectively. The miles of perennial stream and Conservation and Restoration Reaches in each travel designation can be found in the *Special Status Fish and Aquatic Invertebrates* section (Table 4- 128 and Table 4- 129, respectively).

Table 4- 51. 303(d)-Listed Streams by Travel Designation by Alternative (Miles)

Travel Designation	Alternative					
	No Action	I	II	III	IV	V
Open to Cross Country Motorized Vehicle Use	141	0	0	0	0	0
Limited to Designated Routes and Ways	0	136	140	139	137	128
Closed to Motorized Vehicle Use	0	5	1	2	4	13

Impacts from Management Specific to the No Action Alternative

Under the No Action Alternative, 114 miles of perennial streams are in areas open to cross-country motorized vehicle use. Open areas contain 141 miles of 303(d)-listed streams (Table 4- 51), of which 85 miles are Priority 1 and 2 reaches. The No Action Alternative is the only alternative where 303(d)-listed streams occur in areas open to cross-country use.

Table 4- 52. 303(d)-Listed Priority Reaches by Travel Designation by Alternative (Miles)

Priority Rating	Alternative					
	No Action	I	II	III	IV	V
Limited to Designated Routes or Ways						
Priority 1 and 2	0	85	85	85	85	77
Priority 3	0	28	31	31	28	28
Total	**0**	**113**	**116**	**116**	**112**	**105**
Closed to Motorized Vehicle Use						
Priority 1 and 2	0	1	1	1	1	9
Priority 3	0	4	0	0	4	4
Total	**0**	**5**	**1**	**1**	**5**	**13**

Under the No Action Alternative, 97 miles of perennial streams are in areas limited to designated routes or inventoried ways; none of these are 303(d)-listed streams. Limiting motorized vehicle use to designated routes or inventoried ways has provided little protection for riparian areas and wetlands as is evident by the increase in the number of roads in RCAs. The increase in route density is primarily due to a substantial increase in ATV and off-road motorcycle use, which enabled public land users to pioneer roads into areas previously not accessible by four-wheel drive vehicles. The result of increased roads in RCAs is an increase in the number of stream crossings, increased sediment contributions to riparian areas and wetlands from existing and new roads, increased recreational use in RCAs, localized loss of riparian vegetation, an increase in the spread of noxious weeds into riparian areas, and an increased incidence of human-caused fires. The continuation of these trends is expected to prevent achieving or moving toward State water quality objectives for priority reaches and 303(d)-listed streams. The No Action Alternative contains management direction for roads to avoid riparian areas to the extent practical. However, the guidance under the No Action Alternative provides no direction for reducing route density, eliminating duplicate roads (i.e., roads with same destination), reducing road surface erosion to streams, or improving stream crossings to reduce effects to riparian areas and wetlands.

Under the No Action Alternative, 105 miles of perennial streams are in areas closed to motorized vehicle use; none of these are 303(d)-listed streams. The lack of motorized vehicle use in these areas may have helped maintain water quality, as evidenced by none of these streams being listed for water quality impairment.

Impacts from Management Common to All Action Alternatives

Travel management activities in riparian areas would follow the guidelines in the ARMS, which contains guidance to reduce impacts from existing roads and for avoiding construction of new roads in RCAs unless a site-specific analysis indicates short-term effects would result in the achievement of riparian and water quality objectives in the long-term. Compliance with the ARMS would improve PFC ratings and therefore would promote attaining or moving toward State water quality standards for Idaho and Nevada.

Developing a Comprehensive Transportation and Travel Management Plan (CTTMP) would provide a site-specific analysis to identify road closures, travel restrictions, or other travel management adjustments to reduce impacts on RCAs. Short-term effects and long-term improvements to PFC and water quality in 303(d)-listed streams would occur as a result of road improvement projects, culvert replacements, and route closures or road rehabilitation. The potential for effects to riparian areas and water quality from roads in RCAs would continue to occur until mitigation is applied or restoration actions are accomplished.

Impacts from Management Specific to Alternative I

Under Alternative I, no perennial stream miles and, therefore, no 303(d)-listed streams would be in areas open to cross-country motorized vehicle use. As a result, effects of cross-country travel on water quality across large portions of the planning area would not continue. Even though motorized cross-country travel would not be authorized in perennial streams in this alternative, exceptions may be granted to BLM permit, lease, or ROW holders or may be allowed on a case-by-case basis for non-BLM government entities. Cross-country motorized vehicle use in RCAs or wetlands could locally reduce PFC ratings. Similar impacts are expected from allowing game retrieval using motorized vehicles 300 feet off designated routes except in closed areas and WSAs. Motorized cross-country travel off designated routes to access a campsite is less likely to affect RCAs or wetlands as it would not be allowed in riparian areas.

Limiting travel to designated routes or ways could reduce travel-related impacts on 189 miles of perennial streams. These areas include 136 miles of 303(d)-listed streams (Table 4- 51), of which 85 miles are Priority 1 and 2 reaches (Table 4- 52). Alternative I would have more miles of 303(d)-listed streams in areas with a limited travel designation than the No Action Alternative and Alternative V, but fewer miles than Alternatives II, III, and IV. Where roads currently occur in RCAs, their impacts to water quality would be reduced if the road was no longer used, but reclamation of the road would be needed to completely eliminate road-related impacts to water quality in the long-term. Designated roads could also be modified to reduce impacts to 303(d)-listed streams.

Areas closed to motorized vehicle use in Alternative I would include 126 miles of perennial streams, including 5 miles of 303(d)-listed streams (Table 4- 51), of which 1 mile is a Priority 1 or 2 reach (Table 4-52). Alternative I would have more miles of 303(d)-listed streams closed to motorized vehicle use than the No Action Alternative and Alternatives II, III, and IV, but fewer miles than Alternative V. Transportation-related impacts to water quality would decrease on these streams. As described above, road-related impacts may still occur in closed areas if roads in closed areas are not reclaimed, although the impacts would be less than if the road was still in use.

The proposed changes in travel designations compared to the No Action Alternative would promote 303(d)-listed streams moving toward or achieving water resource objectives in the life of the plan, with most improvement on 303(d)-listed Priority 1 and 2 reaches.

Impacts from Management Specific to Alternative II

Under Alternative II, the impacts from cross-country motorized vehicle use on water quality are the same as described for Alternative I; however, the area impacted may increase as Alternative II would not restrict game retrieval to only 300 feet off designated routes.

Limiting travel to designated routes and ways could reduce travel-related impacts on 240 miles of perennial streams, including 140 miles of 303(d)-listed streams, of which 85 miles are Priority 1 and 2 reaches. Alternative II would have the most miles of 303(d)-listed streams in areas with a limited designation of all alternatives. Impacts of this travel designation are the same as described for Alternative I.

Areas closed to motorized vehicle use would include 76 miles of perennial streams, including 1 mile of 303(d)-listed stream, which is also a Priority 1 or 2 reach. Alternative II would have the fewest miles of 303(d)-listed streams closed to motorized vehicle use of all alternatives except the No Action Alternative. Impacts of this travel designation are the same as described for Alternative I.

The proposed changes in travel designation would promote 303(d)-listed streams moving toward or achieving water resource objectives in the life of the plan, with the most improvement on 303(d)-listed Priority 1 and 2 reaches, although to a slightly lower degree than in Alternative I.

Impacts from Management Specific to Alternative III

Under Alternative III, the impacts from cross-country motorized vehicle use on water quality are the same as described for Alternative I; however, the area impacted may decrease as Alternative III would not allow game retrieval off designated routes.

Limiting travel to designated routes and ways could reduce travel-related impacts on 209 miles of perennial streams, including 139 miles of 303(d)-listed streams, of which 85 miles are Priority 1 and 2 reaches. Alternative III would have the second highest number of miles of 303(d)-listed streams in areas with a limited designation. Impacts of this travel designation are the same as described for Alternative I.

Areas closed to motorized vehicle use would include 107 miles of perennial streams, including 2 miles of 303(d)-listed streams, 1 mile of which is also a Priority 1 or 2 reach. Alternative III would have one more mile of 303(d)-listed stream closed to motorized vehicle use than Alternative II. Impacts of this travel designation are the same as described for Alternative I.

The proposed changes in travel designation would promote 303(d)-listed streams moving toward or achieving water resource objectives in the life of the plan to a similar degree as Alternative II.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Under Alternative IV, the impacts from cross-country motorized vehicle use on water quality are the same as described for Alternative I; however, the area impacted may decrease as Alternative IV would not allow game retrieval off designated routes.

Limiting travel to designated routes and ways could reduce travel-related impacts on 209 miles of perennial streams, including 137 miles of 303(d)-listed streams, of which 85 miles are Priority 1 and 2 reaches. Alternative IV would have the third highest number of miles of 303(d)-listed streams in areas with a limited designation. Impacts of this travel designation are the same as described for Alternative I.

Areas closed to motorized vehicle use would include 107 miles of perennial streams, including 4 miles of 303(d)-listed streams, 1 mile of which is also a Priority 1 or 2 reach. Alternative IV would have the third highest number of miles of 303(d)-listed streams closed to motorized vehicle use. Impacts of this travel designation are the same as described for Alternative I.

The proposed changes in travel designation would promote 303(d)-listed streams moving toward or achieving water resource objectives in the life of the plan to a similar degree as Alternative I.

Impacts from Management Specific to Alternative V

Alternative V would have the least impacts from cross-country motorized vehicle use on water quality compared to any other alternative, as no exceptions to motorized vehicle restrictions would be granted to permit, lease, and ROW holders or for game retrieval.

Limiting travel to designated routes and ways could reduce travel-related impacts on 180 miles of perennial streams, including 128 miles of 303(d)-listed streams, of which 77 miles are Priority 1 and 2 reaches. Alternative IV would have the fewest miles of 303(d)-listed streams in areas limited to designated routes of all the alternatives except the No Action Alternative. Impacts of this travel designation are the same as described for Alternative I.

Areas closed to motorized vehicle use would include 136 miles of perennial streams, including 13 miles of 303(d)-listed streams, of which 9 miles are Priority 1 and 2 reaches. Alternative V would have the most miles of 303(d)-listed streams closed to motorized vehicle use of all the alternatives. Impacts of this travel designation are the same as described for Alternative I.

The proposed changes in travel designation would promote 303(d)-listed streams moving toward or achieving water resource objectives in the life of the plan the most of all alternatives.

Impacts from Land Use Authorizations Actions

The impacts from land use authorizations on water resources vary by the type of authorization, location and season of use, duration of use, and proximity of use to streams. Some uses, such as powerlines, phonelines, and communication sites in uplands, could have little or no impacts to water resources. Other land uses authorizations, such as roads, water developments, ditches, wind energy infrastructure, and other surface-disturbing uses, have potential to impact water quality or quantity depending on their proximity to streams. Energy development, such as wind energy, in itself does not pose a threat to water resources in the planning area. The risk to water resources comes from the roads and physical disturbances that accompany energy development. Many of the effects from roads and transmission lines may be addressed through BMPs; however, as the level of development increases, there is a corresponding increase in the level of risk to water resources. The miles of 303(d)-listed priority reaches in ROW avoidance and exclusion areas are summarized in Table 4- 53.

Table 4- 53. 303(d)-Listed Priority Reaches in ROW Avoidance and Exclusion Areas by Alternative (Miles)

Priority Rating	Alternative					
	No Action	**I**	**II**	**III**	**IV**	**V**
Row Exclusion Areas						
Priority 1 and 2	0	9	9	9	9	9
Priority 3	0	2	0	2	5	5
Total	**0**	**11**	**9**	**11**	**14**	**14**
Row Avoidance Areas						
Priority 1 and 2	9	51	51	51	51	84
Priority 3	7	15	15	15	15	30
Total	**16**	**66**	**66**	**66**	**66**	**114**

Wind energy projects are an increasing use on public lands. Most of the infrastructure for wind developments, such as towers, support facilities, and associated powerlines, are located in upland areas or ridge tops and would have limited impacts to riparian areas or 303(d)-listed streams. The road systems that support wind developments pose the greatest threat to riparian areas from the use of existing roads and creation of new roads. Any roads entering RCAs could have impacts to stream channel conditions (HC), riparian vegetation (PFC), and water quality (303(d)). The use of culverts or bridges directly influences the long-term impacts to PFC ratings in and below areas where roads cross a stream. Wind developments can also have short-term impacts to instream flows if surface water is required for road construction or reconstruction, dust abatement on roads or equipment staging areas, or mixing with concrete to construct tower foundations. The impacts to RCAs from removing surface water vary by location, season, amount, and rate of withdrawal. The miles of 303(d)-listed priority reaches are summarized in Table 4- 54.

Table 4- 54. 303(d)-Listed Priority Reaches in Potential Wind Development Areas by Alternative (Miles)

Priority Rating	Alternative					
	No Action	**I**	**II**	**III**	**IV**	**V**
Priority 1 and 2	12	1	12	1	1	1
Priority 3	7	1	7	1	1	0
Total	**19**	**2**	**19**	**2**	**2**	**1**

The areas of most concern in this analysis are Priority 1 and 2 reaches that are 303(d) listed due to their impaired water quality and are available for land use authorizations. Any actions that improve PFC and HC would also improve the condition of 303(d)-listed streams and promote the attainment of State water quality standards for Idaho and Nevada. Perennial stream miles affected by ROW avoidance and exclusion areas, utility corridors, and potential wind development areas are displayed in Table 4- 130 in the *Special Status Fish and Aquatic Invertebrates* section; Conservation and Restoration Reaches affected by ROW avoidance and exclusion areas and potential wind development areas are displayed in Table 4- 131 in the *Special Status Fish and Aquatic Invertebrates* section

Impacts from Management Specific to the No Action Alternative

The No Action Alternative would include 118 miles of perennial streams in ROW avoidance areas, 15 miles in potential utility development areas, and 48 miles in potential wind development areas. ROW avoidance areas contain 9 miles of 303(d)-listed Priority 1 and 2 reaches (Table 4- 53). The No Action Alternative identifies riparian areas as avoidance areas, but some ROWs have been approved in RCAs.

The current management direction does not provide specific guidance for avoiding utility corridor development or associated infrastructure in areas where water quality would be affected because the 303(d)-listed stream segments had not been identified. The guidance for issuing ROWs was limited to general direction to avoid riparian areas to the extent practical.

Potential wind development areas for the No Action Alternative contain 12 miles of 303(d)-listed Priority 1 and 2 reaches (Table 4- 54). This alternative has the same miles of 303(d)-listed Priority 1 and 2 reaches as Alternative II and more miles than all other alternatives.

Impacts from Management Common to the No Action and All Action Alternatives

The No Action Alternative and all action alternatives would adopt programmatic policies and BMPs for the wind energy program, which would provide mitigation to reduce impacts to riparian areas and wetlands from wind energy projects.

Impacts from Management Common to All Action Alternatives

All existing and new ROWs on public land would follow the guidance in the ARMS which would improve HC ratings, PFC ratings, and 303(d)-listed streams over the life of the plan. The guidance in Appendix E would also provide measures to reduce impacts from land use authorizations on HC and PFC ratings on 303(d)-listed streams.

Impacts from Management Specific to Alternative I

In Alternative I, ROW exclusion areas would include 107 miles of perennial streams; exclusion areas include 9 miles of 303(d)-listed Priority 1 and 2 reaches (Table 4- 53). ROW exclusion areas would eliminate the risk of reducing HC ratings, PFC ratings, or water quality of 303(d)-listed streams due to ROW development.

ROW avoidance areas would include 221 miles of perennial streams. The ROW avoidance areas for Alternative I include 70 miles of 303(d)-listed streams (Table 4- 53). The miles of 303(d)-listed priority reaches do not vary between Alternatives I, II, III, and IV. Alternative I would have 51 miles (77%) of 303(d)-listed Priority 1 and 2 reaches that would be moving toward the water resources objective of meeting State water quality standards. The ROW avoidance areas also contain 15 miles (23%) of 303(d)-listed Priority 3 reaches that are at PFC, which indicates water quality has not yet achieved State water quality objectives. The reason for the impairment may be related to actions in the upper portions of the watershed or the delayed response from the improvement of HC and PFC ratings that precede the attainment of water quality standards. Alternative I would have more miles of 303(d)-listed streams in ROW avoidance areas than the No Action Alternative.

Potential utility development areas for Alternative I would include 9 miles of perennial streams. A majority of the potential utility development areas are located in upland areas and would have limited impacts, if any, to PFC ratings or 303(d)-listed streams. Portions of these corridors cross 303(d)-listed streams and would have the potential to affect HC ratings, PFC ratings, or water quality on these streams. The greatest impacts to RCAs from utility corridor development would occur where utilities are buried in RCAs or where new stream crossings are created to construct and maintain utility corridors.

Potential wind development areas for Alternative I would include 7 miles of perennial streams along the Snake River from the Hagerman Fossil Beds National Monument to the town of Hammett and along upper Salmon Falls Creek in the China Creek and Cedar Creek Watersheds. There are 2 miles of 303(d)-listed streams in the potential wind development area, 1 mile of which is a Priority 1 or 2 reach (Table 4-54). The impacts from infrastructure development and roads in RCAs would pose the greatest threat to HC rating, PFC rating, and water quality of 303(d)-listed streams. Alternative I would have fewer miles of 303(d)-listed Priority 1 and 2 reaches in potential wind development areas than the No Action Alternative, which would result in fewer risks to these streams than in the No Action Alternative.

Impacts from Management Specific to Alternative II

In Alternative II, ROW exclusion areas for Alternative II would encompass 105 miles of perennial streams. ROW exclusion areas for Alternative II would encompass the same 303(d)-listed Priority 1 and 2 streams as Alternative I (Table 4- 53). ROW avoidance areas would include 220 miles of perennial streams. ROW avoidance areas for Alternative II encompass the same 303(d)-listed streams as Alternative I (Table 4-53). Potential utility development areas for Alternative II would encompass 15 miles of perennial streams. The effects of ROW avoidance and exclusion areas and potential utility development areas are the same as Alternative I.

Potential wind development areas for Alternative II would be in the same general areas described for Alternative I, but would include a larger area in the Jarbidge Foothills and along the Snake River, encompassing 48 miles of perennial streams. The potential wind development areas contain 19 miles of

303(d)-listed streams, of which 12 miles are Priority 1 and 2 reaches (Table 4- 54). Along with the No Action Alternative, Alternative II has the most 303(d)-listed streams in potential wind development areas of all alternatives, and as a result, has the most risk to HC rating, PFC rating, and water quality of 303(d)-listed streams of all alternatives.

Impacts from Management Specific to Alternative III

In Alternative III, the ROW exclusion areas in Alternative III would be in the same locations and have the same effects as described for Alternative I.

The ROW avoidance areas would be the same as in Alternative II except the Bruneau-Jarbidge ACEC would be a ROW avoidance area. As in Alternative II, the ROW avoidance areas would include 220 miles of perennial streams; the same amounts of 303(d)-listed Priority 1 and 2 reaches would be in avoidance areas as well. As a result, effects on water resources would be the same as described for Alternative II.

The potential utility and wind development areas for Alternative III would be located in the same areas and would include the same perennial stream miles and 303(d)-listed streams as Alternative I. Therefore, the impacts to water quality from these developments are the same as described for Alternative I.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

In Alternative IV, ROW exclusion areas for Alternative IV would encompass 138 miles of perennial streams. Exclusion areas include 14 miles of 303(d)-listed streams, of which 9 miles are Priority 1 or 2 reaches (Table 4- 53). ROW exclusion areas would eliminate the risk of reducing HC or PFC ratings or water quality of 303(d)-listed streams due to ROW development.

ROW avoidance areas would be in the same areas in Alternative II except the Bruneau-Jarbidge ACEC would be included as a ROW avoidance area. ROW avoidance areas would reduce the potential for decreases in water quality in 224 miles of perennial streams. Miles of 303(d)-listed priority reaches in ROW avoidance areas would be the same as in Alternative I (Table 4- 53). The effects of this alternative would be the same as described under Alternative II except more miles of riparian areas would be included in ROW avoidance areas.

The potential utility and wind development areas for Alternative IV are the same as identified in Alternative I. Therefore, the impacts to water quality from these developments are the same as described for Alternative I.

Impacts from Management Specific to Alternative V

In Alternative V, ROW exclusion areas for Alternative V would be in the same location and include the same number of perennial stream miles and 303(d)-listed streams as Alternative IV. The effects of ROW exclusion areas on water quality are the same as described for Alternative IV.

ROW avoidance areas would include 294 miles of perennial streams. The ROW avoidance areas for Alternative V include 133 miles of 303(d)-listed stream (Table 4- 53). Alternative V would have 83 miles (62%) of 303(d)-listed Priority 1 and 2 reaches that would be moving toward meeting State water quality standards. The ROW avoidance areas also contain 30 miles (38%) of 303(d)-listed Priority 3 reaches that are at PFC, indicating water quality has not yet achieved State water quality objectives. The reason for the impairment may be related to actions in the upper portions of the watershed or the delayed response from the improvement of HC and PFC ratings that precede the attainment of water quality standards. Alternative IV would have the most miles of 303(d)-listed streams in ROW avoidance areas of all alternatives.

Potential utility development areas for Alternative V include the same corridors described in Alternative I, except the Saylor Creek Corridor would not be a designated utility corridor. The effects of energy corridor development are the same as described for Alternative I, except 3 fewer miles of perennial streams would be affected.

Potential wind development areas for Alternative V would affect the same areas described in Alternative I, except potential wind development areas would not include areas along upper Salmon Falls Creek and Cedar Creek. There would be 3 miles of perennial stream in these potential wind development areas. There is 1 mile of 303(d)-listed streams in the potential wind development areas and less than 1 mile of 303(d)-listed Priority 1 and 2 reaches (Table 4- 54). Alternative V would have the least risk for impacts to HC ratings, PFC ratings, and water quality in 303(d)-listed streams of all alternatives because it has the fewest miles of 303(d)-listed streams in potential wind development areas.

Impacts from Minerals Actions

Leasable minerals include energy resources such as oil, gas, and geothermal steam as well as other non-energy leasable minerals. The development of geothermal resources could impact water quality and quantity due to the removal of surface or subsurface water or due to infrastructure and transportation systems related to these projects. Activities associated with oil and gas development could have similar effects.

Some aspects of oil and gas or geothermal exploration and development, such as blasting, consumptive and non-consumptive use of surface or groundwater, disposal of waste water, and general surface disturbance of RCAs, could reduce HC and PFC ratings where these activities occur within RCAs. There would be unknown impacts from directional drilling to access geothermal or oil and gas resources. NSO restrictions would avoid direct impacts to riparian areas, but indirect impacts to HC and PFC ratings could occur where activities associated with minerals exploration or development occurs within RCAs at any time of the year. The miles of 303(d)-listed priority reaches open and closed to leasing in potential oil and gas and potential geothermal areas are summarized in Table 4- 55 and Table 4- 56. 303(d)-listed Priority 1 and 2 reaches are at more risk from impacts of oil and gas development due to their reduced condition; as a result, the more miles of Priority 1 and 2 reaches open to leasing, the greater the risk for impacts to 303(d)-listed streams from oil and gas development.

Table 4- 55. 303(d)-Listed Priority Reaches Open or Closed to Leasing in Potential Oil and Gas Areas by Alternative (Miles)

Priority Rating	Alternative [A]				
	I	II	III	IV	V
Open [B]					
Priority 1 and 2	7	13	13	10	7
Priority 3	6	15	13	6	6
Total	**13**	**28**	**26**	**16**	**13**
Closed					
Priority 1 and 2	6	0	0	3	6
Priority 3	9	<1	1	8	9
Total	**15**	**<1**	**1**	**11**	**15**
Grand Total	**28**	**28**	**27**	**27**	**28**

[A] The No Action Alternative identifies the majority of the planning area as open to mineral leasing, but does not identify specific boundaries.
[B] "Open" includes areas open with surface occupancy, seasonal, and/or controlled surface use restrictions as well as areas open for leasing without these restrictions.

Miles of perennial stream and Conservation and Restoration Reaches in potential oil and gas areas are summarized in Table 4- 132 and Table 4- 133 in the *Special Status Fish and Aquatic Invertebrates* section. Miles of perennial stream and Conservation and Restoration Reaches in potential geothermal areas are summarized in Table 4- 134 and Table 4- 135 in the *Special Status Fish and Aquatic Invertebrates* section.

In general, the locations of existing salable mineral developments are in areas where surface water resources are not affected. New mineral material sources would be located in areas where water quality would not be impacted. The miles of 303(d)-listed priority reaches open and closed to salable mineral development areas are summarized in Table 4- 57. The risk of a decrease in PFC rating would be greater for 303(d)-listed Priority 1 and 2 reaches open to salable mineral development than for Priority 3 reaches. Impacts of salable mineral development would not occur in areas closed to this use. Miles of perennial stream and Conservation and Restoration Reaches in areas open and closed to salable mineral development are summarized in Table 4- 136 and Table 4- 137 in the *Special Status Fish and Aquatic Invertebrates* section.

Table 4- 56. 303(d)-Listed Priority Reaches Open or Closed to Leasing in Potential Geothermal Areas by Alternative (Miles)

Priority Rating	Alternative [A]					
	I	II	III	IV		V
				IV-A	IV-B	
Medium Potential						
Open [B]						
Priority 1 and 2	0	4	4	2		0
Priority 3	1	9	9	0		1
Total	**1**	**13**	**13**	**2**		**1**
Closed						
Priority 1 and 2	4	0	0	2		2
Priority 3	9	0	0	0		9
Total	**13**	**0**	**0**	**2**		**11**
Low Potential						
Open [B]						
Priority 1 and 2	67	72	72	65	67	67
Priority 3	17	21	21	17	17	17
Total	**84**	**93**	**93**	**82**	**84**	**84**
Closed						
Priority 1 and 2	14	9	9	17	14	14
Priority 3	4	0	0	4	4	4
Total	**18**	**9**	**9**	**21**	**18**	**18**

[A] The No Action Alternative identifies the majority of the planning area as open to mineral leasing, but does not identify specific boundaries.
[B] "Open" includes areas open with surface occupancy, seasonal, and/or controlled surface use restrictions as well as areas open for leasing without these restrictions.

Table 4- 57. 303(d)-Listed Priority Reaches Open and Closed to Salable Mineral Development by Alternative (Miles)

Priority Rating	Alternative [A]					
	I	II	III	IV		V
				IV-A	IV-B	
Open to Salable Mineral Development						
Priority 1 and 2	69	77	69	67	69	67
Priority 3	19	31	19	19	19	19
Total	**88**	**108**	**88**	**85**	**88**	**85**
Closed to Salable Mineral Development						
Priority 1 and 2	15	9	17	19	17	19
Priority 3	15	0	13	13	13	13
Total	**30**	**9**	**30**	**32**	**30**	**32**

[A] The No Action Alternative identifies acres open to salable mineral development, but not specific locations.

Most locatable mineral development in the planning area has historically occurred in RCAs (e.g., jasper and gold claims); locatable mineral development in RCAs can result in disturbances to the streambed, streambank, streamflow, streamside vegetation, and other RCA components (Nelson, et al., 1991). Water quality can be affected as a result of chemicals used in the mineral extraction process. Recreational panning and placer mining for gold occurs in the planning area and can locally degrade water quality and riparian condition. Suction dredging is a method of mineral extraction whereby streambed particles are pulled from the stream to be sifted onshore. This activity can be disruptive to the channel bottom and result in increased sedimentation, turbidity, and long-term instability of the channel, causing short-term and long-term effects to water quality. The miles of 303(d)-listed priority reaches withdrawn and recommended for withdrawal from locatable mineral entry are summarized in Table 4- 58. 303(d)-listed Priority 1 and 2 reaches in areas recommended for withdrawal from locatable mineral entry are at least risk for impacts from locatable mineral development. Miles of perennial stream and Conservation and Restoration Reaches in areas recommended for withdrawal are summarized in Table 4- 138 and Table 4-139 in the *Special Status Fish and Aquatic Invertebrates* section.

Table 4- 58. 303(d)-Listed Priority Reaches Withdrawn or Recommended for Withdrawal from Locatable Mineral Entry by Alternative (in Miles)

Priority Rating	Alternative [A]				
	I	II	III	IV	V
Priority 1 and 2	18	7	7	16	10
Priority 3	13	13	13	13	13
Total	**31**	**20**	**20**	**29**	**23**

[A] The No Action Alternative identifies acres open to salable mineral development, but not specific locations.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative allows mineral leasing in riparian areas, but with an NSO stipulation within 500 feet of the riparian area; however, there are currently no mineral leases in place. The acreage on which salable minerals occurs is expected to increase from approximately 1,300 acres to approximately 2,300 acres over the life of the plan. No mineral material sources were developed that affected riparian areas, wetlands, or 303(d)-listed streams. The allocation for locatable minerals recommends the Bruneau-Jarbidge and Sand Point ACEC; designated wilderness; and the Bruneau, Jarbidge, and Salmon Falls Creek Canyon to be withdrawn from mineral entry. This withdrawal would reduce the potential for impacts from locatable mineral development in these areas.

Leasable, salable, and locatable minerals exploration and development would be expected to reduce HC ratings, PFC ratings, and water quality in 303(d)-listed streams because the guidance in the ARMS would not be applied to mineral exploration and development projects. However, according to the RFDS for oil and gas development (Appendix U), approximately 90 acres of surface disturbance are expected to occur in the planning area as a result of oil and gas exploration and development over the life of the plan. This is less than 0.1% of the potential oil and gas areas that would be available for oil and gas leasing. Similarly, according to the RFDS for geothermal development (Appendix V), between 185 and 230 acres of surface disturbance are expected to occur in the planning area as a result of geothermal exploration and development over the life of the plan. This is less than 0.1% of the potential geothermal areas that would be available for geothermal leasing. Salable mineral development is expected to occur on approximately 0.2% of the area available for salable mineral development. Demand for locatable minerals in the planning area is not expected to change from present levels.

Impacts from Management Common to All Action Alternatives

All action alternatives allow for leasable, salable, and locatable mineral development with stipulations to protect biological and cultural resources. Leasable, salable, and locatable mineral developments would comply with the ARMS, which would minimize the potential to reduce HC ratings, PFC ratings, and water quality in 303(d)-listed streams. The ARMS provides guidance for conserving high quality habitats and restoring impaired habitats so that HC and PFC ratings are maintained or improved. Site-specific analysis would be conducted to assure actions encroaching on RCAs do not impair the attainment of ARMS objectives.

Use restrictions are expected to reduce the potential for effects to HC ratings, PFC ratings, and water quality in 303(d)-listed streams from surface-disturbing activities or occupancy in RCAs. NSO restrictions for RCAs would avoid direct impacts to riparian areas and wetlands.

Impacts from Management Specific to Alternative I

Within potential oil and gas areas, Alternative I would have 55 miles of perennial streams in areas open and 35 miles in areas closed to oil and gas leasing. Potential oil and gas areas open to leasing contain 28 miles of 303(d)-listed streams, of which 7 miles are Priority 1 and 2 reaches (Table 4- 55), while potential oil and gas areas closed to leasing contain 6 miles of 303(d)-listed Priority 1 and 2 reaches. 303(d)-listed Priority 1 and 2 reaches in potential oil and gas areas open to leasing are more at risk from the effects of oil and gas development than 303(d)-listed Priority 3 reaches because of their reduced riparian condition. However, the actual impact to water quality is expected to be low, as only 90 acres of surface disturbance from oil and gas exploration and leasing activities are expected, based on the oil and gas potential of the planning area (Appendix U). This is less than 0.1% of the potential oil and gas areas that would be available for oil and gas leasing. In addition, even if all 90 acres were located in RCAs, the controlled surface use restriction for RCAs would require surface use to be consistent with the guidelines in the ARMS. Alternative I would have the fewest miles of 303(d)-listed Priority 1 and 2 reaches in potential oil and gas areas open to leasing of the action alternatives and therefore would have the lowest amount of risk for a further reduction in PFC rating. Alternative I has the most miles of 303(d)-listed Priority 1 and 2 reaches in potential oil and gas areas closed and, therefore, is the most likely of all alternatives to promote attaining or moving toward water quality objectives.

Areas with high, medium, or low potential for geothermal development areas would include all 316 miles of perennial streams in the planning area; 135 miles would be in areas open to leasing, with 182 miles in areas closed to leasing. Areas open to leasing contain 67 miles of 303(d)-listed Priority 1 and 2 reaches and 18 miles of 303(d)-listed Priority 3 reaches (Table 4- 56). Areas closed to leasing contain 18 miles of 303(d)-listed Priority 1 and 2 reaches and 13 miles of 303(d)-listed Priority 3 reaches (Table 4- 56). Due to their reduced condition, the 303(d)-listed Priority 1 and 2 reaches in areas open to geothermal leasing are more at risk for a reduction in PFC ratings than the 303(d)-listed Priority 1 and 2 reaches in areas closed to geothermal leasing. Alternative I would have the same miles of 303(d)-listed Priority 1 and 2 reaches open to geothermal leasing in areas with medium potential as Alternative V and fewer miles than the other action alternatives. Within areas with low geothermal leasing potential, Alternative I would have the same miles of 303(d)-listed Priority 1 and 2 reaches open to geothermal leasing as Alternatives IV-B and V, fewer miles than Alternatives II and III, and more miles than Alternative IV-A. The kinds of impacts of geothermal exploration and development in RCAs are similar to those described for oil and gas, except 185 to 230 acres of surface disturbance are expected for geothermal activities based on geothermal resource potential (Appendix V). This is less than 0.1% of the potential geothermal areas that would be available for geothermal leasing. Closing 303(d)-listed Priority 1 and 2 reaches to geothermal leasing would facilitate those reaches moving toward or achieving water resource objectives because they would not be at risk from geothermal development.

Alternative I would have 138 miles of perennial streams in areas open and 178 miles in areas closed to salable mineral development. Areas open to salable mineral development contain 69 miles of 303(d)-listed Priority 1 and 2 streams, while areas closed to such development contain 15 miles of 303(d)-listed Priority 1 and 2 streams (Table 4- 57). All salable mineral developments would comply with the ARMS, which would reduce the potential impacts to HC ratings, PFC ratings, and water quality in 303(d)-listed streams. Salable minerals development under this management guidance would have minor, if any, impacts to water quality. 303(d)-listed streams in areas closed to salable mineral development would not be impacted by this use.

Alternative I would have 182 miles of perennial streams in areas recommended for withdrawal from locatable mineral development. Areas recommended to be withdrawn include 18 miles of 303(d)-listed Priority 1 and 2 reaches (Table 4- 58). Alternative I would have the most miles of 303(d)-listed Priority 1 and 2 reaches recommended for withdrawal of the alternatives. Locatable mineral projects would pose an increased risk for a reduction in water quality where these activities occur in RCAs. All locatable mineral developments would be mitigated according to the guidance in the ARMS to reduce the potential to reduce water quality to the extent possible. Demand for locatable minerals in the planning area is not expected to change from present levels; thus, the potential for impacts to occur in the life of the plan is low.

Impacts from Management Specific to Alternative II

Within potential oil and gas areas, Alternative II would have 87 miles of perennial streams in areas open and 1 mile in areas closed to oil and gas leasing. Potential oil and gas areas open to leasing contain 28 miles of 303(d)-listed streams, of which 13 miles are Priority 1 and 2 reaches (Table 4- 55); there are no 303(d)-listed Priority 1 and 2 reaches closed to leasing in the potential oil and gas areas. The types of impacts of oil and gas exploration and development on water quality are the same as described for Alternative I, but the spatial extent of impacts differs. Alternative II would have the same miles of 303(d)-listed Priority 1 and 2 reaches open to leasing as Alternative III, which is more than Alternatives I, IV, and V; therefore, Alternative II is the least likely of all alternatives to promote attaining or moving toward water quality objectives.

Areas with high, medium, or low potential for geothermal development would include all 316 miles of perennial streams in the planning area; 212 miles would be in areas open to leasing, with 105 miles in areas closed to leasing. Areas open to leasing contain 76 miles of 303(d)-listed Priority 1 and 2 reaches and 30 miles of 303(d)-listed Priority 3 reaches (Table 4- 56). Areas closed to leasing contain 9 miles of 303(d)-listed Priority 1 and 2 reaches and no 303(d)-listed Priority 3 reaches (Table 4- 56). The types of impacts of geothermal exploration and development on water quality are the same as described for Alternative I, but the spatial extent differs. Alternative II would have the same miles of 303(d)-listed Priority 1 and 2 reaches open to geothermal leasing as Alternative III, which is the most miles of all action alternatives, and therefore would have the most risks to water quality in 303(d)-listed streams.

Alternative II would have 211 miles of perennial streams in areas open and 105 miles in areas closed to salable mineral development. Areas open to salable mineral development contain 77 miles of 303(d)-listed Priority 1 and 2 reaches, while areas closed to such development contain 9 miles of 303(d)-listed Priority 1 and 2 reaches (Table 4- 57). This alternative would have the most 303(d)-listed Priority 1 and 2 reaches in areas open to salable mineral development of any of the action alternatives. The acreage on which salable mineral development occurs is expected to increase from approximately 1,300 acres to approximately 3,300 acres over the life of the plan. This is approximately 0.2% of the area available for salable mineral development. All salable mineral developments would comply with the ARMS, which would reduce the potential impacts to water quality. Salable mineral development under this management guidance would have minor, if any, impacts to 303(d)-listed streams, although a higher demand for mineral materials under Alternatives II and III as compared to Alternatives I, IV, and V would increase the risk of impacts.

Alternative II would have 161 miles of perennial streams in areas recommended for withdrawal from locatable mineral development. Areas recommended to be withdrawn include 7 miles of 303(d)-listed Priority 1 and 2 reaches (Table 4- 58). Alternative II would have the fewest miles of 303(d)-listed Priority 1 and 2 reaches recommended for withdrawal of all alternatives except the No Action Alternative, and the same miles as Alternative III. The effects of locatable minerals development on riparian areas and wetlands are the same as described for Alternative I, except that more 303(d)-listed Priority 1 and 2 reaches would be available for locatable mineral development.

Impacts from Management Specific to Alternative III

Within potential oil and gas areas, Alternative III would have 26 miles of 303(d)-listed streams in areas open for oil and gas leasing, of which 13 miles are Priority 1 and 2 reaches (Table 4- 55); there are no 303(d)-listed Priority 1 and 2 reaches closed to leasing in the potential oil and gas areas. The effects from this alternative are the same as described for Alternative II.

Alternative III would have the same miles of 303(d)-listed priority reaches open and closed to geothermal leasing as Alternative II. The effects to HC ratings, PFC ratings, and water quality of 303(d)-listed streams are the same as described for Alternative II

Alternative III would have 142 miles of perennial streams in areas open and 173 miles in areas closed to salable mineral development. Areas open to salable mineral development contain 69 miles of 303(d)-listed Priority 1 and 2 reaches, while areas closed to such development contain 17 miles of 303(d)-listed Priority 1 and 2 reaches (Table 4- 57). This alternative would have similar miles of 303(d)-listed Priority 1 and 2 reaches in areas open and closed to salable mineral development as Alternative I. The effects of salable minerals development are the same as for Alternative I, although a higher demand for mineral materials under Alternatives II and III as compared to Alternatives I, IV, and V would increase the risk of impacts.

Alternative III would have 163 miles of perennial streams in areas recommended for withdrawal from locatable mineral development. Areas recommended to be withdrawn include 7 miles of 303(d)-listed Priority 1 and 2 reaches (Table 4- 58). Alternative III would have the same miles of 303(d)-listed Priority 1 and 2 reaches recommended for withdrawal as Alternative II. The effects of this alternative are the same as described for Alternative I, except more Priority 1 and 2 reaches would be available for locatable mineral development.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Within potential oil and gas areas, Alternative IV would have 59 miles of streams in areas open and 31 miles in areas closed to oil and gas leasing. Potential oil and gas areas open to leasing contain 16 miles of 303(d)-listed streams, of which 10 miles are Priority 1 and 2 reaches (Table 4- 55), while potential oil and gas areas closed to leasing contain 3 miles of 303(d)-listed Priority 1 and 2 reaches. The types of impacts of oil and gas exploration and development on water quality are the same as described for Alternative I, but the spatial extent of impacts differs. Alternative IV would have the second highest miles of 303(d)-listed Priority 1 and 2 reaches open to leasing; therefore, Alternative IV would have the second highest risk for further reduction in water quality of those reaches.

In areas with high, medium, or low potential for geothermal development, there is a slight variation in the open and closed acres for Alternatives IV-A and IV-B (the Preferred Alternative). Alternative IV-A has 132 miles of perennial streams in areas open and 185 miles in areas closed to leasing, while Alternative IV-B has 135 miles in areas open and 183 miles in areas closed to leasing. Areas open to leasing in Alternatives IV-A and IV-B contain 67 and 69 miles of 303(d)-listed Priority 1 and 2 reaches, respectively, and 17 miles of 303(d)-listed Priority 3 reaches (Table 4- 56). Areas closed to leasing contain 19 and 16 miles of 303(d)-listed Priority 1 and 2 reaches, respectively, and 4 miles of 303(d)-listed Priority 3 reaches. The types of impacts of geothermal exploration and development on water quality are the same as described for Alternative I, but the spatial extent differs. Alternative IV would have the second fewest miles of 303(d)-listed Priority 1 and 2 reaches in open designations in areas with medium potential.

In Alternatives IV-A and IV-B, areas open to salable mineral development contain 67 and 69 miles of 303(d)-listed Priority 1 and 2 reaches, respectively, while areas closed to such development contain 19 and 17 miles of 303(d)-listed Priority 1 and 2 reaches, respectively (Table 4- 57). Along with Alternative V, Alternative IV-A has the fewest miles of 303(d)-listed Priority 1 and 2 reaches open for salable mineral development; Alternative IV-B has a similar amount available as Alternatives I and III. All salable mineral developments would comply with the ARMS, which would minimize the potential to reduce water quality due to salable mineral development. Salable mineral development under this management guidance would have minor, if any, impacts to 303(d)-listed streams.

Alternative IV would have 180 miles of perennial streams in areas recommended for withdrawal from locatable mineral development. Areas recommended to be withdrawn include 16 miles of 303(d)-listed Priority 1 and 2 reaches (Table 4- 58). Alternative IV would have more miles recommended for withdrawal than Alternatives II, III, and V, but fewer than Alternative I. The effects of this alternative are the same as described for Alternative I, except more areas would be impacted.

Impacts from Management Specific to Alternative V

Within potential oil and gas areas, Alternative V would have 52 miles of perennial streams in areas open and 37 miles in areas closed to oil and gas leasing. The areas open and closed to oil and gas leasing and the miles of 303(d)-listed Priority 1 and 2 reaches are the same as for Alternative I. Therefore, the effects of oil and gas leasing on water quality are the same as described for Alternative I.

In areas with high, medium, or low potential for geothermal development, Alternative V would have 133 miles of perennial streams in areas open to geothermal leasing and 184 miles in areas closed to geothermal leasing. The miles of 303(d)-listed priority reaches in areas open for leasing for Alternative V are the same as for Alternative I except there are 2 fewer miles of 303(d)-listed Priority 3 reaches closed to leasing in areas with medium geothermal potential. The impacts are the same as described for Alternative I.

Alternative V would include 130 miles of perennial streams in areas open and 186 miles in areas closed to salable mineral development. Miles of 303(d)-listed Priority 1 and 2 reaches in areas open and closed to salable mineral development in Alternative V are the same as in Alternative IV-A; therefore, the effects of salable minerals development on water quality are the same as described for Alternative IV-A.

Alternative V would have 167 miles of perennial streams in areas recommended for withdrawal from locatable mineral development. Areas recommended to be withdrawn include 10 miles of 303(d)-listed Priority 1 and 2 reaches (Table 4- 58). Alternative V would have fewer miles of Priority 1 and 2 reaches closed to locatable minerals than Alternatives I and IV. The effects of this alternative are the same as those described for Alternative I, except more areas would be impacted.

Impacts from Areas of Critical Environmental Concern Actions

The management actions for each ACEC are designed to maintain or improve relevant and important values by modifying or eliminating activities impairing these resources. Modifications to access, infrastructure, fire suppression, mineral withdrawal, livestock grazing, and restoration treatments would support or maintain relevant and important values for the ACECs overall, but only some actions would improve water resources. The most improvement in water quality would be expected to occur in areas where these activities occur and are contributing to the reduced PFC rating and the 303(d) listing. All of the proposed ACECs contain surface water resources. ACEC designations are likely to maintain or improve water quality in those locations.

ACEC management would comply with the guidance in the ARMS and would be implemented in a manner that would improve instream and riparian conditions over the life of the plan. Maintaining 303(d)-listed Priority 3 reaches at PFC and restoring 303(d)-listed Priority 1 and 2 reaches would promote the long term objective of achieving or moving toward State water quality standards for water resources within the life of the plan. The miles of 303(d)-listed streams in ACECs are displayed in Table 4- 59; 303(d)-listed priority reaches in ACECs are summarized in Table 4- 60. Miles of perennial stream and Conservation and Restoration Reaches in ACECs are summarized in Table 4- 141 and Table 4- 142 in the *Special Status Fish and Aquatic Invertebrates* section.

Table 4- 59. 303(d)-Listed Streams by ACEC by Alternative (Miles)

<table>
<tr><th rowspan="3">ACEC</th><th colspan="7">Alternative</th></tr>
<tr><th rowspan="2">No Action</th><th rowspan="2">I</th><th rowspan="2">II</th><th rowspan="2">III</th><th colspan="2">IV</th><th rowspan="2">V</th></tr>
<tr><th>IV-A</th><th>IV-B</th></tr>
<tr><td>Bruneau-Jarbidge</td><td>13</td><td>13</td><td></td><td></td><td colspan="2">18</td><td></td></tr>
<tr><td>Inside Desert</td><td></td><td></td><td></td><td></td><td>2</td><td>0</td><td></td></tr>
<tr><td>Jarbidge Foothills</td><td></td><td></td><td></td><td></td><td>42</td><td>12</td><td></td></tr>
<tr><td>Middle Snake</td><td></td><td>8</td><td></td><td></td><td></td><td></td><td>9</td></tr>
<tr><td>Sagebrush Sea</td><td></td><td></td><td></td><td></td><td></td><td></td><td>119</td></tr>
<tr><td>Sand Point</td><td>1</td><td>2</td><td></td><td>2</td><td colspan="2">2</td><td>2</td></tr>
<tr><td>Total 303(d)-Listed Stream Miles</td><td>14</td><td>23</td><td></td><td>2</td><td>64</td><td>32</td><td>130</td></tr>
<tr><td colspan="8">Notes:
Shaded cells indicate the ACEC would not be designated in that alternative.
Riparian areas in the Lower Bruneau Canyon and Sand Point ACECs do not have PFC data and therefore do not have priority ratings.</td></tr>
</table>

Table 4- 60. 303(d)-Listed Priority Reaches in ACECs by Alternative (Miles)

Priority Rating	Alternative						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
Priority 1 and 2	9	13	0	0	41	21	85
Priority 3	5	10	0	2	17	8	27
Total	**14**	**23**	**0**	**2**	**58**	**29**	**112**

Impacts from Management Specific to the No Action Alternative

The designation of the Bruneau-Jarbidge, Salmon Falls Creek, and Sand Point ACECs include approximately 138 miles of perennial streams. These ACECs contain 14 miles of 303(d)-listed streams, of which 9 miles are Priority 1 and 2 reaches, which would be restored, and 5 miles are Priority 3 reaches, which would be maintained at PFC (Table 4- 60). The riparian and instream objectives would have to be achieved before the water quality objectives would be met. This rate of water quality improvement would be the slowest of all alternatives. The No Action Alternative does not include guidance for improving water quality indicators in ACECs.

A portion of the impacts to water quality on the BLM-managed stream reaches are the result of impacts to water quality upstream from public land that are beyond BLM discretion (i.e., alterations in streamflow). The impacts to water quality that have occurred in these ACECs include impacts related to recreational uses and an increased incidence of noxious weeds and invasive plants in RCAs. These ACECs receive a limited amount of human use due to the steep canyon walls that limit access. The source of water quality impairment for these ACEC is most likely from upstream uses that are impairing water quality (i.e., road maintenance, reduced riparian vegetation condition, consumptive and non-consumptive water uses). Re-designating the ACECs in the No Action Alternative is not expected to improve water quality or result in removing these streams from the 303(d) list because activities outside the ACECs are contributing to the impaired water quality.

Impacts from Management Specific to Alternative I

Alternative I would designate five ACECs including 152 miles of perennial streams. These ACECs contain 23 miles of 303(d)-listed streams, of which 13 miles are Priority 1 and 2 reaches and 10 miles are Priority 3 reaches (Table 4- 59). This alternative would have more miles of 303(d)-listed streams within ACECs moving toward or attaining State water quality standards than No Action Alternative.

Impacts from Management Specific to Alternative II

No ACECs would be designated under Alternative II (Table 4- 59 and Table 4- 60). In some locations, riparian areas and water quality would be maintained or improved by WSA management or eligible or suitable WSR management where water quality is identified as an ORV. In areas not encompassed by WSA or WSR management, actions could pose an increased risk for a reduction in HC ratings, PFC ratings, and water quality in 303(d)-listed streams because these streams would not have the increased management emphasis from ACEC designation. The stream reaches most at risk for effects to water quality would be 303(d)-listed streams, Priority 1 and 2 reaches, and Restoration Reaches because one or more water quality indicators are already impaired (Appendix D). Some activities (i.e., fuels treatments, road construction) in the uplands, which are not covered by the ARMS, could have short-term or long-term effects to water quality and result in slower rate of achieving State water quality standards or HC and PFC objectives. Not designating ACECS would result in a slower rate of achieving water quality objectives than if ACECs were designated to reduce impacts from land uses and improve relevant and important values. Areas that are not designated as an ACEC would still have to comply with State water quality standards and the guidance in the ARMS to improve HC and PFC ratings, which would contribute to attaining water quality objectives.

Impacts from Management Specific to Alternative III

Alternative III would designate three ACECs including 82 miles of perennial streams, all of which are either WSR suitable or eligible. These ACECs encompass fewer than 2 miles of 303(d)-listed stream, of which none are Priority 1 or 2 reaches and 2 miles are Priority 3 reaches (Table 4- 59 and Table 4- 60).

Instream and riparian objectives would have to be achieved before the water quality objectives would be met. This alternative would have fewer miles of 303(d)-listed streams moving toward or achieving State water quality standards than the No Action Alternative and Alternative I, but more than Alternative II.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV would designate five ACECs. Alternative IV-A would include 191 miles of perennial streams, and Alternative IV- B (the Preferred Alternative) would include 159 miles. There are 33 miles and 17 miles of Restoration Reaches in ACECs for Alternatives IV-A and IV-B, respectively, indicating instream conditions are in need of improvement. There are 64 miles and 32 miles of 303(d)-listed streams in Alternatives IV-A and IV-B, respectively (Table 4- 59). These ACECs include 41 miles in Alternative IV-A and 21 miles in Alternative IV-B of 303(d)-listed Priority 1 and 2 reaches (Table 4- 60), which would be moving toward the water resources objective of meeting State water quality standards. The riparian and instream ratings would have to be improved before the water quality objectives would be met. Alternative IV would result in more improvement in HC and PFC ratings, which would result in more miles of 303(d)-listed streams moving toward or achieving State water quality standards than the No Action Alternative and Alternatives I, II, and III. Active restoration would reduce water quality in the short-term but would improve it in the long-term. This would facilitate 303(d)-listed streams achieving or moving toward State water quality standards in the life of the plan faster than in Alternatives I, II, and III.

Impacts from Management Specific to Alternative V

Alternative V would designate five ACECs including 272 miles of perennial streams. There are 35 miles of Restoration Reaches in these ACECs, indicating instream conditions are in need of improvement. These ACECs include 130 miles of 303(d)-listed streams, of which 85 miles are Priority 1 and 2 reaches and 27 miles are Priority 3 reaches (Table 4- 59 and Table 4- 60). Alternative V would have the most miles of 303(d)-listed streams moving toward or achieving State water quality standards than any other alternatives.

Impacts from Wild and Scenic Rivers Actions

The management of WSRs includes management direction to maintain or enhance ORVs, free-flowing character, water quality, and tentative classification. These qualifying values are to be maintained or enhanced on eligible segments and cannot be modified pending a subsequent suitability determination or designation decision by Congress. Water quality could be impacted by management actions within WSR river segments; there are 303(d)-listed streams within WSR eligible and suitable segments (Table 4- 61).

Table 4- 61. Eligible and Suitable WSR Segments that are 303(d) Listed or have 303(d)-Listed Tributaries (Miles)

Wild and Scenic River Segment	Priority Rating	Miles of 303(d)-Listed Priority Streams
Snake River [A]	Priority 1 and 2	2
	Priority 3	9
Jarbidge River, East Fork (including Cougar Point Creek and Dave Creek)	Priority 1 and 2	0
	Priority 3	4
Jarbidge River, West Fork	Priority 1 and 2	5
	Priority 3	0
Bruneau River	Priority 1 and 2	<1
	Priority 3	0
Salmon Falls Creek (Cedar Creek)	Priority 1 and 2	0
	Priority 3	0
	Total	**23**

[A] There are 2 miles of 303(d)-listed streams in the Three Island Reach of the Snake River that do not have PFC data.

Impacts from Management Specific to the No Action Alternative

The objectives for managing WSRs in the No Action Alternative are to protect the scenic and recreational values of the Bruneau and Jarbidge Rivers through special designation and management. Managing the

Bruneau and Jarbidge Rivers as components of the National Wild and Scenic River System (NWSRS) until Congress acts would ensure that activities within these river segments would maintain water quality values. Recommending the rim-to-rim corridor surrounding the suitable segments of the Bruneau and Jarbidge Rivers for withdrawal from mineral entry and as utility avoidance areas would ensure these uses do not impact water quality in these segments. Water resource values are expected to be maintained in their current condition under the suitable WSR management direction in the No Action Alternative.

Impacts from Management Common to All Action Alternatives

All action alternatives include management direction to maintain or enhance the ORVs, free-flowing character, water quality, and tentative classification of designated, suitable, or eligible WSR segments until Congress acts. All action alternatives would include management direction that would recommend designated, suitable, and eligible WSR corridors for withdrawal from mineral entry and identify these river segments as ROW avoidance areas, reducing the potential for impacts to water quality. New ROWs within designated, suitable, and eligible WSR corridors would be required to maintain or enhance the river segment's ORVs, free-flowing character, water quality, and tentative classification.

The WSRs in the action alternatives would include 23 miles of 303(d)-listed streams of which 7 miles are Priority 1 and 2 reaches and 13 miles are Priority 3 reaches (Table 4- 61). Two miles of 303(d)-listed streams in WSR corridors do not have corresponding PFC data.

Impacts from Management Specific to Alternatives I, IV, and V

In Alternatives I, IV, and V, designated, suitable, and eligible WSR corridors would be closed to salable mineral development and mineral leasing. Closing the WSR corridors to salable and leasable mineral development would avoid the potential for impacts to water resources from salable mineral development and mineral leasing. This would promote the attainment of State water quality standards for Idaho and Nevada within the WSR corridors.

Since there are 303(d)-listed streams and riparian areas in WSRs that are FAR (Priority 1 and 2 reaches), there are other land uses contributing to impaired water quality or riparian condition that are not addressed by the WSR designations. Management for WSRs that have riparian-dependent wildlife designated as ORVs would facilitate the improvement in HC and PFC ratings and promote the achievement of State water quality standards. Compliance with the ARMS is expected to reduce impacts from other land uses on water quality in eligible and suitable WSR segments.

Impacts from Management Specific to Alternative II

In Alternative II, designated, suitable, and eligible WSR corridors would be open to salable mineral development and open to mineral leasing with an NSO stipulation. The effects of salable mineral development and mineral leasing are discussed under *Impacts from Minerals Actions*. This alternative would have more risks to water quality than the No Action Alternative or Alternative I.

Impacts from Management Specific to Alternative III

In Alternative III, designated, suitable, and eligible WSR corridors would be closed to salable mineral development and open to mineral leasing with an NSO stipulation. The effects of having the WSR corridors closed to salable minerals developed are the same as for Alternative I. The effects of mineral leasing are discussed under *Impacts from Minerals Actions*. Alternative III would have more risk to water quality than the No Action Alternative and Alternatives I, IV, and V, but less than Alternative II.

Summary of Direct and Indirect Impacts

The impact analysis for water resources focused on resource uses that posed the greatest risk to PFC ratings within 303(d)-listed streams. The miles of 303(d)-listed Priority 1 and 2 reaches are summarized in Table 4- 62. The risk to PFC ratings for 303(d)-listed streams were evaluated on whether the resource uses would facilitate the movement toward or achievement of the riparian objectives and the State water quality standards (Table 4- 62). The resource uses that pose the most risk to PFC ratings and water quality include the following: Conditional Suppression Areas, areas open to livestock grazing, areas not within a SRMA, areas open to cross-country motorized vehicle use, areas open to ROW and wind energy

Table 4- 62. Summary of Impacts to PFC Rating for 303(d)-Listed Streams by Alternative (Miles)

Indicator [A]	Alternative						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
Wildland Fire Ecology and Management							
Improve	117	68	31	59	82	70	117
Decline	N/A[B]	49	86	58	35	47	<1
Livestock Grazing							
Improve	20	49	32	32	44	43	74
Decline	97	69	85	85	73	74	43
Riparian Reference Areas							
Improve	N/A[C]	17	7	7	17		24
Recreation (SRMAs)							
Improve	N/A[C]	47	2	3	10		1
Decline	N/A[C]	70	115	114	107		116
Travel and Transportation							
Improve	2	5	1	1	5		13
Maintain	45	112	116	116	112		104
Decline	94	N/A[B]	N/A[B]	N/A[B]	N/A[B]		N/A[B]
Land Use Authorizations							
ROWs							
Improve	N/A[B]	11	9	11	15		15
Maintain	16	66	66	66	66		109
Decline	101	40	42	40	36		
Wind Development							
Improve	98	115	98	115	115		116
Decline	19	2	19	2	2		1
Minerals							
Oil and Gas Leasing							
Improve	N/A[B]	14	<1	1	11		14
Decline	N/A[C]	13	27	26	16		13
Geothermal Leasing							
Improve	N/A[B]	31	9	9	23	20	31
Decline	N/A[B]	85	106	106	84	86	85
Salable Minerals							
Improve	N/A[C]	15	9	17	19	17	19
Decline	N/A[C]	88	108	88	86	88	86
Locatable Minerals							
Improve	N/A[B]	31	20	20	29		23
Decline	N/A[B]	86	97	97	88		94
Areas of Critical Environmental Concern							
Improve	14	22	0	2	58	28	112
Decline	103	95	0	115	59	89	5

[A] The following is the baseline number of miles for each of the categories in the table:

Total Perennial Stream Miles in Planning Area = 316 miles
Total Miles of Streams with PFC Ratings (Riparian Priority Reaches) in Planning Area = 225 miles
303(d)-Listed Streams = 141miles (132 in Idaho, 9 in Nevada)
303(d)-Listed Streams with PFC Data = 117 miles (86 miles of Riparian Priority 1 and 2 Reaches)
303(d)-Listed Streams with HC Data = 21 miles (15 miles of High, Moderate, and Low Restoration Reaches)
303(d)-Listed Streams that do not have supporting PFC data = 24 Miles (15 miles in Idaho and 9 in Nevada)

The total miles for 303(d)-listed streams and PFC for Water Resources, Riparian and Wetlands, Special Status Fish and Aquatic Invertebrates and Wild and Scenic Rivers are the same for All Action Alternatives.

[B] The land allocation does not apply.

[C] Data are not available.

development, areas open to mineral exploration and development, and areas not within ACECs. The more miles of 303(d)-listed Priority 1 and 2 reaches in areas open to resource uses, the greater the risk for reduction in PFC rating and water quality. The summary of impacts discussed below focuses on the resource uses that have the greatest likelihood to impact PFC ratings on 303(d)-listed streams or prevent the attainment of the State water quality standards. Currently, 140 miles of riparian area within the planning area are not at PFC (Priority 1 and 2 reaches) and 141 miles are 303(d) listed as water quality impaired.

The guidance in the ARMS and compliance with the State water quality standards apply to all action alternatives and are expected to reduce impacts to PFC ratings and water quality. The guidance in the ARMS does not apply to the No Action Alternatives, but compliance with State water quality standards is still required. The rate of improvement in PFC ratings for 303(d)-listed streams is dependent on the riparian objectives for each of the alternatives (see the *Riparian Areas and Wetlands* section, Table 4-81). Improving PFC ratings to be moving toward or attaining PFC would improve water quality in 303(d)-listed streams and promote the attainment of State water quality standards over the life of the plan.

Impacts from the No Action Alternative

The No Action Alternative is expected to have the highest risk to water resources and have the longest recovery time of degraded watershed conditions of all action alternatives. Water resources would continue to be protected through the use of existing policies and regulations. The ARMS would not be implemented under the No Action Alternative, resulting in fewer miles of 303(d)-listed stream achieving PFC and moving toward the achievement of State water quality standards. The No Action Alternative is expected to maintain current water quality conditions and result in the fewest miles of 303(d)-listed stream meeting State water quality standards over the life of the plan of all alternatives.

Overall, the No Action Alternative would result in minor adverse impacts to water resources.

Impacts from Alternative I

The ARMS would be applied to all actions in Alternative I and would reduce the risk to 303(d)-listed, water quality impaired streams and PFC ratings. In Alternative I, the ARMS would be used to maintain 85 miles of stream at PFC, achieve 60 miles of PFC, and have 80 miles of stream moving toward PFC over the life of the plan. These riparian ratings include 117 miles of 303(d)-listed stream, all of which are expected have improvements in water quality commensurate with the rate and level of improvement in riparian condition. The rate of improvement in water quality for Alternative I is expected to be faster than what is expected for Alternative II and III, but slower than Alternatives IV and V. The amount of improvement in water quality is expected to be greater than Alternative II, but less than Alternatives III, IV and V. Alternative I is more likely to facilitate the attainment of State water quality standards and riparian objectives within the life of the plan than the No Action Alternative and Alternatives II and III, but less likely than Alternatives IV and V.

Alternative I would have more miles of 303(d)-listed stream not at PFC vulnerable to impacts from wildland fire than the No Action Alternative and Alternatives II, III and IV, but fewer than Alternative V. Alternative I would have more miles of 303(d)-listed stream not at PFC within areas available to grazing than Alternative V, but less than the other alternatives. Alternative I would rank third for improvement in PFC ratings and water quality. Alternative I would have the most miles of 303(d)-listed stream not at PFC included within SRMAs of any alternative which would improve water quality and PFC ratings related to recreation impacts. Leasable minerals in Alternative I would be the same as for Alternative V which has the least potential for a decline in water quality for 303(d)-listed streams and PFC ratings of all alternatives. ACEC management guidance for Alternative I is expected to result in the third most miles of improvement in water quality for 303(d)-listed streams and riparian area achieving or moving toward PFC of all alternatives.

Overall, Alternative I would result in minor adverse impacts to water resources.

Impacts from Alternative II

The ARMS would be applied to all actions in Alternative II and would reduce the risk to water quality in 303(d)-listed streams and PFC ratings. In Alternative II, the ARMS would be used to achieve 85 miles of stream at PFC and 140 miles of stream to be moving toward PFC over the life of the plan. This rate of improvement in water quality is the slowest of all alternatives except the No Action Alternative. These riparian ratings include 117 miles of 303(d)-listed stream, all of which are expected have improvements in water quality commensurate with the rate and level of improvement in riparian condition. Alternative II is more likely to attain State water quality standards within the life of the plan than the No Action Alternative, but less likely than Alternatives I, III, IV, and V.

Alternative II would have the most miles of 303(d)-listed stream outside Critical Suppression Areas of all alternatives. In Alternative II, VMA A would be the first priority for fire suppression which has the least amount of 303(d)-listed stream and riparian areas not at PFC of all four VMAs. In Alternative II, there would be substantially more livestock grazing than any other alternative. Livestock grazing in Alternative II would pose the most risk to water quality and PFC ratings and is expected to result in the fewest miles of 303(d)-listed stream attaining State water quality standards within the life of the plan than all alternatives except for the No Action Alternative. In Alternative II, the areas with travel limited to designated routes and ways is the same as Alternative III and includes the most miles of 303(d)-listed stream not at PFC in the areas with travel limited to designated routes and ways. In Alternative II, ROW avoidance areas and ROW exclusion areas would encompass the same miles of 303(d)-listed stream and PFC rating as for Alternative III which is the most miles at risk for a decline in water quality and PFC ratings. The potential wind development areas would include the most miles of 303(d)-listed stream of all alternatives including the No Action Alternative. Leasable minerals in Alternative II would have the greatest amount of risk to water quality in 303(d)-listed streams and PFC ratings of all alternatives. In Alternative II, no ACECs would be designated. Eliminating the three designated ACEC would increase risk to water quality and PFC ratings within these ACECs.

Overall, Alternative II would result in minor adverse impacts to water resources.

Impacts from Alternative III

The ARMS would be applied to all actions in Alternative III and would minimize the potential to reduce water quality and PFC ratings. The ARMS would be used to maintain 85 miles of stream at PFC, achieve 98 miles of PFC, and move 42 miles of stream toward PFC over the life of the plan. In Alternative III, the attainment of the riparian objectives is less likely to occur than in Alternative I because the amount of riparian improvement required to meet the objectives is greater while accommodating an increased level of authorized resource use and enhanced wildland fire suppression capabilities. This alternative would achieve riparian objectives slower than Alternatives I, IV, and V, but faster than the No Action Alternative and Alternative II. Alternative III is more likely to facilitate the attainment of State water quality standards and movement towards the attainment of riparian objectives within the life of the plan than the No Action Alternative and Alternative II, but is less likely than Alternatives I, IV, and V.

In Alternative III, there would be more fire suppression-related infrastructure than any of the other action alternatives and would result in the most long-term impacts to water quality and PFC ratings from fire suppression infrastructure of all alternatives. VMA B would be first priority for fire suppression which has the most miles of miles of 303(d)-listed stream not at PFC of all four VMAs. This would result in the fewest impacts to water quality from wildland fire. This alternative would achieve State water quality standards and riparian objectives slower than Alternatives I, IV, and V, but faster than the No Action Alternative and Alternative II. There would be an increase in route density because all routes would be maintained for wildland fire suppression and new routes would be created to enhance suppression efforts. This alternative would have the most miles of 303(d)-listed stream at risk for a decline in condition from road-related impacts. Alternative III authorizes livestock grazing on the same amount of riparian area as Alternative II, but fewer AUMs. Livestock grazing in Alternative III would have a greater potential for a decline in water quality and PFC ratings than Alternatives I, IV, and V, but less than what could occur in the No Action Alternative and Alternative II. In Alternative III, the impacts to water quality from ROWs would be the same as for Alternatives I and II. Leasable minerals in Alternative III would be the same as Alternative II which has the most risk for a decline in water quality in 303(d)-listed streams and PFC ratings of all alternatives. Alternative III would have the fewest miles of 303(d)-listed stream and riparian area within an ACEC of all alternatives except for Alternative II.

Overall, Alternative III would result in minor adverse impacts to water resources.

Impacts from Alternative IV (the Preferred Alternative)

The ARMS would be applied to all actions in Alternative IV and would minimize the potential to reduce water quality in 303(d)-listed streams and PFC ratings. In Alternative IV, the ARMS would be used to maintain or improve the same miles of riparian area as Alternative III. Alternative IV has greatest potential for 303(d)-listed streams not at PFC to achieve State water quality standards (42 miles moving toward PFC and the 98 miles achieving PFC) than any of the other alternatives. Active restoration is more likely to facilitate the achievement of State water quality standards within the life of the plan than passive restoration. Overall, Alternative IV is more likely to facilitate the movement towards or the attainment State water quality standards than all other alternatives.

Alternative IV would have the second most miles of 303(d)-listed stream not at PFC in Critical Suppression Areas of all alternatives. The increase in roads to improve wildland fire suppression response times is expected to result in fewer miles of riparian area with reduced water quality and PFC ratings to be impacted by wildland fire. However, the increase in roads to enhance wildland fire suppression is expected to have localized, long-term reductions in water quality and PFC ratings where the new roads occur in the RCA. Alternative IV would have more miles of 303(d)-listed stream not at PFC in areas available to livestock grazing than Alternative I and V, but fewer than the No Action Alternative and Alternatives II and III. Alternative IV would have the same number of roads closed to cross-country motorized use as Alternative I and more than Alternatives II and III. Alternative IV emphasizes active restoration and is likely to result in more miles of road in RCAs containing 303(d)-listed streams to be improved or modified to reduce impacts to water quality than in the No Action Alternative and Alternatives I, II, and III. Alternative IV would have more impacts to water quality from ROWs and leasable minerals development than Alternative V, but less than all other alternatives. Alternative IV would include more miles of 303(d)-listed stream not at PFC within ACECs than the No Action Alternative and Alternatives I, II, and III.

Overall, Alternative IV would result in minor beneficial impacts to water resources.

Impacts from Alternative V

The ARMS would be applied to all actions in Alternative V and would minimize the potential to reduce water quality in 303(d)-listed streams and PFC ratings. In Alternative V, the ARMS would be used to maintain or improve the same miles of riparian area as Alternatives III and IV. The rate of water quality and riparian improvement in Alternative V is faster than what is expected for the No Action Alternative and Alternative I, II, and III, but slower than Alternative IV. Passive restoration techniques would have fewer short-term impacts but longer timeframes for meeting State water quality standards and riparian objectives. The amount of improvement in water quality for this alternative is expected to be more than the No Action Alternative and Alternatives I and II, but the same as Alternatives IV. Alternative V is more likely to facilitate the movement towards the attainment of State water quality standards and riparian objectives than the No Action Alternative and Alternatives I, II, and III. Alternative V would have the least amount of public land uses of all alternatives which would result in improved water quality and PFC ratings across a broader area than would be expected for Alternative IV. Alternative V has the least risk to 303(d)-listed streams and PFC ratings of all alternatives.

This alternative would have the least amount of fire suppression infrastructure of all alternatives and the most miles of 303(d)-listed stream in Critical Suppression Areas. Water developments would be maintained at their current levels and no new roads would be constructed which would result in fewer disturbances to 303(d)-listed streams and riparian areas. Alternative V includes the least amount of 303(d)-listed stream not at PFC in areas available to livestock grazing of all alternatives and the most miles of 303(d)-listed stream in riparian reference areas. The level of livestock use in Alternative V would be substantially less than under all alternatives and is expected to result in the fewest impacts to water quality in 303(d)-listed stream and related to livestock grazing of any alternative. Alternative V has the most miles of 303(d)-listed stream not at PFC within the areas designated as closed to motorized vehicle or limited to designated routes and ways of all alternatives. Alternative V would have the most reduction in route density and the greatest expected decrease in motorized use of all alternatives which would result in the greatest reduction in travel related impacts to water quality of all alternatives. Alternative V is expected to have the fewest impacts to water quality from ROWs of all alternatives. Leasable minerals in Alternative V would have the fewest impacts to water quality in 303(d)-listed streams of all alternatives which is the same as for Alternative I. Alternative V would include the most miles of 303(d)-listed stream not at PFC within ACECs which is the most miles of all alternatives.

Overall, Alternative V would result in minor beneficial impacts to water resources.

Cumulative Impacts

Past, Present, and Reasonably Foreseeable Actions

This assessment considers the effects of past, present, and reasonably foreseeable actions on Federal, State, and private lands within and adjacent to the planning area in addition to the management proposed in the alternatives. Management actions in the planning area could influence portions of the following three primary watersheds: Bruneau River, Salmon Falls Creek, and Snake River. These primary watersheds include lands administered by BLM's Bruneau, Burley, and Shoshone FOs; the Humboldt-Toiyabe National Forest; Hagerman Fossil Beds National Monument; and State lands. These watersheds also include private inholdings and two military withdrawal areas. Actions and activities that occur in the identified watersheds that have influenced water quality and quantity in the past or present or have the potential to influence water quality and quantity in the future were considered in this cumulative effects assessment.

Past, present, and reasonably foreseeable actions for the following resource and resource uses cumulatively affect water resources:

- Wildland Fire Ecology and Management
- Livestock Grazing
- Recreation
- Transportation and Travel
- Land Use Authorizations
- Minerals

These actions are described in detail in the *Introduction* to this chapter.

Management actions in the planning area could influence portions of the following three primary watersheds. Primary factors affecting water quality in these watersheds are related to human uses and activities on Federal, State, and private lands in the analysis area. Consumptive and non-consumptive uses have occurred since the turn of the 21st century and include livestock watering, crop irrigation, hydroelectric power generation, fish hatcheries, reservoirs, and other impounded waters for recreation and private irrigation water. All of these uses have placed an increased demand on surface and groundwater resources in the analysis area. The effects of hydroelectric dams and other surface water developments are expected to continue in the future as human demands for water resources continue to increase over time.

For various reasons, riparian areas and wetlands are focus areas for many uses and have been locally degraded over time as a result. Actions in RCAs that contributed to current 303(d) listings for impaired water quality and reduced riparian condition include livestock grazing, recreational uses, road construction and use, wildland fire and fire suppression, increases in the amount of noxious weeds and invasive plants, and the diversion of surface water. All of these actions have reduced PFC condition over time and are expected to continue to influence water quality and riparian condition in the future. Actions would be implemented on BLM-managed land to improve water quality and riparian condition, but actions on State and private land may continue to affect water quality and quantity and PFC ratings on BLM-managed land. As human population increase over time, the demand for surface water that supports riparian areas and wetlands is expected to increase.

Summary of Cumulative Impacts

Cumulative Impacts from the No Action Alternative

Management actions implemented under the No Action Alternative, combined with actions on State and private lands, have contributed to the current condition of 303(d)-listed streams and riparian condition within the planning area. Water quality is directly related to riparian condition and is not expected to improve to levels that would meet State standards or result in a delisting of 303(d)-listed streams until riparian condition has improved to PFC (Appendix D). Water quality is not expected to improve until the 86 miles of 303(d)-listed streams not at PFC improve. A portion of the impaired water quality and reduced riparian condition are due to dewatering of streams for private land uses under legal water rights granted by the states of Idaho and Nevada. The occurrence and frequency of large wildland fires and fire suppression activities has also increased on Federal, State, and private land in the analysis area, partially as a result of the increase in noxious weeds and invasive plants, the increase in motorized recreational use, and the open designation for travel in the planning area. Trails, primitive roads, and infrastructure from other uses such as livestock grazing, energy development activities, or minerals exploration or development, are expected to result in a cumulative increase in impacts to water quality in 303(d)-listed streams. Impacts associated with resource uses under the No Action Alternative are expected to maintain or result a cumulative decrease in water quality over the life of the plan.

Cumulative Impacts from Alternative I

In Alternative I, management actions or authorized uses could be implemented in RCAs that would result in cumulative effects to water quality in 303(d)-listed streams in addition to existing actions and uses that have already occurred. Restoration activities on the public land would add to these effects in the short-term, but would improve water quality and riparian condition in the long-term.

The development of new water sources for fire suppression in addition to existing water uses on Federal, State, and private land would increase impacts to water quality and quantity where these developments are constructed in RCAs. Building new roads and guard stations and creating fuels breaks on public land, in addition to similar activities on State and private land in the analysis area, would also increase disturbances to riparian areas and result in additional impacts to water quality.

Livestock grazing on public lands in the analysis area would continue to impact water quality in 303(d)-listed streams in addition to current impacts to water quality from livestock grazing on State and private land. As more restrictions are placed on livestock grazing, the level of livestock use on State and private lands would be expected to increase and pose an increased risk to water quality. Areas where fencing or topography is insufficient to contain livestock grazing on State or private land would continue to pose an increased risk for cumulative impacts to water quality in 303(d)-listed streams on public land.

Proposed changes in travel management would limit motorized travel to designated routes or ways and would reduce the number of new roads being pioneered into RCAs, the spread of noxious weeds, and the potential for human-caused wildland fires. However, the anticipated increase in recreational use combined with the authorization of cross-country motorized vehicle use for allotment administration and other permit, lease, or ROW holders would continue to pose an increased risk for a cumulative increase in roads and new infestations of noxious weeds and invasive plants.

Land uses, such as oil and gas development, wind energy development, and geothermal development would create new roads and infrastructure on Federal, State, and private land. These activities would increase demands on surface and groundwater for project construction, operation, and maintenance that would continue to result in additional impacts to 303(d)-listed streams and water quality in general. Overall, all of these actions would have cumulative impacts to water quality within the planning area.

The cumulative impacts from implementing the restoration guidance in the ARMS in Alternative I are expected to improve water quality on 303(d)-listed streams and riparian condition more than is expected to occur in the No Action Alternative.

Cumulative Impacts from Alternative II

In Alternative II, water quality in 303(d)-listed streams and riparian condition may be maintained but would likely be locally reduced compared to the existing condition over the life of the plan. Management strategies most beneficial to commodity uses such as livestock grazing, recreation, transportation and travel, land use authorizations, energy development, and minerals exploration would be emphasized.

Wildland fires and fire suppression are expected to continue on Federal, State, and private land in the analysis area. Improving roads and stream crossings and building new roads and guard stations are expected to increase road densities over the life of the plan. Creating fuels breaks may help reduce fire size and severity, but may not address water quality related concerns due to fire frequency and post-fire riparian recovery. The creation of new unvegetated fuels breaks would lead to long-term disturbances that could result in additional sediment into streams and impact water quality.

Alternative II would include fuels treatments using prescribed fire and targeted grazing in addition to a substantial increase in permitted livestock grazing. These activities would occur concurrently with other land uses in the analysis area, such as oil and gas development, wind energy development, geothermal development, existing and new range infrastructure, existing and new water developments, and ROWs. All of these actions would result in an incremental increase in impacts to water quality in 303(d)-listed streams and water quality in general. Several small wind projects exist on private land in the northern portion of the planning area, and a large wind energy development project (China Mountain) is proposed in the southern portion of the planning area. These land use actions would continue to increase on State and private lands within the life of the plan and have additional effects to 303(d)-listed streams and water quality on public land.

Implementation of the ARMS would moderate impacts to water quality and riparian areas from authorized public land uses, but the guidance would not moderate impacts from similar actions on State and private land within or adjacent to the planning area. The cumulative impacts from implementing Alternative II are expected to result in less improvement in water quality than Alternative I but more than the No Action Alternative. The overall increase in authorized land uses in Alternative II are expected to result in less improvement in riparian condition, which would limit the improvement of existing water quality in water quality impaired streams because of the overall increased land uses.

Cumulative Impacts from Alternative III

In Alternative III, water quality may be maintained but would likely be reduced below the existing condition over the life of the plan. Management strategies most beneficial for enhancing fire suppression capabilities, management of fuels, and reducing wildland fire would be emphasized and would occur concurrently with commodity uses such as livestock grazing, recreation, transportation and travel, land use authorizations, and minerals exploration. The potential increase in total AUMs once upland vegetation objectives are achieved may impact a larger percentage of riparian areas containing 303(d)-listed streams in the planning area than all other alternatives except Alternative II.

The greatest increase in road and other infrastructure to enhance fire suppression is expected to occur in VMA B, which has first priority for fire suppression during multiple ignitions and has the second most miles of 303(d)-listed streams in the planning area. These new roads would result in a cumulative increase in roads in addition to existing roads currently used and existing roads on State and private land. Fire response time would be shortened as a result of these additional roads, and fewer miles of riparian area and water quality limited stream would be affected by wildland fire. These additional roads, particularly the roads within RCAs, are expected to contribute additional sediment to streams. New water developments created to enhance fire suppression would occur simultaneously with the private land irrigation and livestock watering developments and would increase water demand on existing surface and groundwater resources. These increased water demands would primarily occur in VMA B, where water resources are already limited and a majority of the streams are 303(d) listed. The increase in recreational activities would contribute to a cumulative increase in the spread of noxious weeds and invasive plants and human-caused fires over the long-term. There would be fewer acres of noxious weeds treated in Alternative III than all alternatives. Similar increases in route density on Federal, State, and private lands in the analysis area are expected.

Implementation of the ARMS would moderate some of the impacts to water quality on public lands, but it would not moderate impacts to water quality from similar actions on State and private lands in the analysis area. Alternative III is likely to result in some improvement in water quality in 303(d)-listed streams and riparian condition due to implementing the restoration guidance in the ARMS, but the amount of improvement would be limited by the increased fire suppression infrastructure. The impacts to water quality from the increased fire suppression infrastructure would occur in addition to and at the same time as the current levels of authorized public land uses, which are expected to increase in the future. Alternative III would result in less improvement in riparian and wetland condition than Alternative I but more than the No Action Alternative and Alternative II. The likelihood of meeting State water standards and riparian objectives over the life of the plan is less in this alternative than Alternatives I, IV, and V.

Cumulative Impacts from Alternative IV (the Preferred Alternative)

Alternative IV has fewer authorized land uses and more active restoration of riparian areas containing 303(d)-listed streams than Alternatives I, II, and III. The increased fire suppression emphasis would be expected to result in fewer cumulative impacts to water quality from wildland fire and a reduced potential for fire to spread onto State and private lands. VMAs C and D have first and second priority for fire suppression during multiple ignitions and contain 45 miles (32%) of 303(d)-listed streams not at PFC in the planning area. Alternative IV has the most weed treatments of all alternatives and would reduce the spread of noxious weeds and invasive plants between the Federal, State, and private land.

The cumulative effects of transportation and travel actions, ROW avoidance and exclusion areas, and oil and gas and geothermal development would be similar to Alternative I.

Implementation of the ARMS would moderate impacts to water quality from the above actions in 303(d)-listed streams and riparian areas on BLM-managed lands in the planning area, but would not moderate similar actions on other lands in the analysis area. Alternative IV would result in improved water quality and riparian condition throughout the planning area and is the most likely to achieve State water quality standards and riparian objectives within the life of the plan of all alternatives because of the active restoration emphasis.

Cumulative Impacts from Alternative V

Alternative V relies on natural recovery rates for water quality in 303(d)-listed streams and riparian areas not at PFC, using limited amounts of active restoration. This alternative would have least amount of land uses of all alternatives and the fewest cumulative effects to water quality and riparian areas. Alternative V includes no additional infrastructure and the least amount of permitted grazing of all alternatives including the No Action Alternative. This is expected to result in fewer cumulative effects to water quality and riparian areas from livestock grazing on the public land than in any other alternative. Grazing impacts could increase on the State and private land and could result in cumulative effects to water quality in 303(d)-listed streams and riparian condition on the public land. Designating the Sagebrush Sea ACEC as a Critical Suppression Area with management objectives that include minimizing public land uses would reduce the potential for impacts to water quality in 303(d)-listed streams and riparian areas not at PFC.

Impacts to water quality on 303(d)-listed streams in the analysis area are expected to continue. Implementation of the ARMS would moderate impacts to riparian areas and wetlands on BLM-managed lands in the planning area, but would not moderate similar actions on other lands in the analysis area. Alternative V would result in improved riparian condition throughout the planning area but at a slower rate of recovery than Alternative IV because of the passive restoration emphasis.

4.3.5. Vegetation Communities

4.3.5.1. Upland Vegetation

Analysis Methods

Indicators

The following indicators were used for the analysis of impacts to upland vegetation:

- **Composition of each Vegetation Management Area (VMA) and the planning area by Vegetation Sub-Group (VSG)** – Management actions prescribed in the alternatives might result in changes in the number of acres present in each VSG. Therefore, the relative composition of VSGs within each VMA or the planning area might change by alternative.

- **Composition of each VMA and the planning area by seral stage** – Seral stages are early, mid, and late seral for VSGs dominated by native vegetation (i.e., Native Grassland, Native Shrubland). VSGs dominated by non-native vegetation (i.e., Annual, Non-Native Perennial, Non-Native Understory) are defined as "uncharacteristic" (LANDFIRE, 2007); vegetation communities in these VSGs do not follow processes defined for native communities. Management actions prescribed in the alternatives might result in changes in the relative proportions of each seral stage, conversion of uncharacteristic vegetation to one of the three native vegetation seral stages, or conversion of a native vegetation seral stage to uncharacteristic.

- **Potential for introduction and spread of noxious weeds and invasive plants**

Methods and Assumptions

Impacts to upland vegetation from management in the following sections of Chapter 2 were analyzed in detail: *Upland Vegetation*, *Noxious Weeds and Invasive Plants*, *Wildland Fire Ecology and Management*, *Livestock Grazing*, *Transportation and Travel*, and *Areas of Critical Environmental Concern*. Management from the remaining sections was not analyzed in detail because the management did not vary measurably between alternatives or impact the indicator for upland vegetation. **Impacts from management for upland vegetation** can be found under *Impacts from Upland Vegetation Actions* in the *Tribal Rights and Interests*, *Air Quality*, *Climate Change*, *Soil Resources*, *Wildlife*, *Special Status Plants*, *Special Status Wildlife*, *Noxious Weeds and Invasive Plants*, *Wild Horses*, *Livestock Grazing*, *National Historic Trails*, and *Economic Conditions* sections.

Data were summarized for the 2012 projected acreages for upland vegetation (baseline) in each VSG within each VMA. VSGs were further broken down by potential natural vegetation groups (PNVGs) and Successional Classes (S-classes) within each PNVG. Management actions prescribed in each alternative were assessed to determine if they resulted in a change in S-class acreage for the PNVG within or between VSGs. Treatment acres were estimated across PNVGs within VSGs to reflect priorities associated with individual management actions and resource concerns. For analysis purposes, treatments focused primarily on the Wyoming Sagebrush Steppe PNVG, as it is a dominant group and most of the change to annual or non-native dominated vegetation has occurred in this type.

Treatment acres were assigned proportionally to other dominant PNVGs within the VMA to reflect alternative objectives. Acreages for S-classes by alternative were ultimately aggregated to VSGs within each VMA. S-classes were aggregated into broader seral stages according to information contained in LANDFIRE (LANDFIRE, 2007). Acreages for seral stages were aggregated by VMA. Acreages for VSGs and seral stages were converted to percent composition for each VMA and for the entire planning area (1,374,000 acres). These calculations included acres not classified in the original S-class classification, acres for which there were no data, and unvegetated acres. For the analysis, all acreages resulting from actions prescribed in the alternatives were compared to the baseline acreages for upland vegetation.

In cases where it was not possible to quantify acres changed and change in composition, effects of actions were qualified in terms of whether there is potential for change in VSG or seral stage, or effects to the community within a VSG, including introduction and spread of noxious weeds and invasive plants.

Minor discrepancies in acres (± 3 acres or less) or percentages (± 1%) occurred as the result of rounding figures in summary calculations. These discrepancies do not affect overall comparison of VSG and seral stage composition in VMAs and the planning area.

Acreages for riparian and wetland areas are not considered a component of the VSGs and are addressed in separate analysis (see the *Riparian Areas and Wetlands* section). Likewise, special status plants and noxious weeds and invasive plants are addressed separately in the *Special Status Plants* and *Noxious Weeds and Invasive Plants* sections, respectively.

Ecological literature has long agreed that while plant communities are inherently variable due to a number of environmental and biological forces (MacCracken, et al., 1983), there is a general understanding that ecosystem stability is characterized by increasing species diversity and structural complexity (Kormondy, 1969; Odum, 1971). Species diversity refers to the number and type of species that occur in a community. Structural complexity refers to the number and type of layers present, as well as the arrangement of components of these layers (e.g., shrubs, grasses, forbs, biological soil crusts) within a community. Structural complexity resulting from the relative proportions of seral stages is also important at the landscape scale. In general, greater species diversity and structural complexity would be more likely to support the common goal to promote soil stability, water infiltration, nutrient cycling, and energy flow; to provide habitat for sage-grouse and other sagebrush steppe obligates; and to provide for multiple use. In addition, native plants and naturally occurring native plant communities are generally assumed to have a greater level of species diversity and structural complexity and more likely to support this goal than annual, non-native perennial, and non-native understory communities. It is also assumed that alternatives that result in proportions of seral stages more similar to reference conditions for PNVGs (LANDFIRE, 2007) result in more structural complexity at the landscape scale; in general for the planning area, this would mean a decrease in the proportion of early-seral native communities and an increase in the proportion of mid-seral native communities (LANDFIRE, 2007). These assumptions are incorporated into the following analysis.

Additional assumptions used when analyzing the effects of proposed actions on upland vegetation communities:

- Classification for areas burned in 2007 wildland fires was projected for the year 2012 as described in Appendix R. The resulting projected acreages were used as the baseline for this analysis.
- For comparison only, it is assumed that vegetation treatments would occur within five years of the signing of the ROD. Desired plant species composition and structure typically would occur within 15 to 20 years following restoration treatments intended to move areas towards the Native Shrubland VSG.
- Vegetation treatments would be applied in locations and using materials and methods that maximize the potential for success and are appropriate for existing conditions. Otherwise stated, an area would not be treated unless there is a reasonable expectation of success.
- Toolboxes defined for each alternative would be fully utilized as appropriate to treat upland vegetation communities and maximize potential for success of treatments.
- With active management, adequate ground cover for site stabilization would occur within two to five years following surface-disturbing activities.
- Biological soil crusts would increase in cover and complexity with establishment of perennial vegetation and increased time with no or low levels of soil surface disturbance (Belnap & Eldridge, 2001; Jayne Belnap, et al., 2001; Hilty, et al., 2004). Cover and complexity of biological soil crusts are dependent on site potential including soil texture and chemistry, vegetation cover, and precipitation. Generally biologocial crust development is inversely proportional to vegetation cover and precipitation, i.e., the sites with low vegetative cover in low precipitation zones have greater potential for biological soil crusts to be a dominant component of the plant community (Jayne Belnap, et al., 2001). Recovery times are also dependent on site potential; recovery might begin in as little as five

years, but might not be complete for a century or more (Belnap & Eldridge, 2001; Jayne Belnap, et al., 2001).

- The potential for any area to support the identified PNVG could change due to factors such as disturbance, soil loss or deposition, changes in soil physiology, or climate change. For this analysis, it was assumed that acres identified for the PNVGs would remain the same through the life of the plan.
- Vegetation treatments would result in eventual attainment of the stated objectives. Failed or partially-failed treatments would be identified through monitoring and retreated utilizing adaptive management methods until the objectives are met.
- Since fire is an episodic event, untreated native vegetation and treated areas could burn within the life of the plan. Locations identified in Critical Suppression Areas would be less likely to burn and fire size would be smaller than for Conditional Suppression Areas.
- Vegetation treatments (e.g., ES&BAR) could be applied proactively to meet resource objectives or reactively following wildland fire.
- Cultivars of native species would be considered as native. Communities dominated by native cultivars would be classified in the Native Grassland or Native Shrubland VSGs. In general, these communities would be expected to emulate native communities with respect to structural qualities and ecosystem processes.
- Noxious weeds and invasive plants would continue to be introduced into upland vegetation communities as a result of land uses, wildlife movements, and wind.
- Yearly climatic variability would influence the health and productivity of upland vegetation communities, but would be a common influence regardless of alternative.
- PNVGs comprising less than 10% of the total acres for the VSG or that occur as small patches over the landscape were assumed to be treated as inclusions within dominant vegetation types.
- Natural successional processes would continue to occur in native plant communities throughout the life of the plan. For analysis purposes, natural processes are assumed to be consistent for all alternatives and are not accounted for here. All change represented in the analysis is assumed to be due to proposed management actions.
- The degree of impact attributed to proposed management actions would be influenced by multiple factors including, but not limited to, current vegetation type and condition; the type, seasonal timing, and degree of disturbance; yearly climatic variability including temperature and precipitation; and other mitigating or constraining actions.
- Impacts that result from management actions, authorizations, or allocations that result in surface disturbance are assumed to occur in proportion to the area affected.

Direct and Indirect Impacts

Impacts from Upland Vegetation Actions

Upland vegetation actions directly affect the vegetation composition of the planning area, both with respect to VSG as well as seral stage. Table 4- 63 identifies changes in composition of the planning area by VSG by alternative, while Table 4- 64 identifies changes in composition of the planning area by seral stage by alternative.

Table 4- 63. Changes in Composition of the Planning Area by VSG by Alternative (Acres)

VSG	Baseline	Alternative					
		No Action	I	II	III	IV	V
Annual	119,000	112,000	75,000	47,000	53,000	47,000	81,000
Non-Native Perennial	343,000	431,000	299,000	448,000	415,000	151,000	152,000
Non-Native Understory	66,000	7,000	40,000	34,000	64,000	133,000	257,000
Native Grassland	424,000	424,000	211,000	424,000	230,000	150,000	245,000
Native Shrubland	388,000	367,000	715,000	388,000	568,000	860,000	605,000
Unvegetated Areas	30,000	30,000	30,000	30,000	41,000	30,000	30,000
No Data	3,000	3,000	3,000	3,000	3,000	3,000	3,000

Table 4- 64. Changes in Composition of the Planning Area by Seral Stage by Alternative (Acres)

Seral Stage	Baseline	Alternative					
		No Action	I	II	III	IV	V
Early	426,000	424,000	213,000	426,000	232,000	152,000	247,000
Mid	110,000	91,000	437,000	110,000	295,000	581,000	327,000
Late	264,000	264,000	264,000	264,000	259,000	264,000	264,000
Unclassified Native Shrubland	12,000	12,000	12,000	12,000	12,000	12,000	12,000
Uncharacteristic	528,000	549,000	414,000	528,000	532,000	331,000	490,000
Unvegetated Areas	30,000	30,000	30,000	30,000	41,000	30,000	30,000
No Data	3,000	3,000	3,000	3,000	3,000	3,000	3,000

Impacts from Management Specific to the No Action Alternative

The overall effect of actions proposed for upland vegetation in the No Action Alternative would be to increase the relative proportion of non-native perennial communities through conversion of annual communities and removal of shrubs in non-native understory communities. Actions proposed for the No Action Alternative would maintain vegetation in the planning area in the current state, dominated by early- and late-seral native communities and uncharacteristic vegetation, primarily in the form of non-native perennial communities. This results in a rather homogeneous landscape with limited structural and species diversity.

With loss of sagebrush habitats, shrub islands would become increasingly valuable as refugia for wildlife, soil biota, and ecological functions such as water infiltration and nutrient cycling (Eldridge & Rosentreter, 2004; Longland & Bateman, 2002). The dominance of non-native perennial communities limits potential for diversification of structure and species composition through water and nutrient competition with sagebrush and native perennial grasses (D'Antonio & Vitousek, 1992).

Impacts from Management Common to All Action Alternatives

Management actions common to all action alternatives provide guidance for protection of existing vegetation and newly treated areas. This guidance is intended to reduce or eliminate improper uses or over-allocation, particularly during vulnerable periods such as growing seasons, drought periods, or seeding establishment. These actions would reduce potential impacts of uses and maintain acreages resulting from actions prescribed for upland vegetation. In the long-term, these actions would promote ecological processes including soil stability, water infiltration, nutrient cycling, and energy flow; maintain or enhance habitat for sage-grouse and other sagebrush steppe obligates; and facilitate multiple uses of public lands.

Impacts from Management Specific to Alternative I

The overall effect of actions proposed for upland vegetation in Alternative I would be to increase the relative proportion of native shrubland through conversion of annual, non-native perennial, non-native understory, and native grassland communities (Table 4- 63). Table 4- 65 identifies the change in composition of VMAs by VSG.

Actions proposed for Alternative I would decrease the relative proportion of communities dominated by uncharacteristic and early-seral native vegetation and increase the relative proportion of communities dominated by mid-seral native vegetation (Table 4- 64). Actions resulting in an increase in the relative proportion of mid-seral native shrubland communities would enhance species diversity and structural complexity throughout the planning area. Increased numbers of native shrubland patches would create islands for seed dispersal and habitat for small mammals that could assist in the seed dispersal process (Longland & Bateman, 2002). Table 4- 66 identifies the change in composition of VMAs by seral stage.

The establishment of 75 ungrazed reference areas (12,000 acres) would provide for enhanced monitoring and adaptive management of livestock grazing effects and the ability to observe both natural processes and treatment effects in the absence of use. Inclusion of biological soil crusts in monitoring and adaptive management procedures would enhance landscape stability by detection and management of processes that might not be apparent through monitoring of vascular vegetation only (Ponzetti & McCune, 2001).

Table 4- 65. Change in Composition of VMAs by VSG in Alternative I (Acres)

VSG	VMA A		VMA B		VMA C		VMA D	
	Baseline	Post-Treatment	Baseline	Post-Treatment	Baseline	Post-Treatment	Baseline	Post-Treatment
Annual	74,000	49,000	36,000	18,000	6,000	6,000	4,000	2,000
Non-Native Perennial	96,000	98,000	185,000	148,000	56,000	38,000	6,000	15,000
Non-Native Understory	5,000	5,000	25,000	17,000	23,000	6,000	12,000	12,000
Native Grassland	25,000	31,000	194,000	97,000	132,000	66,000	73,000	17,000
Native Shrubland	17,000	33,000	174,000	335,000	92,000	194,000	104,000	153,000
Unvegetated Areas	2,000	2,000	15,000	15,000	3,000	3,000	10,000	10,000
No Data	2,000	2,000	700	700	<100	<100	200	200

Table 4- 66. Change in Composition of VMAs by Seral Stage in Alternative I (Acres)

Seral Stage	VMA A		VMA B		VMA C		VMA D	
	Baseline	Post-Treatment	Baseline	Post-Treatment	Baseline	Post-Treatment	Baseline	Post-Treatment
Early	25,000	31,000	195,000	98,000	132,000	66,000	48,000	18,000
Mid	8,000	24,000	45,000	205,000	41,000	143,000	15,000	64,000
Late	9,000	9,000	122,000	122,000	47,000	47,000	86,000	86,000
Unclassified Native Shrubland	0	0	6,000	6,000	4,000	4,000	2,000	2,000
Un-characteristic	175,000	153,000	246,000	183,000	85,000	50,000	22,000	29,000
Unvegetated Areas	2,000	2,000	15,000	15,000	3,000	3,000	10,000	10,000
No Data	2,000	2,000	700	700	<100	<100	200	200

VMA A

When compared to baseline vegetation acreages, the composition of VMA A would be modified to contain a greater proportion of plant communities dominated by perennial vegetation and increasing the relative proportion of native communities (Table 4- 65). These changes would most likely occur within the Wyoming Sagebrush Steppe PNVG, as it is the dominant PNVG in VMA A (see the *Riparian Areas and Wetlands* and *Wildland Fire Ecology and Management* sections of Chapter 3 and Appendix R). The increased proportion of native grassland and shrubland communities would increase species diversity and structural complexity; however, this would be limited within the VMA, as the dominant VSG would remain Non-Native Perennial. Natural succession from early-seral, herbaceous-dominated native grassland communities to mid-seral communities with shrub cover of 5% to 25% would take a minimum of about 20 years for the Wyoming Sagebrush Steppe PNVG (LANDFIRE, 2007). Although Alternative I allows for natural succession of shrubs in the Native Grassland VSG, it is unlikely this would result in a shift in the relative proportions of native grassland and native shrubland within the life of the plan due to low availability of shrubland communities for seed dispersal. Since sagebrush seed lacks mechanisms for dispersal much more than 100 feet from a mother plant and typically within 3 feet of the canopy edge (Meyer, 1994; Welch, 2005), low density of seed sources would limit potential for dispersal and establishment. Treatments would result in a decrease in the relative proportion of uncharacteristic vegetation, coupled with increases in communities in early and mid-seral condition (Table 4- 66). It is unlikely that any of the treated acres would reach the late-seral stage with shrub cover exceeding 25% in less than 40 years ((LANDFIRE, 2007); Table 4- 66). Therefore most of the acres treated to move towards the Native Shrubland VSG would remain in either early- or mid-seral stages for the life of the plan.

VMA B

While the Annual VSG is not dominant in VMA B, Alternative I would convert a portion of the projected acreage for this sub-group to the Native Shrubland VSG, reducing the potential for spread of invasive annual vegetation (Table 4- 65). Vegetation treatments implemented under Alternative I would almost double the relative proportion of the Native Shrubland VSG. This could result in greater species diversity and structural complexity through conversion of annual, non-native perennial, and native grassland communities to native shrubland communities. These changes would most likely occur within the Wyoming Sagebrush Steppe PNVG, as it is the dominant PNVG in VMA B (see the *Riparian Areas and Wetlands* and *Wildland Fire Ecology and Management* sections of Chapter 3 and Appendix R). As in VMA A, natural shifts from early-seral, herbaceous-dominated native grassland communities to mid-seral communities with shrub cover of 5% to 25% would take a minimum of about 20 years for the Wyoming Sagebrush Steppe PNVG (LANDFIRE, 2007). Timeframes for conversion to native shrubland could be accelerated by implementation of Alternative I actions to treat annual-dominated, non-native perennial, or native grassland communities by seeding or planting of shrubs along with perennial herbaceous vegetation. This would result in reductions in the relative proportion of uncharacteristic vegetation and early seral communities. The relative proportion of communities in mid-seral condition would increase by about 370% (Table 4- 66). Likewise, conversion of non-native understory communities to native shrubland using techniques ranging from interseeding native plants in the understory to full restoration (Cox & Anderson, 2004; Stevens, 2004) would likely result in mid-seral communities within the life of the plan. It is unlikely that any of the treated acres would reach the late-seral stage with shrub cover exceeding 25% in less than 40 years (LANDFIRE, 2007). Alternative I allows for natural succession of shrubs in the Native Grassland VSG, which is more likely to occur than in VMA A due to increased availability of shrubland vegetation. However, it is unlikely this would result in a shift in the relative proportions of native grassland and native shrubland within the life of the plan due to timeframes for natural succession and naturally low recruitment, establishment, and survival rates (LANDFIRE, 2007; Meyer, 1994). Alternative I also allows for assisted succession of native shrubland communities to introduce forbs and late-seral grasses to the understory. These understory treatments would enhance the complexity of mid- or late-seral communities, but it is unlikely that treatment would affect relative proportions of these seral stages within VMA B.

VMA C

Actions proposed under Alternative I for VMA C would have the primary effect of increasing the relative proportion of the Native Shrubland VSG in the VMA by more than double (Table 4- 65). Most of the effects would occur in the Wyoming Sagebrush Steppe PNVG, as it is the dominant PNVG in VMA C (see the *Riparian Areas and Wetlands* and *Wildland Fire Ecology and Management* sections of Chapter 3 and Appendix R). Treatments implemented under Alternative I would move vegetation from the Non-Native Perennial, Non-Native Understory, and Native Grassland VSGs to the Native Shrubland VSG, resulting in a shift from communities dominated by uncharacteristic and early-seral communities to mid-seral communities (Table 4- 66). This would ultimately result in a larger proportion of the VMA being occupied by plant communities with a greater level of species diversity and structural complexity (Cox & Anderson, 2004). Alternative I allows for natural succession of shrubs in the Native Grassland VSG, which is more likely to occur than in VMA A due to increased availability of shrubland vegetation. However, it is unlikely this would result in a shift in the relative proportions of native grassland and native shrubland within the life of the plan due to timeframes for natural succession and naturally low recruitment, establishment, and survival rates (LANDFIRE, 2007; Meyer, 1994). It is also unlikely that any of the treated acres would reach the late-seral stage with shrub cover exceeding 25% in less than 40 years (LANDFIRE, 2007). Alternative I also allows for assisted succession of native shrubland communities to introduce forbs and late-seral grasses to the understory. These understory treatments would enhance the complexity of mid- or late-seral communities, but it is unlikely that treatment would affect relative proportions of these seral stages within VMA C.

VMA D

VMA D contains a greater diversity of vegetation communities due to higher elevation (see the *Riparian Areas and Wetlands* section of Chapter 3 and Appendix R). Treatments would focus on the dominant PNVGs: Black and Low Sagebrush, Mountain Big Sagebrush, Wyoming Sagebrush Steppe, and Basin Big Sagebrush. The Annual VSG is not dominant in VMA D; however, Alternative I would convert a portion of the projected acreage for this sub-group to the Native Shrubland VSG, reducing the potential for spread of invasive annual vegetation (Table 4- 65). Actions proposed under Alternative I for VMA D would have the primary effect of increasing the structural complexity of native grassland communities by adding a shrub component and increasing the relative proportion of native shrubland to 73% of the VMA (Table 4- 65). This would reduce the relative proportion of herbaceous-dominated, early-seral communities to less than 10% and increase the proportion of shrub-dominated, mid-seral communities to nearly a third of the VMA (Table 4- 66). The increased elevation in VMA D may translate to higher effective precipitation and greater potential for community diversity (Goodrich, 2005). Unassisted succession from one seral stage to another would be dependent on the type of plant community (LANDFIRE, 2007) and the presence of seed sources. Alternative I allows for natural succession of shrubs in the Native Grassland VSG, which is more likely to occur in VMA D due to high proportion of native shrublands. There could be some small shifts in relative proportions of native grassland and native shrubland within the life of the plan, as timeframes for natural succession between early- and mid-seral stages in some higher elevation vegetation types (e.g., mountain shrub, aspen, mountain mahogany, mountain big sagebrush) are less than 12 years (LANDFIRE, 2007). Alternative I also allows for diversification of native shrubland communities to introduce forbs and late-seral grasses to the understory. These understory treatments would enhance the complexity of mid- or late-seral communities, but it is unlikely that treatment would affect relative proportions of these seral stages within VMA D.

Impacts from Management Specific to Alternative II

The overall effect of actions proposed for upland vegetation in Alternative II would be similar to the No Action Alternative. Compared to baseline vegetation acreages, the relative proportion of the Non-Native Perennial VSG would increase through conversion of annual and non-native understory communities (Table 4- 63). The relative proportions of the Native Grassland and Native Shrubland VSGs would be maintained while enhancing diversity through seeding of late-seral grasses. Increases in the Non-Native Perennial VSG and the grass component of native plant communities would increase available forage for livestock. Removal of shrubs in non-native understory communities would result in a decrease in structural complexity throughout the planning area. Likewise, focus on use of non-native and fire-tolerant species (such as crested wheatgrass) in vegetation treatments would tend to discourage recovery or recruitment of native plants in treated areas (D'Antonio & Vitousek, 1992; Marlette & Anderson, 1986). Table 4- 67 identifies the change in composition of VMAs by VSG.

Actions proposed in Alternative II are unlikely to change the current relative proportions of native community seral stages or uncharacteristic vegetation (Table 4- 64). Table 4- 68 identifies the change in seral stage by VMA.

The establishment of 75 ungrazed reference areas excluding 2,000 acres would provide for enhanced monitoring and adaptive management of livestock grazing effects and the ability to observe both natural processes and treatment effects in the absence of use.

Table 4- 67. Change in Composition of VMAs by VSG in Alternative II (Acres)

VSG	VMA A		VMA B		VMA C		VMA D	
	Baseline	Post-Treatment	Baseline	Post-Treatment	Baseline	Post-Treatment	Baseline	Post-Treatment
Annual	74,000	29,000	36,000	9,000	6,000	6,000	4,000	2,000
Non-Native Perennial	96,000	141,000	185,000	220,000	56,000	68,000	6,000	20,000
Non-Native Understory	5,000	5,000	25,000	17,000	23,000	12,000	12,000	0
Native Grassland	25,000	25,000	194,000	194,000	132,000	132,000	73,000	73,000
Native Shrubland	17,000	17,000	174,000	174,000	92,000	92,000	104,000	104,000
Unvegetated Areas	2,000	2,000	15,000	15,000	3,000	3,000	10,000	10,000
No Data	2,000	2,000	700	700	<100	<100	200	200

Table 4- 68. Change in Composition of VMAs by Seral Stage in Alternative II (Acres)

Seral Stage	VMA A		VMA B		VMA C		VMA D	
	Baseline	Post-Treatment	Baseline	Post-Treatment	Baseline	Post-Treatment	Baseline	Post-Treatment
Early	25,000	25,000	195,000	195,000	132,000	132,000	48,000	75,000
Mid	8,000	8,000	45,000	45,000	41,000	41,000	15,000	15,000
Late	9,000	9,000	122,000	122,000	47,000	47,000	86,000	86,000
Unclassified Native Shrubland	0	0	6,000	6,000	4,000	4,000	2,000	2,000
Un-characteristic	175,000	175,000	246,000	246,000	85,000	85,000	22,000	22,000
Unvegetated Areas	2,000	2,000	15,000	15,000	3,000	3,000	10,000	10,000
No Data	2,000	2,000	700	700	<100	<100	200	200

VMA A

When compared to baseline vegetation acreages, the composition of VMA A would be modified by Alternative II to contain a greater proportion of plant communities dominated by perennial vegetation (Table 4- 67), and increasing the relative proportion of the Non-Native Perennial VSG by almost 50%. These changes would most likely occur within the Wyoming Sagebrush Steppe PNVG, as it is the dominant PNVG in VMA A (see the *Riparian Areas and Wetlands* and *Wildland Fire Ecology and Management* sections of Chapter 3 and Appendix R). The shift in dominance from annual to non-native perennial vegetation could increase resilience to fire disturbance (Monsen, 1994), but would limit both species diversity and structural complexity within VMA A. Natural shifts from early-seral, herbaceous-dominated native grassland communities to mid-seral communities with shrub cover of 5% to 25% would take a minimum of about 20 years for the Wyoming Sagebrush Steppe PNVG (LANDFIRE, 2007). Since no treatments are proposed that would accelerate this process, it is likely that the relative proportion of seral stages in native plant communities would remain relatively consistent over the life of the plan (Table 4- 68). Treatments would not affect the relative proportion of uncharacteristic vegetation within VMA A.

VMA B

While the Annual VSG is not dominant in VMA B, Alternative II would convert a portion of the projected acreage for this sub-group to the Native Shrubland VSG, reducing the potential for spread of invasive annual vegetation (Table 4- 67). Vegetation treatments implemented under Alternative II would increase the relative proportion of the Non-Native Perennial VSG by about 20%. Some of this change would occur through removal of shrubs in the Non-Native Understory

VSG, which would slightly reduce the relative proportion of this VSG in VMA B, subsequently reducing structural complexity in those areas. These changes would most likely occur within the Wyoming Sagebrush Steppe PNVG, as it is the dominant PNVG in VMA B (see the *Riparian Areas and Wetlands* and *Wildland Fire Ecology and Management* sections of Chapter 3 and Appendix R). As in VMA A, the shift in dominance from annual invasive to non-native perennial vegetation could increase resilience to fire disturbance (Monsen, 1994), but would limit both species diversity and structural complexity within VMA B. Natural shifts from early-seral, herbaceous-dominated native grassland communities to mid-seral communities with shrub cover of 5% to 25% would take a minimum of about 20 years for the Wyoming Sagebrush Steppe PNVG (LANDFIRE, 2007). The only actions proposed that would accelerate this process would be the inclusion of shrubs in ES&BAR seedings in burned native grassland and native shrubland communities. While diversification of grasses by seeding of late-seral grasses is allowed for both native grassland and native shrubland, it is unlikely that the relative proportion of seral stages in native plant communities would change over the life of the plan (Table 4- 68). Treatments would not affect the relative proportion of uncharacteristic vegetation within VMA B.

<u>VMA C</u>
Actions proposed under Alternative II for VMA C would have the primary effect of increasing the relative proportion of the Non-Native Perennial VSG in the VMA by about 20% (Table 4- 67). This change would occur through removal of shrubs in the Non-Native Understory VSG and reducing the relative proportion of this VSG in VMA C, subsequently reducing structural complexity in those areas. These changes would most likely occur within the Wyoming Sagebrush Steppe PNVG, as it is the dominant PNVG in VMA C (see the *Riparian Areas and Wetlands* and *Wildland Fire Ecology and Management* sections of Chapter 3 and Appendix R). Natural shifts from early-seral, herbaceous-dominated native grassland communities to mid-seral communities with shrub cover of 5% to 25% would take a minimum of about 20 years for the Wyoming Sagebrush Steppe PNVG (LANDFIRE, 2007). As in Alternative I, allowance for natural succession of shrubs in the Native Grassland VSG under Alternative II would not likely result in a shift in the relative proportions of native grassland and native shrubland within the life of the plan. The only actions proposed that would accelerate this process would be the inclusion of shrubs in ES&BAR seedings in burned native grassland and native shrubland communities. And while seeding of late-seral grasses is allowed to diversify both native grassland and native shrubland communities, it is unlikely that the relative proportion of seral stages in native plant communities would change over the life of the plan (Table 4- 68). Treatments would not affect the relative proportion of uncharacteristic vegetation within VMA C.

<u>VMA D</u>
VMA D contains a greater diversity of vegetation communities due to higher elevation (see the *Riparian Areas and Wetlands* section of Chapter 3 and Appendix R). Treatments would focus on the dominant PNVGs currently occupied by non-native perennial or non-native understory communities: Black and Low Sagebrush, Mountain Big Sagebrush, and Wyoming Sagebrush Steppe. The Annual VSG is not dominant in VMA D; however, Alternative II would convert a portion of the projected acreage for this sub-group to the Non-Native Perennial VSG, reducing the potential for spread of invasive annual vegetation (Table 4- 67). Actions proposed under Alternative II for VMA D would have the primary effect of tripling the relative proportion of the Non-Native Perennial VSG in the VMA (Table 4- 67). This change would occur through removal of shrubs in the Non-Native Understory VSG and eliminating this VSG in VMA D. The increased elevation in VMA D may translate to higher effective precipitation and greater potential for community diversity (Goodrich, 2005). Unassisted succession from one seral stage to another would be dependent on the type of plant community (LANDFIRE, 2007) and the presence of seed sources. As in Alternative I, allowance of natural succession of shrubs in the Native Grassland VSG might result in some small shifts in relative proportions of native grassland and native shrubland within the life of the plan, as timeframes for natural succession between early and mid-seral stages in some higher elevation vegetation types (e.g., mountain shrub, aspen, mountain mahogany, mountain big sagebrush) are less than 12 years (LANDFIRE, 2007). The only actions proposed that would accelerate this process would be the inclusion of shrubs in ES&BAR

seedings in burned native grassland and native shrubland communities. And while seeding of late-seral grasses is allowed to diversify both native grassland and native shrubland communities, it is unlikely that the relative proportion of seral stages in native plant communities would change over the life of the plan (Table 4- 68). Treatments would not affect the relative proportion of uncharacteristic vegetation within VMA D.

Impacts from Management Specific to Alternative III

The overall effect of actions proposed for upland vegetation in Alternative III would be to reduce the amount and continuity of fine fuels throughout the planning area. This would be accomplished by increasing the relative proportion of non-native perennial communities through conversion of annual communities, and increasing the relative proportion of native shrubland communities through the addition of shrubs to native grassland communities (Table 4- 69). Areas treated with fire-tolerant and fire-resistant species, such as crested wheatgrass, would tend to discourage recovery or recruitment of native species in treated areas (D'Antonio & Vitousek, 1992; Marlette & Anderson, 1986). Treatments in native communities would result in a decrease in the relative proportion of early-seral, native communities and an increase in the relative proportion of mid-seral communities (Table 4- 70). Creation of fuel breaks, coupled with the placement of vegetation treatments to create discontinuous fuels, would result in fragmentation of contiguous blocks of native shrubland communities. Increased numbers of native shrubland patches would create islands for seed dispersal and habitat for small mammals that could assist the seed dispersal process (Longland & Bateman, 2002). However, these effects would be discontinuous over the landscape due to vegetation patchiness. Should fire occur, discontinuity of vegetation types could result in a mosaic of burn intensities and unburned patches that could function as refugia for native seed dispersal (Longland & Bateman, 2002; Whisenant, 1989).

The establishment of 75 ungrazed reference areas excluding 3,000 acres would provide for enhanced monitoring and adaptive management of livestock grazing effects and the ability to observe both natural processes and treatment effects in the absence of use.

Table 4- 69. Change in Composition of VMAs by VSG in Alternative III (Acres)

VSG	VMA A		VMA B		VMA C		VMA D	
	Baseline	Post-Treatment	Baseline	Post-Treatment	Baseline	Post-Treatment	Baseline	Post-Treatment
Annual	74,000	37,000	36,000	9,000	6,000	6,000	4,000	1,000
Non-Native Perennial	96,000	131,000	185,000	215,000	56,000	60,000	6,000	8,000
Non-Native Understory	5,000	5,000	25,000	25,00	23,000	23,000	12,00	11,000
Native Grassland	25,000	26,000	194,000	89,000	132,000	60,000	73,000	55,000
Native Shrubland	17,000	17,000	174,000	270,000	92,000	157,000	104,000	124,000
Unvegetated Areas	2,000	4,000	15,000	20,000	3,000	7,000	10,000	10,000
No Data	2,000	2,000	700	700	<100	<100	200	200

Table 4- 70. Change in Composition of VMAs by Seral Stage in Alternative III (Acres)

Seral Stage	VMA A		VMA B		VMA C		VMA D	
	Baseline	Post-Treatment	Baseline	Post-Treatment	Baseline	Post-Treatment	Baseline	Post-Treatment
Early	25,000	26,000	195,000	90,000	132,000	60,000	48,000	56,000
Mid	8,000	8,000	45,000	142,000	41,000	107,000	15,000	37,000
Late	9,000	9,000	122,000	120,000	47,000	46,000	86,000	84,000
Unclassified Native Shrubland	0	0	6,000	6,000	4,000	4,000	2,000	2,000
Un-characteristic	175,000	173,000	246,000	250,000	85,000	88,000	22,000	20,000
Unvegetated Areas	2,000	4,000	15,000	20,000	3,000	7,000	10,000	10,000
No Data	2,000	2,000	700	700	<100	<100	200	200

VMA A

When compared to baseline vegetation acreages, the composition of VMA A would be modified by Alternative III to contain a greater proportion of plant communities dominated by perennial vegetation (Table 4- 69), and increasing the relative proportion of the Non-Native Perennial VSG by nearly 40%. These changes would most likely occur within the Wyoming Sagebrush Steppe PNVG, as it is the dominant PNVG in VMA A (see the *Riparian Areas and Wetlands* and *Wildland Fire Ecology and Management* sections of Chapter 3 and Appendix R). The shift in dominance from annual invasive to non-native perennial vegetation could result in greater resilience to fire disturbance (Monsen, 1994), but would limit both species diversity and structural complexity in VMA A. Natural shifts from early-seral, herbaceous-dominated native grassland communities to mid-seral communities with shrub cover of 5% to 25% would take a minimum of about 20 years for the Wyoming Sagebrush Steppe PNVG (LANDFIRE, 2007). Since no treatments are proposed that would accelerate this process, it is likely that the relative proportion of seral stages in native plant communities would remain relatively consistent over the life of the plan (Table 4-70). Treatments would not result in a change in the relative proportion of uncharacteristic vegetation within VMA A.

VMA B

While the Annual VSG is not dominant in VMA B, Alternative III would convert a portion of the projected acreage for this sub-group to the Non-Native Perennial VSG, reducing the potential for spread of invasive annual vegetation (Table 4- 69). Vegetation treatments implemented under Alternative III would increase the relative proportion of the Native Shrubland VSG about 50%. This could result in greater species diversity and structural complexity through conversion of native grassland communities to native shrubland communities. These changes would most likely occur within the Wyoming Sagebrush Steppe PNVG, as it is the dominant PNVG in VMA B (see the *Riparian Areas and Wetlands* and *Wildland Fire Ecology and Management* sections of Chapter 3 and Appendix R). As in VMA A, natural shifts from early-seral, herbaceous-dominated native grassland communities to mid-seral communities with shrub cover of 5% to 25% would take a minimum of about 20 years for the Wyoming Sagebrush Steppe PNVG (LANDFIRE, 2007). This timeframe could be accelerated by implementation of Alternative III actions to treat native grassland communities by seeding or planting of shrubs. This would result in a 50% reduction in the relative proportion in VMA B of early-seral communities. The relative proportion of communities in mid-seral condition would triple (Table 4- 70). The treated acres are unlikely to reach the late-seral stage with shrub cover exceeding 25% in less than 40 years (LANDFIRE, 2007). A slight decrease in the relative proportion of late-seral communities would occur due to removal of shrubs for the creation of fuel breaks (Table 4- 70; see *Impacts from Wildland Fire Ecology and Management Actions*). Likewise, slight increases in the relative proportion of uncharacteristic vegetation and unvegetated areas would occur due to the creation of vegetated and unvegetated fuel breaks. These fire breaks could reduce potential for fire spread that could further reduce acreages of late-seral native shrubland.

<u>VMA C</u>
Actions proposed under Alternative III for VMA C would have the primary effect of nearly doubling the relative proportion of the Native Shrubland VSG in the VMA (Table 4- 69). Most of the effects would occur in the Wyoming Sagebrush Steppe PNVG, as it is the dominant PNVG in VMA C (see the *Riparian Areas and Wetlands* and *Wildland Fire Ecology and Management* sections of Chapter 3 and Appendix R). Treatments implemented under Alternative III would move vegetation from the Native Grassland VSG to the Native Shrubland VSG, resulting in a shift in the relative proportion of communities dominated by early seral vegetation to mid-seral vegetation (Table 4-70). This would ultimately result in a larger proportion of the VMA being occupied by plant communities with a greater level of species diversity and structural complexity. It is unlikely that any of the treated acres would reach the late-seral stage with shrub cover exceeding 25% in less than 40 years (LANDFIRE, 2007). Slight increases in the relative proportion of uncharacteristic vegetation and unvegetated areas would also occur due to the creation of vegetated and unvegetated fuel breaks (Table 4- 70; see *Impacts from Wildland Fire Ecology and Management Actions*).

<u>VMA D</u>
VMA D contains a greater diversity of vegetation communities due to higher elevation (see the *Riparian Areas and Wetlands* section of Chapter 3 and Appendix R). Treatments would focus on the dominant PNVGs: Black and Low Sagebrush, Mountain Big Sagebrush, Wyoming Sagebrush Steppe, and Basin Big Sagebrush. The Annual VSG is not dominant in VMA D; however, Alternative III would convert a portion of the projected acreage for this sub-group to the Native Grassland VSG, reducing the potential for spread of invasive annual vegetation (Table 4- 69). Actions proposed for VMA D under Alternative III would have the primary effect of increasing the structural complexity of native grassland communities by adding a shrub component and increasing the relative proportion of native shrubland in the VMA by almost 20% (Table 4- 69). This would reduce the relative proportion of herbaceous-dominated, early-seral communities and increase shrub-dominated, mid-seral communities (Table 4- 70). Creation of fuel breaks would result in a slight increase in the Non-Native Perennial VSG with concurrent reduction of the Non-Native Understory VSG due to the removal of shrubs (Table 4- 70; see *Impacts of Wildland Fire Ecology and Management Actions*). Creation of fuel breaks would also result in a slight reduction in the relative proportion of late-seral native shrubland due to the removal of shrubs.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

The overall effect of actions proposed for Alternative IV would be to create a landscape dominated by native vegetation with an emphasis on mid-seral shrubland communities and to increase the amount and continuity of communities dominated by shrubs. Actions would increase both the relative proportion and continuity of the Native Shrubland VSG through conversion of annual, non-native perennial, and non-native understory communities and diversification of native grassland communities (Table 4- 63). Table 4-71 identifies the change in composition of VMAs by VSG.

The addition of shrubs to existing non-native perennial communities would increase the relative proportion of the Non-Native Understory VSG. Increases in the relative proportion of mid-seral native shrubland communities would increase species diversity and structural complexity throughout the planning area (Table 4- 64). Table 4- 72 identifies the change in composition of VMAs by seral stage. Increased numbers of native shrubland patches would create islands for seed dispersal and habitat for small mammals that could assist that process (Longland & Bateman, 2002); increased size of shrub patches would enhance local species diversity (Whisenant, 1989).

The establishment of 75 ungrazed reference areas excluding 12,000 acres would provide for enhanced monitoring and adaptive management of livestock grazing effects and the ability to observe both natural processes and treatment effects in the absence of use. Inclusion of biological soil crusts in monitoring and adaptive management procedures would enhance landscape stability by detection and management of processes that might not be apparent through monitoring of vascular vegetation only (Ponzetti & McCune, 2001).

Table 4- 71. Change in Composition of VMAs by VSG in Alternative IV (the Preferred Alternative; Acres)

VSG	VMA A		VMA B		VMA C		VMA D	
	Baseline	Post-Treatment	Baseline	Post-Treatment	Baseline	Post-Treatment	Baseline	Post-Treatment
Annual	74,000	29,000	36,000	9,000	6,000	6,000	4,000	2,000
Non-Native Perennial	96,000	87,000	185,000	64,000	56,000	0	6,000	0
Non-Native Understory	5,000	5,000	25,000	72,000	23,000	50,000	12,000	5,000
Native Grassland	25,000	12,000	194,000	97,000	132,000	33,000	73,000	7,000
Native Shrubland	17,000	83,000	174,000	371,000	92,000	221,000	104,000	184,000
Unvegetated Areas	2,000	2,000	15,000	15,000	3,000	3,000	10,000	10,000
No Data	2,000	2,000	700	700	<100	<100	200	200

Table 4- 72. Change in Composition of VMAs by Seral Stage in Alternative IV (the Preferred Alternative; Acres)

Seral Stage	VMA A		VMA B		VMA C		VMA D	
	Baseline	Post-Treatment	Baseline	Post-Treatment	Baseline	Post-Treatment	Baseline	Post-Treatment
Early	25,000	12,000	195,000	99,000	132,000	33,000	48,000	9,000
Mid	8,000	74,000	45,000	242,000	41,000	169,000	15,000	96,000
Late	9,000	9,000	122,000	122,000	47,000	47,000	86,000	86,000
Unclassified Native Shrubland	0	0	6,000	6,000	4,000	4,000	2,000	2,000
Un-characteristic	175,000	121,000	246,000	146,000	85,000	56,000	22,000	7,000
Unvegetated Areas	2,000	2,000	15,000	15,000	3,000	3,000	10,000	10,000
No Data	2,000	2,000	700	700	<100	<100	200	200

VMA A

When compared to baseline vegetation acreages, the composition of VMA A would be modified by Alternative IV to contain a greater proportion of plant communities dominated by perennial vegetation (Table 4- 71), and an increase in the relative proportion of the Native Shrubland VSG by 375%. These changes would most likely occur within the Wyoming Sagebrush Steppe PNVG, as it is the dominant PNVG in VMA A (see the *Riparian Areas and Wetlands* and *Wildland Fire Ecology and Management* sections of Chapter 3 and Appendix R). The increased proportion and continuity of native shrubland vegetation in VMA A would result in greater species diversity and structural complexity. While natural succession of shrubs would occur in untreated, existing non-native perennial communities, this process could be inhibited due to competition from non-native perennial grasses (Cox & Anderson, 2004; Stevens & Monsen, 2004). Natural succession from early-seral, herbaceous-dominated native grassland communities to mid-seral communities with shrub cover of 5% to 25% would take a minimum of about 20 years for the Wyoming Sagebrush Steppe PNVG (LANDFIRE, 2007). This timeframe could be accelerated by implementation of Alternative IV actions to treat native grassland communities by seeding or planting of shrubs. This would result in a reduction by more than half in the relative proportion of communities in early-seral condition and a 750% increase in the relative proportion of communities in mid-seral condition (Table 4- 72). It is unlikely that any of the treated acres would reach the late-seral stage with shrub cover exceeding 25% in less than 40 years (Table 4- 72) (LANDFIRE, 2007); therefore the relative proportion of the late-seral stage would likely remain static for the life of the plan. Most of the acres treated to move towards the Native Shrubland VSG would remain in either early- or mid-seral stages. Although Alternative IV allows for natural succession of shrubs in the Native Grassland VSG, it is unlikely this would result in a shift in the relative proportions of native grassland and native shrubland within the life of the plan. Alternative IV also allows for assisted succession of native shrubland communities to introduce forbs and late-seral grasses to the understory. These understory treatments would enhance the complexity of mid- or late-seral communities, but it is unlikely that treatment would affect relative proportions of these seral stages within VMA A.

<u>VMA B</u>

While the Annual VSG is not dominant in VMA B, Alternative IV would convert a portion of the projected acreage for this sub-group to the Non-Native Perennial and Native Shrubland VSGs, reducing the potential for spread of invasive annual vegetation (Table 4- 71). Vegetation treatments implemented under Alternative IV would increase the relative proportion of the Native Shrubland VSG by about 110%. This would result in greater species diversity and structural complexity through conversion of annual, non-native perennial, non-native understory, and native grassland communities to native shrubland communities. These changes would most likely occur within the Wyoming Sagebrush Steppe PNVG, as it is the dominant PNVG in VMA B (see the *Riparian Areas and Wetlands* and *Wildland Fire Ecology and Management* sections of Chapter 3 and Appendix R). As in VMA A, natural shifts from early-seral, herbaceous-dominated native grassland communities to mid-seral communities with shrub cover of 5% to 25% would take a minimum of about 20 years for the Wyoming Sagebrush Steppe PNVG (LANDFIRE, 2007). This timeframe could be accelerated by implementation of Alternative IV actions to treat native grassland communities by seeding or planting of shrubs. This would result in a reduction in the relative proportion in VMA B of early-seral communities by about half. The relative proportion of communities in mid-seral condition would increase by about 440% (Table 4- 72). Likewise, conversion of non-native understory communities to native shrubland using techniques ranging from interseeding native plants in the understory to full restoration (Cox & Anderson, 2004; Stevens, 2004) would likely result in mid-seral communities within the life of the plan. It is unlikely that any of the treated acres would reach the late-seral stage with shrub cover exceeding 25% in less than 40 years (LANDFIRE, 2007). Although Alternative IV allows for natural succession of shrubs in the Native Grassland VSG, it is unlikely this would result in a shift in the relative proportions of native grassland and native shrubland within the life of the plan. Alternative IV also allows for assisted succession of native shrubland communities to introduce forbs and late-seral grasses to the understory. These understory treatments would enhance the complexity of mid- or late-seral communities, but it is unlikely that treatment would affect relative proportions of these seral stages within VMA B. While natural succession of shrubs would occur in untreated existing non-native perennial communities, this process could be inhibited due to competition from non-native perennial grasses (Cox & Anderson, 2004; Stevens & Monsen, 2004). Treatments to add shrubs to non-native perennial communities and forbs to non-native understory communities would contribute additional complexity at a community level and within VMA B.

Under Alternative IV-A, vegetation treatment levels would be sufficient to restore all non-native perennial communities to native shrubland in the Inside Desert ACEC (15,000 acres; 2% of VMA B) within VMA B. Vegetation treatment levels would also restore all non-native perennial communities to native shrubland in the Inside Desert ACEC (6,000 acres; <1% of VMA B) within VMA B under Alternative IV-B (the Preferred Alternative). Due to the smaller acreage of the ACEC in Alternative IV-B, a greater proportion of the treatment acres would occur outside the ACEC.

<u>VMA C</u>

Actions proposed under Alternative IV for VMA C would have the primary effect of increasing the relative proportion of the Native Shrubland VSG in the VMA by about 140% (Table 4- 71). Most of the effects would occur in the Wyoming Sagebrush Steppe PNVG, as it is the dominant PNVG in

VMA C (see the *Riparian Areas and Wetlands* and *Wildland Fire Ecology and Management* sections of Chapter 3 and Appendix R). Treatments implemented under Alternative IV would move vegetation from the Non-Native Perennial, Non-Native Understory, and Native Grassland VSGs to the Native Shrubland VSG, resulting in a shift from communities dominated by uncharacteristic and early-seral vegetation to mid-seral vegetation. This would ultimately result in a larger proportion of the VMA being occupied by plant communities with a greater level of species diversity and structural complexity. Although Alternative IV allows for natural succession of shrubs in the Native Grassland VSG, it is unlikely this would result in a change in the relative proportions of native grassland and native shrubland within the life of the plan. It is also unlikely that any of the treated acres would reach the late-seral stage with shrub cover exceeding 25% in less than 40 years (LANDFIRE, 2007). Alternative IV allows for assisted succession of native shrubland communities by introducing forbs and late-seral grasses to the understory. These understory treatments would enhance the complexity of mid- or late-seral communities, but it is unlikely that treatment would affect relative proportions of these seral stages within VMA C. While natural succession of shrubs would occur in untreated existing non-native perennial communities, this process could be inhibited due to competition from non-native perennial grasses (Cox & Anderson, 2004; Stevens & Monsen, 2004). Treatments to add shrubs to non-native perennial communities and forbs to non-native understory communities would contribute additional complexity at a community level and within VMA C.

Under Alternative IV-A, vegetation treatment levels would be sufficient to restore all non-native perennial communities to native shrubland in the Inside Desert ACEC (21,000 acres; 7% of VMA C) and Jarbidge Foothills ACEC (2,000 acres; <1% of VMA C) within VMA C. Vegetation treatment levels would also restore all non-native perennial communities to native shrubland in the Inside Desert ACEC (15,000 acres; 5% of VMA C) and Jarbidge Foothills ACEC (2,000 acres; <1% of VMA C) within VMA C under Alternative IV-B (the Preferred Alternative). Due to the smaller acreages of the ACECs in Alternative IV-B, a greater proportion of the treatment acres would occur outside the ACECs.

<u>VMA D</u>

VMA D contains a greater diversity of vegetation communities due to higher elevation (see the *Riparian Areas and Wetlands* section of Chapter 3 and Appendix R). Treatments would focus on the dominant PNVGs: Black and Low Sagebrush, Mountain Big Sagebrush, Wyoming Sagebrush Steppe, and Basin Big Sagebrush. The Annual VSG is not dominant in VMA D; however, Alternative IV would convert a portion of the projected acreage for this sub-group to the Native Shrubland VSG, reducing the potential for spread of invasive annual vegetation (Table 4- 71). Actions proposed under Alternative IV for VMA D would have the primary effect of increasing the structural complexity of native grassland communities by adding a shrub component and increasing the relative proportion of native shrubland by 76% (Table 4- 71). This would reduce the relative proportion of herbaceous-dominated early-seral communities by 91%, with an increase in shrub-dominated mid-seral communities almost 560% (Table 4- 72). The increased elevation in VMA D may translate to higher effective precipitation and greater potential for community diversity (Goodrich, 2005). Unassisted succession from one seral stage to another would be dependent on the type of plant community (LANDFIRE, 2007) and the presence of seed sources. Allowance for natural succession of shrubs could result in small shifts in the relative proportions of native grassland and native shrubland within the life of the plan. Alternative IV also allows for diversification of native shrubland communities to introduce forbs and late-seral grasses to the understory. These understory treatments would enhance the complexity of mid- or late-seral communities, but it is unlikely that treatment would affect relative proportions of these seral stages within VMA D. While natural succession of shrubs would occur in untreated existing non-native perennial communities, this process could be inhibited due to competition from non-native perennial grasses (Cox & Anderson, 2004; Stevens & Monsen, 2004). Treatments to add shrubs to non-native perennial communities and forbs to non-native understory communities would contribute additional complexity at a community level and within VMA D.

Impacts from Management Specific to Alternative V

The overall effect of actions proposed for upland vegetation in Alternative V would be to increase the amount and continuity of communities dominated by shrubs within the planning area through conversion of annual, non-native perennial, and native grassland communities (Table 4- 63). Increased relative proportion of the Non-Native Understory VSG would provide for added structural complexity in existing non-native perennial communities. Table 4- 73 identifies the change in composition of VMAs by VSG.

Increased relative proportion of mid-seral native shrubland communities would increase species diversity and structural complexity throughout the planning area (Table 4- 64). Table 4- 74 identifies the change in composition of VMAs by seral stage. Increased numbers of native shrubland patches would create islands for seed dispersal and habitat for small mammals that could assist in the seed dispersal process (Longland & Bateman, 2002); increased size of shrub patches would tend to increase plant community species diversity (Whisenant, 1989).

The establishment of 40 ungrazed reference areas excluding 193,000 acres from livestock grazing would provide for monitoring and adaptive management of livestock grazing effects and the ability to observe both natural processes and treatment effects in the absence of use on a landscape scale. Inclusion of biological soil crusts in monitoring and adaptive management procedures would enhance landscape stability by detection and management of processes that might not be apparent through monitoring of vascular vegetation only (Ponzetti & McCune, 2001).

Table 4- 73. Change in Composition of VMAs by VSG in Alternative V (Acres)

VSG	VMA A		VMA B		VMA C		VMA D	
	Baseline	Post-Treatment	Baseline	Post-Treatment	Baseline	Post-Treatment	Baseline	Post-Treatment
Annual	74,000	55,000	36,000	36,000	6,000	6,000	4,000	2,000
Non-Native Perennial	96,000	72,000	185,000	185,000	56,000	17,000	6,000	2,000
Non-Native Understory	5,000	29,000	25,000	25,000	23,000	62,000	12,000	16,000
Native Grassland	25,000	25,000	194,000	194,000	132,000	66,000	73,000	24,000
Native Shrubland	17,000	36,000	174,000	174,000	92,000	158,000	104,000	155,000
Unvegetated Areas	2,000	2,000	15,000	15,000	3,000	3,000	10,000	10,000
No Data	2,000	2,000	700	700	<100	<100	200	200

Table 4- 74. Change in Composition of VMAs by Seral Stage in Alternative V (Acres)

Seral Stage	VMA A		VMA B		VMA C		VMA D	
	Baseline	Post-Treatment	Baseline	Post-Treatment	Baseline	Post-Treatment	Baseline	Post-Treatment
Early	25,000	25,000	195,000	131,000	132,000	66,000	48,000	26,000
Mid	8,000	27,000	45,000	127,000	41,000	107,000	15,000	66,000
Late	9,000	9,000	122,000	122,000	47,000	47,000	86,000	86,000
Unclassified Native Shrubland	0	0	6,000	6,000	4,000	4,000	2,000	2,000
Un-characteristic	175,000	157,000	246,000	228,000	85,000	85,000	22,000	20,000
Unvegetated Areas	2,000	2,000	15,000	15,000	3,000	3,000	10,000	10,000
No Data	2,000	2,000	700	700	<100	<100	200	200

VMA A
When compared to baseline vegetation acreages, the composition of VMA A would be modified by Alternative V to contain a greater proportion of plant communities dominated by perennial vegetation (Table 4- 73) and increase the relative proportion of the Non-Native Understory VSG by 550% and doubling the relative proportion of the Native Shrubland VSG through conversion of non-native perennial and annual communities. These changes would most likely occur within the Wyoming Sagebrush Steppe PNVG, as it is the dominant PNVG in VMA A (see the *Riparian Areas and Wetlands* and *Wildland Fire Ecology and Management* sections of Chapter 3 and Appendix R). Treatments should result in native shrubland communities in mid-seral condition within the life of the plan. The increased proportion of native shrubland vegetation in VMA A would result in greater species diversity and structural complexity. Natural succession from early-seral, herbaceous-dominated native grassland communities to mid-seral communities with shrub cover of 5% to 25% would take a minimum of about 20 years for the Wyoming Sagebrush Steppe PNVG (LANDFIRE, 2007). No treatments are proposed for either native grassland or native shrubland under Alternative V, and it is unlikely that relative proportions of early- and late-seral communities would change due to natural succession over the life of the plan (Table 4- 74). Likewise natural succession of shrubs would occur in untreated existing non-native perennial communities, this process could be inhibited due to competition from non-native perennial grasses (Cox & Anderson, 2004; Stevens & Monsen, 2004). Treatments to add shrubs to non-native perennial communities would contribute additional complexity at a community level and within VMA A.

VMA B
The Annual VSG is not dominant in VMA B; however, Alternative V would convert a portion of the projected acreage for this sub-group to the Native Shrubland VSG, reducing the potential for spread of invasive annual vegetation (Table 4- 73). Vegetation treatments implemented under Alternative V would increase the relative proportions of the Non-Native Understory VSG by 500% and the Native Shrubland VSG by 46%. This would result in greater species diversity and structural complexity through conversion of annual, non-native perennial, and native grassland communities to non-native understory and native shrubland communities. These changes would most likely occur within the Wyoming Sagebrush Steppe PNVG, as it is the dominant PNVG in VMA B (see the *Riparian Areas and Wetlands* and *Wildland Fire Ecology and Management* sections of Chapter 3 and Appendix R). As in VMA A, natural shifts from early-seral, herbaceous-dominated native grassland communities to mid-seral communities with shrub cover of 5% to 25% would take a minimum of about 20 years for the Wyoming Sagebrush Steppe PNVG (LANDFIRE, 2007). This timeframe could be accelerated by implementation of Alternative V actions to treat native grassland communities by seeding or planting of shrubs. This would result in a reduction in the relative proportion in VMA B of early seral communities by one-third and an increase in communities in mid-seral condition by almost double (Table 4- 74). It is unlikely that any of the treated acres would reach the late-seral stage with shrub cover exceeding 25% in less than 40 years (LANDFIRE, 2007). Although Alternative V allows for natural succession of shrubs in the Native Grassland VSG, it is unlikely this would result in a shift in the relative proportions of native grassland and native shrubland within the life of the plan. While natural succession of shrubs would occur in untreated existing non-native perennial communities, this process could be inhibited due to competition from non-native perennial grasses (Cox & Anderson, 2004; Stevens & Monsen, 2004). Treatments to add shrubs to non-native perennial communities would contribute additional complexity at a community level and within VMA B.

VMA C
Actions proposed under Alternative V for VMA C would have the primary effect of increasing the relative proportion of the Non-Native Understory VSG by about 185% and the Native Shrubland VSG in the VMA by almost double (Table 4- 73). Most of the effects would occur in the Wyoming Sagebrush Steppe PNVG, as it is the dominant PNVG in VMA C (see the *Riparian Areas and Wetlands* and *Wildland Fire Ecology and Management* sections of Chapter 3 and Appendix R). Treatments implemented under Alternative V would move vegetation from the Native Grassland VSG to the Native Shrubland VSG, resulting in a shift from communities dominated by early seral

vegetation to mid-seral vegetation (Table 4- 74). This would ultimately result in a larger proportion of the VMA being occupied by plant communities with a greater level of species diversity and structural complexity. Although Alternative V allows for natural succession of shrubs in the Native Grassland VSG, it is unlikely this would result in a change in the relative proportions of native grassland and native shrubland within the life of the plan. It is also unlikely that any of the treated acres would reach the late-seral stage with shrub cover exceeding 25% in less than 40 years (LANDFIRE, 2007). While natural succession of shrubs would occur in untreated existing non-native perennial communities, this process could be inhibited due to competition from non-native perennial grasses (Cox & Anderson, 2004; Stevens & Monsen, 2004). Treatments to add shrubs to non-native perennial communities would contribute additional complexity at a community level and within VMA C.

VMA D

VMA D contains a greater diversity of vegetation communities due to higher elevation (see the *Riparian Areas and Wetlands* section of Chapter 3 and Appendix R). Treatments would focus on the dominant PNVGs: Black and Low Sagebrush, Mountain Big Sagebrush, Wyoming Sagebrush Steppe, and Basin Big Sagebrush. The Annual VSG is not dominant in VMA D; however, Alternative V would convert a portion of the projected acreage for this sub-group to the Native Shrubland VSG, reducing the potential for spread of invasive annual vegetation (Table 4- 73). Actions proposed under Alternative V for VMA D would have the primary effect of increasing the structural complexity of non-native perennial and native grassland communities by adding a shrub component. This would result in a slight increase in the relative proportion of non-native understory communities and an increase in native shrubland communities by about 50% (Table 4- 73). The relative proportion of herbaceous-dominated, early-seral communities would be reduced by two-thirds, with an increase in shrub-dominated mid-seral communities by almost 360% (Table 4- 74). The increased elevation in VMA D may translate to higher effective precipitation and greater potential for community diversity (Goodrich, 2005). Unassisted succession from one seral stage to another would be dependent on the type of plant community (LANDFIRE, 2007) and the presence of seed sources. Natural succession of shrubs could result in some small shifts in the relative proportions of native grassland and native shrubland within the life of the plan. Natural succession of shrubs in untreated existing non-native perennial communities would occur. However, competition from non-native perennial grasses could inhibit the process (Cox & Anderson, 2004; Stevens & Monsen, 2004).

Impacts from Noxious Weeds and Invasive Plants Actions

Introduction and spread of noxious weeds and invasive plants into upland vegetation communities impacts native plant community composition and function. Many noxious weeds and invasive plants are known to displace native plants and disrupt the structure and function of local ecosystems (Vitousek, 1990). As noxious weed populations increase in size and frequency, they tend to reduce species diversity of surrounding native plant communities, altering the composition and community structure. As noxious weed and invasive plant populations are reduced, native vegetation is expected to increase in terms of acreage, cover, and diversity. Actions related to noxious weeds would not likely result in changes in vegetation between VSGs or in native plant community seral stages.

Management actions related to invasive plants could convert acreages from the Annual VSG to a native or non-native perennial VSG. Where invasive plants are dominant, management actions that would result in this type of conversion are analyzed under *Impacts from Upland Vegetation Actions*. Where invasive plants are not dominant, management actions would not result in conversion of treated acreages from one VSG to another or changes in native community seral stages. Since existing acreages of noxious weeds are not currently mapped, effects of actions proposed for treatment of noxious weeds and invasive plants are addressed in the context of risk of invasion or spread and potential for control or eradication.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative provides no objectives or clear prioritizations for inventory or control of noxious weeds. It is unlikely that the No Action Alternative would reduce the potential for introduction or spread of noxious weeds. Occupied acreages and diversity of noxious weeds would likely continue to increase within the planning area. Relative proportion of annual-dominated communities would be expected to decrease slightly due to vegetation treatments proposed under the No Action Alternative (see *Impacts from Upland Vegetation Actions*).

Impacts from Management Common to All Action Alternatives

Management actions common to all action alternatives provide for proactive inventory, collaborative control, and incorporation of BMPs and stipulations into BLM management activities, authorized uses, permits, and leases to limit introduction and spread of noxious weeds and invasive plants. Inventory would have the overall impact of quantifying existing conditions and providing a baseline for evaluation of risk for new invasions and spread of existing populations. An up-to-date inventory would also provide a basis for treatment prioritization. Appropriate prioritization, cooperative treatment, and incorporation of BMPs and stipulations would reduce risk of invasion and spread. Ultimately these actions could reduce the potential for community- or landscape-level fragmentation due to introduction and spread of noxious weeds and invasive plants and the need to restore upland vegetation communities.

Impacts from Management Specific to Alternative I

Alternative I would treat about 200,000 acres (15%) of the planning area to prevent spread and an additional 50,000 acres (3%) to meet objectives for noxious weeds and invasive plants. Management actions prescribed in Alternative I would reduce the risk of noxious and invasive plant introduction and spread by focusing treatments in high-disturbance areas (e.g., motorized and recreational access points, roadsides) and utilizing proactive management activities. Treatments in special designation areas, riparian areas, special status species habitat, mule deer winter range, and native plant communities would maintain or improve vegetation community or habitat quality. Achievement of objectives to reduce the cover of invasive plants would decrease the potential for conversion of perennial communities to annual, particularly in native communities.

Impacts from Management Specific to Alternative II

Alternative II would treat about 200,000 acres (15%) of the planning area to prevent spread and an additional 50,000 acres (3%) to meet objectives for noxious weeds and invasive plants. Management actions prescribed in Alternative II would reduce the risk of noxious and invasive plant introduction and spread, but do not prioritize treatments in areas where potential for introduction is high. Therefore, the introduction and spread of noxious weeds and invasive plants could occur in the vicinity of roads, motorized and recreational access points, and other high-disturbance areas. A narrower range of proactive management activities compared to Alternatives I, III, and V would contribute to increased potential for introduction and spread. Since thresholds described by the Alternative II objectives to reduce cover of invasive plants are higher than for the other alternatives, the risk of spread in both native and non-native communities would be greater. This would increase the potential for conversion of perennial communities to annual.

Impacts from Management Specific to Alternative III

Alternative III would treat about 200,000 acres (15%) of the planning area to prevent spread of noxious weeds and invasive plants. Alternative III would make the least progress of all the alternatives towards reduction or eradication of noxious weeds, as it prescribes the lowest level of treatment and focuses primarily on fuels reduction and, therefore, invasive plants. Management actions prescribed in Alternative III would reduce risk of noxious and invasive plant spread by prioritizing treatments in areas with high potential for introductions to occur (e.g., fuel breaks, areas with high wildland fire occurrence, roadsides) and utilizing proactive management activities. Achievement of objectives to reduce cover of invasive plants would decrease the potential for conversion of perennial communities to annual.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV would treat about 200,000 acres (15%) of the planning area to prevent spread and an additional 250,000 acres (18%) to meet objectives for noxious weeds and invasive plants. Management actions prescribed in Alternative IV would reduce the risk of noxious and invasive plant introduction and spread, but do not prioritize treatments in areas where potential for introduction is high. Therefore, the introduction and spread of noxious weeds and invasive plants could occur in the vicinity of roads, motorized and recreational access points, or other high-disturbance areas. A narrower range of proactive management activities compared to Alternatives I, III, and V would contribute to increased potential for introduction and spread. However, based on stated objectives and projected treatment acres, Alternative IV would make the greatest progress of all the alternatives towards eradication of noxious weeds. Treatments in special designation areas, riparian areas, special status species habitat, and native plant communities would maintain or improve vegetation community or habitat quality. Achievement of objectives to reduce cover of invasive plants would decrease the potential for conversion of perennial communities to annual, particularly in native communities.

Impacts from Management Specific to Alternative V

Alternative V would treat about 200,000 acres (15%) of the planning area to prevent spread and an additional 100,000 acres (7%) to meet objectives for noxious weeds and invasive plants. Management actions prescribed in Alternative V would reduce the risk of noxious and invasive plant introduction and spread, but do not prioritize treatments in areas where potential for introduction is high. Therefore, the introduction and spread of noxious weeds and invasive plants could occur in the vicinity of roads, motorized and recreational access points, or other high-disturbance areas. The use of proactive management activities would contribute to decreased potential for introduction and spread. Based on stated objectives, Alternative V would make intermediate progress towards eradication of noxious weeds. Treatments in special designation areas, riparian areas, special status species habitat, and native plant communities would maintain or improve vegetation community or habitat quality. Achievement of objectives to reduce cover of invasive plants would decrease the potential for conversion of perennial communities to annual, particularly in native communities.

Impacts from Wildland Fire Ecology and Management Actions

Wildland fire is an episodic event and can result in short- or long-term conversion of acres from one VSG or seral stage to another. The effects of wildland fire are dependent on multiple factors including the type of existing vegetation, fire severity, fire size and continuity, time and frequency of previous disturbance, and post-fire weather. Four types of wildland fire management actions have the potential to impact upland vegetation communities: fire suppression priorities, fire suppression actions, ES&BAR activities, and fuels treatment actions.

Fire suppression priorities have been identified for each alternative. Locations within the planning area are designated as either Critical or Conditional Suppression Areas, depending on resource management priorities. Additional priorities have been identified to guide fire suppression in the case of multiple starts. Areas identified for critical suppression would be less likely to burn and, subsequently, less likely to experience a change in VSG or seral stage due to fire.

Fire suppression actions could result in removal of vegetation through blading, cutting, or burning. These result in localized disturbances that would be small in scale from a landscape perspective and might be restricted for resource protection. However, they could cause soil surface disturbance that creates physical openings in communities for noxious weeds or invasive plants. Use of fire retardant can result in short-term increases in nitrogen and phosphorus. This can affect vegetation community composition by creating conditions favorable for growth of annual plants (Larson & Duncan, 1982).

ES&BAR actions performed within three years of a wildland fire can assist natural revegetation through protection of the burned area or result in changes in VSGs through treatments including seeding and planting of native or non-native vegetation.

Fuels treatment actions modify vegetation community composition and structure to reduce the potential for fire spread. Fuels treatment actions are normally applied to manage vegetation and other resources including WUI, cultural sites, and wildlife and special status species habitat.

The effects of wildland fire ecology and management actions on upland vegetation communities were assessed based on suppression priorities and protective measures such as fuel breaks. Suppression priorities were evaluated to determine which VSGs would likely have higher priority and what proportion of priority VSGs would be protected over the planning area and within the VMAs.

Impacts from Management Specific to the No Action Alternative

In the No Action Alternative, the entire planning area is under full suppression; therefore, the No Action Alternative does not prioritize wildland fire suppression activities. Lack of prioritization reduces the potential for critical resource needs to be identified and acted on in the event of multiple starts. Therefore, there is a higher potential for loss of native shrubland communities under the No Action Alternative as compared to the action alternatives. There is also greater potential that areas treated to restore native communities or to stabilize and rehabilitate areas under ES&BAR could burn or re-burn before becoming fully established. The No Action Alternative could perpetuate the current trend of loss of shrubland communities and maintenance of the landscape in annual, non-native perennial, and early-seral native communities.

Impacts from Management Common to All Action Alternatives

The overall goal common to all action alternatives for wildland fire management is to create fire management strategies that would result in firefighter and public safety and protection of property and natural and cultural resources, while considering suppression and rehabilitation costs. These actions provide for guidance and planning relative to appropriate management response for Critical and Conditional Suppression Areas. While these actions would have no specific effect on upland vegetation, they provide a framework in the case of wildland fire to reduce the potential for important resource loss. The overall goal common to all action alternatives for fuels and ES&BAR is to reduce fire hazard to WUI. Effects of these actions on upland vegetation are primarily through guidance for vegetation treatment application and rest from uses following treatment. This guidance for treatment implementation and management would have the primary effect of increasing the potential for short- and long-term success of vegetation treatments.

Impacts from Management Specific to Alternative I

Alternative I identifies 481,000 acres (35% of the planning area) as Critical Suppression Areas with priorities in the WUI; the Bruneau-Jarbidge, Lower Bruneau Canyon, Middle Snake, and Salmon Falls Creek ACECs; and key sage-grouse habitat. Unburned patches of native grassland and native shrubland within the perimeter of an active fire would be protected, while unburned annual and non-native perennial communities would be allowed to burn. Based on suppression priorities for Alternative I, priority VSGs would be Native Grassland and Native Shrubland.

In the case of multiple ignitions, Critical Suppression Areas are prioritized by VMA in the following order:

- VMA C (92,000 acres in Critical Suppression Areas; 29% of VMA C)
- VMA B (209,000 acres in Critical Suppression Areas; 33% of VMA B)
- VMA D (130,000 acres in Critical Suppression Areas; 62% of VMA D)
- VMA A (50,000 acres in Critical Suppression Areas; 23% of VMA A)

Fire management priorities for critical suppression would not fully protect native grassland and shrubland communities within the planning area or in the highest priority VMAs (Table 4- 75). Native grassland would be relatively resilient if burned; burning of native grassland communities could facilitate conversion to native shrublands through post-fire treatments to seed or plant shrubs. Protection of key sage-grouse habitat would prioritize suppression resources for native shrubland communities and would reduce the potential for loss in the case of multiple ignitions. Allowing wildland fire to burn annual and non-native perennial communities within the perimeter of an active fire would facilitate restoration of these communities to native shrubland. Fuel breaks placed to protect restoration and ES&BAR treatments would enhance the potential for treatment success and lessen the potential need for re-treatment due to subsequent wildland fire. However, fuel breaks also create linear disturbances that can facilitate introduction of noxious weeds and invasive plants (Merriam, et al., 2006). These disturbances would be short-term for the establishment of vegetated fuel breaks but long-term for the establishment and maintenance of unvegetated fuel breaks.

Table 4- 75. Percent of Priority VSGs in Critical Suppression Areas by VMA Priority in Alternative I

Area	Priority VSG Protected (Baseline)	Priority VSG Protected following Implementation of Upland Vegetation Treatments
Planning Area	59	52
VMA C	41	35
VMA B	56	49
VMA D	73	77
VMA A	100	79

Fire management priorities would not be adequate to protect all native grassland and shrubland communities resulting from implementation of vegetation treatments, particularly in VMAs C and B. These VMAs would likely continue to experience loss of native shrublands due to fire.

Impacts from Management Specific to Alternative II

Alternative II identifies 172,000 acres (13% of the planning area) as Critical Suppression Areas with priorities in the WUI. Unburned patches of native and non-native perennial communities within the perimeter of an active fire would be protected, while unburned annual communities would be allowed to burn. Based on suppression priorities in Alternative II, priority VSGs would be Native Grassland and Non-Native Perennial.

In the case of multiple ignitions, Critical Suppression Areas are prioritized by VMA in the following order:

- VMA A (46,000 acres in Critical Suppression Areas; 21% of VMA A)
- VMA B (55,000 acres in Critical Suppression Areas; 9% of VMA B)
- VMA D (52,000 acres in Critical Suppression Areas; 25% of VMA D)
- VMA C (19,000 acres in Critical Suppression Areas; 6% of VMA C)

Fire management priorities under Alternative II provide low levels of protection to resources outside of the WUI in all VMAs (Table 4- 76). Priority VSGs under Alternative II are native and non-native perennial grasslands, which would be relatively resilient if burned. Critical suppression priorities do not extend to either native shrubland or non-native understory communities under Alternative II; therefore, it is likely that acres occupied by shrubland communities would decrease over the life of the plan. Seeding of shrubs into burned native grassland and native shrubland communities would be allowed under ES&BAR, which could balance loss to fire. However, lack of protection priority would likely maintain native communities in early-seral condition due to high potential for re-burning. Allowing wildland fire to burn annual communities within the perimeter of an active fire would facilitate conversion of these communities to non-native perennial. Actions to improve protection of native communities (e.g., fuel breaks placed in non-native communities to protect native communities and improvement of water availability for suppression) could reduce loss of native shrublands, depending on location of fires and whether there are concurrent incidents of higher priority. However, fuel breaks also create linear disturbances that can facilitate introduction of noxious weeds and invasive plants (Merriam, et al., 2006). These disturbances would be short-term for the establishment of vegetated fuel breaks but long-term for the establishment and maintenance of unvegetated fuel breaks.

Table 4- 76. Percent of Priority VSGs in Critical Suppression Areas by VMA Priority in Alternative II

Area	Priority VSG Protected (Baseline)	Priority VSG Protected following Implementation of Upland Vegetation Treatments
Planning Area	23	20
VMA A	39	28
VMA B	15	14
VMA D	66	56
VMA C	10	9

Impacts from Management Specific to Alternative III

Alternative III identifies 469,000 acres (34% of the planning area) as Critical Suppression Areas with priorities in the WUI, the Bruneau-Jarbidge and Salmon Falls Creek ACECs, and key sage-grouse habitat. Unburned patches of native and non-native perennial communities within the perimeter of an active fire would be protected, while unburned annual communities would be allowed to burn. Based on suppression priorities in Alternative III, priority VSGs would be Native Shrubland (key sage-grouse habitat), Native Grassland, and Non-Native Perennial.

In the case of multiple ignitions, Critical Suppression Areas are prioritized by VMA in the following order:
- VMA B (211,000 acres in Critical Suppression Areas; 34% of VMA B)
- VMA A (49,000 acres in Critical Suppression Areas; 22% of VMA A)
- VMA C (91,000 acres in Critical Suppression Areas; 29% of VMA C)
- VMA D (118,000 acres in Critical Suppression Areas; 56% of VMA D)

Fire management priorities for critical suppression would not fully protect native shrubland, native grassland and non-native perennial communities within the planning area or in the highest priority VMAs (Table 4- 77). Native grassland and non-native perennial communities would be relatively resilient if burned. Burning could facilitate establishment of shrubs in native grassland communities to break up fuel continuity in VMAs B, C, and D through post-fire treatments, although the potential for re-burning, particularly in VMA C, would be relatively high. Protection of key sage-grouse habitat would prioritize suppression resources for native shrubland communities and would reduce the potential for loss in the case of multiple ignitions. Allowing wildland fire to burn in annual communities within the perimeter of an active fire would facilitate conversion of these communities to non-native perennial in VMAs A and B and native grassland in VMA D. Alternative III contains the largest network of fuel breaks, placed in strategic locations to disrupt continuity of fuels and to protect important resources such as sage-grouse and slickspot peppergrass habitat. This action could be effective in breaking up fuel continuity on the landscape, but could also result in spatial fragmentation of contiguous blocks of native shrubland vegetation. In addition, fuel breaks create linear disturbances that can facilitate introduction of noxious weeds and invasive plants (Merriam, et al., 2006). These disturbances would be short-term for the establishment of vegetated fuel breaks but long-term for the establishment and maintenance of unvegetated fuel breaks.

Table 4- 77. Percent of Priority VSGs in Critical Suppression Areas by VMA Priority in Alternative III

Area	Priority VSG Protected (Baseline)	Priority VSG Protected following Implementation of Upland Vegetation Treatments
Planning Area	40	39
VMA B	39	37
VMA A	35	28
VMA C	33	33
VMA D	64	63

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV-A identifies 594,000 acres (43% of the planning area) and Alternative IV-B (the Preferred Alternative) identifies 555,000 acres (40% of the planning area) as Critical Suppression Areas with priorities in the WUI; the Bruneau-Jarbidge, Inside Desert, Jarbidge Foothills, and Lower Bruneau Canyon ACECs; and key sage-grouse habitat. Unburned patches of native grassland and native shrubland within the perimeter of an active fire would be protected, while unburned annual and non-native perennial communities would be allowed to burn. Based on suppression priorities in Alternative IV, priority VSGs would be Native Grassland and Shrubland.

In the case of multiple ignitions, Critical Suppression Areas are prioritized by VMA in the following order:
- VMA C (138,000 acres in Critical Suppression Areas or 44% of VMA C in Alternative IV-A; 129,000 acres or 41% of VMA C in Alternative IV-B)
- VMA D (160,000 acres in Critical Suppression Areas or 77% of VMA D in Alternative IV-A; 139,000 acres or 66% of VMA D in Alternative IV-B)
- VMA B (246,000 acres in Critical Suppression Areas or 39% of VMA B in Alternative IV-A; 237,000 acres or 38% of VMA B in Alternative IV-B)
- VMA A (50,000 acres in Critical Suppression Areas or 23% of VMA A in Alternatives IV-A and IV-B)

Fire management priorities under Alternatives IV-A and IV-B would be similar, with the exception of reduced critical suppression acreages in the Inside Desert and Jarbidge Foothills ACECs in Alternative IV-B. Fire management priorities for critical suppression would not fully protect native grassland and shrubland communities within the planning area or in the highest priority VMAs (Table 4- 78). Native grassland would be relatively resilient if burned; burning of native grassland communities could facilitate conversion to native shrublands through post-fire treatments that seed or plant shrubs. Allowing wildland fire to burn annual and non-native perennial communities within the perimeter of an active fire would facilitate conversion of these communities to native through application of post-fire ES&BAR or restoration treatments. Protection of key sage-grouse habitat would prioritize suppression resources for native shrubland communities and would reduce the potential for loss in the case of multiple ignitions. As other VSGs are converted to native shrubland, the potential for protection of all native shrubland communities would be reduced; therefore, it is likely that these communities would revert to native grassland in less resilient areas with a lower suppression priority, such as VMA A. Fuel breaks placed to protect restoration and ES&BAR treatments would enhance the potential for treatment success and lessen the potential need for re-treatment due to subsequent wildland fire. Fuel breaks also create linear disturbances that can facilitate introduction of noxious weeds and invasive plants (Merriam, et al., 2006). These disturbances would be short-term for the establishment of vegetated fuel breaks but long-term for the establishment and maintenance of unvegetated fuel breaks.

Table 4- 78. Percent of Priority VSGs in Critical Suppression Areas by VMA Priority in Alternative IV (the Preferred Alternative)

Area	Priority VSG protected (Baseline)	Priority VSG Protected following Implementation of Upland Vegetation Treatments
Alternative IV-A		
Planning Area	73	58
VMA C	62	54
VMA D	91	84
VMA B	66	53
VMA A	100	52
Alternative IV-B		
Planning Area	68	54
VMA C	58	51
VMA D	78	72
VMA B	64	51
VMA A	100	52

Impacts from Management Specific to Alternative V

Alternative V identifies 1,067,000 acres (78% of the planning area) as Critical Suppression Areas with priorities in the WUI; the Lower Bruneau Canyon, Middle Snake, and Sagebrush Sea ACECs; and key sage-grouse habitat. Unburned patches of native grassland and native shrubland within the perimeter of an active fire would be protected, while unburned annual and non-native perennial communities would be allowed to burn. Based on suppression priorities in Alternative V, priority VSGs would be Native Grassland and Shrubland.

In the case of multiple ignitions, Critical Suppression Areas are prioritized by VMA in the following order:

- VMA C (313,000 acres in Critical Suppression Areas; 100% of VMA C)
- VMA B (495,000 acres in Critical Suppression Areas; 79% of VMA B)
- VMA D (209,000 acres in Critical Suppression Areas; 100% of VMA D)
- VMA A (450,000 acres in Critical Suppression Areas; 22% of VMA A)

Fire management priorities for critical suppression under Alternative V would protect native grassland and shrubland communities throughout the planning area (Table 4- 79). Allowing wildland fire to burn annual and non-native perennial communities within the perimeter of an active fire would facilitate conversion of these communities to native through application of post-fire ES&BAR or restoration treatments. This would likely occur in VMA A. In VMAs B, C, and D, there would be less opportunity for vegetation treatments following wildland fire; therefore, Alternative V would require more use of prescribed fire in these VMAs. Placement of shrubs to break up fine fuels in non-native perennial and native grassland communities could help reduce fire spread. Fuel breaks placed along roads could increase fragmentation of vegetation patches, by increasing the width of disturbance and the associated potential for invasion by noxious weeds or invasive vegetation (Gelbard & Belnap, 2003; Gelbard & Harrison, 2003; Merriam, et al., 2006) (see *Impacts from Transportation and Travel Actions*).

Table 4- 79. Percent of Priority VSGs in Critical Suppression Areas by VMA Priority in Alternative V

	% of priority VSG protected (baseline)	% of priority VSG protected following implementation of upland vegetation treatments
Planning Area	100	100
VMA C	100	100
VMA B	100	100
VMA D	100	100
VMA A	100	81

Impacts from Livestock Grazing Actions

The sagebrush steppe communities, such as those that historically dominated the planning area, did not evolve with large herds of grazing ungulates such as bison (Mack & Thompson, 1982); herbaceous plants and biological soil crusts that inhabit the sagebrush steppe did not evolve with grazing systems that concentrate animal use during critical growing periods. Rather, grazing by native ungulates is characterized by smaller groups of animals that utilize shrubs for browse, as well as grass and forbs, and seasonal elevational migrations that extend the periods of food availability (Platou & Tueller, 1985).

Livestock grazing actions would not result in changes between VSGs. However, livestock grazing can alter herbaceous cover and may influence species composition and structure of upland vegetation communities (Saab, et al., 1995). The type and intensity of effects depend on factors such as type of livestock and grazing system used including stocking rate, season of use, use levels, and location and density of livestock facilities (e.g., fences, water, salt). The effects can be due to consumption or trampling and can be direct (e.g., removal of vegetation, trampling plants) or indirect (e.g., soil compaction). In some cases targeted grazing can be applied to control or eliminate specific plants such as noxious or invasive species or reduce biomass to meet management goals (Launchbaugh, et al., 2008; Olson & Wallander, 1998).

Vegetation allocations for livestock grazing in the alternatives are based on vegetation production. Allocation percentages would be constant through the life of the plan; the specific number of AUMs allocated would change dependent on production.

S&Gs encourage grazing management practices that maintain or improve native plant populations, wildlife habitats in native plant communities, and structural diversity and production in seeded areas (BLM, 1997). Livestock grazing actions were evaluated on the potential to maintain or improve plant community species diversity and structural complexity. Impacts from specific actions, including the assignment of grazing systems and forage allocations on an allotment level, would be addressed in implementation-level plans.

Impacts from Management Specific to the No Action Alternative

Under the No Action Alternative, 1,414,000 acres (97%) of the planning area would be available for livestock grazing and 51,000 acres (3%) of the planning area would be unavailable. Areas unavailable for livestock grazing are not specifically identified for vegetation treatments. Livestock exclusion would not likely result in short-term changes in VSG or native community seral stages and would have negligible effects to upland vegetation at the scale of the VMAs or planning area.

Locally in the ungrazed areas, long-term exclusion of grazing from native plant communities could eventually result in increased plant cover, species diversity, and structural complexity (Anderson &

Inouye, 2001). Exclusion of non-native perennial communities would likely result in greater cover of perennial plants; diversification of these communities would depend on residual seed banks and proximity to native seed sources (Marlette & Anderson, 1986; Yeo, 2005). Exclusion of grazing is expected to have long-term results of increased cover and complexity of biological soil crusts (Ponzetti & McCune, 2001; Warren & Eldridge, 2001). However, the extent and timing of recovery for all formerly grazed communities depends on several factors including species composition at the time of exclusion (including biological crusts), residual seed bank, proximity to propagule sources, and precipitation (Anderson & Inouye, 2001; Belnap & Eldridge, 2001; Hilty, et al., 2004; Marlette & Anderson, 1986). Grazing exclusion in areas dominated by annual communities could result in short- or long-term change in VSG. Mechanisms for perpetuation of the Annual VSG under grazing exclusion include short fire-return intervals that inhibit recovery of perennial grasses and shrubs (Chambers, et al., 2007; Laycock, 1991), and modification of litter type and distribution as well as soil physical and biological properties to favor cheatgrass (Belnap & Phillips, 2001; Belnap, et al., 2005; Evans, et al., 2001). Grazing exclusion could result in long-term increase of on-site native perennial species. Potential for improvement would be dependent on several factors including the amount of residual perennial vegetation and climatic patterns (e.g., drought) that might favor suppression of annuals (Laycock, 1991; West & Yorks, 2002).

Under the No Action Alternative, vegetation allocations would remain as current; AUMs would increase with increases in available forage due to completion of vegetation treatments. Objectives for the No Action Alternative are: 1) to design and establish grazing management practices to meet fisheries, riparian, and water quality needs; and 2) to recognize the physiological requirements of forbs and shrubs. Since proposed vegetation treatments focus on perennial grass production and objectives focus on protection of forbs and shrubs, it is assumed that most allocation for livestock would focus on use of annual and perennial grass production. Due to the lack of actions regarding variable and minimal residual heights for wildlife habitat needs and utilization criteria, it is expected that residual herbaceous height would be relatively uniform with minimum height near water sources. Authorization of TNR would prolong grazing seasons and promote uniform use. These actions would tend to promote short-stature native early- and mid-seral grasses, such as Sandberg bluegrass and bottlebrush squirreltail, and non-native perennial grasses.

Increases in the miles of pipelines and fences and numbers of reservoirs, wells, or springs would result in increased density of linear disturbance and disturbed areas radiating from watering points. Installation and maintenance of pipelines results in linear disturbance from burial and, unless pipelines are installed along existing roads, formation and maintenance of primitive roads through repeated use. This can create conduits for noxious weed and invasive plant invasions and could result in modification of native plant community species composition (Gelbard & Belnap, 2003; Gelbard & Harrison, 2003). Likewise, construction and maintenance of fences can have similar effects. Fence construction does not result in the same degree of soil disturbance as pipeline construction, but primitive roads often form on one or both sides of the fence due to maintenance and other uses. Repeated livestock trailing along fences can also create linear disturbances that may be vulnerable to noxious weed and invasive plant introduction.

Construction, installation, and maintenance of watering facilities including reservoirs, wells, troughs, and spring developments can result in both linear disturbance corridors due to access needs, and a zone of disturbance that radiates out from the watering location (Brooks, et al., 2006; Lange, 1969; Rogers & Lange, 1971). The size of the impacted area depends on levels and consistency of use, but complete removal of vegetation can occur within a 50 to 100 foot radius of a watering site. Effects resulting from high use can radiate for several hundred feet from a watering site and can include removal of herbaceous cover, damage to shrubs from trampling, and invasion and spread of noxious weeds and invasive plants (Brooks, et al., 2006; Vallentine, 2001). Similar effects can be found at locations where salt or supplements are offered.

Impacts from Management Common to All Action Alternatives

Management actions common to all action alternatives provide guidance and design criteria for implementation-level planning to reduce resource impacts. These actions would not result in short- or long-term changes in VSG or native community seral stages, but would help maintain or improve plant community species diversity, structural complexity, and ecological function.

Impacts from Management Specific to Alternative I

Under Alternative I, 1,381,000 acres (94%) of the planning area would be available for livestock grazing and 84,000 acres (6%) of the planning area would be unavailable. This would include areas in the Middle Snake ACEC and Wildlife Tracts that would be restored from annual communities to native shrubland and the Deadman/Yahoo SRMA which would be treated to convert annual communities to native grassland and non-native perennial communities. These areas occur within VMAs A and B and include some of the driest sites in the planning area. Because restoration treatments can be slow to establish in low precipitation zones, potential for success of restoration treatments in these areas and long-term maintenance of restored native shrubland would be increased through minimizing effects associated with livestock trampling and grazing (Stevens, 2004). Long-term effects of livestock exclusion would be the same as described for the No Action Alternative.

Allocation of less than 60% of vegetation production for native and non-native perennial grass, shrub, and forb production to watershed and wildlife would promote landscape stability due to retention of plant biomass and structure (Pellant, et al., 2005). Diversification of species composition and community structure could occur in native plant communities; however, the extent of natural diversification would be dependent on the presence of native plants and growing conditions such as precipitation and competition with exotic annuals (Anderson & Inouye, 2001). Annual grass production is unpredictable and highly variable on an annual basis (Vallentine & Stevens, 1994). Allocation of annual grass production to livestock could result in greater use of perennial grasses in years when annual grass production is low, resulting in over-allocation of perennial forage. This could result in reduced perennial cover and increased susceptibility for dominance by annual grasses (Blaisdell & Pechanec, 1949; Chambers, et al., 2007).

Likewise, targeted grazing treatments are proposed to occur in late spring and early summer to reduce fine fuels and other undesirable vegetation. Targeted grazing could be applied to vegetated fuel breaks or adjacent to areas identified for protection including restoration and ES&BAR treatments. The effectiveness of targeted grazing would be temporary and localized (Launchbaugh, et al., 2008; Vallentine & Stevens, 1994) and, because of the late spring/early summer timing, could potentially reduce vigor of perennial grasses (Pellant, 1990). This treatment would be best suited for use in areas dominated by grazing tolerant non-native perennial or invasive annual grasses as opposed to native grasses (Meays, et al., 2000). Targeted grazing in areas dominated by invasive annuals would need to be combined with other treatments (e.g., chemical, seeding with perennial plants) for long-term success (Hempy-Mayer & Pyke, 2008).

Estimated utilization levels to achieve resource and use objectives of 30% to 40% for native communities and 40% to 50% for non-native communities are generally considered to be of moderate intensity (Holecheck, 1988; Holecheck, et al., 1998). Utilization at the upper end of the ranges would tend to keep vegetation conditions static; consistent utilization at the lower end of the ranges or below would be required for improvement (Holecheck, et al., 1999). Biological soil crusts are more sensitive to livestock disturbance than vascular plants and would likely be more abundant and diverse in native communities with lower utilization (Ponzetti & McCune, 2001; Rogers & Lange, 1971; Warren & Eldridge, 2001). Periodic heavy use (i.e., up to 70% every 5 years) in non-native communities would reduce competition from perennial grasses and increase shrubby vegetation (Beck & Mitchell, 2000). However, this short-term, high-intensity use could also weaken remnant native plants and result in short-term increased potential for introduction of noxious weeds and invasive plants (Chambers, et al., 2007; Ellison, 1960).

Implementation of actions to provide adequate protective cover for nesting sage-grouse and other ground-nesting birds would provide a moderate level of protection for herbaceous plant vigor in non-native understory and native plant communities through establishment of residual heights within time frames that coincide with critical growing periods for plants, between approximately March 1 and May 1. Due to low residual heights (i.e., 4 inches) these actions would tend to promote low-stature, early- and mid-seral grasses such as Sandberg bluegrass and bottlebrush squirreltail. Additional protections for big game breeding habitats (Appendix H) and aspen would promote maintenance of mid- and late-seral stages in native shrublands, primarily in VMAs C and D. Compliance with BMPs for livestock grazing in upland areas (Appendix E) would help maintain or improve diversity and structure in native plant communities by retaining adequate cover for breeding sage-grouse, special status birds, and big game and placing salt and other supplements to minimize congregation of livestock in native communities. Winter use (i.e., December through March) of native shrubland by livestock could result in reduced vigor of herbaceous plants due to removal of standing dead biomass that might provide protection from light and increased available moisture due to snow entrapment (Merrill, et al., 1994; Sauer, 1978; Willms & Chanasyk, 2006).

Use of TNR in pastures with less than 50% big game winter range or native plant communities, excluding Sandberg bluegrass/non-native areas, would extend the grazing season and could potentially result in more uniform utilization of perennial grasses. While utilization standards would apply, this would reduce structural complexity in native patches, non-native perennial, and non-native understory communities until regrowth occurs.

The number, type, and density of range infrastructure developments under Alternative I would be similar to the No Action Alternative; however locations could be modified to meet resource objectives. Potential for introduction of noxious weeds and/or invasive plants could be reduced by application of BMPs (Appendix E).

Removal of fences could result in short-term disturbance due to access for removal of posts, wire, and other components. Long-term effects of fence removal to upland vegetation would be dependent on continued use of established primitive roads or trails by humans or livestock, but could include recovery of vegetation adjacent to the former fence line. Recovery could be facilitated by treatment of noxious weeds or invasive plants.

Impacts from Management Specific to Alternative II

Under Alternative II, 1,406,000 acres (96%) of the planning area would be available for livestock grazing and 59,000 acres (4%) of the planning area would be unavailable. Areas unavailable for livestock grazing are not specifically identified for vegetation treatments. The effects of livestock grazing exclusion would be the same as those described for the No Action Alternative.

Vegetation allocations would tend to promote retention of shrub and forb biomass. High allocation of annual grass production could provide substantial forage in years where growing conditions support annual grass production. However, this production is unpredictable (Vallentine & Stevens, 1994) and, as described for Alternative I, high allocation could result in over-use of perennial grasses in years when annual grasses are not abundant. This could result in reduced perennial cover and increased susceptibility for dominance by annual grasses (Blaisdell & Pechanec, 1949; Chambers, et al., 2007).

Estimated utilization levels to achieve resource objectives of 40% to 50% for native communities and 50% to 60% for non-native perennial communities are considered to be of moderate to high intensity (Holecheck, 1988; Holecheck, et al., 1998). Utilization at the upper end of the ranges would tend to result in eventual degradation of plant communities; utilization at the lower end of the ranges would be necessary to maintain static conditions (Holecheck, et al., 1999). It is expected that biological soil crusts would be reduced in both cover and species abundance under moderate to high utilization (Ponzetti & McCune, 2001; Rogers & Lange, 1971; Warren & Eldridge, 2001). Periodic short-term heavy use (i.e., up to 70% every 5 years) to reduce wolf plants is expected to have results similar to those described for Alternative I.

Management actions that provide residual cover for sage-grouse and other ground nesting birds would be limited both spatially to allotments with less than 50% native plant communities and native shrublands within 1 mile of active leks, and temporally to the initiation of the nesting season. This would not provide variable residual cover in all native plant communities or potential habitat and would reduce impacts only during the onset of the growing season. Due to low residual heights (i.e., 4 inches), these actions would tend to promote short-statured, early- and mid-seral grasses such as Sandberg bluegrass and bottlebrush squirreltail. Alternative II does not contain specific protections for big game breeding habitats or aspen and would not promote maintenance of mid- and late-seral stages in native shrublands. The effects of compliance with BMPs for wildlife habitat and winter use would be similar to those described for Alternative I.

The designation of Reserve Common Allotments would provide flexibility for post-wildland fire rest of burned areas and post-treatment rest of ES&BAR and proactive vegetation treatments. The ability to provide post-disturbance rest would improve upland vegetation recovery or seeding establishment, particularly in cases where two growing seasons is not an adequate rest period.

The effects of TNR, targeted grazing, and the installation, construction, and maintenance of grazing facilities would be similar to those described for Alternative I. It is expected that the number and density of all types of range infrastructure developments under Alternative II would increase compared to the No Action Alternative to accommodate increased allocations. Locations of existing facilities could be modified to meet resource objectives.

Impacts from Management Specific to Alternative III

Under Alternative III, 1,404,000 acres (96%) of the planning area would be available for livestock grazing and 61,000 acres (4%) of the planning area would be unavailable. Areas unavailable for livestock grazing are not specifically identified for vegetation treatments. The effects of livestock grazing exclusion would be the same as those described for the No Action Alternative.

The effects of allocations would be similar to those described for Alternative II. Proposed utilization levels are 30% to 40% for native communities and 50% to 60% for non-native perennial communities. The effects of estimated utilization levels on native communities would be similar to those described for Alternative I; the effects of proposed utilization levels on non-native communities would be similar to Alternative II. Management of upland vegetation for sage-grouse, other wildlife habitat, and aspen and the effects of winter use would be similar to those described for Alternative I. As in Alternative II, the spatial extent of management actions that provide residual cover for ground-nesting birds would be limited to allotments with less than 50% native plant communities and would not extend to all native plant communities or potential habitat.

The effects of Reserve Common Allotments, TNR, targeted grazing, and the installation, construction, maintenance, and removal of grazing facilities would be similar to those described for Alternative I. It is expected that the number and density of all types of range infrastructure developments under Alternative III would increase compared to the No Action Alternative to accommodate increased allocations. Locations of existing facilities could be modified to meet resource objectives.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Under Alternative IV-A, 1,320,000 acres (90%) of the planning area would be available for livestock grazing and 145,000 acres (10%) of the planning area would be unavailable; under Alternative IV-B (the Preferred Alternative), 1,352,000 acres (92%) of the planning area would be available for livestock grazing and 113,000 acres (8%) of the planning area would be unavailable. Livestock exclusion would include areas in the Inside Desert ACEC identified for restoration of non-native perennial communities to native shrubland. The effects of livestock exclusion on restoration treatments would be similar to those described in Alternative I. The long-term effects of livestock exclusion would be similar to those described for the No Action Alternative, but would occur over larger and more contiguous areas.

Allocation of the majority of vegetation production, more than 70% for native and non-native perennial grass and all annual, shrub, and forb production, to watershed and wildlife would promote landscape stability due to retention of plant biomass and structure (Pellant, et al., 2005). Diversification of species composition and community structure could occur in native plant communities; however, the extent of natural diversification would be dependent on the presence of native plants and growing conditions such as precipitation and competition with exotic annuals (Anderson & Inouye, 2001). Low allocation of native perennial grass and shrubs for livestock would support restoration goals to convert annual communities to native shrubland, particularly in VMAs A and B. Because restoration treatments can be slow to establish in low precipitation zones, the potential for success of restoration treatments in these areas and long-term maintenance of restored native shrubland would be increased through minimizing the effects associated with livestock trampling and grazing (Stevens, 2004). Lack of allocation of annual grass to livestock would reduce potential for over-use of perennial grasses in years of low annual grass production.

Estimated utilization levels to achieve resource objectives of 20% to 30% for native communities and 30% to 40% for non-native communities are generally considered to be of light intensity (Holecheck, 1988; Holecheck, et al., 1998). Utilization within these ranges, particularly at the lower end of the ranges, would tend to result in improvement of vegetation community condition (Holecheck, et al., 1999) and reduce potential for invasion by noxious weeds and invasive plants (Chambers, et al., 2007). The light utilization levels proposed under Alternative IV would also tend to promote greater cover and species abundance for biological soil crusts (Ponzetti & McCune, 2001; Rogers & Lange, 1971; Warren & Eldridge, 2001). The effects of habitat management actions and implementation of BMPs would be similar to Alternative I, except greater residual heights (i.e., 7 inches) for late-seral grasses would be more favorable to retention of those species and greater structural diversity.

The effects of TNR would be similar to Alternative I; however, since TNR would not be allowed in pastures with greater than 25% native communities by cover, excluding Sandberg/non-native areas, the proportion of landscape affected would be less than in the No Action Alternative or Alternatives I, II, or III. Areas unavailable for TNR would increase with conversion of annual and non-native communities to native communities through vegetation treatment.

The effects of Reserve Common Allotments would be similar to those described for Alternatives II. The effects of TNR, targeted grazing, and the installation, construction, maintenance, and removal of grazing facilities would be similar to those described for Alternatives I. It is expected that the number and density of all types of range infrastructure developments would decrease under Alternative IV compared to the No Action Alternative due to decreased allocations. Locations of existing facilities could be modified to meet resource objectives.

Impacts from Management Specific to Alternative V

Under Alternative V, 1,156,000 acres (79%) of the planning area would be available for livestock grazing and 309,000 acres (21%) of the planning area would be unavailable. This would include areas in the Lower Bruneau Canyon and Middle Snake ACECs identified for restoration of annual and non-native perennial communities to native shrubland and non-native understory. The effects of livestock exclusion on restoration treatments would be similar to those described in Alternative I. The long-term effects of livestock exclusion would be similar to those described for the No Action Alternative, but would occur over the largest and most contiguous areas of all the alternatives.

The effects of allocations in Alternative V would be similar to Alternative IV. There would be no TNR, targeted grazing, or use of big game winter range in Alternative V, and forage on acquired lands and in allotments where permits are relinquished or cancelled would be held for the life of the plan for wildlife habitat and watershed protection. Therefore, Alternative V would provide the greatest level of landscape stability due to retention of plant biomass and structure (Pellant, et al., 2005). Alternative V would also provide for the greatest potential for diversification of species composition and community structure; however, the extent of natural diversification would be dependent on the presence of native plants and growing conditions such as precipitation and competition with exotic annuals (Anderson & Inouye, 2001). The lack of Reserve Common Allotments under Alternative V would reduce flexibility for post-wildland fire rest of burned areas and post-treatment rest of ES&BAR and proactive vegetation treatments. Lack of allocation of annual grass to livestock would reduce potential for over-use of perennial grasses in years of low annual grass production. The effects of estimated utilization levels and habitat management for sage-grouse, ground-nesting birds, big game, and other wildlife would be similar to Alternative IV, except utilization levels would be 10% to 20% in the Sagebrush Sea ACEC. This would include about 70% of the planning area in VMAs B, C, and D and would promote the long-term success of treatments to convert annual communities and native grassland to native shrubland by minimizing post-treatment effects associated with livestock trampling and grazing (Stevens, 2004).

The effects of installation, construction, maintenance, and removal of grazing facilities would be similar to those described for Alternative I. It is expected that the number and density of all types of range infrastructure developments would decrease substantially under Alternative V compared to the No Action Alternative to accommodate decreased allocations, especially in the Sagebrush Sea ACEC. Since no new pipelines would be authorized, Alternative V would reduce the potential for linear disturbance and introduction of noxious weeds and invasive plants throughout the planning area. The locations of existing facilities could be modified to meet resource objectives.

Impacts from Transportation and Travel Actions

Routes and route density can influence human-related disturbance including introduction and spread of noxious weeds and invasive plants (Gelbard & Belnap, 2003; Gelbard & Harrison, 2003) and human-caused fire (Svejcar, 2003). Changes in travel designation (i.e., open to cross-country motorized vehicle use, limited to designated routes or ways, closed to motorized vehicle use) and seasonal restrictions can influence vegetation continuity and condition.

Impacts from Management Specific to the No Action Alternative

Under the No Action Alternative, 77% of the planning area would be open to cross-country motorized vehicle use, 16% would be limited to designated routes, 5% would be limited to inventoried ways, and 2% would be closed to motorized vehicle use. The majority of the closed area is WSA, where canyonland topography restricts travel. It is expected that motorized vehicle use would increase and that additional unplanned routes would be created by repeated use. This would result in a long-term increase in route density within the planning area.

The primary effect of cross-country motorized vehicle use and roads on upland vegetation communities is an increase in introduction and spread of noxious weeds and invasive plants (Gelbard & Belnap, 2003; Gelbard & Harrison, 2003). Vehicle use results in both shear and compressional forces on the soil surface, destroying biological soil crusts and creating openings for invasion by weedy plants by physically and chemically altering the soil environment (Belnap & Eldridge, 2001; Masters & Sheley, 2001; Stohlgren, et al., 2001). Noxious weed and invasive plant introductions could result in modification of native plant community species composition (Gelbard & Belnap, 2003; Gelbard & Harrison, 2003). Fire resulting from human use or natural ignition in areas with increased weed densities could result in decreased proportions of native shrubland and increased proportions of annual, non-native perennial, or native grasslands, depending on pre-fire vegetation composition and post-fire treatments.

Impacts from Management Common to All Action Alternatives

Management actions common to all action alternatives provide guidance and protective mechanisms that would reduce impacts to upland vegetation due to route or use designations. No actions common to all action alternatives would result in changes in either VSG or seral stages within native plant communities.

Impacts from Management Specific to Alternative I

Under Alternative I, less than 1% of the planning area would be open to cross-country motorized vehicle use, 93% would be limited to designated routes, 5% would be limited to designated ways, and 4% would be closed to motorized vehicle use. Approximately 3,600 acres of the Deadman/Yahoo SRMA, contained within the Deadman/Yahoo TMA, would be designated open to cross-country motorized vehicle use. This relatively small area currently has a high density of motorized use, which would be expected to continue under the open designation. This would result in areas that are unvegetated due to concentrated disturbance and high potential for invasion and spread of noxious weeds and invasive species. Vegetation actions proposed under Alternative I would treat about half of annual communities, approximately 10,000 acres, in the Deadman/Yahoo SRMA using fire-tolerant native and non-native species. When combined with existing vegetation, this would result in about half the SRMA being occupied by native grassland and non-native perennial communities, which would provide a greater level of vegetation and resilience should fires occur. While the potential for invasion and spread of noxious weeds and invasive plants would continue to be high both in open areas and along designated routes, use would not likely result in changes in either VSG, even in the event of fire resulting from human use. Likewise, areas occupied by annual communities under Alternative I would not be changed. Native shrubland communities could be at risk for weed invasion and spread or fire.

Route density is expected to decrease over about 48% of the planning area. This decrease would be focused in the Canyonlands, Jarbidge Foothills, and Snake River TMAs. The focus on increases in core habitat for mule deer in the Canyonlands and Jarbidge Foothills TMAs would tend to reduce routes in native plant communities, reducing the risk of weed invasion and spread. Route reduction would tend to facilitate the success of vegetation treatments by reducing potential for post-treatment human disturbance, as well as weed invasion and spread. About 49% of the planning area would retain the current level of route density, primarily in the Devil Creek TMA. Since the focus of this TMA would be to balance livestock grazing management needs with restoration activities, it is anticipated that route locations would continue to access existing livestock facilities and could be modified on establishment of new facilities. However, it is unlikely that this would modify the relative proportions of VSGs.

Actions that allow game retrieval within 300 feet of a designated route and access to camp sites within 25 feet of a designated route would result in an expansion of potential risks to upland vegetation communities beyond the designated route corridor. It is expected that these actions would result in low density disturbances adjacent to designated routes and could cause localized degradation of plant communities, especially if repeated use occurred. Disturbance due to cross-country motorized vehicle use would have the greatest effect on native shrublands due to crushing of shrubs and biological soil crusts. Exemptions to motorized vehicle restrictions that allow cross-country travel would have effects similar to those described for the No Action Alternative.

Areas closed to motorized vehicle use under Alternative I would include approximately 3% of the total native grassland for the planning area, prior to any vegetation treatments, and 5% of the native shrubland. These areas would be free of impacts associated with cross-country motorized vehicle use and roads described for the No Action Alternative, and could serve as refugia for native plants throughout the planning area (Gelbard & Harrison, 2003). These areas are small and isolated; therefore, there would be limited potential for native plant dispersal beyond the immediate area.

Seasonal closures or restrictions on primitive roads, trails, and open areas would reduce potential for human-caused wildland fire. This would reduce potential for loss of shrubland communities and conversion to annual, non-native perennial, or native grasslands, depending on pre-fire vegetation composition and post-fire treatments.

Implementation of BMPs to control noxious weeds and invasive plants in roadside areas would reduce impacts to upland vegetation in areas that would be open to cross-country motorized vehicle use and limited to designated routes.

Impacts from Management Specific to Alternative II

Under Alternative II, none of the planning area would be open to cross-country motorized vehicle use, 93% would be limited to designated routes, 5% would be limited to designated ways, and 2% would be closed to motorized vehicle use. The lack of areas open to cross-country motorized vehicle use would eliminate the impacts described for Alternative I.

Route density would be expected to increase in about 85% of the planning area, primarily within the Bruneau Desert TMA to facilitate access for commercial uses. Impacts of increased route density within the Bruneau Desert TMA would be similar to impacts described for the No Action Alternative. Route density would be expected to remain the same in about 15% of the planning area, primarily within the Canyonlands TMA to facilitate livestock grazing with mitigation for impacts to resources. Impacts within the Canyonlands TMA would be similar to those described for the Devil Creek TMA in Alternative I.

Unlimited motorized access off designated routes for game retrieval and within 100 feet of a designated route for camp site access in areas not closed to motorized use would result in impacts similar to those described in Alternative I, but would apply to most of the planning area. Exemptions to motorized vehicle restrictions that allow cross-country motorized vehicle use would have effects similar to those described for the No Action Alternative.

Areas closed to motorized vehicle use under Alternative II would be limited to the Bruneau-Jarbidge Canyon, which is physically restrictive to motorized transportation. This area contains is less than 1% native grassland and native shrubland. Therefore, areas closed to motorized vehicle use would provide negligible protection to native upland vegetation under Alternative II.

The effects of implementation of BMPs would be similar to those described for Alternative I.

Impacts from Management Specific to Alternative III

Under Alternative III, less than 1% of the planning area would be open to cross-country motorized vehicle use, 93% would be limited to designated routes, 5% would be limited to designated ways, and 2% would be closed to motorized vehicle use. The effects of designated open areas in the Deadman/Yahoo SRMA, which coincides with the Deadman/Yahoo TMA, would be similar to those described for Alternative I. Although the SRMA and TMA are not designated for vegetation treatment under Alternative III, actions prescribed for VMAs A and B focus on conversion of annual communities to non-native perennial communities to reduce fine fuel loads. Since the focus of the area is for cross-country motorized vehicle use and some limitations to designated trails, it is likely that this area would be treated to decrease fire spread and increase resilience in the case of human-caused fire.

Route density would be expected to increase in about 2% of the planning area, primarily within the Deadman/Yahoo TMA to facilitate motorized recreational opportunities. The impacts of increased route density within the Deadman/Yahoo TMA would be similar to impacts described for Alternative I. Route density would be expected to remain the same in about 98% of the planning area, primarily within the Devil Creek, Jarbidge Foothills, Snake River, and West Side TMAs. These TMAs would be managed to improve access and facilitate wildland fire prevention and suppression. Management might not increase route density, but could improve surface condition. Improvement of road condition could result in wider disturbance areas adjacent to roads due to increased maintenance, including mowing of roadside areas, and increased cover of noxious weeds and invasive plants due to increased use (Gelbard & Belnap, 2003).

Lack of motorized access off designated routes for game retrieval and limiting motorized access to camp sites to within 25 feet of a designated route would reduce off-road disturbance relative to the No Action Alternative and Alternatives I and II. Exemptions to motorized vehicle restrictions that allow cross-country motorized vehicle use would have effects similar to those described for the No Action Alternative.

Areas closed to motorized vehicle use under Alternative III would be limited to the Salmon Falls Creek ACEC and the Bruneau and Jarbidge Canyons, which are physically restrictive to motorized transportation. The closed areas are less than 1% native grassland and native shrubland. Therefore, areas with closed designation would provide negligible protection to native upland vegetation under Alternative III.

The effects of seasonal closures for wildland fire prevention and BMPs would be similar to those described for Alternative I.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Under Alternative IV, less than 1% of the planning area would be open to cross-country motorized vehicle use, 89% would be limited to designated routes, 5% would be limited to designated ways, and 5% would be closed to motorized vehicle use. The effects of designated open areas in the Deadman/Yahoo SRMA, which coincides with the Deadman/Yahoo TMA, would be similar to those described for Alternative I. Although the SRMA and TMA are not designated for vegetation treatment under Alternative IV, actions prescribed for VMAs A and B focus on conversion of annual communities to native and non-native perennial communities, with emphasis on areas adjacent to the Snake River and its tributaries. Since the focus of the area is for cross-country motorized vehicle use and some limitations to designated trails, it is likely that this area would be treated to decrease fire spread and increase resilience in the case of human-caused fire.

Route density would be expected to increase in about 2% of the planning area, primarily within the Deadman/Yahoo TMA to facilitate motorized recreational opportunities. Impacts of increased route density within the Deadman/Yahoo TMA would be similar to impacts described for Alternative I. Route density would be expected to decrease in about 98% of the planning area, primarily within the Canyonlands, Devil Creek, Jarbidge Foothills, and Snake River TMAs. These TMAs would be managed for protection of sage-grouse and big game habitat and restoration activities while continuing to provide public access. Route reduction would tend to facilitate success of vegetation treatments by reducing potential for post-treatment human disturbance, as well as weed invasion and spread.

Lack of motorized access off designated routes for game retrieval and limiting motorized access to camp sites to within 25 feet of a designated route would reduce off-road disturbance relative to the No Action Alternative and Alternatives I and II. Exemptions to motorized vehicle restrictions that allow cross-country motorized vehicle use would have effects similar to those described for the No Action Alternative.

Areas closed to motorized vehicle use under Alternative IV would include the Bruneau and Jarbidge Canyons and non-WSA lands managed for their wilderness characteristics. The closed areas contain 3% of the native grassland and about 8% of the native shrubland in the planning area. The effects would be similar to those described for Alternative I.

The effects of seasonal closures for wildland fire prevention and BMPs would be similar to those described for Alternative I.

Impacts from Management Specific to Alternative V

Under Alternative V, less than 1% of the planning area would be open to cross-country motorized vehicle use, 89% would be limited to designated routes, none would be limited to designated ways, and 11% would be closed to motorized vehicle use. The effects of designated open areas in the Yahoo SRMA, which coincides with the Yahoo TMA, would be similar to those described for Alternative I but would be spatially reduced by about 80%.The SRMA and TMA are not identified for vegetation treatment; however, the area is dominated by native and non-native perennial plant communities and would be relatively resilient in the case of human-caused fire.

Route density would be expected to increase in less than 1% of the planning area, primarily within the Yahoo TMA to facilitate motorized recreational opportunities. The impacts of increased route density within the Yahoo TMA would be similar to impacts described for Alternative I, but would apply to less than 1% of the spatial area of Alternative I. Route density would be expected to decrease in about 99% of the planning area, primarily within the Devil Creek, Jarbidge Foothills, Snake River, and West Side TMAs. These TMAs would be managed for increasing core habitat size for sage-grouse and other special status species and accommodating restoration activities. Route reduction in Alternative V would do the most of all the alternatives to facilitate success of vegetation treatments by reducing potential for post-treatment human disturbance, as well as weed invasion and spread.

Since the density of routes within the planning area would be reduced, lack of motorized access off designated routes for game retrieval and limiting motorized access to camp sites to within 25 feet of a designated route would reduce off-road disturbance to the greatest degree of all the alternatives. Application of motorized vehicle restrictions to lessees, BLM permit holders, and ROW holders would reduce the potential for cross-country motorized vehicle use to the greatest degree of all the alternatives and would eliminate most impacts described in the No Action Alternative.

Areas closed to motorized vehicle use under Alternative V would include WSAs, including inventoried ways, and non-WSA lands managed for their wilderness characteristics. The closed areas contain 9% of the native grassland and about 19% of the native shrubland in the planning area. The effects would be similar to those described for Alternative I, but would cover a geographic area 3.5 times greater in size.

The effects of seasonal closures for wildland fire prevention and BMPs would be similar to those described for Alternative I.

Impacts from Areas of Critical Environmental Concern Actions

ACECs, regardless of identified important and relevant values, provide some level of protection for upland vegetation. Where ACEC designation requires special management for upland vegetation communities or wildlife habitat, actions can reduce human disturbance, and elevate priority for vegetation protection or restoration. Where vegetation or wildlife habitat is an important and relevant value, impacts of the ACEC designation are analyzed.

Impacts from Management Specific to the No Action Alternative

Actions prescribed under the No Action Alternative for the Bruneau-Jarbidge ACEC would provide general protection for upland vegetation in the Bruneau and Jarbidge Canyons and along the rims. Actions would tend to maintain native plant communities at the current acreage and condition. Placement of livestock facilities (e.g., fencing, water, salt) to draw livestock away from bighorn sheep habitat would shift patterns of livestock use into adjacent communities (i.e., annual, non-native perennial, non-native understory) or outside the ACEC.

Actions prescribed under the No Action Alternative for the Salmon Falls Creek ACEC would generally protect native grassland and shrubland communities. The effects of livestock grazing exclusion and motorized vehicle closure on upland vegetation communities are described under *Impacts from Livestock Grazing Actions* and *Impacts from Transportation and Travel Actions*.

Impacts from Management Specific to Alternative I

Actions prescribed under Alternative I for the Bruneau-Jarbidge ACEC would provide general protection for upland vegetation in the Bruneau and Jarbidge Canyons and along the rims. Actions would tend to maintain native plant communities at the current acreage and condition. Required use of weed-free forage and straw, designating camp areas outside the ACEC, limited motorized use to designated routes, and integrated treatment of noxious weeds and invasive plants would reduce risk of fragmentation of plant communities or conversion of native communities to annual. The prioritization of the ACEC for critical fire suppression would reduce the potential for loss of shrubland communities. Placement of livestock facilities (e.g., fencing, water, salt) to draw livestock away from bighorn sheep habitat would protect native communities within the ACEC from concentrated use and would shift patterns of livestock use outside the ACEC.

Actions prescribed under Alternative I for the Lower Bruneau Canyon ACEC would promote restoration of annual and non-native plant communities to native shrubland. Integrated treatment of noxious weeds and invasive plants and prioritization of the ACEC for critical fire suppression would reduce the potential for loss of restored or existing shrubland communities.

Actions prescribed under Alternative I for the Middle Snake ACEC would promote restoration of annual and non-native plant communities to native shrubland. Integrated treatment of noxious weeds and invasive plants and prioritization of the ACEC for critical fire suppression would reduce the potential for loss of restored or existing shrubland communities. The effects of livestock grazing exclusion on upland vegetation communities are described under *Impacts from Livestock Grazing Actions*. Livestock trailing through the ACEC could result in short-term, localized disturbance within the trailing corridor for each trailing event. This disturbance would include trampling of plants and removal of vegetation. The amount of impact would depend on the number, frequency, and season of trailing events as well as the number and class of livestock.

Actions prescribed under Alternative I for the Salmon Falls Creek ACEC would generally protect native grassland and shrubland communities. Integrated treatment of noxious weeds and invasive plants and prioritization of the ACEC for critical fire suppression would reduce the potential for loss of restored or existing shrubland communities. The effects of livestock grazing exclusion and motorized vehicle closure on upland vegetation communities are described under *Impacts from Livestock Grazing Actions* and *Impacts from Transportation and Travel Actions*.

Impacts from Management Specific to Alternative II

Under Alternative II, the existing ACEC designations would be removed and no new ACECs would be designated, therefore no special management is prescribed. The impacts of the existing ACECs on upland vegetation described for the No Action Alternative would no longer occur.

Impacts from Management Specific to Alternative III

The effects of actions prescribed under Alternative III for the Bruneau-Jarbidge ACEC would be similar to those described for Alternative I, but would apply to about 67% of the area of Alternative I.

The effects of actions prescribed under Alternative III for the Salmon Falls Creek ACEC would be identical to those described for Alternative I.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Actions prescribed under Alternative IV for the Bruneau-Jarbidge ACEC would protect 144% of the area in Alternative I, including more upland vegetation areas. Actions would tend to maintain native plant communities at the current acreage, improve condition, and promote success of vegetation treatments by limiting human and livestock disturbance. Required use of weed-free forage and straw, designating camp areas outside the ACEC, limiting motorized use to designated routes, and integrated treatment of noxious weeds and invasive plants would all reduce risk of fragmentation of plant communities or conversion of native communities to annual. The prioritization of the ACEC for critical fire suppression would reduce the potential for loss of shrubland communities. Placement of livestock facilities (e.g., fencing, water, salt) to draw livestock away from bighorn sheep habitat would protect native communities within the ACEC from concentrated use, and would shift patterns of livestock use outside the ACEC. Adjustment of livestock season of use or stocking rates in pastures to protect Davis peppergrass from December through June would also protect native plant communities by reducing impacts during much of the active growth period for plants.

Actions prescribed under Alternative IV for the Inside Desert ACEC would generally protect native grassland and shrubland communities and restored areas through protections for slickspot peppergrass. Alternative IV-B (the Preferred Alternative) would protect 56% of the area of Alternative IV-A. Integrated treatment of noxious weeds and invasive plants and prioritization of the ACEC for critical fire suppression would reduce the potential for loss of restored or existing shrubland communities. The elimination of staging areas for fire suppression and rehabilitation and camping from the ACEC would reduce the potential for human disturbance that would result in small-scale fragmentation of plant communities. The effects of livestock grazing exclusion and motorized vehicle closure on upland vegetation communities are described under *Impacts from Livestock Grazing Actions* and *Impacts from Transportation and Travel Actions*.

Actions prescribed under Alternative IV for the Jarbidge Foothills ACEC would generally protect native grassland and shrubland communities and restored areas by limiting human and livestock disturbance. Alternative IV-B would protect 48% of the area of Alternative IV-A. Required use of weed-free forage and straw, designating camp areas within the ACEC, limiting motorized use to designated routes, and integrated treatment of noxious weeds and invasive plants would all reduce the risk of fragmentation of plant communities or conversion of native communities to annual. The prioritization of the ACEC for critical fire suppression would reduce the potential for loss of shrubland communities. Management actions that specifically reduce disturbance of sage-grouse during breeding and nesting periods and for protection of habitat would likewise protect native shrubland habitats during active growth periods for plants.

Actions prescribed under Alternative IV for the Lower Bruneau Canyon ACEC would be identical to those described for Alternative I.

Impacts from Management Specific to Alternative V

Actions prescribed under Alternative V for the Lower Bruneau Canyon ACEC would promote restoration of annual communities to native shrubland and non-native perennial communities to non-native understory. Integrated treatment of noxious weeds and invasive plants and prioritization of the ACEC for critical fire suppression would reduce the potential for loss of restored or existing shrubland communities. The effects of livestock grazing exclusion on upland vegetation communities are described under *Impacts from Livestock Grazing Actions*.

Actions prescribed under Alternative V for the Middle Snake ACEC would promote restoration of annual communities to native shrubland and non-native perennial communities to non-native understory. The effects of actions prescribed under Alternative V would be similar to those described for Alternative I, except that livestock grazing would be allowed in the Asquena pasture. This pasture is primarily annual and non-native perennial vegetation. The effects of grazing are generally described under *Impacts from Livestock Grazing Actions*.

Actions prescribed under Alternative V for the Sagebrush Sea ACEC would provide protection for existing and restored native plant communities over about 70% of the planning area including lands in VMAs B, C, and D. Reduction of utilization levels to 10% to 20% and reduction of livestock infrastructure would promote success of restoration treatments by minimizing post-treatment effects associated with livestock trampling and grazing (Stevens, 2004). Required use of weed-free forage and straw, designating camp areas within the ACEC, limiting motorized use to designated routes, and integrating treatment of noxious weeds and invasive plants would all reduce risk of fragmentation of plant communities or conversion of native communities to annual. The prioritization of the ACEC for critical fire suppression would reduce the potential for loss of existing and restored shrubland communities.

Summary of Direct and Indirect Impacts

Table 4- 80 contains a ranking of the impacts of proposed management on upland vegetation communities by alternative.

Table 4- 80. Summary of Impacts to Upland Vegetation Communities

	Alternative						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
Upland Vegetation Communities							
Acres of Annual VSG (1=lowest, 6=highest)	6	4	2	3	1		5
Acres of Shrubland Communities (1=highest, 6=lowest)	6	3	5	4	1		2
Noxious Weeds and Invasive Plants							
Decrease in Occupied Acres, Species Diversity, and Cover (1=highest, 6=lowest)	6	3	4	5	1		2
Wildland Fire Ecology and Management							
Maintain Acres of Native Plant Communities (1=highest, 7=lowest)	7	5	6	4	2	3	1
Livestock Grazing							
Maintain or Increase Species Diversity and Structural Complexity (1=highest, 7=lowest)	5	4	7	6	2	3	1
Transportation and Travel							
Decrease Landscape Fragmentation (1=highest, 6=lowest)	6	3	5	4	2		1
ACECs							
Manage for Native Plant Communities (1=highest, 7=lowest)	5	4	7	6	2	3	1
Note: Rankings on each line are intended to convey how well each alternative benefits upland vegetation communities. A ranking of 1 indicates that the alternative would benefit upland vegetation communities; a rating of 7 would indicate less benefit. Rankings are for comparison purposes within a row only and are not meant to be additive by alternative.							

Impacts from the No Action Alternative

Actions prescribed in the No Action Alternative would increase the relative proportion of acreage occupied by non-native perennial communities within the planning area while maintaining proportions of annual, native grassland, and native shrubland communities and reducing proportions of non-native understory communities. Vegetation treatments would result in 28% of the planning area being occupied by shrubland communities, including non-native understory (1%) and native shrubland (27%). The lack of prioritization for wildland fire suppression would contribute to long-term maintenance of the planning area in annual, non-native perennial, and early-seral native communities by perpetuating the current trend of native shrubland loss. Livestock management actions would promote uniform use of perennial grass and dominance of the planning area by non-native perennial and short-stature, early- and mid-seral grasses. Increased disturbance associated with livestock facilities would likely increase introduction and spread of noxious and invasive weeds. Designation of 77% of the planning area as open to cross-country motorized vehicle use would result in continued creation of unplanned routes, fragmentation of plant communities, and introduction and spread of noxious weeds and invasive plants. Maintenance of existing ACECs would have little effect on upland vegetation.

Overall, the No Action Alternative would result in moderate adverse impacts to upland vegetation in the long term.

Impacts from Alternative I

Actions prescribed in Alternative I would increase the relative proportion of acreage occupied by native shrublands, primarily in VMAs B, C, and D, while decreasing proportions of annual, non-native perennial, non-native understory, and native grassland communities. Vegetation treatments would result in 55% of the planning area being occupied by shrubland communities, including non-native understory (3%) and native shrubland (52%). Over the long term, Alternative I would create a landscape dominated by native communities in a variety of seral stages with greater species diversity and structural complexity compared to the No Action Alternative and Alternatives II and III. This diversity would promote improved landscape functions over 67% of the planning area, including water and nutrient cycling and soil stabilization. Livestock management actions including allocations, estimated utilization levels, residual height for wildlife habitat, and TNR would result in moderate, uniform use that would tend to reduce structural complexity for perennial herbaceous plants.

Fire management priorities would promote protection of existing and restored native shrubland communities and facilitate post-fire conversion of annual, non-native perennial, and native grassland communities to native shrubland. Protection of key sage-grouse habitat would prioritize suppression resources for native shrubland; however, critical suppression priorities would not be adequate to retain all native vegetation. It is likely that there would be continued loss of native shrublands under Alternative I.

Actions associated with cross-country motorized vehicle use, use and maintenance of designated routes, fuel breaks, livestock facilities, targeted grazing, and periodic heavy use to promote establishment of shrubs all cause soil surface disruption and vegetation removal that would tend to promote invasion and spread of noxious weeds and invasive plants. While cross-country motorized vehicle use and route density would decrease compared to the No Action Alternative, disturbance associated with fuel breaks and livestock management would be similar to the No Action Alternative or slightly increased. This would not likely result in large-scale conversion of native or non-native communities to annual communities, but would result in localized degradation of plant communities that could expand over the long-term. Actions for treatment of noxious weeds and invasive plants would reduce the risk of introduction due to roads and recreational access, particularly in native plant communities.

Actions associated with ACECs would provide protection to existing and restored native plant communities, primarily in the Bruneau, Jarbidge, and Salmon Falls Creek Canyons, that would result in reduced potential for degradation or loss due to human and livestock uses, noxious weeds, invasive plants, or fire.

Overall, Alternative I would result in a minor beneficial impacts to upland vegetation in the long term.

Impacts from Alternative II

Actions prescribed in Alternative II would result in a composition of upland vegetation communities within the planning area similar to the No Action Alternative. The relative proportion of non-native perennial communities would increase in all VMAs and would result from conversion of annual communities or removal of shrubs from non-native understory communities. Relative proportions of native grassland and native shrubland would not change due to vegetation treatments. This would create a relatively homogeneous landscape dominated by early-seral and uncharacteristic vegetation in VMAs A, B, and C. Vegetation treatments would result in about 30% of the planning area being occupied by shrubland communities, including non-native understory (2%) and native shrubland (28%), with the majority occurring in VMA D. Limited species and structural diversity in areas dominated by non-native perennial vegetation would decrease water and nutrient cycling compared to shrubland communities. Livestock management actions, including allocations, utilization standards, residual height for wildlife habitat, and TNR would promote uniform use of perennial grass and long-term dominance of the planning area, primarily in VMAs A, B, and C, by non-native perennial and short-stature, early- and mid-seral grasses.

Fire management priorities would promote protection of native grassland and non-native perennial communities with no prioritization for shrubland communities. It is likely that there would be continued loss of native shrublands under Alternative II. The absence of Critical Suppression Areas outside of the WUI would increase the potential for re-burning of upland vegetation communities.

Actions associated with cross-country motorized vehicle use, maintenance and use of designated routes, fuel breaks, livestock facilities, targeted grazing, and periodic heavy use to promote establishment of shrubs all cause soil surface disruption and vegetation removal that would tend to promote invasion and spread of noxious weeds and invasive plants. While cross-country motorized vehicle use would decrease compared to the No Action Alternative, increased allocations for livestock grazing as well as travel associated with commodity and resource use would increase the number, size, and density of disturbed areas. This would not likely result in large-scale conversion of native or non-native communities to annual communities, but would result in localized degradation of plant communities and would increase the potential for expansion over the long-term. Actions for treatment of noxious weeds and invasive plants would not reduce risk of introduction due to roads and recreational access, stock driveways or other high use areas. Therefore, there would be a higher potential for introduction and spread of noxious weeds and invasive plants under Alternative II compared to the other alternatives.

There would be no ACECs under Alternative II. No areas supporting upland plant communities would receive additional protections.

Overall, Alternative II would result in minor adverse impacts to upland vegetation in the long-term.

Impacts from Alternative III

Actions prescribed in Alternative III would increase the relative proportion of acreage occupied by native shrublands in VMAs B, C, and D and non-native perennial communities within the entire planning area. Proportions of annual and native grassland communities would decrease and non-native understory would remain unchanged. Vegetation treatments would result in 46% of the planning area being occupied by shrubland communities, including non-native understory (5%) and native shrubland (41%). Over the long term, Alternative III would create a landscape dominated by perennial vegetation with native communities in a variety of seral stages interspersed with non-native perennial communities to disrupt fuel continuity. This would result in a greater number of native patches with more species diversity and structural complexity than would be created under either the No Action Alternative or Alternative II. Native communities, particularly shrublands, would be less continuous than in Alternatives I, IV, or V. Livestock management actions, including allocations, utilization standards, residual height for wildlife habitat, and TNR would result in moderate, uniform use that would tend to reduce structural complexity for perennial herbaceous plants.

Fire management priorities would promote protection of native shrubland, as well as native grassland and non-native perennial communities. Native grassland and non-native perennial communities would be relatively resilient if burned, and burning could facilitate establishment of shrubs in native grasslands to disrupt fuel continuity in VMAs B, C, and D through post-fire treatments. Critical suppression priorities would not be adequate to protect all priority VSGs and the potential for re-burning would be relatively high, particularly in VMA C. Protection of key sage-grouse habitat would prioritize suppression resources for native shrublands and reduce the potential for loss for existing shrubland patches.

Actions associated with cross-country motorized vehicle use, maintenance and use of designated routes, fuel breaks, livestock facilities, targeted grazing, and periodic heavy use to promote establishment of shrubs all cause soil surface disruption and vegetation removal that would tend to promote invasion and spread of noxious weeds and invasive plants. While cross-country motorized vehicle use would decrease, route density would remain similar to the No Action Alternative, disturbance associated with fuel breaks and livestock management would be greater than the No Action Alternative and Alternatives I, IV, and V. This would not likely result in large-scale conversion of native or non-native communities to annual communities, but would result in localized degradation of plant communities that could expand and connect over the long-term. Actions for treatment of noxious weeds and invasive plants would treat areas with high-potential for introduction such as fuel breaks, areas with high wildland fire occurrence, and roadsides, reducing the risk of invasion and spread.

Actions associated with ACECs would provide protection to existing and restored native plant communities, primarily in the Bruneau, Jarbidge, and Salmon Falls Creek Canyons, resulting in reduced potential for degradation or loss due to human and livestock uses, noxious weeds, invasive plants, or fire. The area protected by the Bruneau-Jarbidge ACEC would be about 67% of the area protected under Alternative I.

Alternative III would have both adverse and beneficial impacts to upland vegetation, resulting in an overall neutral impact. Alternative III would provide for protection and restoration of native shrublands; however, the mechanisms required for those activities (i.e., use of roads, fire breaks, targeted grazing) could increase potential for the spread of noxious species and invasive plants.

Impacts from Alternative IV (the Preferred Alternative)

Actions prescribed in Alternative IV would increase the relative proportion of acreage occupied by native shrublands across the entire planning area while decreasing the proportions of annual, non-native perennial, non-native understory, and native grassland communities. Vegetation treatments would result in 73% of the planning area occupied by shrubland communities, including non-native understory (10%) and native shrubland (63%). Over the long term, Alternative IV would create a landscape dominated by native communities in a variety of seral stages and the lowest proportion of uncharacteristic vegetation of all the alternatives. The greater proportion and continuity of diverse native shrubland communities, compared to all the other alternatives, would improve functions associated with these communities, including water infiltration, nutrient cycling, and soil stabilization. Livestock management actions, including allocations, utilization standards, residual height for wildlife habitat, and TNR, coupled with vegetation treatments, would result in greater structural complexity for both woody and herbaceous vegetation throughout the planning area compared to the No Action Alternative and Alternatives I, II, and III.

Fire management priorities would promote the protection of existing and restored native shrubland communities and facilitate post-fire conversion of annual, non-native perennial, and native grassland communities to native shrubland. The protection of key sage-grouse habitat would prioritize suppression resources for native shrublands. Critical suppression priorities would not be adequate to retain all native communities; however, native grasslands would be relatively resilient if burned. As other VSGs are converted to native shrubland, the potential for protection of all native shrubland communities would be reduced; therefore, it is likely that these communities would revert to native grassland in less resilient areas with lower suppression priority such as VMA A.

Actions associated with cross-country motorized vehicle use, maintenance and use of designated routes, fuel breaks, livestock facilities, targeted grazing, and periodic heavy use to promote establishment of shrubs all cause soil surface disruption and vegetation removal that would tend to promote invasion and spread of noxious weeds and invasive plants. Cross-country motorized vehicle use, route density, disturbance associated with fuel breaks and livestock management would be reduced compared to the No Action Alternative and Alternatives I, II, and III. This would reduce the potential for localized degradation of plant communities and expansion of disturbed areas. Actions for treatment of noxious weeds and invasive plants would not reduce potential for introduction in high use areas. However, due to reduction of activities that would result in introduction and spread, coupled with the greatest level of treatment of all the alternatives, Alternative IV would make the most progress towards control or eradication.

Actions associated with ACECs would provide a greater protection to existing and restored native plant communities, especially native shrublands, than the No Action Alternative and Alternatives I, II, and III. This would substantially reduce the potential for degradation or loss of native shrublands due to human or livestock uses, noxious weeds, invasive plants, or fire in 17% (Alternative IV-B; the Preferred Alternative) or 24% (Alternative IV-A) of the planning area, primarily in VMAs B, C, and D.

Overall, Alternative IV would result in moderate beneficial impacts to upland vegetation in the long term.

Impacts from Alternative V

Actions prescribed in Alternative V would increase the relative proportion of acreage occupied by non-native understory and native shrublands across the entire planning area while decreasing proportions of annual, non-native perennial, and native grassland communities. Vegetation treatments would result in 63% of the planning area occupied by shrubland communities, including non-native understory (19%) and native shrubland (44%). Over the long term, Alternative V would create a landscape dominated by perennial vegetation with large patches of native communities in a variety of seral stages interspersed with non-native perennial and non-native understory communities. The greater proportion and continuity of diverse native shrubland communities, compared to the No Action Alternative and Alternatives I, II, and III, would improve functions associated with these communities within the planning area, including water infiltration, nutrient cycling, and soil stabilization. Livestock management actions, including allocations, utilization standards, residual height for wildlife habitat, and lack of TNR, coupled with vegetation treatments, would result in the greatest potential for species diversity and structural complexity and the highest potential for landscape stability compared to the No Action Alternative and all other action alternatives.

Fire management priorities would promote protection of existing and restored native shrubland communities and facilitate post-fire conversion of annual and non-native perennial communities to native. The protection of key sage-grouse habitat would prioritize suppression resources for native shrublands. Most of this conversion would likely occur in VMA A. In VMAs B, C, and D, opportunities would be limited for post wildland fire treatments; therefore, Alternative V would require more use of prescribed fire in these VMAs as part of vegetation treatments.

Actions associated with cross-country motorized vehicle use, maintenance and use of designated routes, fuel breaks, and livestock facilities all cause soil surface disruption and vegetation removal that would tend to promote invasion and spread of noxious weeds and invasive plants. Cross-country motorized vehicle use, route density, disturbance associated with fuel breaks and livestock management would be the least of all alternatives. This would reduce the potential for localized degradation of plant communities and expansion of disturbed areas. Actions for treatment of noxious weeds and invasive plants would not reduce potential for introduction in high use areas. However, due to reduction of activities that would result in introduction and spread, coupled with the intermediate levels of treatment compared to the other alternatives, Alternative V would make intermediate progress towards control or eradication.

Actions associated with ACECs would provide a greater level of protection to existing and restored native plant communities, especially native shrublands, than any of the other alternatives. This would substantially reduce the potential for degradation or loss of native shrublands due to noxious weeds, invasive plants, or fire over greater than 70% of the planning area, primarily in VMAs B, C, and D.

Overall, Alternative V would result in minor beneficial impacts to upland vegetation in the long term.

Cumulative Impacts

Past, Present, and Reasonably Foreseeable Actions

Cumulative impacts for upland vegetation communities consist of incremental effects of the alternatives when added to other past, present, and reasonably foreseeable future actions. These effects can occur over a long period of time, resulting in the gradual changes in upland vegetation communities.

Because of similarities in geology, soils, and vegetation, the planning area and the following areas form the geographic boundary for the analysis of cumulative effects on upland vegetation: adjacent portions of BLM's Burley, Bruneau, Shoshone, and Wells (NV) FOs and Snake River Birds of Prey NCA; the South Hills Unit of the Sawtooth National Forest; and the Jarbidge Ranger District of the Humboldt-Toiyabe National Forest. The area includes Federal, State, and private lands. The temporal scope of the analysis is approximately 20 years or the life of the plan.

Past, present, and reasonably foreseeable actions for the following resources and resource uses cumulatively affect upland vegetation communities:

- Military Use
- Upland Vegetation
- Noxious Weeds and Invasive Plants
- Wildland Fire Ecology and Management
- Livestock Grazing
- Transportation and Travel

These actions are described in detail in the *Introduction* to this chapter.

Summary of Cumulative Impacts

Cumulative Impacts from the No Action Alternative

Past livestock grazing, wildland fires, and vegetation treatments resulted in vegetation removal and, in some areas, replacement of native plant communities with annual or non-native perennial communities. This conversion has been extensive throughout the cumulative analysis area, particularly in areas where the elevation is less than 5,000 feet. Wildland fires and associated impacts to plant communities are expected to continue throughout the analysis area. High suppression priorities for ignitions on military ranges could shift suppression efforts away from BLM-managed lands within the planning area or adjacent Federal, State, or private lands in the event of multiple incidents. This could result in local or large-scale changes in VSGs or seral stages of native plant communities due to burning of adjacent Federal, State, or private land and possibly post-fire vegetation treatments. Vegetation treatments that reduce acreage of annual communities and increase acreage of non-native and native perennial communities are expected to continue, primarily on adjacent Federal lands. This could reduce potential for future conversion of these areas to annual communities in the event of fire.

Removal of livestock from burned public lands and shifting use elsewhere could result in increased use on other Federal, State, or private lands. This could increase potential for localized introduction and spread of noxious weeds and invasive plants in these areas.

Because most of the planning area would remain open to cross-country motorized vehicle use, users from surrounding areas with more restrictions (e.g., National Forests and the Snake River Birds of Prey NCA) are expected to utilize the planning area, increasing the potential for noxious weeds and invasive plants into previously unused areas. This would increase the need for inventory and treatment.

Cumulative Impacts from Alternative I

Under Alternative I, cumulative impacts related to wildland fire would be due to upland vegetation treatments and wildland fire management actions that would increase vegetation resilience and reduce fire size. This would potentially reduce impacts of wildland fire and associated potential VSG conversions on adjacent Federal, State, and private lands.

Alternative I would increase the number of acres closed to motorized vehicle use and limited to designated routes within the cumulative analysis area. Restrictions in the planning area may result in increased impacts on adjacent Federal and State lands where cross-country motorized vehicle use is less restricted. Increased impacts to adjacent BLM lands would be short-term since the Bruneau, Burley, and Shoshone FOs are scheduled to prepare resource management plans for their respective planning areas in the near future. Likewise, the Humboldt-Toiyabe National Forest has initiated their travel management planning process. According to current policy, travel and transportation allocations would substantially decrease the amount of areas open to cross-country motorized vehicle use. This would decrease the potential for introduction and spread of noxious weeds and invasive plants, both within and adjacent to the planning area.

Cumulative Impacts from Alternative II

Cumulative impacts regarding potential activities that would result in VSG conversions and introduction and spread of noxious weeds and invasive plants under Alternative II are expected to be similar to the No Action Alternative. Alternative II prioritizes the least acreage of all action alternatives for critical suppression and creates a landscape dominated by non-native perennial communities. While these plant communities are relatively resilient in the event of fire, fire management priorities would increase potential for fire spread to adjacent Federal, State, and private lands. This would increase potential in those areas for VSG conversions.

Although no areas would be open to cross-country motorized vehicle use, the effects to vegetation, including introduction and spread of noxious weeds and invasive plants, would be larger in scale due to the expected increase in route density associated with commercial operations. As with Alternative I, the lack of opportunities for cross-country motorized vehicle use would likely shift current use to adjacent Federal or State lands with fewer restrictions.

Cumulative Impacts from Alternative III

Under Alternative III, cumulative effects of wildland fire management on upland vegetation are expected to be slightly greater than for Alternative I. Increases in fire suppression infrastructure could reduce potential for fire to spread to adjacent Federal, State, and private lands. However, potential for introduction and spread of noxious weeds and invasive plants would be greater. Cumulative impacts related to travel and transportation actions would be similar to Alternative I.

Cumulative Impacts from Alternative IV (the Preferred Alternative)

Under Alternative IV, cumulative effects of wildland fire management are expected to be slightly less than for Alternative I. This is due to greater acreage prioritized for critical suppression and reduced potential for fire spread to adjacent Federal, State, and private lands. Cumulative effects of transportation and travel actions would be similar to Alternative I.

Cumulative Impacts from Alternative V

Under Alternative V, cumulative effects of wildland fire management on upland vegetation are expected to be lowest of all alternatives. Critical suppression priorities could reduce potential for spread to adjacent Federal, State, and private lands. Alternative V contains the most restrictive travel management allocations of all the alternatives. Therefore lack of opportunities for cross-country motorized vehicle use would likely shift current use to adjacent Federal or State lands with fewer restrictions.

4.3.5.2. Riparian Areas and Wetlands

Analysis Methods

Indicators

The following indicators were used for the analysis of impacts to riparian areas and wetlands:

- **Riparian condition of Priority 1, 2, and 3 reaches as determined through Proper Functioning Condition (PFC) ratings** – PFC is qualitative assessment of the physical function of streams, wetlands, lakes, reservoirs, and other areas associated with riparian or wetland vegetation. PFC ratings are based on hydrology, riparian vegetation, and the balance between erosional and depositional forces.

- **Habitat condition for special status fish species in Priority 1 reaches with Habitat Condition (HC) data** – HC encompasses streambank stability, streambank cover, stream substrate condition (including spawning fine sediments), water temperature (maximums for juvenile fish rearing), pool volume, pool quality, migration barriers, width-to-depth ratio, habitat complexity, and relative fish abundance. Generally, actions that improve habitat condition for special status fish would also be actions that improve riparian condition. HC and its relationship to stream condition for special status fish are assessed in detail in the *Special Status Fish and Aquatic Invertebrates section.*

Methods and Assumptions

Impacts to riparian areas and wetlands from management in the following sections of Chapter 2 were analyzed in detail: *Riparian Areas and Wetlands*, *Special Status Species*, *Noxious Weeds and Invasive Plants*, *Wildland Fire Ecology and Management*, *Livestock Grazing*, *Recreation*, *Transportation and Travel*, *Land Use Authorizations*, *Minerals*, and *Areas of Critical Environmental Concern*. Impacts from management in the *Water Resources*, *Upland Vegetation*, and *Fish and Wildlife* sections were captured in the analysis of sections that were analyzed in detail and, to avoid repetition, were not discussed separately. Management from the remaining sections was not analyzed in detail because the management did not vary measurably between alternatives or impact the indicator for riparian areas and wetlands. **Impacts from management for riparian areas and wetlands** can be found under *Impacts from Riparian Areas and Wetlands Actions* in the *Water Resources*, *Fish*, *Wildlife*, *Special Status Fish and Aquatic Invertebrates*, and *Livestock Grazing* sections.

Assessing PFC is the first step in determining riparian and wetland condition. The guidance for assessing PFC for riparian areas can be found in *Riparian Area Management: A Users Guide to Assessing Proper Functioning Condition and the Supporting Science for Lotic Areas* (BLM, 1998a). The guidance for assessing PFC for wetland areas can be found in *Riparian Area Management: A Users Guide to Assessing Proper Functioning Condition and the Supporting Science for Lentic Areas* (BLM, 1999b). Both of these references were used to complete the PFC assessments for riparian areas and wetlands that were carried forward into this analysis.

Riparian Areas

PFC evaluates the physical characteristics of the riparian ecosystem. Where instream channel characteristics and riparian vegetation are functioning properly, the habitat requirements for fish and wildlife are also maintained. While streams at PFC are conducive to good fish habitat, PFC does not address all biological requirements of fish and wildlife including, but not limited to, factors such as barriers to migration and impaired water quality. Therefore, PFC is a starting point, or a minimum condition needed, to sustain fish and wildlife resources. For this reason, the HC and PFC data were both considered in the analysis for riparian areas. In general, improving PFC condition for riparian areas and wetlands would also improve habitat conditions and water quality for fish. There were 245 miles of riparian PFC data used for the analysis. Of these, data for 196 miles were collected in 2006, and data for the remaining 49 miles were collected between 1999 through 2007.

Riparian areas are lands adjacent to or contiguous with permanent or intermittently flowing water bodies (Hansen & Hall, 2002). The boundaries of the riparian area extend outward to the limits of flooding and upward into the canopy of streamside vegetation (Gregory, et al., 1991; Swanson, et al., 1982). Indicators that include vegetative and instream characteristics are important for evaluating the functionality of riparian systems and their interrelated physical and biotic components. These indicators are included in the PFC rating for evaluating riparian areas and the HC rating for evaluating special status fish habitat and were used to analyze the impacts from management actions.

The 2006 lotic PFC data were validated using the quantitative HC fisheries data for individual stream reaches and are summarized in Table 7 of Appendix D (Aquatic and Riparian Management Strategy, referred to as “the ARMS” throughout this section). The PFC evaluation was used to assess riparian function at a watershed scale (general qualitative assessment) and the HC data were used to assess stream channel condition (i.e., hydrology, riparian vegetation, erosion, and deposition) at a site-specific scale. Where the HC and PFC data overlapped, both data sets were used to discuss the impacts to riparian areas and prioritize restoration objectives based on feasibility of BLM actions to improve riparian condition. The validation process used the HC habitat data to answer PFC questions (PFC checklist questions 3, 8, 9, 11, 14, and 15) to ensure consistency between the HC and PFC determination of functional condition (BLM, 1998a). Where the HC and PFC data did not overlap, BLM relied on the functional condition determinations (Table 4- 81).

Table 4- 81. Priority Reaches with HC Data by Type of HC Rating (Miles)

HC Rating	Total Miles of Priority Reaches with HC Data
Priority 1 (FAR, FAR-DN)	
Restoration Reaches	11
Conservation Reaches	9
Total	**19**
Priority 2 (FAR-UP, NF)	
Restoration Reaches	4
Conservation Reaches	3
Total	**7**
Priority 3 (PFC)	
Restoration Reaches	11
Conservation Reaches	1
Total	**12**
Grand Total	**39**

The PFC ratings generated from the miles of PFC data and the validation of the PFC ratings with the HC data (Table 4- 81) were used to prioritize riparian reaches for restoration (Table 4- 82). The priority for restoration focuses on stream reaches that are functioning-at-risk with no apparent trend (FAR-NA) or functioning-at-risk with a downward trend (FAR-DN). Non-functioning (NF) stream reaches were included in the assessment, but are generally not considered a priority for restoration because the reduced riparian condition can be a result of factors beyond BLM discretion (i.e., dewatering). The effort, cost, and time required for recovery in NF riparian areas is dramatically increased compared to riparian areas that are closer to PFC (BLM, 1998a). Areas that are at PFC are usually not a high priority for restoration because they are already properly functioning and are more resilient than the FAR areas. The priorities for riparian restoration by functional condition rating are summarized in Table 4- 82. Stream reaches with these PFC ratings are referred to as Priority 1, Priority 2, or Priority 3 reaches through the rest of the document. PFC assessments were completed on 20 miles of riparian area where their classification as riparian areas is unknown. These areas with unknown riparian condition encompass 8% of the total miles of riparian PFC in the planning area and were included in the riparian miles as Unknown.

Table 4- 82. Riparian PFC Ratings and Priorities for Restoration (Miles)

Riparian PFC Rating	Priority for Restoration	Miles of Stream
FAR-NA and FAR-DN	Priority 1	77
FAR-UP and NF	Priority 2	63
PFC	Priority 3	85
Unknown		20
	Total	**245**

The effects analysis compared relevant management actions under each alternative to the objective of achieving the riparian management goals and objectives for PFC. Either the action contributes to attaining the goals and objectives, has a neutral effect, or reduces the likelihood that the goals and objective would be achieved. Within each of the alternatives, a certain amount of risk is associated with actions under the various resources as to whether the objectives for riparian management would be met in the life of the plan.

To identify the overall riparian resource in the planning area, the United States Geological Survey (USGS) National Hydrologic Data (NHD) Layer was used to identify the miles of stream by stream type in the planning area. The NHD are designed to be used in general mapping and in the analysis of surface-water systems using GIS. Local, on-the-ground knowledge was used to verify the stream types generated by the NHD. The planning area is primarily high desert, with the exception of the southern portion (e.g., Jarbidge Mountains and Foothills). These types of environments are often comprised of primarily ephemeral and intermittent streams. In the planning area, 89% of all stream types are ephemeral or intermittent. In most cases, intermittent streams contain riparian vegetation, have defined channel, and contain water more than 30 days a year. Ephemeral streams are located above the water table, contain water only in direct response to precipitation, and are dominated by upland plant species. These streams contribute to watershed functionality and condition as a whole. The planning area also contains interrupted streams, streams with discontinuities in stream flow due to factors such as diversions or dams. A portion of the FAR-DN and NF ratings include these stream types.

Perennial stream miles were provided to establish a context for the miles of streams with the potential to be affected by a specific land use allocation and to provide a relationship between the amount of riparian area available relative to the amount of riparian area available that has PFC data.

Wetlands

The existing wetland data were collected using BLM Technical Report 1737-16, *A User's Guide to Assessing Proper Functioning Condition and the Supporting Science for Lentic Areas* (BLM, 1999b) and is summarized in (Table 3-11). It is estimated that fewer than 10% of the wetlands in the planning area have been assessed for PFC. The wetlands impact analysis focuses on management actions that have the potential to affect wetland conditions through authorized land uses (i.e., livestock grazing, transportation and travel, recreation, land use authorizations, minerals). It is assumed the guidance in the ARMS and the guidance to protect cultural resources near wetlands and springs would minimize effects to wetlands and springs from these land uses. The management of wetlands would follow the Idaho BLM Technical Bulletin 2007-2, *Lentic Riparian-Wetland Prioritization Guide: A Process for Evaluating Management and Restoration Priorities for Non-Riverine Systems* (Burton, et al., 2008). Lentic PFC may be completed as part of rangeland health assessments, grazing allotment reviews, and other project planning efforts to facilitate the development of restoration priorities for wetlands.

Other assumptions used in the analysis of impacts to riparian areas and wetlands include the following:

- Riparian PFC is a broad-scale rating representative of an entire stream reach. Small components of the reach may display conditions that are more or less than the overall reach rating, but on the whole, the PFC assessments are an accurate representation of the current condition.
- Stream reaches with overlapping PFC and HC data are accurate representations of the riparian areas functionality.
- Pairing qualitative PFC data and quantitative HC data strengthens the rating of that reach and the rationale/indicators addressing the vegetative component and hydrological/biotic component for the rating.
- Miles of stream type are accurate to the best available knowledge. PFC miles represent actual on-the-ground miles that have been verified.
- Intermittent streams contain riparian characteristics (i.e., hydric vegetation, defined stream channel, contains surface water more than 30 days a year) and were included in the PFC condition summaries. The inclusion of intermittent streams with PFC data yields a more comprehensive analysis of the current riparian condition.
- Riparian areas rated as “Unknown” would need to be further assessed to determine their functional condition.
- NF riparian areas would not provide quality habitat for fish and wildlife (BLM, 1998a).
- In a high-flow event, a FAR riparian-wetland area would likely lose any habitat that exists (BLM, 1998a).
- Management associated with Riparian Conservation Areas (RCAs) in the ARMS would improve riparian areas that are in need of restoration for special status fish.
- The guidance in the ARMS would be adequate to maintain riparian conditions for land use activities occurring near or in riparian areas that do not contain special status fish.
- Riparian areas along larger rivers are more resistant to wildland fire than riparian areas along smaller headwater streams.
- Management actions that address or impact special status aquatic species also impact riparian areas and wetlands; actions that improve habitat for special status aquatic species also improve riparian condition.
- The use of the Multiple Indicator Monitoring (MIM) protocol (Burton, et al., 2007) to determine short-term and long-term trends would detect areas where the objectives for RCA improvement were not being achieved. The use of adaptive management would ensure objectives would be met.

Direct and Indirect Impacts

Impacts from Riparian Areas and Wetlands Actions

Riparian vegetation, such as trees, brush, grasses, and forbs, all play an important role in building and maintaining productive streams. Trees provide shade and streambank stability because of their large size and massive root systems. As trees mature and fall into or across streams, they create pools and riffles, and their large mass also helps to control the slope and stability of the channel. Brush not only protects the streambank from water erosion, its low overhanging height adds cover that is used by fish. Brush, like trees, builds stability in streambanks through its root systems and leaf litter. Grasses form the vegetative mats and sod banks that reduce surface erosion and mass wasting of streambanks (Platts, 1991). Streamside vegetation needs to be vigorous and dense and to have enough species diversity that it can form layers over the ground. Each vegetative type plays an important role in forming and protecting the aquatic habitat (Platts, 1991). Riparian vegetation reduces instream fine sediments, the intensity of solar radiation, assimilates nutrients, and moderates streamflows. These values are a component of HC and PFC ratings. When instream HC and PFC riparian ratings are functioning properly, the riparian and aquatic objectives would be met

Impacts from Management Specific to the No Action Alternative

The No Action Alternative includes direction to maintain or improve riparian habitat condition and identifies fish and riparian values as high priority. Riparian and wetland habitat would have a high priority for protection and improvement according to national policy. Management actions in floodplains and wetlands include measures to preserve, protect, and, if necessary, restore their natural function. In general, the management guidance is to avoid uses in the riparian buffer zone, but there is no direction for improving or restoring riparian condition over the life of the plan. The conditions of the riparian areas in the planning area are summarized in Table 3-10.

The No Action Alternative provides general guidance for wetlands in conjunction with riparian areas, but does not provide specific management direction for maintaining or improving wetland condition. The wetlands that have been assessed for lentic PFC are summarized in Table 3-11.

Impacts from Management Common to All Action Alternatives

All action alternatives would implement the ARMS to achieve riparian and wetland management objectives through the implementation of conservation and restoration activities. The ARMS outlines priorities for riparian restoration based on PFC and HC data and provides direction to maintain RCAs in good condition and for prioritizing other riparian areas for restoration and recovery. Implementing the ARMS would lead to improvements in HC and PFC riparian ratings for fish over the life of the plan.

The ARMS provides direction to use adaptive management (Williams, et al., 2007) to reduce impacts on riparian areas and wetlands from BLM authorized uses and activities. By adjusting management strategies as supported by monitoring or other site-specific data, adaptive management would result in a long-term trend toward meeting HC and PFC objectives. Adaptive management would also promote achieving the long-term objectives of the RMP for ESA, Clean Water Act, and S&Gs. Compliance with the ARMS would promote the long-term improvement in riparian condition over the life of the plan. The use of the MIM Protocol (BLM, 1998a) would determine trend and allow adaptive management to be implemented to improve riparian areas and assure conditions are progressing toward achieving HC and PFC objectives.

All action alternatives include management actions to consider authorizing activities where long-term improvements would outweigh short-term impacts to riparian condition and for removing non-essential human-made structures and objects that impact floodplain function. Although short-term localized effects to riparian areas could occur, these actions would comply with the ARMS to promote improvements in riparian condition in the long-term.

The ARMS includes specific guidelines for improving aquatic habitats under the RCA guidance for Category 3 riparian areas (i.e., ponds, lakes, reservoirs, and wetlands greater than 1 acre) and Category

4 riparian areas (i.e., seasonally flowing or intermittent streams and wetlands less than 1 acre). Wetland condition is expected to improve under all action alternatives as a result of this management direction.

The ARMS includes guidance to apply the Idaho Stream Channel Alteration rules to actions involving construction in the high water lines and to apply the *Grazing Management Processes and Strategies for Riparian-Wetland Areas* (Wyman, et al., 2006) to riparian areas and wetlands that do not contain special status aquatic species. These guidance documents would reduce effects to riparian areas and wetlands and improve PFC ratings over the life of the plan.

Impacts from Management Specific to Alternative I

Management actions for riparian areas and wetlands would improve riparian condition, move riparian Priority 1 and 2 reaches toward PFC, and maintain Priority 3 reaches at PFC. Riparian reaches containing special status fish and rated as Priority 1 would receive the highest priority for restoration as identified in the ARMS. The restoration actions could result in short-term and localized reductions in PFC ratings, but riparian condition would be improved in the long-term. This is expected to result in an upward trend in riparian condition over the life of the plan. The result of the management guidance in Alternative I would be:

- 60 miles of Priority 1 reaches and 63 miles of Priority 2 reaches would achieve PFC
- 17 miles of Priority 1 reaches would move toward PFC
- 85 miles of Priority 3 reaches would be maintained at PFC

Impacts from Management Specific to Alternative II

Management actions for riparian areas and wetlands would aid in restoration, move riparian Priority 1 and 2 reaches towards PFC, and maintain Priority 3 reaches at PFC. Riparian reaches containing special status fish and rated as Priority 1 would receive the highest priority for restoration. The restoration actions could result in short-term and localized reductions in PFC ratings, but riparian condition would be improved in the long-term. This is expected to result in an upward trend in riparian condition for Priority 1 and Priority 2 streams over the life of the plan. The result of the management guidance in Alternative II would be:

- 77 miles of Priority 1 reaches and 63 miles of Priority 2 reaches would move toward PFC
- 85 miles of Priority 3 reaches would be maintained at PFC

Impacts from Management Specific to Alternative III

Management actions for riparian areas and wetlands would aid in restoration, move riparian Priority 1 and 2 reaches towards PFC, and maintain Priority 3 reaches at PFC. Riparian reaches containing special status fish that were rated as Priority 1 would receive the highest priority for restoration. Stream reaches with the potential to serve as fire breaks would also be a high priority for restoration. This management action would improve riparian vegetation in these emphasis areas. The identified restoration actions could result in short-term reductions in PFC ratings, but riparian condition would be improved in the long-term. This is expected to result in an upward trend in riparian condition over the life of the plan. The result of the management guidance in Alternative III would be:

- 77 miles of Priority 1 reaches and 21 miles of Priority 2 reaches would achieve PFC
- 42 miles of Priority 2 reaches would move toward PFC
- 85 miles of Priority 3 reaches would be maintained at PFC

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Management actions for riparian areas and wetlands would aid in restoration, move riparian Priority 1 and 2 reaches towards PFC, and maintain Priority 3 reaches at PFC. Riparian reaches containing special status fish and rated as Priority 1 would receive the highest priority for restoration. The restoration actions could result in short-term and localized reductions in PFC ratings condition, but riparian condition would be improved in the long-term. This is expected to result in an upward trend in riparian condition over the life of the plan. The result of the management guidance in Alternative IV would be:

- 77 miles of Priority 1 reaches and 21 miles of Priority 2 reaches would achieve PFC
- 42 miles of Priority 2 reaches would move toward PFC

- 85 miles of Priority 3 reaches would be maintained at PFC

Impacts from Management Specific to Alternative V

Management actions in the restoration toolbox would aid in restoration, move riparian Priority 1 and 2 reaches towards PFC, and maintain PFC Priority 3 reaches at PFC. Riparian reaches containing special status fish and rated as Priority 1 would receive the highest priority for restoration. Active restoration would be limited to those reaches rated as FAR-DN or NF. The restoration actions could result in short-term localized reductions in PFC ratings, but riparian condition would be improved in the long-term. This is expected to result in an upward trend in riparian condition over the life of the plan. The result of the management guidance in Alternative V would be:

- 77 miles of Priority 1 reaches and 21 miles of Priority 2 reaches would achieve PFC
- 42 miles of Priority 2 reaches would move toward PFC
- 85 miles of Priority 3 reaches would be maintained at PFC

Impacts from Special Status Species Actions

Managing streams to maintain and promote the biological needs of special status aquatic species directly influences HC and PFC ratings. Special status aquatic species require stable streams that are well vegetated with low instream fine sediments and cool water temperatures for survival and reproduction (Appendix D). Shaded stream areas are preferred habitats of juvenile salmonids (Platts, 1991). PFC is a minimal requirement for special status aquatic species. HC goes beyond PFC by addressing sediment, water temperature, fish abundance, and instream characteristics related to hydrological function (e.g., depth, maximum width, length, area, number/mile, and dominant substrate of pools). The interaction between special status aquatic species and HC and PFC ratings are discussed in the *Special Status Fish and Aquatic Invertebrates* section.

Any actions related to restoring, conserving, moving toward or achieving a satisfactory HC rating for special status species habitat would improve PFC ratings for riparian areas. A total of 39 miles have both riparian HC and PFC data, 19 miles (49%) of which are Priority 1 reaches. The miles of priority reaches with HC data and their HC rating are summarized in Table 4- 81.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative includes management guidance to protect the riparian habitat for Sensitive and Candidate species in the Snake River below lower Salmon Falls Dam. The current management direction does not include guidance for improving the existing habitat condition in the Snake River or any other fish-bearing streams in the planning area. A portion of the Snake River snail habitat would be protected but not improved under this management direction. The 500-foot year-round occupancy restrictions for oil and gas exploration and development would include riparian areas and wetlands containing redband trout, white sturgeon, and Shoshone sculpin, but would not include riparian areas and wetlands in the Jarbidge River Watershed. Some riparian areas would be maintained under the management for eligible WSR segments, but other riparian areas not included in eligible WSR segments would be at risk of being maintained in their current condition (Restoration Reaches that overlap Priority 1 and 2 reaches). The No Action Alternative provides limited guidance for riparian areas to be moving toward or achieving management objectives. This alternative does not identify how riparian areas and wetlands would be restored or provide clear direction for avoiding impacts to riparian areas or wetlands from new land use authorizations.

Impacts from Management Common to the No Action and All Action Alternatives

The No Action Alternative and all action alternatives include guidance to follow current conservation measures in biological opinions and letters of concurrence, which can be updated, revised, or replaced through future consultation with the FWS. This guidance would maintain or improve riparian condition in streams containing aquatic species for which ESA consultation has been completed (see *Special Status Fish and Aquatic Invertebrates* section).

Impacts from Management Common to All Action Alternatives

All action alternatives include management direction to maintain or improve aquatic species habitats according to the ARMS. The ARMS guidance supports the attainment of special status fish and riparian condition objectives. Since special status aquatic species are dependent upon functional riparian areas, any activities that improve HC ratings would also improve PFC ratings. All action alternatives would include the use of BMPs contained in Appendix E (referred to as "BMPs" throughout this section) to maintain and improve HC ratings for special status aquatic species, which would also improve PFC ratings for riparian areas.

Impacts from Management Specific to Alternative I

Alternative I includes adjustments to livestock use levels, seasons of use, or other management techniques to maintain or enhance special status aquatic species and their habitat. The guidance in the ARMS would be used to manage 145 miles of stream to achieve PFC and 80 miles of stream to be moving toward PFC over the life of the plan. This rate of riparian improvement is slower than in Alternatives III, IV, and V, but faster than in Alternative II. The ARMS and BMPs would be used to meet the habitat needs of special status aquatic species, which would also improve riparian condition for Priority 1 and Priority 2 reaches.

Based on the riparian objectives for Alternative I, 60 miles of Priority 1 reaches would achieve PFC and 17 miles of Priority 1 reaches would be moving toward PFC. The 19 miles of Priority 1 reaches with HC data would achieve PFC over the life of the plan in addition to 41 miles of Priority 1 reaches without HC data. This guidance supports the attainment of the ARMS objectives, the special status aquatic species objectives, and the riparian objectives.

Impacts from Management Specific to Alternative II

In Alternative II, management strategies that support commodity uses would be implemented in a manner that complies with the ARMS. The ARMS guidance would be used to manage 85 miles of stream to achieve PFC and 140 miles of stream to be moving toward PFC over the life of the plan. This rate of riparian improvement is slower than all of the other action alternatives and would result in more miles of stream being in a condition that is lower than PFC over the life of the plan. The ARMS and BMPs would be used to meet the riparian habitat needs of special status aquatic species, which would also improve riparian condition for Priority 1 and Priority 2 reaches.

Based on the riparian objectives for Alternative II, all 77 miles of Priority 1 reaches would be moving toward PFC, including the 19 miles of Priority 1 reaches with HC data and 58 miles of Priority 1 reaches without HC data. This guidance supports the attainment of the ARMS objectives, the special status aquatic species objectives, and the riparian objectives.

Impacts from Management Specific to Alternative III

In Alternative III, management strategies to enhance wildland fire suppression and prevention would be implemented. The ARMS includes management direction for wildland fire ecology and management, watershed and habitat restoration, and species-specific fire and fuels management guidance for ESA-listed bull trout and aquatic snails. The guidance in the ARMS would be used to meet the riparian objectives of managing 183 miles of stream to achieve PFC and 42 miles of stream to be moving toward PFC over the life of the plan. This rate of riparian improvement is similar to Alternatives IV and V and faster than in Alternatives I and II. Compliance with this guidance is expected to minimize the potential for effects to riparian areas and wetlands from fire suppression activities.

Based on the riparian objectives for Alternative III, all 77 miles of Priority 1 reaches would achieve PFC, including the 19 miles of Priority 1 reaches with HC data would and 58 miles of Priority 1 reaches without HC data. This guidance supports the attainment of the ARMS objectives, the special status aquatic species objectives, and the riparian objectives.

Some fire-related actions, such as fuels treatments in RCAs, could have long-term effects to RCA condition. Compliance with ESA consultations, where applicable, and compliance with the ARMS in other riparian areas and wetlands is expected to minimize the potential for fuels treatments to affect riparian condition. Fuels treatments in riparian areas and wetlands that do not contain ESA-listed species would be managed according to the ARMS, which is expected to reduce the potential to affect these riparian and wetland areas. The guidance in Appendix E would also be used to minimize the potential for effects to riparian areas from fuels treatment in RCAs.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV includes the management direction to implement strategies most beneficial to other resources, where practical, and has an active restoration emphasis for resource uses. Stream reaches containing special status aquatic species habitat would be a high priority for active restoration (Appendix D). Active restoration would be limited to Priority 1 and Priority 2 restoration reaches. The guidance in the ARMS would be used to meet the riparian objective to manage 183 miles of stream to achieve PFC and 42 miles of stream to be moving toward PFC over the life of the plan. This rate of riparian improvement is similar to Alternatives III and V and is faster than in Alternatives I and II. As a result, more miles of stream would be at PFC over the life of the plan than in Alternatives I and II.

Based on the riparian objectives for Alternative IV, all 77 miles of Priority 1 reaches would achieve PFC, including the 19 miles of Priority 1 reaches with HC data and 58 miles of Priority 1 reaches without HC data. This guidance supports the attainment of the ARMS objectives, the special status aquatic species objectives, and the riparian objectives.

The ARMS includes general management direction for activities such as active watershed and riparian restoration and includes a list of conservation and restoration watersheds for the action alternatives. Active restoration activities in RCAs could have more short-term effects, but there is likely to be more improvements to the habitat in the long-term and at a faster rate than would be expected from passive restoration. Appendix E also includes guidance for restoration activities in RCAs that would reduce the potential for effects to riparian areas and wetlands.

Impacts from Management Specific to Alternative V

Alternative V includes management direction to implement primarily passive restoration strategies most beneficial to other resources. Stream reaches containing special status species habitat would be a high priority for restoration. The guidance in the ARMS would be used to meet the riparian objective of managing 183 miles of Priority 1 and 2 reaches to achieve PFC and 42 miles of stream to be moving toward PFC over the life of the plan. This rate of riparian improvement is similar to Alternatives III and IV and faster that in Alternatives I and II.

Based on the riparian objectives for Alternative V, all 77 miles of Priority 1 reaches would achieve PFC, including the 19 miles of Priority 1 reaches with HC data and 58 miles of Priority 1 reaches without HC data. This guidance supports that attainment of the ARMS objectives, the special status aquatic species objectives and the riparian objectives.

The passive restoration activities would have fewer short-term effects and longer habitat recovery time frames from restoration activities than the restoration activities in Alternative IV. In some cases, recovery may not be achieved if specific actions are needed to restore a riparian component that is no longer present (i.e., appropriate hydric vegetation) or to remove an impact to the stream channel (i.e., remove a culvert that is impairing streamflow). Passive restoration combined with fewer resource uses would improve HC and PFC ratings in the long-term. Priority 2 reaches are likely to achieve PFC in a shorter timeframe than reaches that are Priority 1 because the Priority 2 reaches are in a higher functional condition.

Impacts from Noxious Weeds and Invasive Plants Actions

Noxious weeds and invasive plants are often the first colonizers of disturbed areas. These species lack deep root systems, which stabilize streambanks and maintain narrow stream channels. Noxious weeds and invasive plants can replace native vegetation (e.g., juniper encroachment prevents aspen and willow regeneration). These types of plants can also affect wetlands, resulting in the possible formation of headcuts from overland flows; this can result in lowering the water table and loss of riparian plant species necessary for water retention in soils. Noxious weeds and invasive plants can alter soil stability, promote erosion, and affect the accumulation of leaf litter or other soil resources. Where noxious weeds invade riparian areas and wetlands, PFC ratings decline, and the attainment of the riparian objectives is less likely to occur.

Noxious weed and invasive plant treatments can generally be described as chemical, mechanical, manual, or biological. When these treatments are used in riparian areas, their potential effects vary by the method used, the amount and type of vegetation treated, the amount of soil disturbed, the proximity of the treatment to water, and a variety of other factors (BLM, 2007c). Maintaining native vegetation in RCAs is essential to maintaining PFC. Noxious weed and invasive plant treatments in RCAs would be desirable as long as mitigation is applied to reduce effects to native riparian vegetation to the extent possible. The short-term effects of noxious weed and invasive plant treatments are generally less than the effects of allowing noxious weeds and invasive plants to displace native riparian vegetation over the long-term.

Impacts from Management Specific to the No Action Alternative

Noxious weeds and invasive plants are expected to continue to increase in riparian habitats under the No Action Alternative. Canadian thistle and bull thistle have been observed along portions of Shack, Rocky Canyon, Bear, China, Cedar, Deer, and Deadwood Creeks. These invasive plants lack the rhizomatous root masses necessary for maintaining streambank stability and can displace desirable riparian plants. Under the No Action Alternative, invasive plants such as tamarisk, Russian olive, purple loosestrife, and reed canary grass are also expected to increase over time. The number and diversity of aquatic invasive plants, such as Hydrilla, milfoil, and others (Table 3-12) have also increased under the No Action Alternative and are expected to continue to increase over time. Management also includes guidance to comply with biological opinions, Candidate Conservation Agreements, management plans for ACECs and other special designations, and current BLM policy for noxious weed and invasive plant treatments. This provides direction for riparian areas occupied by ESA-listed species and BLM Sensitive species, but not necessarily for all riparian areas in the planning area. Compliance with the terms and conditions in biological opinions issued by FWS would minimize the potential for effects from noxious weed and invasive plant treatments to affect riparian areas containing special status aquatic species. Noxious weed treatments in these riparian areas occupied by special status aquatic species are expected to reduce the potential for noxious weeds to increase to levels that would reduce PFC ratings. Overall, the management provided in the No Action Alternative is not expected to promote the attainment of objectives for Priority 1 and 2 reaches due to the expected increase in noxious weeds and invasive plants in RCAs.

Impacts from Management Common to All Action Alternatives

All action alternatives would treat noxious weeds and invasive plants in upland and riparian areas to achieve a variety of resource objectives. Management common to all action alternatives includes direction to follow applicable laws, policies, label instructions for the application of herbicides, and the current vegetation treatment EIS, currently the *Final Programmatic Environmental Impact Statement for Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States* (BLM, 2007b), which would reduce the potential for native riparian vegetation to be reduced due to an increase in noxious weeds or from treatments that would be implemented to reduce these plants. This management guidance is expected to promote the attainment of objectives for Priority 1 and 2 reaches. The BMPs for noxious weed and invasive plants would be incorporated into BLM management activities and authorized uses as appropriate.

Impacts from Management Specific to Alternative I

In Alternative I, chemical, mechanical, biological treatments, and targeted grazing would be used to treat noxious weeds and invasive plants in RCAs. The emphasis areas would include RCAs occupied by special status aquatic species, recreation access points, and special designations. Noxious weed and invasive plant treatments in RCAs occupied by ESA-listed species would be conducted according to ESA consultation requirements, which would avoid the potential for effects to non-target riparian vegetation. The current vegetation treatment EIS (BLM, 2007b) and the Clean Water Act would provide guidance so that chemicals would not be used in a manner where they could affect riparian areas containing special status aquatic species. Noxious weed and invasive plant treatments in RCAs reduce the risk for these plants to outcompete native riparian vegetation and would promote riparian areas to be moving toward PFC.

The guidance in the ARMS includes direction to improve riparian condition by reducing threats to native vegetation from noxious weeds and invasive plants. This guidance would reduce the potential for riparian vegetation to be degraded due to the invasion of noxious weeds and invasive plants. Alternative I would have an estimated 250,000 acres of noxious weed and invasive plant treatments in the life of the plan, which is more than the No Action Alternative. The treatment of noxious weeds and invasive plants in RCAs is expected to promote the attainment of objectives for Priority 1 and 2 reaches.

The use of targeted grazing to treat noxious weeds and invasive plants could affect riparian conditions depending on intensity and timing. Although the purpose of the treatment would be to reduce noxious weeds in RCAs, livestock would also browse non-target vegetation such as willows, carex, and sedges. This could result in a decrease in streambank stability prior to achieving the objectives for reducing noxious and invasive plants. The timing of the treatments and monitoring would be essential in reducing yearly weed production while not impairing the yearly growth of the desirable riparian vegetation. Targeted grazing to reduce noxious weeds in upland areas would have minimal effects to riparian areas as long as livestock do not enter the riparian area as part of the treatment and the guidelines in the ARMS are followed. Managing riparian areas at their potential would discourage invasive plants due to dense woody and herbaceous vegetation. Since targeted grazing could not be implemented to only remove the noxious weeds and invasive plants, impacts to herbaceous and woody hydric vegetation would be expected in RCAs. The use of targeted grazing is not expected to promote the attainment of objectives for Priority 1 and 2 reaches.

Impacts from Management Specific to Alternative II

In Alternative II, the priority areas for treating noxious weeds and invasive plants would be riparian areas, special status species habitat, and native plant communities. Chemical, mechanical, and biological methods, as well as targeted grazing and prescribed fire, would be used to treat noxious weeds and invasive plants. The effects of noxious weed and invasive plant treatments are the same as described in Alternative I. Overall, noxious weed and invasive plant treatments in RCAs reduce the risk for these plants to outcompete native riparian vegetation and would promote objectives for Priority 1 and 2 reaches, although some treatment methods could locally reduce native riparian vegetation.

The potential effects from using targeted grazing to reduce fuels in RCAs are the same as described for Alternative I. Alternative II differs from Alternative I in that prescribed fire would be allowed to treat noxious weeds and invasive plants in RCAs. Prescribed fire has similar effects on the landscape as wildland fire, although the effects can be less pronounced because they are planned ignitions and are conducted according to specific project guidelines. The use of prescribed fire in riparian areas could potentially reduce PFC ratings because the fire would remove non-target vegetation. These effects would persist over the long term (5 to 10 years) because woody riparian vegetation recovers much slower than herbaceous vegetation (Burton, 2005; Rieman & Clayton, 1997). A site-specific analysis would be needed to assure using prescribed fire in RCAs to control noxious weeds and invasive plants would achieve ARMS objectives for riparian recovery. Using prescribed fire to reduce noxious weeds and invasive plants in RCAs is not expected to promote the attainment of objectives for Priority 1 and 2 reaches.

Impacts from Management Specific to Alternative III

In Alternative III, the priority areas for treating noxious weed and invasive plants would be special designations, fuel breaks, areas with high fire occurrences, areas around historic structures, roadsides, and riparian areas containing special status aquatic species. Chemical, mechanical, and biological methods, as well as targeted grazing and prescribed fire, would be used for noxious weed treatments. There would be fewer acres of noxious weeds treated under Alternative III than in any of the action alternatives, which could result in an incremental increase in noxious weeds and invasive plants in RCAs over time. An increase in noxious weeds in RCAs could reduce PFC ratings and the likelihood for riparian areas to be moving toward or achieving riparian management objectives. Overall, noxious weed and invasive plant treatments in RCAs reduce the risk for these plants to outcompete native riparian vegetation and would promote objectives for Priority 1 and 2 reaches, although some treatment methods have the potential to reduce native riparian vegetation.

The effects of noxious weed and invasive plant treatments in RCAs are the same as described in Alternative I. The potential effects from using targeted grazing and prescribed fire to reduce fuels in RCAs are the same as described under Alternatives I and II. Modifying uses in RCAs could reduce the introduction of noxious weeds and invasive plants into RCAs and the need for treatments that could impact non-target riparian vegetation and reduce PFC ratings.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

In Alternative IV, the priority areas for treating noxious weed and invasive plants would be special designations, riparian areas, special status species habitat, and native plant communities. This alternative would have the greatest number of weed treatment acres (estimated 450,000 acres over the life of the plan) of any of the action alternatives. Chemical, mechanical, and biological methods as well as targeted grazing and prescribed fire would be used for treatments. The effects of these treatments in RCAs are the same as described for Alternatives I and II, except the effects could potentially occur over a larger area. Overall, noxious weed and invasive plant treatments in RCAs reduce the risk for these plants to outcompete native riparian vegetation and would promote management objectives for riparian areas to be moving toward PFC. Some treatment methods, such as prescribed fire and targeted grazing, have the potential to reduce native riparian vegetation and may not promote the attainment of riparian management objectives. Alternative IV would have the greatest risk for riparian objectives not to be met due to noxious weed treatments.

Impacts from Management Specific to Alternative V

In Alternative V, the priority areas for treating noxious weed and invasive plants would be special designations, riparian areas, special status species habitat, and native plant communities. This alternative would have fewer acres treated than Alternative IV, but more than Alternatives I, II, and III. The emphasis areas and treatment methods are the same as those described for Alternative IV, except that targeted grazing would not be used. The effects of these treatments in RCAs are the same as those described under Alternatives I and II except there would be no impacts related to targeted grazing. Overall, noxious weed and invasive plant treatments in RCAs would reduce the risk for these plants to outcompete native riparian vegetation and would promote objectives for Priority 1 and 2 reaches.

Impacts from Wildland Fire Ecology and Management Actions

Riparian areas are often resilient to the effects of wildland fire when they are functioning properly and have adequate vegetation. These areas may burn in a fire, but with low to moderate intensity. The areas of most concern in this analysis are those riparian reaches currently not at PFC. The susceptibility of these riparian areas to fire effects may also vary by position in a watershed and size of the riparian area or wetland. The ecological diversity of riparian areas is maintained by natural disturbances regimes (Dwire & Kauffman, 2003; Naiman, et al., 1993), including fire, fire-related flooding, debris flows, and landslides. In some cases, fire may improve riparian areas and wetlands by releasing nitrogen and facilitating additional growth for vegetation. Floods following fires may result in both the erosion of established floodplains as well as the deposition of varied substrates and large wood where succession or stand establishment begins anew. These events create complex patterns of soil morphology and groundwater dynamics that influence riparian plant and animal communities (Dwire, 2001; Gregory, et al., 1991; Otting, 1999). The regeneration of aspen clones, cottonwood, and willows are promoted by light severity fire. These plant species are well adapted to the effects of wildland fire.

Fire or other disturbances can reduce the vigor of resident plants and their ability to resist invasion, or alter environmental conditions to favor invaders (King & Grace, 2000). The larger perimeter-to-area ratio of small burns can make areas more vulnerable to invasion by noxious weeds and invasive plants than with larger fires (Turner, et al., 1997). This is related to dispersal capabilities of these plants in riparian areas. Riparian burns tend to be “spotty” due to an elevated water table in the riparian area and the presence of water-loving plants, which also raise the water table in riparian areas through their deep root masses and transpiration. Promoting or suppressing wildland fire can change the functionality and dynamics of entire ecosystems (Richardson, et al., 2000; Vitousek, 1990). Fire history studies have concluded that both frequency and severity of wildland fires are lower in riparian areas than adjacent uplands (Morrison & Swanson, 1990; Teensma, 1987; Weisberg, 1998). The presence of noxious weeds, which are effective at colonizing disturbed areas, are a threat to riparian vegetation and may facilitate more frequent fire in riparian areas and wetlands than historically occurred.

Impacts from human alterations associated with fire suppression, as summarized in the literature (Backer, 2004), include soil compaction, erosion, and reduced riparian productivity from fire camps, fire lines, helibases, incident command posts, road construction, and non-native plant species introductions. Prescribed fire used to reduce fuels may have impacts to riparian ecosystems similar to low-severity wildland fires. Such impacts may include reductions in riparian vegetation in the short term followed by immediate re-vegetation responses following fire.

Critical Suppression Areas represent the highest suppression priority. Alternatives that identify critical suppression for high priority riparian areas and wetlands would reduce the potential for effects to these habitats. Conditional Suppression Areas, which represent areas of lower suppression priority based on the resource values and a desired fire role in the ecosystem, could result in unsuppressed wildland fire in RCAs; this could result in a short-term reduction in PFC ratings followed by a long-term improvement in PFC ratings.

Priority 1 and 2 reaches are most at risk from the effects of wildland fire because of their impaired riparian function and therefore would benefit most from being in a Critical Suppression Area. These riparian areas with reduced PFC ratings are more susceptible to increased burn severity than riparian areas that are functioning properly. Priority 1 and 2 reaches in Conditional Suppression Areas would be more at risk if there are multiple fire starts and suppression resources are focused in other priority areas.

Table 4- 83 displays the miles of priority reaches in Critical Suppression Areas by VMA. Perennial stream miles in Critical and Conditional Suppression Areas by VMA and Conservation and Restoration Reaches in Critical Suppression Areas are summarized in the *Special Status Fish and Aquatic Invertebrates* section (Table 4- 120 and Table 4- 121).

Impacts from Management Specific to the No Action Alternative

The No Action Alternative manages the planning area for full suppression and aggressively suppressing all new fires; however, this results in no prioritization for wildland fire suppression activities. Limited management guidance is provided for fuels treatments and ES&BAR for protecting watershed and riparian conditions. Management direction to avoid mechanical equipment in canyons and some riparian areas provides guidance for a small portion of the Snake River at the Sand Point ACEC. Although the direction in the No Action Alternative is to suppress all wildland fires, the possibility for large fires to occur due to factors that are beyond human control (i.e., drought conditions, weather, availability of flashy fuels) is expected to continue. Riparian areas would continue to be at risk from wildland fire due to these factors combined with limited access and a lack of prioritization for riparian areas for wildland fire suppression. The riparian areas in a reduced condition (Priority 1 and 2 reaches) are at most risk for further reduction in condition due to wildland fire. The current management provides limited direction for minimizing impacts to aquatic habitats, riparian areas, or water quality. This could result in a reduction in PFC ratings from wildland fire suppression activities. There is higher potential for a reduction in PFC ratings for Priority 1 and 2 reaches in the No Action Alternative than in the action alternatives. The No Action Alternative would not promote the attainment of riparian objectives for Priority 1 and 2 reaches.

Impacts from Management Common to All Action Alternatives

All action alternatives include using the ARMS for wildland fire suppression in riparian areas and incorporating BMPs into BLM management activities and authorized uses. The potential for short-term impacts to riparian areas and wetlands would still occur as a result of the wildland fire; however, the management guidance in the ARMS would reduce the potential effects from the suppression activities on riparian areas and wetlands. Implementing the guidance in the ARMS would promote the attainment of objectives for Priority 1 and 2 reaches.

Fire suppression activities would use MIST to minimize impacts to riparian areas due to fire suppression activities. Additional guidance for fire suppression activities such as the ARMS and other BMPs would also reduce impacts to riparian areas and wetlands and improve PFC ratings. Site-specific mitigation, such as drafting water from streams in a manner that does not cause localized dewatering and avoiding fueling, staging, and other fire support areas in RCAs, would minimize the potential effects from fire suppression activities on riparian areas and wetlands.

Table 4- 83. Priority Reaches in Critical Suppression Areas by VMA by Alternative (Miles)

Priority Rating	Alternative [A]					
	I	II	III	IV		V
				IV-A	IV-B	
VMA A						
Priority 1	1	1	1	1	1	1
Priority 2	7	7	7	7	7	9
Priority 3	10	1	10	10	10	10
Total	**18**	**9**	**18**	**18**	**18**	**20**
VMA B						
Priority 1	15	3	8	15	15	20
Priority 2	3	3	3	3	3	18
Priority 3	18	1	16	17	17	17
Total	**36**	**7**	**27**	**35**	**35**	**55**
VMA C						
Priority 1	13	6	11	13	13	15
Priority 2	2	0	2	4	2	13
Priority 3	15	1	15	17	17	21
Total	**30**	**7**	**28**	**34**	**32**	**49**
VMA D						
Priority 1	24	8	22	33	27	38
Priority 2	15	6	15	22	15	25
Priority 3	25	11	20	36	30	37
Total	**64**	**25**	**57**	**91**	**72**	**100**
Entire Planning Area						
Priority 1	53	18	42	62	56	75
Priority 2	26	16	26	36	27	63
Priority 3	67	22	62	78	72	84
Total	**145**	**56**	**130**	**176**	**155**	**222**

[A] The No Action Alternative does not identify Critical or Conditional Suppression Areas.

All action alternatives would include fuels treatments to protect WUI; an unspecific amount of these treatments would be in riparian areas and would follow the guidelines in the ARMS. Fuels treatments in the riparian area would have short-term impacts but potentially long-term improvements in riparian vegetation in areas that are at PFC. Degraded riparian areas may not respond in a similar manner because they tend to burn with greater severity and take more time to recover. The guidance in the ARMS, BMPs, and ESA consultation guidelines would reduce the potential for fuels treatments to affect riparian areas containing special status species. Rest from uses such as livestock grazing and recreation use would be an important component for the recovery of RCAs after fuels treatments.

A variety of mechanical, chemical, and manual methods would be used to restore vegetation and stabilize soils in burned areas. The ARMS, BMPs, and compliance with ESA consultations where required would reduce impacts to riparian areas and wetlands from ES&BAR projects. Some localized short-term reduction in PFC ratings could occur, but are not expected to result in an overall decrease in PFC ratings for the burned area in the long term.

Impacts from Management Specific to Alternative I

Of the 316 miles of perennial streams in the planning area, 239 miles would be in Critical Suppression Areas, leaving 77 miles in Conditional Suppression Areas in Alternative I. Critical Suppression Areas contain 53 miles of Priority 1 reaches, 27 miles of Priority 2 reaches, and 68 miles of Priority 3 reaches

(Table 4- 83). Critical suppression in Priority 1 and 2 reaches supports the objectives for these areas. Conditional Suppression Areas contain 24 miles of Priority 1 reaches, 36 miles of Priority 2 reaches, and 17 miles of Priority 3 reaches. Priority 1 and 2 reaches are more at risk under conditional suppression. This alternative would rank fourth of the action alternatives for the risk of reducing the PFC rating for Priority 1 and 2 reaches in Conditional Suppression Areas.

VMA C would have highest priority for fire suppression when multiple wildland fire ignitions occur. Critical Suppression Areas in VMA C contain 13 miles of Priority 1 reaches, 2 miles of Priority 2 reaches, and 15 miles of Priority 3 reaches (Table 4- 83). VMA C has the third highest amount of Priority 1 and 2 reaches of the four VMAs.

Alternative I would include guidance for improving water availability. The types of water development would include water storage tanks, draft sites, hydrants off pipelines, enlarging stock water and surface water storage ponds, and vehicle wash stations. The general effects of diverting surface flows from streams would depend on their proximity to the riparian areas and wetlands, the amount of water used, and the rate and time of year surface waters are diverted (see the *Water Resources* section). Effects of water developments on riparian areas would also depend upon whether the potential water resource is from impounded waters (e.g., livestock watering ponds, reservoirs) or flowing waters in rivers and streams. The use of impounded waters for fire suppression would likely have a minimal impact on PFC ratings for riparian areas and wetlands.

The use of flowing waters for wildland fire suppression could have localized effects to riparian areas and wetlands. The development of new draft sites could have localized effects to streamside vegetation, streambanks, streambed fine sediments, pool quality, and the amount of surface flows if water is diverted during low flow conditions or at a rate that locally reduces surface flows (see *Impacts from Wildland Fire Ecology and Management Actions* in the *Special Status Fish and Aquatic Invertebrates* section).

Hydrants off pipelines would probably have a minor short-term effect on streamflow due to additional surface water being diverted from streams to accommodate fire suppression needs.

The use or expansion of stock water and other water storage ponds could be a concern for riparian areas and wetlands. Water storage impoundments can reduce PFC ratings for riparian areas and wetlands by altering streamflows, introducing sediments into stream channels and locally reducing water quality. Water impoundments in tributaries can have similar effects of altering streamflows and could eliminate perennial flows to downstream reaches as a result of impounding or diverting surface water. These changes in streamflow can have direct, indirect, and potentially long-term reductions in downstream PFC ratings for riparian areas and wetlands. Stock water ponds and water impoundments tend to concentrate livestock in RCAs. This can increase grazing-related impacts to adjacent riparian areas resulting in a reduction in PFC ratings. Stock water ponds in upland areas would have less potential to affect PFC ratings than water impoundments in RCAs.

Vehicle wash stations would likely be located in upland areas and obtain water from an on-site storage tank or well. These stations would not be expected to have a measurable effect on local surface flows. Vehicle wash stations could reduce the potential for noxious weeds and invasive plants to be introduced into RCAs from fire suppression vehicles and equipment.

Road and stream crossing improvements would occur under this alternative. Road improvements in RCAs can have a short-term reduction in PFC ratings that ultimately lead to long-term improvements in PFC rating for riparian areas and wetlands. The primary effect of roads on streams is from sediment contributions that exceed the stream’s ability to transport the additional fine sediments. Site-specific and short-term effects to HC ratings from fire-related road improvements would occur, but road improvements would ultimately have to improve instream habitats in the long-term to comply with the ARMS. Improved road surfacing, road realignment away from riparian areas and wetlands, improved road drainage, or replacing damaged riparian vegetation would reduce sediment contributions to streams where roads are present in RCAs and result in improved PFC ratings.

New roads could also be constructed to assist fire suppression in areas with limited access. Some of these new roads or road-related improvements would likely be in RCAs. Roads constructed in RCAs and any other road-related improvements would be constructed using the guidance in the ARMS to reduce effects to riparian area and wetlands. New roads in uplands would likely have a minor effect on riparian habitats as long as BMPs are used to minimize off-site surface erosion to RCAs. It is possible that the new roads in uplands would improve the response time for fire suppression and would reduce the potential for riparian habitats to burn due to wildland fire, especially in areas with Priority 1 and 2 reaches.

Management guidance to improve stream crossings would include upgrading undersized culverts or replacing culverts with bridges. All of these actions result in a localized short-term reduction in PFC rating but improved PFC ratings in the long term due to restored riparian vegetation and hydrologic function. The guidance in the ARMS and BMPs would reduce impacts to riparian areas and wetlands from improving stream crossings for fire suppression. Stream crossings could also be designed to allow for water withdrawals for fire suppression so additional riparian and wetland disturbance is not created to obtain water.

As these new roads and stream crossings are created, the potential for increased use by public land users would have an additive effect to RCAs. The guidance in the ARMS and BMPs would reduce impacts to PFC ratings from constructing new roads and stream crossings for wildland fire suppression efforts.

New guard stations could be constructed under this alternative. It is expected this infrastructure would not be constructed in RCAs and would be located in areas that meet the guidance in the ARMS. Petroleum products and other hazardous materials are likely to be stored and used at these facilities. The storage and handling of these materials would be conducted according to the ARMS, BMPs, the Clean Water Act, and other State standards. Locating these facilities in uplands would minimize the potential for direct or indirect effect to riparian areas and wetlands.

Impacts from using targeted grazing to treat fuels in RCAs are similar to those described under *Impacts from Noxious Weeds and Invasive Plants Actions*. In general, using livestock to treat fuels in RCAs would increase the amount of livestock browsing on non-target native hydric species and could reduce PFC ratings. Targeted grazing would be expected to increase impacts to RCAs, particularly in VMAs B and D which contain the majority of Priority 1 and 2 reaches in the planning area, unless additional infrastructure (i.e., fences, off-site water) is used to reduce the potential for impacts to RCAs.

Impacts from Management Specific to Alternative II

Critical Suppression Areas would include 88 miles of perennial streams, with the remaining 228 miles of perennial streams in Conditional Suppression Areas in Alternative II. Critical Suppression Areas contain 18 miles of Priority 1 reaches, 16 miles of Priority 2 reaches, and 14 miles of Priority 3 reaches (Table 4-83). This is the least amount of Priority 1 and 2 reaches in Critical Suppression Areas for all action alternatives. Conditional Suppression Areas in Alternative II contain 59 miles of Priority 1 reaches, 46 miles of Priority 2 reaches, and 71 miles of Priority 3 reaches. This alternative would be the least likely to improve PFC ratings of all alternatives and facilitate achievement of riparian objectives in the life of the plan, as Alternative II has more miles of Priority 1 and 2 reaches in Conditional Suppression Areas and has substantially fewer miles of Priority 1 and 2 reaches in Critical Suppression Areas than the other action alternatives.

VMA A would have highest priority for fire suppression when multiple wildland fire ignitions occur for Alternative II. Critical Suppression Areas in VMA A contain 1 mile of Priority 1 reaches, 3 miles of Priority 2 reaches, and 1 mile of Priority 3 reaches (Table 4- 83). VMA A is the northernmost VMA in the planning area and has the least amount of Priority 1 and 2 reaches of the four VMAs.

Creating new and improving existing water developments would have the same effects to riparian areas and wetlands as described for Alternative I; however, vehicle wash stations would not be developed. Improving roads and stream crossings, building new roads in areas with limited access, and building new guard stations would have the same effects to riparian areas and wetlands as Alternative I.

Alternative II would include the use of prescribed fire, targeted grazing, and increased permitted livestock grazing to reduce fuels. The potential effects from using targeted grazing for fuels treatments are similar to those described under *Impacts from Noxious Weeds and Invasive Plants Actions*; the impacts of using increased permitted livestock grazing to reduce fuels are described under *Impacts from Livestock Grazing Actions*. These fuels treatment methods could reduce the condition of RCAs containing Priority 1 and 2 reaches.

Impacts from Management Specific to Alternative III

Critical Suppression Areas would encompass 180 miles of perennial streams, with the remaining 135 miles of perennial streams in Conditional Suppression Areas in Alternative III. Critical Suppression Areas contain 42 miles of Priority 1 reaches, 27 miles of Priority 2 reaches, and 61 miles of Priority 3 reaches (Table 4- 83). This alternative has slightly fewer Priority 1 and 2 reaches under critical fire suppression than Alternative I. Conditional Suppression Areas in Alternative III contain 35 miles of Priority 1 reaches, 36 miles of Priority 2 reaches, and 24 miles of Priority 3 reaches. This alternative would rank fifth for the risk of reducing the PFC rating for miles of Priority 1 and 2 reaches in Conditional Suppression Areas

VMA B would have highest priority for fire suppression when multiple fire ignitions occur for Alternative III. Critical Suppression Areas in VMA B contain 8 miles of Priority 1 reaches, 3 miles of Priority 2 reaches, and 17 of miles Priority 3 reaches (Table 4- 83). The VMA includes lower portions of Clover Creek (intermittent or dry), middle sections of the Bruneau River, and lower sections of Salmon Falls Creek before its confluence with the Snake River. VMA B has the second largest amount of Priority 1 and 2 reaches of the four VMAs.

For Alternative III, the effects of management as Critical and Conditional Suppression Areas on PFC ratings are similar to those described for Alternative I, although fewer miles would be in Critical Suppression Areas. The difference for Alternative III is the increased amount of infrastructure that would be constructed to support fire suppression activities.

There would be more infrastructure to increase water availability for fire suppression under this alternative than any of the other action alternatives. The effects from water storage tanks, draft sites, hydrants off pipelines, enlarging stock water and surface water storage ponds, and vehicle wash stations are the same in Alternative I; however, the development of new pipelines could have additional effects to RCAs. These developments would have localized disturbance to streamside vegetation, streambeds, and streambank stability. There also would be effects to streamflows as additional water is removed from the stream and the riparian area narrows. Some of the site-specific effects from these developments could be mitigated, but impacts to PFC ratings would occur from their development and use.

Alternative III would have the greatest number of new roads and improvements to existing roads and stream crossings to facilitate fire suppression of any of the action alternatives and the greatest potential for a reduction in PFC ratings. The effects of improving existing roads and stream crossings and building new roads are similar to those described under Alternative I.

The effects of building new guard stations are similar to those described under Alternative I. New airstrips and helipads could be constructed under this alternative, and existing airstrips could be improved. It is expected this infrastructure would not be constructed in RCAs and would be located in areas that meet the guidance in the ARMS. Petroleum products and other hazardous materials are likely to be stored and used at these facilities. The storage and handling of these materials would be conducted according to the ARMS, BMPs, the Clean Water Act, and other State standards. Locating these facilities in uplands would minimize the potential for direct or indirect effect to riparian areas and wetlands.

In Alternative III, fuels treatments would occur at the landscape scale and would include increased permitted livestock grazing, targeted grazing, and prescribed fire. These fuels treatments would have similar effects to PFC ratings as described under *Impacts from Livestock Grazing Actions* and *Impacts from Noxious Weeds and Invasive Plants Actions*. Fuels treatments would occur on approximately 492,000 acres over the life of the plan, more acres than under Alternative II but fewer than in the other alternatives.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

In Alternative IV-A, Critical Suppression Areas would encompass 262 miles of perennial streams, with the remaining 54 miles of perennial streams in Conditional Suppression Areas. In Alternative IV-B (the Preferred Alternative), Critical Suppression Areas would encompass 251 miles of perennial streams, with the remaining 66 miles of perennial streams in Conditional Suppression Areas. More Priority 1 and 2 reaches would be in Critical Suppression Areas in the Jarbidge Foothills ACEC in Alternative IV-A than in IV-B. Critical suppression in the Inside Desert ACEC would provide increased emphasis for riparian areas in portions of lower Clover Creek in Alternative IV-A compared to Alternative IV-B.

Critical Suppression Areas in Alternative IV-A contain 62 miles of Priority 1 reaches, 36 miles of Priority 2 reaches, and 80 miles of Priority 3 reaches (Table 4- 83). This alternative has the second highest amount of Priority 1 and 2 reaches in Critical Suppression Areas of all the alternatives. Conditional Suppression Areas contain 15 miles of Priority 1 reaches, 27 miles of Priority 2 reaches, and 5 miles of Priority 3 reaches. Alternative IV-A would be ranked second for the risk of reducing PFC rating for Priority 1 and 2 reaches in Conditional Suppression Areas.

Critical Suppression Areas in Alternative IV-B contain 56 miles of Priority 1 reaches, 27 miles of Priority 2 reaches, and 74 miles of Priority 3 reaches (Table 4- 83). This alternative has the third highest amount of Priority 1 and 2 reaches in Critical Suppression Areas of all the alternatives. Conditional Suppression Areas contain 21 miles of Priority 1 reaches, 36 miles of Priority 2 reaches, and 11 miles of Priority 3 reaches. Alternative IV-B would be ranked third for the risk of reducing PFC rating for Priority 1 and 2 reaches in Conditional Suppression Areas.

VMA C would have highest priority for fire suppression when multiple fire ignitions occur for Alternative IV. In Alternative IV-A, Critical Suppression Areas in VMA C contain 13 miles of Priority 1 reaches, 4 miles of Priority 2 reaches, and 17 miles of Priority 3 reaches (Table 4- 83); miles of Priority 1 and 3 reaches in Critical Suppression Areas in VMA C are the same in Alternative IV-B, with 2 fewer miles in Priority 2.

As in the other action alternatives, there would be an increased emphasis on improving water sources, roads and stream crossings, and other infrastructure to enhance fire suppression. However, water development improvements would consist only of hydrants off pipelines and enlarging stock water and surface water storage ponds. The effects from these facilities are the same as those described for Alternative I. The effects of improving existing roads and stream crossings, constructing new roads and crossings, and building new guard stations would also be the same as described for Alternative I.

The effects of using prescribed fire and targeted grazing for fuels reduction are similar to those described under *Impacts from Noxious Weeds and Invasive Plants Actions*. Alternative IV would include more acres of fuels treatments (1,115,000 acres) than Alternative III (492,000 acres) over the life of the plan. Not all of these treatment acres would be in RCAs, but riparian areas and special status aquatic species habitats would be an emphasis for these treatments.

Impacts from Management Specific to Alternative V

Critical Suppression Areas would encompass 303 miles of perennial streams, with the remaining 13 miles of perennial streams in Conditional Suppression Areas in Alternative V. Critical Suppression Areas in the Sagebrush Sea ACEC would encompass 258 miles of the 316 total perennial stream miles in the planning area. The suppression emphasis and tactics are expected to reduce the potential for wildland fire and fire suppression to reduce PFC ratings to the extent practical. The ARMS guidance would be used to reduce effects from fire suppression on riparian areas and wetlands. RCAs could be affected from suppression activities in localized areas when there is a need to protect structures and public safety. However, identifying critical suppression for such a large area could limit fire suppression options during multiple fire ignitions when flexibility with suppression resources is needed to suppress the fire.

Critical Suppression Areas in Alternative V contain 74 miles of Priority 1 reaches, 65 miles of Priority 2 reaches, and 85 miles of Priority 3 reaches (Table 4- 83). This is the most miles of Priority 1 and 2 reaches under critical suppression of all alternatives. Conditional Suppression Areas in Alternative V contain 3 miles of Priority 1 reaches. Alternative V would have the least risk of all the action alternatives of reducing PFC ratings of Priority 1 and 2 reaches due to their inclusion in Conditional Suppression Areas.

VMA C would have highest priority for fire suppression when multiple fire ignitions occur for Alternative V. Critical Suppression Areas in VMA C contain 15 miles of Priority 1 reaches, 13 miles of Priority 2 reaches, and 21 miles of Priority 3 reaches (Table 4- 83); VMA C has the third highest amount of Priority 1 and 2 reaches of the four VMAs.

This alternative would have less fire suppression infrastructure and less watershed disturbance than any of the other action alternatives and would have the least potential to reduce PFC ratings of any alternative due to these activities. Water developments would be maintained at their current levels, which would result in fewer disturbances to RCAs and less risk for a reduction in PFC rating than under the other action alternatives. However, maintaining water availability at current levels could affect response time for suppression and result in more acres burned by fire under more extreme burn conditions; this would pose an increased risk to PFC ratings where wildland fire burns in RCAs. Road improvements in RCAs could result in areas where water can be obtained for wildland fire suppression in areas already impacted by roads or stream crossing. The effects of road and stream crossing improvements are the same as described for Alternative I.

The effects of using prescribed fire for fuels treatments are the same as described under *Impacts from Noxious Weeds and Invasive Plants Actions*.

Impacts from Livestock Grazing Actions

Livestock can alter the structure and function of riparian plant communities by grazing, browsing, and trampling; the quantity and composition of plant species as well as the quantity and depth of plant roots can be affected. Livestock can also change the vertical structure and distribution of vegetation, as selective removal or trampling damage can alter age structure of plant communities (Kauffman & Krueger, 1984; Popolizio, et al., 1994). Riparian areas where livestock have access and the PFC data indicate a reduced condition (Priority 1 and 2 reaches) are at most risk for impacts from livestock grazing and least likely to attain or be moving toward riparian objectives.

Streambank shape, soil composition, and gradient are the primary drivers of a stream's hydrological function. Streambanks are the interface between instream characteristics (e.g., flow) and terrestrial characteristics (e.g., riparian vegetation). Excessive livestock trampling can break down streambanks, resulting in lower (flattened) bank angles, a reduction in bank undercutting (Platts, 1991), and accelerated bank erosion. Bank sloughing by livestock can influence the erosion-deposition cycle by accelerating soil erosion (bank degradation) and decreasing deposition on streambanks (bank building) during flood events, largely due to removal of vegetative cover (Platts, 1991). Transport of soils and fine organic material away from the site decreases the fertility of the soils and can reduce capacity to support vegetation of any type (Brady, 1984), resulting in riparian degradation. The vegetation component of certain streamside habitat types responds more quickly to improved management practices than other components such as streambank morphology (Platts, 1991).

A combination of trampling and browsing by livestock can alter the structure of willow populations. Krueger and Anderson showed that 41% of willow stands in a riparian habitat with ponderosa pine were tunneled (i.e., lower branches removed, forming paths through the normally intermeshed vegetation) by cattle (Krueger & Anderson, 1985). This can affect overland surface water flow resulting in channeling. Schulz and Leininger reported that willows were both older and larger in a 30-year exclosure compared with a grazed area, indicating cattle browsing had affected both the age structure and size of the plants. Some willows improve from browsing (Schulz & Leininger, 1991). Drummond willow (*Salix drummondiana*) and Booth willow (*Salix boothii*) depend on newly developed gravel bars, freshly broken banks, or seasonal sediment deposition (Winward, 1986) and would also likely improve from wildland fire since they thrive where there are natural disturbances. Browsing can affect riparian trees, primarily by reducing or eliminating regenerating trees, mainly aspen (*Populus tremuloides*) and cottonwood (*Populus trichocarpa*). Skovlin concluded that the impacts of heavy and/or uncontrolled cattle grazing on shrubs and trees were primarily from the damage to the regenerative stage of woody plants (Skovlin, 1984).

Riparian reference areas closed to livestock grazing allow for comparisons for future evaluation of livestock grazing impacts on public lands. These areas create a representative sample of ecosystem components, vegetation types, and elevation gradients. Excluding livestock from these areas allows for the evaluation of changes in stream channels. Livestock exclusion is associated with a decrease in the width-to-depth ratio, which is strongly associated with quality of habitat for fish, particularly for salmonids. Platts found that once grazing ceased, streambanks rebuilt rapidly, and streams were significantly narrower inside a rested exclosure than stream reaches outside the exclosure (Platts, 1991). The riparian reference areas are expected to result in improved HC and PFC ratings and improve special status aquatic species and riparian habitats. This would result in achievement or movement towards riparian and wetland objectives for Priority 1 and 2 reaches under all action alternatives.

Fencing to exclude livestock grazing from streams is a widely used approach for restoring stream habitats (Platts, 1991). Properly constructed and maintained exclosure fences protect riparian vegetation and streambanks from livestock grazing and other effects (e.g., recreation, OHV, and other vehicle access). Research shows that riparian areas quickly improve when they are fenced to exclude grazing. A ten-year riparian grazing study on a cold mountain meadow riparian system in central Idaho found that stream channels narrowed, stream width-to-depth ratios were reduced, and channel substrate embeddedness decreased under a no grazing, light grazing (20-25%), and medium grazing (35-50%) system. Streambank stability increased, and streamside willow communities *(Salix* spp.) increased in both height and cover under all three grazing treatments. Virtually all stream channel measurements improved when pastures were not grazed. Many of the similar improvements indicated these riparian habitats are compatible with light to medium late-spring use by cattle (Clary, 1999). Other grazing strategies can also be compatible with riparian habitats needs (Platts, 1991).

Table 4- 84 displays the miles of priority reaches in areas available and unavailable for livestock grazing by alternative. Table 4- 85 displays the miles of perennial streams and priority reaches in reference areas by alternative.

Table 4- 84. Priority Reaches in Areas Available and Unavailable to Livestock Grazing by Alternative (Miles)

Priority Rating	Alternative						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
Available							
Priority 1	58	41	43	43	41	41	27
Priority 2	58	40	56	56	45	46	34
Priority 3	48	43	47	47	44	44	26
Total	**164**	**124**	**146**	**146**	**130**	**131**	**87**
Unavailable							
Priority 1	17	35	33	33	34	34	49
Priority 2	5	23	7	7	18	17	29
Priority 3	36	42	37	37	41	41	59
Total	**58**	**100**	**77**	**77**	**93**	**92**	**137**

Table 4- 85. Perennial Streams and Priority Reaches in Riparian Reference Areas by Alternative (Miles)

Riparian Reference Areas		Alternative [A]				
		I	II	III	IV	V
Perennial Stream Miles in Reference Areas		19	7	7	19	25
Priority Reach Miles in Riparian Reference Areas	Priority 1	5	4	4	5	4
	Priority 2	11	2	2	11	8
	Priority 3	2	<1	<1	2	11
	Unknown	0	0	0	0	27
[A] The No Action Alternative does not identify reference areas.						

Miles of perennial streams and Conservation and Restoration Reaches in areas available and unavailable for grazing and in riparian reference areas are summarized in the *Special Status Fish and Aquatic Invertebrates* section (Table 4- 122 and Table 4- 123).

Impacts from Management Specific to the No Action Alternative

In the No Action Alternative, 138 miles of perennial streams are available to grazing and 178 miles of perennial streams are unavailable to livestock grazing. The No Action Alternative has the most perennial stream miles available for grazing. Approximately five riparian exclosures were created under the No Action Alternative.

Of the perennial and intermittent streams available for grazing under No Action Alternative, 58 miles are Priority 1, 58 miles are Priority 2, and 48 miles are Priority 3 (Table 4- 84). Of the streams unavailable for grazing, 17 miles are Priority 1, 5 miles are Priority 2, and 36 miles are Priority 3 (Table 4- 84). This management guidance is expected to maintain the current condition of the existing riparian conditions and PFC ratings and would not promote the attainment of objectives for Priority 1 and 2 reaches.

Impacts from Management Common to All Action Alternatives

Livestock grazing would comply with the management guidance in the ARMS. This guidance would be used in grazing authorizations and yearly operating plans to adjust livestock grazing in areas identified as needed improvement based on HC or PFC ratings. This is expected to result in improved HC and PFC ratings in stream reaches needing restoration and maintaining the areas identified for conservation.

Impacts from Management Specific to Alternative I

Under Alternative I, 95 miles of perennial streams would be available and 221 miles would be unavailable for livestock grazing. The areas available for grazing include 41 miles of Priority 1 reaches, 40 miles of Priority 2 reaches, and 43 miles of Priority 3 reaches (Table 4- 84); the areas unavailable for grazing include 35 miles of Priority 1 reaches, 23 miles of Priority 2 reaches, and 42 miles of Priority 3 reaches. Areas unavailable for grazing also include ten riparian reference areas, encompassing 19 miles of perennial streams and approximately 3,000 acres; this includes 5 miles of Priority 1 reaches and 11 miles of Priority 2 reaches (Table 4- 85).

Priority 1 and 2 reaches that remain available for grazing are more at risk for impacts from livestock grazing, while Priority 1 and 2 reaches are unavailable for grazing are more likely to contribute to the attainment of riparian objectives. Alternative I would have more miles of Priority 1 and 2 reaches at risk of reduction in PFC rating due to livestock grazing than Alternative V, but fewer than the No Action Alternative and Alternatives II, III, and IV.

Livestock grazing would not occur in RCAs in the Jarbidge River and its East Fork, but would occur in the smaller tributaries to the Jarbidge Foothills streams. Grazing in these areas could contribute fine sediments to riparian areas and wetlands. Except for the 19 miles in riparian reference areas, livestock would have access to all riparian areas and wetlands in the Jarbidge Foothills. Livestock grazing in these areas would pose an increased risk of reducing PFC ratings in RCAs. Livestock would not have direct access to riparian areas containing special status species in the lower Bruneau River and the Snake River due to existing ESA consultation requirements with the FWS. The ARMS and BMPs would be applied to grazing allotments and would improve PFC ratings, promoting the attainment or movement toward the riparian objectives. Overall, livestock grazing impacts to PFC ratings under this alternative would be more than in Alternative V, but less than in the other alternatives.

TNR would be allowed except in pastures in a WSA, the riparian pasture of the Lower Saylor Creek Allotment, and in the Sand Point ACEC. Any TNR issued in RCAs would be done according to the guidance in the ARMS, which would require HC and PFC ratings to be maintained or improved by actions authorized in RCAs. Livestock have an increased tendency to select for woody vegetation late in the grazing season after the herbaceous vegetation has cured. Issuing TNR late in the grazing season would pose an increased risk to woody vegetation in riparian areas and wetlands. These habitats could also be affected by issuing TNR in upland areas unless upland water is provided and temporary fencing is used to prevent livestock from accessing the RCAs.

Alternative I would allow livestock trailing across the East Fork of the Jarbidge River to the Wilkins Island Allotment using riders to herd livestock. This use would continue to cause localized streambank alteration as livestock trail through the RCA on the East Fork of the Jarbidge River. However, this trailing occurs in the summer months when riparian banks are not saturated and less prone to shearing by hoof impacts. As a result, livestock trailing through the RCA and into the uplands would likely contribute some amount of fine sediment into the East Fork of the Jarbidge River over time as this area continues to be used for livestock trailing.

Impacts from Management Specific to Alternative II

In Alternative II, 121 miles of perennial streams would be available and 195 miles would be unavailable for livestock grazing. The areas available for grazing include 43 miles of Priority 1 reaches, 56 miles of Priority 2 reaches, and 47 miles of Priority 3 reaches (Table 4- 84); the areas unavailable for grazing, 33 miles of Priority 1 reaches, 7 miles of Priority 2 reaches, and 37 miles of Priority 3 reaches. Areas unavailable for grazing also include ten riparian reference areas, encompassing 7 miles of perennial streams and approximately 1,000 acres; this includes 4 miles of Priority 1 reaches and 2 miles of Priority 2 reaches (Table 4- 85).

Priority 1 and 2 reaches that remain available for grazing are more at risk for impacts from livestock grazing, while Priority 1 and 2 reaches unavailable for grazing are more likely to contribute to the attainment of riparian objectives. Alternative II would have more miles of Priority 1 and 2 streams at risk of reduction in PFC rating due to livestock grazing than Alternatives IV, V, and I, the same miles as Alternative III, and fewer miles than the No Action Alternative.

The effects of this alternative are similar to those described for Alternative I, except more miles of riparian area would be available to grazing, including miles along Clover Creek and the Snake River. The guidance in the ARMS and Appendix E would reduce the effects of grazing on riparian areas. Overall, this alternative would have the greatest potential for livestock to affect RCAs than any of the other alternatives.

Reserve Common Allotments would be selected based on special management concerns, such as riparian areas containing aquatic status aquatic species and whether the area can sustain grazing use without significant resource impacts. The designation of Reserve Common Allotments would provide flexibility for post-wildland fire rest of burned areas, post-treatment rest of ES&BAR, and proactive vegetation treatments. The ability to provide post-disturbance rest would improve riparian condition.

The effects of issuing TNR in riparian areas are the same as described for Alternative I. The effects of allowing livestock trailing across the East Fork of the Jarbidge River to the Wilkins Island Allotment using riders to herd livestock are the same as described for Alternative I.

Impacts from Management Specific to Alternative III

Under Alternative III, 120 miles of perennial streams would be available and 196 miles would be unavailable for livestock grazing The miles of priority reaches available and unavailable for grazing, including riparian reference areas, are the same as Alternative II (Table 4- 84 and Table 4- 85). The effects of Alternative III are similar to those described for Alternative II, except Alternative III would allocate a lower percent of vegetation production to livestock.

The effects of creating Reserve Common Allotments are the same as described for Alternative II. The effects of issuing TNR in riparian areas are the same as described for Alternative I. The effects of allowing livestock trailing across the East Fork of the Jarbidge River to the Wilkins Island Allotment using riders to herd livestock are the same as described for Alternative I.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Under Alternative IV-A, 103 miles of perennial streams would be available and 213 miles would be unavailable for livestock grazing. In Alternative IV-B (the Preferred Alternative), 104 miles of perennial streams would be available and 212 miles would be unavailable for livestock grazing. The difference between Alternative IV-A and IV-B is 1 mile of stream in Clover Creek.

The areas available for grazing include 41 miles of Priority 1 reaches, 45 (Alternative IV-A) and 46 (Alternative IV-B) miles of Priority 2 reaches, and 44 miles of Priority 3 reaches (Table 4- 84); the areas unavailable for grazing include 34 miles of Priority 1 reaches, 18 (Alternative IV-A) and 17 (Alternative IV-B) miles of Priority 2 reaches, and 41 miles of Priority 3 reaches. Areas unavailable for grazing also include ten riparian reference areas, encompassing 19 miles of perennial streams and approximately 2,670 acres; this includes 5 miles of Priority 1 reaches and 11 miles of Priority 2 reaches (Table 4- 85).

Priority 1 and 2 reaches that remain available for grazing are more at risk for impacts from livestock grazing, while Priority 1 and 2 reaches are unavailable for grazing are more likely to contribute to the attainment of riparian objectives. Alternative IV would have more miles of Priority 1 and 2 reaches at risk of reduction in PFC rating due to livestock grazing than Alternatives I and V, but less than the No Action Alternative and Alternatives II and III.

The effects of creating Reserve Common Allotments are the same as described for Alternative II. The effects of issuing TNR in riparian areas are the same as described for Alternative I.

Alternative IV would allow livestock trailing on existing roads to the Wilkins Island Allotment using riders to herd livestock. There would be fewer impacts to riparian areas from livestock trailing than in Alternatives I, II, and III because livestock tailing would occur on the road rather than across the riparian area.

Impacts from Management Specific to Alternative V

Under Alternative V, 63 miles of perennial streams would be available and 253 miles would be unavailable for livestock grazing. Alternative V would have the fewest perennial stream miles available to livestock grazing of all alternatives. The areas available for grazing include 27 miles of Priority 1 reaches, 34 miles of Priority 2 reaches, and 26 miles of Priority 3 reaches (Table 4- 84); the areas unavailable for grazing include 49 miles of Priority 1 reaches, 29 miles of Priority 2 reaches, and 59 miles of Priority 3 reaches. Areas unavailable for grazing also include six riparian reference areas, encompassing 25 miles of perennial streams and approximately 23,000 acres; this includes 4 miles of Priority 1 reaches and 8 miles of Priority 2 reaches (Table 4- 85).

Priority 1 and 2 reaches that remain available for grazing are more at risk for impacts from livestock grazing, while Priority 1 and 2 reaches are unavailable for grazing are more likely to contribute to the attainment of riparian objectives. Alternative V would have the fewest miles of Priority 1 and 2 reaches at risk of reduction in PFC rating due to livestock grazing of all alternatives. Estimated use levels in the Sagebrush Sea ACEC would be 10% to 20%, less than in the other alternatives.

Reserve Common Allotments would not be created in Alternative V; instead, forage on acquired lands and in allotments where permits are relinquished or cancelled would be held for the life of the plan for wildlife habitat and watershed protection, increasing the likelihood for improvements in riparian condition.

TNR would not be issued in Alternative V; therefore, the impacts described for Alternative I would not occur. The effects of allowing livestock trailing on existing roads to the Wilkins Island Allotment using riders to herd livestock are the same as described for Alternative IV.

Impacts from Recreation Actions

Human activities that may disrupt riparian vegetation in dry desert environments include the creation and use of trails associated with hiking, horse riding, and cycling; vehicle activities both on and off roads; camping associated with developed and dispersed recreation; and boating and wave activity affecting shorelines (Clark & Gibbons, 1991). These activities can result in the removal, trampling, and compaction of riparian vegetation, especially over an extended period of time in a localized area such as an accessible water source. Recreation activities in RCAs can reduce PFC ratings and reduce the likelihood of attaining or moving toward riparian objectives. Disturbance associated with cross-country motorized vehicle use can alter plant community composition or create openings in cover vegetation on shorelines (Quigley & Arbelbide, 1997).This can affect soil and water filtration and provide avenues for noxious weeds and invasive plants to invade riparian areas.

Establishing SRMAs would provide management emphasis for addressing recreation impacts by geographic area. Table 4- 86 displays the miles of priority reaches in SRMAs by alternative. It is expected that SRMA designation would reduce recreation-related impacts to riparian areas and improve riparian condition to be moving toward or achieving riparian objectives.

Table 4- 86. Priority Reaches in SRMAs by Alternative (Miles)

Priority Rating	Alternative				
	I	II	III	IV	V
Priority 1	45	7	7	20	7
Priority 2	24	0	0	5	0
Priority 3	70	31	31	44	29
Total	**139**	**38**	**38**	**69**	**36**

[A] SRMA boundaries were not delineated for the No Action Alternative.

The miles of perennial stream and Conservation and Restoration Reaches included in each SRMA are provided in the *Special Status Fish and Aquatic Invertebrates* section (Table 4- 124 and Table 4- 125, respectively).

Impacts from Management Specific to the No Action Alternative

The No Action Alternative includes limited management guidance for managing recreation impacts in riparian areas. The only management objective for recreation is to protect Salmon Falls Creek Canyon and portions of the Jarbidge River. There also is no direction for managing recreation uses to avoid impacts to wetlands. This management guidance is expected to maintain the current condition of the existing riparian conditions and PFC ratings and would not promote the attainment of objectives for Priority 1 and 2 streams to be moving towards or achieving PFC in the life of the plan.

Impacts from Management Common to All Action Alternatives

All action alternatives include direction to implement management methods to protect riparian resources, special status species, and wildlife habitat where appropriate while enhancing recreation opportunities. Recreation activities in riparian areas would follow the guidelines in the ARMS, which includes management direction to reduce recreation-related impacts to riparian areas and wetlands through the designation of RCAs. The ARMS includes guidance for reducing impacts from existing recreation sites and avoiding the construction of new recreation sites in RCAs unless a site-specific analysis determines the riparian improvement objectives can be met. This management guidance is expected to improve PFC ratings and would promote the attainment of objectives for Priority 1 and 2.

Impacts from Management Specific to Alternative I

Under Alternative I, 190 miles of perennial streams would be in SRMAs. SRMAs would include 45 miles (29%) of Priority 1 reaches, 24 miles (15%) of Priority 2 reaches, and 70 miles (45%) of Priority 3 reaches (Table 4- 86). The more miles of Priority 1 and 2 reaches in SRMAs the less risk of recreation impacts at levels that reduce the condition of these areas in the life of the plan. Alternative I would have the most miles of Priority 1 and 2 reaches in SRMAs of all action alternatives and therefore would have the most improvement in Priority 1 and 2 ratings of all alternatives.

The localized impacts to riparian vegetation and water quality in SRMAs would likely remain the same under this alternative due to increased SRMA management emphasis. Monitoring recreation use would ensure that impacts to riparian areas would not increase to levels that impair PFC ratings. The proposed SRMA management guidance would comply with the ARMS to maintain or improve riparian habitat conditions and would support achieving riparian objectives.

Impacts from Management Specific to Alternative II

Under Alternative II, 85 miles of perennial streams would be in SRMAs. SRMAs would include 7 miles (19%) of Priority 1 reaches, no Priority 2 reaches, and 31 miles (80%) of Priority 3 reaches (Table 4- 86). The more miles of Priority 1 and 2 reaches in SRMAs the less risk for recreation impacts at levels that reduce the condition of these areas. Alternative II would have fewer miles of Priority 1 and 2 reaches in an SRMA than Alternative I. As a result, Alternative II would have more risk of reducing PFC ratings of Priority 1 and 2 reaches than Alternative I.

Impacts from Management Specific to Alternative III

Under Alternative III, 87 miles of perennial streams would be in SRMAs. SRMAs would include 7 miles (19%) of Priority 1 reaches, no Priority 2 reaches, and 31 miles (80%) are Priority 3 (Table 4- 86). The more miles of Priority 1 and 2 reaches in SRMAs the less risk for recreation impacts at levels that reduce the condition of these areas. Alternative III has the same amount of Priority 1 and 2 reaches in SRMAs as Alternative II, but slightly more perennial stream miles. As a result, the risk of reducing PFC ratings of Priority 1 and 2 reaches is the same as in Alternative II.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Under Alternative IV, 126 miles of perennial streams would be in SRMAs. SRMAs would include 19 miles (25%) of Priority 1 reaches, 4 miles (6%) of Priority 2 reaches, and 44 miles (60%) of Priority 3 reaches (Table 4- 86). The more miles of Priority 1 and 2 reaches in SRMAs the less risk for recreation impacts at levels that reduce the condition of these areas. Alternative IV has more miles of Priority 1 and 2 reaches in an SRMA than Alternatives II and III, but fewer than Alternative I. As a result, the risk of reducing PFC ratings of Priority 1 and 2 reaches would be lower than in Alternatives II and III, but higher than in Alternative I. Conversely, Alternative IV would have the second highest amount of Priority 1 and 2 reaches improve in condition as a result of management in an SRMA.

Impacts from Management Specific to Alternative V

Under Alternative V, 76 miles of perennial streams would be in SRMAs. SRMAs would include 7 miles (19%) of Priority 1 reaches, no Priority 2 reaches, and 29 miles (81%) of Priority 3 reaches (Table 4- 86). Alternative V has the fewest miles of Priority 1 and 2 reaches in SRMAs of all alternatives. As a result, riparian areas with a reduced PFC rating due to existing recreation impacts may not be included in an SRMA and therefore are at a greater risk for a reduction in PFC rating due to recreation. The effects on PFC ratings would be similar to Alternatives II and III.

Impacts from Transportation and Travel Actions

Roads and stream crossings can be a major source of sediment to streams, resulting from channel fill around culverts and subsequent road crossing failures. Sediment in the stream can lead to physical alterations in channel morphology, such as increased channel braiding, increased width-to-depth ratios, and increased incidence and severity of streambank erosion (Furniss, et al., 1991). Unnatural channel width, slope, and other stream channel characteristics can occur upstream and downstream of stream crossings. Roads can alter hill slope hydrology by reducing soil infiltration, concentrating water through road drainage structures, and converting subsurface flow to surface flow (Luce & Black, 1999).

Road construction, use, and maintenance near streams often remove riparian vegetation important for stabilizing streambanks and shading the stream. Mass soil movements and channel changes resulting from roads can also eliminate or damage riparian vegetation and reduce the input of large woody debris to the stream channel, which is important for maintaining channel stability, hydrological functions, floodplain development, and habitat complexity in streams (Furniss, et al., 1991). There are 216 miles of road in RCAs (Table 4- 127), which have reduced PFC ratings due to increased human use in RCAs contributing fine sediment to riparian areas and locally removing riparian vegetation. Road use restrictions in RCAs would result in the most improvement to riparian areas and wetlands, particularly where PFC ratings indicate there are reduced riparian conditions. Transportation and travel restrictions in upland areas could also improve aquatic resources at the watershed scale if they result in less soil disturbance and surface erosion and therefore less sediment entering RCAs.

Cross-country motorized vehicle use increases the risk of impacts to riparian vegetation, sediment introduction to streams, and localized impacts to water quality, which results in a reduced PFC rating. Over time, the number and length of cross-country routes is expected to increase in areas open to cross-country motorized vehicle use. Motorized cross-country use in RCAs would also result in reduced PFC ratings.

Since not all road-related impacts to RCAs can be addressed in the immediate future, some travel-related impacts would continue to occur in RCAs across the planning area until management changes can be implemented. Some travel uses could locally reduce PFC ratings, such as pioneering roads into high-quality riparian habitats and wetlands.

The areas of most concern in this analysis are stream reaches not at PFC currently (i.e., Priority 1 and 2 reaches) in areas open to cross-country motorized vehicle use or limited to designated routes and ways. These areas are at an increased risk for not attaining or moving toward riparian objectives, while Priority 1 and 2 reaches in areas closed to motorized vehicle use are more likely to attain or move toward riparian objectives.

Table 4- 87 contains the miles of Priority 1, 2, and 3 reaches by travel designation. The miles of perennial stream and Conservation and Restoration Reaches in each travel designation can be found in the *Special Status Fish and Aquatic Invertebrates* section (Table 4- 128 and Table 4- 129, respectively).

Table 4- 87. Priority Reaches by Travel Designation by Alternative (Miles)

Priority Reaches	Alternative					
	No Action	I	II	III	IV	V
Open to Cross-Country Motorized Vehicle Use						
Priority 1	32	0	0	0	0	0
Priority 2	45	0	0	0	0	0
Priority 3	27	0	0	0	0	0
Total	**104**	**0**	**0**	**0**	**0**	**0**
Limited to Designated Routes or Ways [A]						
Priority 1	38	68	69	69	67	57
Priority 2	18	58	63	63	58	58
Priority 3	31	48	57	57	46	46
Total	**87**	**174**	**189**	**189**	**171**	**161**
Closed to Motorized Vehicle Use						
Priority 1	5	7	5	5	8	17
Priority 2	0	4	0	0	4	4
Priority 3	26	37	28	28	39	39
Total	**31**	**48**	**33**	**33**	**51**	**60**
[A] In the No Action Alternative, these miles are limited to designated routes or *inventoried* ways.						

Impacts from Management Specific to the No Action Alternative

Under the No Action Alternative, 114 miles of perennial streams are in areas open to cross-country motorized vehicle use. Open areas contain 32 miles of Priority 1 reaches, 45 miles of Priority 2 reaches, and 27 miles of Priority 3 reaches (Table 4- 87), the most of any alternative. Areas open to cross-country motorized vehicle use in the No Action Alternative are expected to result in an increase in the miles of riparian area not at PFC and would not support the riparian objectives.

Under the No Action Alternative, 97 miles of perennial streams are in areas limited to designated routes or inventoried ways. Limited areas contain 38 miles of Priority 1 reaches, 18 miles of Priority 2 reaches, and 31 miles of Priority 3 reaches (Table 4- 87), the fewest of any alternative. Limiting motorized vehicle use to designated routes has provided little protection for riparian areas and wetlands as is evident by the increase in the number of roads in RCAs since the 1987 RMP. The increase in route density is primarily due to a substantial increase in ATV and off-road motorcycle use, which enabled public land users to pioneer roads into areas previously not accessible by four-wheel drive vehicles. The overall effect to riparian areas is an increase in the number of stream crossings, increased sediment contributions to riparian areas and wetlands from existing and new roads, increased recreational use in RCAs, localized loss of riparian vegetation and reduction in riparian condition, an increase in the spread of noxious weeds into upland and riparian areas, and an increased incidence of human-caused fires. All of these have contributed to the reduced PFC ratings where roads are present in RCAs. The guidance under the No Action Alternative provides no direction for reducing route density, eliminating duplicate roads (i.e., roads with same destination), reducing road surface erosion to streams, or improving stream crossings to reduce effects to riparian areas and wetlands.

Under the No Action Alternative, 105 miles of perennial streams are in areas closed to motorized vehicle use. Closed areas contain 5 miles of Priority 1 reaches, no Priority 2 reaches, and 26 miles of Priority 3 reaches (Table 4- 87). The lack of motorized vehicle use has contributed to increases in riparian condition, as evidenced by the majority of stream miles in these areas already having achieved PFC.

Impacts from Management Common to All Action Alternatives

Travel management activities in riparian areas would follow the guidelines in the ARMS, which contains guidance to reduce impacts from existing roads and for avoiding construction of new roads in RCAs unless a site-specific analysis indicates long-term effects to riparian function and condition can be avoided. Compliance with the ARMS would improve PFC ratings and promote attaining or moving toward the riparian objectives.

Developing a CTTMP would provide a site-specific analysis to identify road closures, travel restrictions, or other travel management adjustments to reduce impacts on RCAs. Short-term reductions in PFC ratings and long-term improvements to riparian areas and wetlands would occur as a result of road improvement projects, culvert replacements, route closures, or road rehabilitation. The potential for effects to riparian areas from roads in RCAs would continue to occur until mitigation is applied or restoration actions are accomplished.

Impacts from Management Specific to Alternative I

Under Alternative I, no perennial stream miles, and therefore, no Priority 1, 2, or 3 reaches, would be in areas open to cross-country motorized vehicle use. As a result, effects of cross-country travel on riparian areas and wetlands across large portions of the planning area would not continue. However, even though cross-country motorized vehicle use would not be authorized in perennial streams in this alternative, exceptions may be granted to BLM permit, lease, or ROW holders or may be allowed on a case-by-case basis for non-BLM entities. Cross-country motorized vehicle use in RCAs or wetlands could locally reduce PFC ratings. Similar impacts are expected from allowing game retrieval using motorized vehicles 300 feet off designated routes except in closed areas and WSAs. Motorized cross-country travel off designated routes to access a camp site is less likely to affect RCAs or wetlands as it would not be allowed in riparian areas.

Limiting travel to designated routes or ways could reduce travel-related impacts on 189 miles of perennial streams in the Bruneau River and Jarbidge River and in lower Clover Creek. These areas include 68 miles of Priority 1 reaches, 58 miles of Priority 2 reaches, and 48 miles of Priority 3 reaches (Table 4- 87). Alternative I would have more miles of Priority 1 and 2 reaches in areas with a limited travel designation than the No Action Alternative and Alternatives IV and V, but fewer miles than Alternatives II and III. Limiting travel at Yahoo Creek would reduce the potential for motorized recreation to degrade PFC ratings where roads occur in RCAs. Where roads currently occur in RCAs, their impacts to riparian areas and wetlands would be reduced if the road was no longer used, but reclamation of the road would be needed to completely eliminate road-related impacts to RCAs in the long term. Designated roads could also be modified to reduce impact to Priority 1 and 2 reaches.

Areas closed to motorized vehicle use in Alternative I would include 126 miles of perennial streams; closed areas in Alternative I would contain 7 miles of Priority 1 reaches, 4 miles of Priority 2 reaches, and 37 miles of Priority 3 reaches (Table 4- 87). Alternative I would have more miles of Priority 1 and 2 reaches closed to motorized vehicle use than the No Action Alternative and Alternatives II and III and fewer than Alternatives IV and V. Transportation-related impacts would decrease on these reaches. As described above, road-related impacts may still occur in closed areas if roads in closed areas are not reclaimed, although the impacts would be less than if the road was still in use.

The proposed changes in travel designations compared to the No Action Alternative would promote Priority 1 and 2 reaches moving towards or achieving PFC in the life of the plan. These changes would also maintain Priority 3 reaches and ensure their condition is not reduced due to travel-related impacts.

Alternative I would establish five TMAs. Route density is expected to increase in one TMA (41,000 acres), remain the same in one TMA (667,000 acres), and decrease in three TMAs (666,000 acres). Any changes in route density could affect PFC ratings in RCAs. Areas with reduced condition due to route density would be the most at risk for further reduction in condition if route density increases in RCAs. This alternative would decrease route density on more acres than Alternatives II and III, but fewer acres than Alternatives IV and V. In general, any decrease in route density in riparian areas would reduce effects to riparian areas and wetlands and promote movement towards or achievement of riparian objectives.

Impacts from Management Specific to Alternative II

Under Alternative II, the impacts from cross-country motorized vehicle use on PFC ratings are the same as described for Alternative I; however, the area impacted may increase as Alternative II would not restrict game retrieval to only 300 feet off designated routes.

Limiting travel to designated routes and ways could reduce travel-related impacts on 240 miles of perennial streams. These areas include 69 miles of Priority 1 reaches, 63 miles of Priority 2 reaches, and 57 miles of Priority 3 reaches (Table 4- 87). Alternative II would have the same amount of Priority 1 and 2 reaches in limited areas as Alternative III, but more miles than the No Action Alternative and Alternatives I, IV, and V. Impacts of this travel designation are the same as described for Alternative I.

Areas closed to motorized vehicle use would include 76 miles of perennial streams. These areas contain 5 miles of Priority 1 reaches, no Priority 2 reaches, and 28 miles of Priority 3 reaches (Table 4- 87). Alternative II would have the same amount of Priority 1 and 2 reaches in areas closed to motorized vehicle use as the No Action Alternative, but fewer miles than the other action alternatives. Impacts of this travel designation are the same as described for Alternative I.

The proposed changes in travel designations would promote Priority 1 and 2 reaches moving towards or achieving PFC in the life of the plan. These changes would also maintain Priority 3 reaches and ensure their condition is not reduced due to travel-related impacts.

Alternative II would establish two TMAs. Route density is expected to increase in one TMA (1,161,000 acres) and remain the same in the other TMA (213,000 acres). This is substantially more acres with increased route density than any of the other action alternatives; therefore, impacts to riparian areas would be higher than in the other action alternatives. The overall impacts may be lower than in the No Action Alternative, however. Even though route density is expected to increase in both alternatives, in Alternative II, this would occur through route designation in the CTTMP following guidelines in the ARMS, while this would be more likely to occur in the No Action Alternative through user-created routes in areas open to cross-country motorized vehicle use.

Impacts from Management Specific to Alternative III

Under Alternative III, the impacts from cross-country motorized vehicle use on PFC ratings are the same as described for Alternative I; however, the area impacted may decrease as Alternative III would not allow game retrieval off designated routes.

Areas limited to designated routes or ways would include 209 miles of perennial streams, while areas closed to motorized vehicle use would include 107 miles of perennial streams, The miles of Priority 1, 2, and 3 reaches in limited and closed areas in Alternative III are the same as in Alternative II and would have the same impacts to PFC ratings.

The proposed changes in travel designations for Alternative III would promote Priority 1 and 2 reaches moving towards or achieving PFC in the life of the plan to a similar degree as in Alternative II. These changes would also maintain Priority 3 reaches and ensure their condition is not reduced due to travel-related impacts.

Alternative III would establish five TMAs. Route density is expected to increase in one TMA (34,000 acres) and remain the same in four TMAs (1,339,000 acres). There would be no reduction in route density because routes would be maintained for fire suppression efforts. The result would be a slower rate of recovery from road-related impacts to PFC ratings where roads occur in RCAs than could occur under Alternatives I, IV, and V.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Under Alternative IV, the impacts from cross-country motorized vehicle use on PFC ratings are the same as described for Alternative I; however, the area impacted may decrease as Alternative IV would not allow game retrieval off designated routes.

Limiting travel to designated routes and ways could reduce travel-related impacts on 209 miles of perennial streams. These areas include 67 miles of Priority 1 reaches, 58 miles of Priority 2 reaches, and 46 miles of Priority 3 reaches (Table 4- 87). Alternative IV would have fewer miles of Priority 1 and 2 reaches than Alternatives I, II, and III, but more than the No Action Alternative and Alternative V. Impacts of this travel designation are the same as described for Alternative I.

Areas closed to motorized vehicle use would include 107 miles of perennial streams. These areas contain 8 miles of Priority 1 reaches, 4 miles of Priority 2 reaches, and 39 miles of Priority 3 reaches (Table 4-87). Alternative IV would have more miles of Priority 1 and 2 reaches in areas closed to motorized vehicle use than the No Action Alternative and Alternatives I, II, and III, but fewer than Alternative V. Impacts of this travel designation are the same as described for Alternative I.

The proposed changes in travel designations in relation to the No Action Alternative would promote Priority 1 and 2 reaches moving towards or achieving PFC in the life of the plan. These changes would also maintain Priority 3 reaches and ensure their condition is not reduced due to travel-related impacts.

Alternative IV would establish the same TMAs as Alternative I. Route density is expected to increase in one TMA (34,000 acres) and decrease in four TMAs (1,339,000 acres). Because Alternative IV emphasizes active restoration, it is likely more miles of road in RCAs would be improved or modified to reduce effects to PFC ratings than all other alternatives. A reduction in route density would result in a long-term improvement in PFC ratings, even though there would be short-term localized reductions in PFC ratings from road improvements, relocations, or restoration activities. A reduction in route density would promote Priority 1 and 2 reaches achieving or moving toward in the life of the plan. This alternative would have the most short-term impacts to PFC ratings and the fastest recovery of riparian areas from changes in travel designations than any other alternative.

Impacts from Management Specific to Alternative V

Alternative V would have the least impacts from cross-country motorized vehicle use on PFC ratings compared to any other alternative, as no exceptions to motorized vehicle restrictions would be granted to permit, lease, and ROW holders or for game retrieval.

Limiting travel to designated routes and ways could reduce travel-related impacts on 180 miles of perennial streams. These areas include 57 miles of Priority 1 reaches, 58 miles of Priority 2 reaches, and 46 miles of Priority 3 reaches (Table 4- 87). Alternative V has the fewest miles of Priority 1 and 2 reaches in areas limited to designated routes of all alternatives except the No Action Alternative. Impacts of this travel designation are the same as described for Alternative I.

Areas closed to motorized vehicle use include 136 of perennial stream. These areas contain 17 miles of Priority 1 reaches, 4 miles of Priority 2 reaches, and 39 miles of Priority 3 reaches (Table 4- 87). Alternative V would have the most miles of Priority 1 and 2 reaches in areas closed to motorized vehicle use of all alternatives. Impacts of this travel designation are the same as described for Alternative I.

The proposed changes in travel designations would promote Priority 1 and 2 reaches moving towards or achieving PFC in the life of the plan. These changes would also maintain Priority 3 reaches and ensure their condition is not reduced due to travel-related impacts.

Alternative V would establish five TMAs. Route density under Alternative V is expected to increase in one TMA (3,000 acres) and decrease in four TMAs (1,370,000 acres). This is likely to result in a major long-term improvement in riparian areas and wetlands as a primary source of sediment to would be reduced.

There would be short-term decreases in PFC ratings from road improvements, relocations, or restoration activities, but the long-term improvements to PFC ratings from these activities are expected to out-weigh the short term effects. Alternative V would result in fewer restoration-related impacts to PFC ratings than under Alternative IV because passive techniques would be used for restoration. The rate of recovery of some of the riparian areas with road closures could be slower than if active restoration was used to expedite the recovery process. Alternative V is expected to improve PFC ratings over a longer time period than Alternative IV. However, this alternative would result in a significant reduction in route density over the life of the plan which would be expected to have a major reduction in road related impacts to riparian areas and wetlands.

Impacts from Land Use Authorizations Actions

The impacts from land use authorizations on riparian areas and wetlands vary by the type of authorization, season and duration of use, and proximity of use to riparian areas. Some uses such as powerlines, phonelines, and communication sites in upland areas could have little or no impacts to riparian areas. Other land uses authorizations such as roads, water developments, ditches, wind energy infrastructure, and other surface-disturbing uses have potential to impact riparian conditions depending on their proximity to riparian areas and wetlands. The effects of land uses on riparian vegetation and the introduction of sediment into the stream channel are described under *Impacts from Riparian Areas and Wetlands Actions*, *Impacts from Transportation and Travel Actions*, and *Impacts from Livestock Grazing Actions*. The areas of most concern in this analysis are those stream reaches currently not at PFC (i.e., Priority 1 and 2 reaches) that are available for land use authorizations, as these areas have higher risk of not attaining or moving toward riparian objectives.

Impacts from utility developments include impacts from the powerlines, support towers, roads, and other structures to operate and maintain the corridor. The primary effects of utility developments on riparian areas are related to project-related roads entering RCAs. The effects of roads on riparian areas and the sediment they introduce into stream channels are described under *Impacts from Transportation and Travel Actions*. The construction of utility developments can impact water quality from the storage and use of hazardous chemicals (e.g., petroleum products, lubricants, drill fluids). Surface waters may be needed for road construction or reconstruction, dust abatement on roads or equipment staging areas, or mixing with concrete to construct tower foundations. Table 4- 88 contains the miles of priority reaches in ROW avoidance and exclusion areas by alternative.

Table 4- 88. Priority Reaches in ROW Avoidance and Exclusion Areas by Alternative (Miles)

Priority Rating	Alternative					
	No Action	I	II	III	IV	V
ROW Avoidance Areas [A]						
Priority 1	21	44	43	43	44	75
Priority 2	0	36	35	35	36	56
Priority 3	39	51	48	48	54	82
Total	**59**	**131**	**126**	**126**	**134**	**212**
ROW Exclusion Areas						
Priority 1	0	15	15	15	17	17
Priority 2	0	0	0	0	4	4
Priority 3	0	30	28	30	41	41
Total	**0**	**45**	**43**	**45**	**62**	**62**
[A] Described as “utility avoidance areas” in the No Action Alternative.						

Wind energy projects are an increasing use on public lands. Most of the infrastructure for wind developments, such as towers, support facilities, and associated powerlines, are located in upland areas or ridge tops and would have limited impacts to PFC ratings. The road systems that support wind developments pose the greatest threat to riparian areas and wetlands from the use of existing roads and creation of new roads. Any roads entering RCAs could have impacts to stream channel conditions, riparian vegetation, and water quality and locally reduce PFC ratings. The use of culverts or bridges directly influences the long-term impacts to PFC ratings in and below areas where roads cross a stream.

Wind developments can also have short-term impacts to instream flows if surface water is required for road construction or reconstruction, dust abatement on roads or equipment staging areas, or mixing with concrete to construct tower foundations. The impacts to RCAs from removing surface water vary by location, season, amount, and rate of withdrawal and pose an increasing risk for impacts to PFC rating if water is removed from riparian areas over the long-term. Table 4- 89 displays the miles of priority reaches in potential wind development areas by alternative.

Table 4- 89. Priority Reaches in Potential Wind Development Areas by Alternative (Miles)

Priority Rating	Alternative					
	No Action	I	II	III	IV	V
Priority 1	18	3	19	3	2	<1
Priority 2	10	1	9	1	1	<1
Priority 3	14	2	17	2	2	<1
Total	**42**	**6**	**45**	**6**	**5**	**2**

Perennial stream miles within ROW avoidance and exclusion areas, potential utility development areas, and potential wind development areas are displayed in Table 4- 130 in the *Special Status Fish and Aquatic Invertebrates* section; Conservation and Restoration Reaches affected by ROW avoidance and exclusion areas and potential wind development areas are displayed in Table 4- 131 in the *Special Status Fish and Aquatic Invertebrates* section

Impacts from Management Specific to the No Action Alternative

In the No Action Alternative, 118 miles of perennial streams would be in ROW avoidance areas, 15 miles of streams would be in potential utility development areas, and 48 miles of stream would be in potential wind development areas. ROW avoidance areas contain 21 miles of Priority 1 reaches, no Priority 2 reaches, and 39 miles of Priority 3 reaches (Table 4- 88). The No Action Alternative has the most miles of priority reaches in areas available for ROW development of any alternative. The No Action Alternative has ROW avoidance or use restrictions for the riparian areas in the Bruneau River and the Jarbidge River and its East Fork. The riparian areas in the Jarbidge River below the confluence with the East Fork would be a utility avoidance area, but not all of the Jarbidge River and its East Fork above the confluence would be avoidance areas. Riparian areas in Salmon Falls Canyon would be in a utility avoidance area, but none of the riparian areas and wetlands in the tributaries in the Jarbidge Foothills or upper or lower Salmon Falls Creek would be excluded from utility corridor development. Other than in the Sand Point ACEC, none of the riparian areas adjacent to the Snake River would be excluded from utility corridor development.

The No Action Alternative does not provide specific guidance for preventing utility development or associated infrastructure in riparian areas or wetland or for improving riparian areas and wetlands in areas where utility corridors could occur.

Potential wind development areas for the No Action Alternative contain 18 miles of Priority 1 reaches, 10 miles of Priority 2 reaches, and 14 miles of Priority 3 reaches (Table 4- 89). This alternative has the same miles of Priority 1 and 2 reaches in potential wind development areas as Alternative II and more miles than the other action alternatives. The No Action Alternative has fewer miles of Priority 3 reaches in potential wind development areas than Alternative II.

Impacts from Management Common to the No Action and All Action Alternatives

The No Action Alternative and all action alternatives would adopt programmatic policies and BMPs for the wind energy program, which would provide mitigation to reduce impacts to riparian areas and wetlands from wind energy projects.

Impacts from Management Common to All Action Alternatives

All new ROWs on public land would follow the guidance in the ARMS, which would improve PFC ratings and promote the attainment or movement toward achieving the riparian objectives in ROW avoidance areas, potential utility development areas, and potential wind development areas. These guidelines are expected to maintain Priority 3 reaches and facilitate Priority 1 and 2 reaches achieving or moving toward

PFC in the long term. All new utility corridors would comply with the ARMS and Appendix E to reduce impacts to PFC ratings.

Impacts from Management Specific to Alternative I

In Alternative I, ROW avoidance areas would include 221 miles of perennial streams. ROW avoidance areas contain 44 miles of Priority 1 reaches, 36 miles of Priority 2 reaches, and 51 of Priority 3 reaches (Table 4- 88). The miles of Priority 1 and 2 reaches in ROW avoidance areas vary by no more than 9 miles in Alternatives I through IV, as those alternatives all allocate USAF Military Operating Areas (MOAs), the Oregon NHT, and eligible, suitable, and designated WSRs for ROW avoidance. ROW avoidance areas that include Priority 1 and 2 reaches would facilitate these reaches achieving or moving towards PFC in the life of the plan.

ROW exclusion areas would encompass 107 miles of perennial streams in the Sand Point ACEC and WSAs, which includes portions of the Bruneau and Jarbidge Rivers and portions of Salmon Falls Creek Canyon. ROW exclusion areas contain 15 miles of Priority 1 reaches, no Priority 2 reaches, and 30 miles of Priority 3 reaches (Table 4- 88). ROW exclusion areas would eliminate the risk of reducing PFC ratings of these reaches due to ROW development.

Potential utility development areas for Alternative I would encompass 9 miles of perennial streams in Dave Creek and portions of the East Fork of the Jarbidge River, Salmon Falls Creek, Clover Creek, and Snake River. A majority of the potential utility development areas are located in upland areas and would have limited impacts, if any, to PFC ratings. Portions of these corridors cross RCAs and have the potential to reduce HC or PFC ratings. The greatest potential to reduce PFC ratings would occur where utilities are buried in RCAs or where new stream crossings are created to construct and maintain utility corridors.

Potential wind development areas for Alternative I would include 7 miles of perennial streams along the Snake River from the Hagerman Fossil Beds National Monument to the town of Hammett and along upper Salmon Falls Creek in the China Creek and Cedar Creek Watersheds. The potential wind development areas contain 3 miles of Priority 1 reaches, 1 mile of Priority 2 reaches, and 2 miles of Priority 3 reaches (Table 4- 89). The impacts from infrastructure development and roads in RCAs would pose the greatest potential to reduce PFC ratings in potential wind development areas.

Impacts from Management Specific to Alternative II

In Alternative II, the ROW avoidance areas would include 220 miles of perennial streams. ROW avoidance areas contain 43 miles of Priority 1 reaches, 35 miles of Priority 2 reaches, and 48 miles of Priority 3 reaches (Table 4- 88). This alternative has the same effects on the Jarbidge, Bruneau, and Snake Rivers as described for Alternative I, except more riparian areas in the Browns Bench area of the Jarbidge Foothills would be available for ROWs without having to meet avoidance stipulations.

The ROW exclusion areas for Alternative II would include 105 miles of perennial streams; unlike Alternative I, the Sand Point ACEC would not be an exclusion area. ROW exclusion areas contain 15 miles of Priority 1 reaches, no Priority 2 reaches, and 28 miles of Priority 3 reaches (Table 4- 88). The effects of ROW exclusion areas under this alternative are the same as described for Alternative I, except 2 miles of the Snake River along the Sand Point ACEC would be at an increased risk for a reduction in PFC ratings from ROWs as this area would no longer be an exclusion area.

Potential utility development areas for Alternative II would add a corridor along Browns Bench in the upper Salmon Falls Creek and China Creek Watersheds to those described in Alternative I to include a total of 15 miles of perennial streams. This alternative would have the largest potential utility development area of any alternative. The effects of utility development are the same described for Alternative I.

Potential wind development areas for Alternative II would be in the same general areas described in Alternative I, but would include a larger area in the Jarbidge Foothills and along the Snake River, encompassing 48 miles of perennial streams. The potential wind development area contains19 miles of Priority 1 reaches, 9 miles of Priority 2 reaches, and 17 miles of Priority 3 reaches (Table 4- 89).

Alternative II has the most miles of Priority 1 and 2 reaches in the potential wind development area of all action alternatives and the same amount as the No Action Alternative. Portions of riparian areas in the upper Jarbidge River and Bruneau River would be in potential wind development areas. Priority 1 and 2 reaches in potential wind development areas are the most at risk of not meeting riparian objectives.

Impacts from Management Specific to Alternative III

In Alternative III, the ROW avoidance areas are the same as in Alternative II except the Bruneau-Jarbidge ACEC would be a ROW avoidance area. As in Alternative II, the ROW avoidance areas would include 220 miles of perennial streams; the same amounts of priority reaches would be in avoidance areas as well. As a result, effects on riparian condition are the same as described for Alternative II.

The ROW exclusion areas in Alternative III would be in the same locations and have the same effects as described for Alternative I.

The potential utility and wind development areas in Alternative III would be located in the same areas and would include the same perennial stream miles and priority reaches as Alternative I. The effects of these developments are the same as described for Alternative I.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

In Alternative IV, the ROW avoidance areas would be in the same areas in Alternative II except the Bruneau-Jarbidge ACEC would be included as a ROW avoidance area. ROW avoidance areas would reduce the potential for decreases in PFC ratings in 224 miles of perennial streams. Miles of priority reaches in ROW avoidance areas are the same as in Alternative I with 3 additional miles of Priority 3 reaches in Alternative IV (Table 4- 88). The effects of this alternative are the same as described under Alternative II except more miles of riparian areas would be included in ROW avoidance areas.

ROW exclusion areas for Alternative IV are the same as those described for Alternative I with the addition of non-WSA lands managed for their wilderness characteristics, including riparian areas on portions of the East Fork of the Jarbidge River, upper Salmon Falls Creek, and Browns Bench. ROW exclusion areas would reduce the potential for effects to 138 miles of riparian area. An additional 17 miles of priority reaches would be in ROW exclusion areas compared to Alternative I, including an additional 2 miles of Priority 1 reaches and 4 miles of Priority 2 reaches.

Potential utility development areas for Alternative IV would include the same perennial stream miles and priority reaches as Alternative I. The effects to riparian areas and wetlands are the same as described for Alternative I.

Potential wind development areas for Alternative IV would affect the same perennial streams as Alternative I except for 1 mile of Priority 1 reaches (Table 4- 89).

Impacts from Management Specific to Alternative V

In Alternative V, ROW avoidance areas are the same as described in Alternative I, except the Sagebrush Sea ACEC would be a ROW avoidance area. ROW avoidance areas would reduce the potential for decreases in PFC ratings in 294 miles of perennial streams. Alternative V includes the most miles of Priority 1 reaches (75 miles), Priority 2 reaches (56 miles), and Priority 3 reaches (82 miles) of all alternatives (Table 4- 88). The effects of ROW avoidance areas are the same as described under Alternative I. Managing the Sagebrush Sea ACEC as a ROW avoidance area would reduce the likelihood for a decrease in PFC ratings due to ROWs in that area.

ROW exclusion areas for Alternative V would be in the same location and include the same number of perennial stream miles and priority reaches as Alternative IV. The effects of ROW exclusion areas on riparian areas and wetlands are the same as described for Alternative IV.

Potential utility development areas for Alternative V include the same corridors described in Alternative I except the Saylor Creek Corridor would not be a designated utility corridor. The effects of utility development are the same as described for Alternative I, except 3 fewer miles of perennial streams would be affected.

Potential wind development areas for Alternative V would affect the same areas described in Alternative I except potential wind development areas would not include areas along upper Salmon Falls Creek and Cedar Creek. Alternative V includes 3 miles of perennial streams in potential wind development areas and less than 1 mile each of Priority 1, 2, and 3 reaches (Table 4- 89). This alternative would have the fewest miles of Priority 1 and 2 reaches in potential wind development areas of all alternatives. As a result, the potential wind development areas in Alternative V would have the least potential to reduce PFC ratings of any alternative.

Impacts from Minerals Actions

The impacts on HC and PFC ratings of any minerals development in RCAs would primarily be related to streambank and streambed alteration, removal of riparian vegetation, sediment introduction to streams from ground-disturbing activities such as road construction and maintenance, facilities development and operation, and general impacts to water quality and quantity. Restoration Reaches and Priority 1 and 2 reaches are at higher risk of further reduction in condition and are less likely to improve when in areas open to oil and gas or geothermal leasing or salable or locatable mineral development than areas that are closed to or withdrawn from such uses. Conservation Reaches and Priority 3 reaches are more resilient to impacts associated with these uses; these areas are still at risk for a reduction in condition due to minerals exploration or development, but at less risk than would be expected if they were in a reduced condition prior to development.

Some aspects of oil and gas or geothermal exploration and development, such as blasting, consumptive and non-consumptive use of surface or groundwater, disposal of waste water, and general ground disturbance in RCAs, could reduce HC and PFC ratings if these activities occur in RCAs. There would be unknown impacts from directional drilling to access geothermal or oil and gas resources. NSO restrictions would prevent direct impacts to riparian areas. Indirect impacts could occur where activities associated with minerals exploration or development occur in RCAs at any time of the year. Table 4- 90 and Table 4- 91 describe oil and gas leasing and geothermal leasing allocations, respectively, for priority reaches. Miles of perennial streams and Conservation and Restoration Reaches in potential oil and gas areas are summarized in Table 4- 132 and Table 4- 133 in the *Special Status Fish and Aquatic Invertebrates* section. Miles of perennial streams and Conservation and Restoration Reaches in potential geothermal areas are summarized in Table 4- 134 and Table 4- 135 in the *Special Status Fish and Aquatic Invertebrates* section.

Table 4- 90. Leasable Mineral Allocations for Priority Reaches in Potential Oil and Gas Areas by Alternative (Miles)

Priority Rating	Alternative [A]				
	I	II	III	IV	V
Open [B]					
Priority 1	16	16	16	15	15
Priority 2	8	17	17	12	8
Priority 3	12	21	20	11	11
Total	**36**	**52**	**52**	**38**	**33**
Closed					
Priority 1	0	0	0	1	1
Priority 2	8	0	0	4	8
Priority 3	9	<1	1	10	10
Total	**17**	**<1**	**1**	**15**	**19**

[A] The No Action Alternative identifies the majority of the planning area as open to mineral leasing, but does not identify specific boundaries.
[B] "Open" includes areas open with surface occupancy, seasonal, and/or controlled surface use restrictions as well as areas open for leasing without these restrictions.

Table 4- 91. Leasable Mineral Allocations for Priority Reaches by Geothermal Potential in Potential Geothermal Areas by Alternative (Miles)

Priority Rating	Alternative [A]					
	I	II	III	IV		V
				IV-A	IV-B	
Medium Potential [B]						
Open [C]						
Priority 1	1	1	1	1	1	1
Priority 2	3	10	10	7	7	3
Priority 3	2	13	11	3	3	2
Total	**6**	**24**	**22**	**11**	**11**	**6**
Closed						
Priority 1	0	0	0	0	0	0
Priority 2	7	0	0	3	3	7
Priority 3	11	<1	2	10	10	11
Total	**18**	**<1**	**2**	**13**	**13**	**18**
Low Potential						
Open [B]						
Priority 1	46	60	60	45	45	45
Priority 2	48	54	54	46	48	48
Priority 3	34	46	46	30	30	34
Total	**129**	**159**	**159**	**121**	**123**	**128**
Closed						
Priority 1	29	15	15	30	30	29
Priority 2	6	0	0	8	6	6
Priority 3	39	28	28	44	44	39
Total	**74**	**31**	**43**	**82**	**80**	**75**

[A] The No Action Alternative identifies the majority of the planning area as open to mineral leasing, but does not identify specific boundaries.
[B] No riparian areas were rated as High Priority.
[C] "Open" includes areas open with surface occupancy, seasonal, and/or controlled surface use restrictions as well as areas open for leasing without these restrictions.

Existing salable mineral developments in the planning area are located outside RCAs. However, if future salable mineral developments were to occur in RCAs, impacts to PFC rating would result. The risk of a decrease in PFC rating would be greater for Priority 1 and 2 reaches open to salable mineral development than for Priority 3 reaches. Impacts of salable mineral development would not occur in areas closed to this use. Table 4- 92 displays allocations for salable mineral development for priority reaches. Miles of perennial streams and Conservation and Restoration Reaches in areas open and closed to salable mineral development are summarized in Table 4- 136 and Table 4- 137 in the *Special Status Fish and Aquatic Invertebrates* section.

Most locatable mineral development in the planning area has historically occurred in RCAs (e.g., jasper and gold claims); locatable mineral development in RCAs can result in disturbances to the streambed, streambank, streamflow, and streamside vegetation, which can reduce PFC ratings. Water quality can be affected as a result of chemicals used in the mineral extraction process. Recreational panning and placer mining for gold occurs in the planning area and can locally impair riparian and wetlands function by removing riparian vegetation or disturbing the streambed (Nelson, et al., 1991). These projects can result in a long-term decrease in PFC ratings for riparian areas and wetlands. Table 4- 93 displays priority reaches recommended for withdrawal from mineral entry by alternative. Miles of perennial streams and Conservation and Restoration Reaches in areas recommended for withdrawal from locatable mineral development are summarized in Table 4- 138 and Table 4- 139 in the *Special Status Fish and Aquatic Invertebrates* section.

Table 4- 92. Salable Mineral Allocations for Priority Reaches by Alternative (Miles)

Priority Rating	Alternative [A]					
	I	II	III	IV		V
				IV-A	IV-B	
Open						
Priority 1	45	60	46	44	44	45
Priority 2	53	61	57	51	53	50
Priority 3	37	55	41	32	32	36
Total	**135**	**176**	**145**	**127**	**129**	**131**
Closed						
Priority 1	29	15	29	30	30	30
Priority 2	8	0	4	10	9	12
Priority 3	46	28	41	51	51	47
Total	**84**	**43**	**75**	**92**	**90**	**88**

[A] The No Action Alternative identifies acres open to salable mineral development, but not specific locations.

Table 4- 93. Priority Reaches in Areas Recommended for Withdrawal from Locatable Mineral Development by Alternative (Miles)

Priority Rating	Alternative [A]				
	I	II	III	IV	V
Priority 1 and 2	35	18	23	34	22
Priority 3	48	43	43	50	44
Total	**83**	**62**	**66**	**84**	**65**

[A] The No Action Alternative identifies areas for withdrawal from locatable mineral development, but does not provide specific locations.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative allows mineral leasing in riparian areas, but with a NSO stipulation within 500 feet of the riparian area; however, there are currently no mineral leases in place. The acreage on which salable mineral development occurs is expected to increase from approximately 1,300 acres to approximately 2,300 acres over the life of the plan. No mineral material sources have been developed that affected riparian areas, wetlands, or 303(d)-listed streams. The allocation for locatable minerals recommends the Bruneau-Jarbidge and Sand Point ACECs; designated wilderness; and the Bruneau, Jarbidge, and Salmon Falls Creek Canyons to be withdrawn from mineral entry. This withdrawal would reduce the potential for impacts from locatable mineral development in these riparian areas.

Leasable, salable, and locatable minerals exploration and development would be expected to reduce PFC ratings because the guidance in the ARMS would not be applied to mineral exploration and development projects. However, according to the RFDS for oil and gas development (Appendix U), approximately 90 acres of surface disturbance are expected to occur in the planning area as a result of oil and gas exploration and development over the life of the plan. This is less than 0.1% of the potential oil and gas areas that would be available for oil and gas leasing. Similarly, according to the RFDS for geothermal development (Appendix V), between 185 and 230 acres of surface disturbance are expected to occur in the planning area as a result of geothermal exploration and development over the life of the plan. This is less than 0.1% of the potential geothermal areas that would be available for geothermal leasing. Salable mineral development is expected to occur on approximately 0.2% of the area available for salable mineral development. Demand for locatable minerals in the planning area is not expected to change from present levels.

Impacts from Management Common to All Action Alternatives

Leasable, salable, and locatable mineral developments would comply with the ARMS, which would reduce the potential for effects to riparian areas and wetlands. The ARMS provides guidance for conserving high-quality habitats and restoring impaired habitats so that HC and PFC ratings are maintained or improved. Site-specific analysis would be required to assure actions encroaching on RCAs do not impair the attainment of ARMS objectives.

Use restrictions are expected to reduce the potential for a reduction in PFC ratings due to surface-disturbing activities or occupancy in RCAs. Closing RCAs to mineral development during special status aquatic species spawning periods would reduce impacts to soft streambanks and new riparian vegetation in the spring and fall, but activities in RCAs other times of the year could still result in impacts to PFC ratings.

Impacts from Management Specific to Alternative I

Within potential oil and gas areas, Alternative I would have 55 miles of perennial streams in areas open and 35 miles in areas closed to oil and gas leasing. Potential oil and gas areas open to leasing contain 16 miles of Priority 1 reaches, 8 miles of Priority 2 reaches, and 12 miles of Priority 3 reaches (Table 4- 90), while potential oil and gas areas closed to leasing contain no Priority 1 reaches, 8 miles of Priority 2 reaches, and 9 miles of Priority 3 reaches. Priority 1 and 2 reaches in potential oil and gas areas open to leasing are more at risk from the effects of oil and gas development than Priority 3 reaches because of their reduced riparian condition. However, the actual impact is expected to be low, as only 90 acres of surface disturbance from oil and gas exploration and leasing activities are expected, based on the oil and gas potential of the planning area (Appendix U). This is less than 0.1% of the potential oil and gas areas that would be available for oil and gas leasing. In addition, even if all 90 acres were located in RCAs, the controlled surface use restriction for RCAs would require surface use to be consistent with the guidelines in the ARMS. Alternative I would have the second fewest miles of Priority 1 and 2 reaches in potential oil and gas areas open to leasing of the action alternatives and therefore would have the second lowest amount of risk for a further reduction in PFC rating. Alternative I has the second highest number of miles of Priority 1 and 2 reaches in potential oil and gas areas closed to and therefore is the second most likely of all alternatives to promote attaining or moving toward objectives for Priority 1 and 2 reaches.

Areas with high, medium, or low potential for geothermal development encompass all 316 miles of perennial streams in the planning area; 135 miles would be in areas open to leasing, with 182 miles in areas closed to leasing. Areas open to leasing contain 47 miles of Priority 1 reaches, 51 miles of Priority 2 reaches, and 36 miles of Priority 3 reaches (Table 4- 91). Alternative I would have the same miles of Priority 1 and 2 reaches open to geothermal leasing in areas with medium potential as Alternative V, and fewer miles than the other action alternatives. Due to their reduced condition, Priority 1 and 2 reaches are more at risk for a reduction in PFC ratings when in open areas than Priority 3 reaches. The kinds of impacts of geothermal exploration and development in RCAs are similar to those described for oil and gas, except 185 to 230 acres of surface disturbance are expected for geothermal activities based on geothermal resource potential (Appendix V). This is less than 0.1% of the potential geothermal areas that would be available for geothermal leasing. Closing Priority 1 and 2 reaches to geothermal leasing would facilitate those reaches moving toward or achieving riparian objectives because they would not be at risk from geothermal development.

Alternative I would have 138 miles of perennial streams in areas open and 178 miles in areas closed to salable mineral development. Areas open to salable mineral development contain 45 miles of Priority 1 reaches, 53 miles of Priority 2 reaches, and 37 miles of Priority 3 reaches (Table 4- 92). The open areas would pose a risk for potential impacts to riparian areas in the Jarbidge Foothills. All salable mineral developments would comply with the ARMS, which would substantially reduce the potential for reducing PFC ratings due to salable mineral development. Salable mineral development under this management guidance would have minor, if any, impacts to riparian areas and wetlands. Areas closed to salable mineral development include 29 miles of Priority 1 reaches, 9 miles of Priority 2 reaches, and 46 miles of Priority 3 reaches. The closure areas include the Bruneau River, Jarbidge River and its tributaries, most of the Snake River, and most of Salmon Falls Creek. There is no potential for PFC ratings for riparian areas or wetlands in these areas to be impacted from salable mineral development.

Alternative I would have 182 miles of perennial streams in areas recommended for withdrawal from locatable mineral development. The riparian areas in the Jarbidge Foothills and the Lower Bruneau Canyon ACEC would be in areas not recommended for withdrawal. Areas recommended to be withdrawn include 35 miles of Priority 1 and 2 reaches and 48 miles of Priority 3 reaches (Table 4- 93). Alternative I would have the most miles of Priority 1 and 2 reaches recommended for withdrawal of the alternatives. Locatable mineral projects would pose an increased risk for a reduction in PFC ratings where these activities occur in RCAs. All locatable mineral developments would be mitigated according to the guidance in the ARMS to reduce the potential to reduce PFC ratings to the extent possible. Demand for locatable minerals in the planning area is not expected to change from present levels; thus, the potential for impacts to occur in the life of the plan is low.

Impacts from Management Specific to Alternative II

Within potential oil and gas areas, Alternative II would have 88 miles of perennial streams in areas open and 1 mile in areas closed to oil and gas leasing. Potential oil and gas areas open to leasing contain 16 miles of Priority 1 reaches, 17 miles of Priority 2 reaches, and 21 miles of Priority 3 reaches (Table 4- 90), while potential oil and gas areas closed to leasing contain no Priority 1 and 2 reaches and less than 1 mile of Priority 3 reaches. The types of impacts of oil and gas exploration and development are the same as described for Alternative I, but the spatial extent of impacts differs. Alternative II would have the same miles of Priority 1 and 2 reaches open to leasing as Alternative III, which is more than Alternatives I, IV, and V; therefore, Alternative II is the least likely of all alternatives to promote attaining or moving toward objectives for Priority 1 and 2 reaches.

Areas with high, medium, or low potential for geothermal development encompass all 316 miles of the perennial streams in the planning area; 212 miles would be in areas in areas open to leasing and 105 miles would be in areas closed to leasing. Areas open to leasing contain 61 miles of Priority 1 reaches, 64 miles of Priority 2 reaches ,and 59 miles of Priority 3 reaches (Table 4- 91). The types of impacts of geothermal exploration and development are the same as described for Alternative I, but the spatial extent differs. Alternative II would have the same miles of Priority 1 and 2 reaches open to geothermal leasing in areas with medium potential as Alternative III, which is the most miles of all action alternatives.

Alternative II would have 211 miles of perennial streams in areas open and 105 miles in areas closed to salable mineral development. Areas open to salable mineral development contain 60 miles of Priority 1 reaches, 61 miles of Priority 2 reaches, and 55 miles of Priority 3 reaches (Table 4- 92). Areas closed to salable mineral development contain 15 miles are Priority 1 reaches, no Priority 2 reaches, and 28 miles of Priority 3 reaches. This alternative would have the most Priority 1 and 2 reaches in areas open to salable mineral development of any of the action alternatives. The acreage on which salable mineral development occurs is expected to increase from approximately 1,300 acres to approximately 3,300 acres over the life of the plan. This is approximately 0.2% of the area available for salable mineral development. All salable minerals developments would comply with the ARMS, which would minimize the potential to reduce PFC ratings due to salable mineral development. Salable mineral development under this management guidance would have minor, if any, impacts to riparian areas or wetlands, although a higher demand for mineral materials under Alternatives II and III as compared to Alternatives I, IV, and V would increase the risk of impacts.

Alternative II would have 161 miles of perennial streams in areas recommended for withdrawal from locatable mineral development. The areas recommended for withdrawal that contain perennial streams would be limited to eligible, suitable and designated WSRs. Areas recommended to be withdrawn include 18 miles of Priority 1 and 2 reaches and 43 miles of Priority 3 reaches (Table 4- 93). Alternative II would have the fewest miles of Priority 1 and 2 reaches recommended for withdrawal of all alternatives except the No Action Alternative. The effects of locatable minerals development on riparian areas and wetlands are the same as described for Alternative I, except that more Priority 1 and 2 reaches would be available for locatable mineral development.

Impacts from Management Specific to Alternative III

Alternative III would include the same miles of priority streams in potential oil and gas areas open and closed to leasing as Alternative II, with the addition of 1 more closed mile of Salmon Falls Creek (Priority 3). The effects from this alternative are the same as described for Alternative II.

Alternative III would have the same miles of priority streams open and closed to geothermal leasing as Alternative II, except there would be 2 fewer miles of Priority 3 reaches open to leasing in Alternative III. Alternative III also has 12 more miles of Priority 1 reaches in areas closed to leasing. The effects of this alternative on Priority 1 and 2 reaches are the same as described for Alternative II.

Alternative III would have 142 miles of perennial streams in areas open and 173 miles in areas closed to salable mineral development. Areas open to salable mineral development contain 28 miles of Priority 1 reaches, 4 miles of Priority 2 reaches, and 41 miles of Priority 3 reaches (Table 4- 92). This alternative would have the second most Priority 1 and 2 miles open to salable mineral development of all alternatives. All salable mineral developments would comply with the ARMS, which would minimize the potential to reduce PFC ratings in RCAs. Salable mineral development under this management guidance would have minor, if any, impacts to riparian areas and wetlands, although a higher demand for mineral materials under Alternatives II and III as compared to Alternatives I, IV, and V would increase the risk of impacts.

Alternative III would have 163 miles of perennial streams in areas recommended for withdrawal from locatable mineral development. Areas recommended to be withdrawn include 23 miles of Priority 1 and 2 reaches and 43 miles of Priority 3 reaches (Table 4- 93). Alternative III would have 5 more miles of Priority 1 and 2 reaches recommended for withdrawal than Alternative II, 1 more mile than Alternative V, and fewer miles than Alternatives I and IV. The effects of this alternative are the same as described for Alternative I, except more Priority 1 and 2 reaches would be available for locatable mineral development.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Within potential oil and gas areas, Alternative IV would have 59 miles of perennial streams in areas open and 31 miles in areas closed to oil and gas leasing. Potential oil and gas areas open to leasing contain 15 miles of Priority 1 reaches, 12 miles of Priority 2 reaches, and 11 miles of Priority 3 reaches (Table 4- 90), while potential oil and gas areas closed to leasing contain 1 mile of Priority 1 reaches, 4 miles of Priority 2 reaches, and 10 miles of Priority 3 reaches. The types of impacts of oil and gas exploration and development are the same as described for Alternative I, but the spatial extent of impacts differs. Alternative IV would have the second highest miles of Priority 1 and 2 reaches open to leasing; therefore, Alternative IV would have the second highest risk for a further reduction in PFC ratings.

In areas with high, medium, or low potential for geothermal development, there is a slight variation in the open and closed acres for Alternatives IV-A and IV-B (the Preferred Alternative). Alternative IV-A has 132 miles of perennial streams in areas open and 185 miles in areas closed to leasing, while Alternative IV-B has 135 miles in areas open and 183 miles in areas closed to leasing. Areas open to leasing contain 46 miles of Priority 1 reaches, 53 (Alternative IV-A) or 55 (Alternative IV-B) miles of Priority 2 reaches, and 33 miles of Priority 3 reaches (Table 4- 91). The types of impacts of geothermal exploration and development are the same as described for Alternative I, but the spatial extent differs. Alternative IV would include the second fewest miles of Priority 1 and 2 reaches within open designations in areas with medium potential.

In Alternative IV, areas open to salable mineral development contain 44 miles of Priority 1 reaches, 51 (Alternative IV-A) or 53 (Alternative IV-B) miles of Priority 2 reaches, and 32 miles of Priority 3 reaches (Table 4- 92); 30 miles of Priority 1 reaches, 10 (Alternative IV-A) or 9 (Alternative IV-B) miles of Priority 2 reaches, and 51 miles of Priority 3 reaches would be closed to salable mineral development. The difference between Alternatives IV-A and IV-B only occurs over 2 miles of Clover Creek. Alternative IV-A would have the fewest miles of Priority 1 and 2 reaches open to salable minerals, while Alternative IV-B would have the second fewest. All salable mineral developments would comply with the ARMS, which would minimize the potential to reduce PFC ratings due to salable mineral development. Salable mineral development under this management guidance would have minor, if any, impacts to PFC ratings.

Alternative IV would have 180 miles of perennial streams in areas recommended for withdrawal from locatable mineral development. Areas recommended to be withdrawn include 34 miles of Priority 1 and 2 reaches and 50 miles of Priority 3 reaches (Table 4- 93). Alternative IV would have more miles recommended for withdrawal than Alternatives II, III, and V, but fewer than Alternative I. The effects of this alternative are the same as described for Alternative I, except more areas have potential to be impacted.

Impacts from Management Specific to Alternative V

Within potential oil and gas areas, Alternative V would have 52 miles of perennial streams in areas open and 37 miles in areas closed to oil and gas leasing. Potential oil and gas areas open to leasing contain 15 miles of Priority 1 reaches, 8 miles of Priority 2 reaches, and 11 miles of Priority 3 reaches (Table 4- 90), while potential oil and gas areas closed to leasing contain 1 mile of Priority 1 reaches, 8 miles of Priority 2 reaches, and 10 miles of Priority 3 reaches. The types of impacts of oil and gas exploration and development are the same as described for Alternative I, but the spatial extent differs. Alternative V would have the fewest miles of Priority 1 and 2 reaches open to leasing in potential oil and gas areas of all alternatives and therefore would have the least amount of risk for a further reduction in PFC ratings and the highest likelihood of attaining or moving toward objectives for Priority 1 and 2 reaches.

In areas with high, medium, or low potential for geothermal development, Alternative V would have 133 miles of perennial streams in areas open to geothermal leasing and 184 miles in areas closed to geothermal leasing. The miles of priority reaches in areas open for leasing for Alternative V are the same as for Alternative I except there is one less mile of Priority 1 reaches open for leasing in areas with low geothermal potential. The impacts are the same as described for Alternative I.

Alternative V would include 130 miles of perennial streams in areas open and 186 miles in areas closed to salable mineral development. There are 45 miles of Priority 1 reaches, 50 miles of Priority 2 reaches, and 102 miles of Priority 3 reaches in areas open to salable mineral development (Table 4- 92). Areas closed to salable mineral development contain 30 miles of Priority 1 reaches, 12 miles of Priority 2 reaches, and 47 miles of Priority 3 reaches. This alternative would have the fewest miles of Priority 1 and 2 reaches open to this use of any alternative, the same as Alternative IV-A. Salable mineral developments would comply with the ARMS, which would minimize the potential to reduce PFC ratings. Under this guidance, salable minerals development would have minor, if any, impacts to riparian areas and wetlands.

Alternative V would have 167 miles of perennial streams in areas recommended for withdrawal from locatable mineral development. Areas recommended to be withdrawn include 22 miles of Priority 1 and 2 reaches and 44 miles of Priority 3 reaches (Table 4- 93). Alternative V would have fewer miles of Priority 1 and 2 reaches closed to locatable minerals of all alternatives except Alternative II. The effects of this alternative are the same as those described for Alternative I, except more areas have potential to be impacted.

Impacts from Areas of Critical Environmental Concern Actions

The management actions for each ACEC are designed to maintain or improve relevant and important values by modifying or eliminating activities that are impairing the identified values. All actions implemented to maintain or improve relevant and important values for the ACEC would comply with the guidance in the ARMS and promote the maintenance and improvement of riparian condition in the ACEC. ACEC management actions that promote healthy riparian vegetation and improve and maintain water quality would ultimately improve the riparian areas and wetlands. ACECs affecting the Snake River would have limited effect on riparian areas and wetlands due to fluctuating water levels. ACEC management is expected to improve PFC and HC ratings and facilitate priority reaches moving toward or attaining riparian objectives.

Table 4- 94 contains the miles of priority reaches in ACECs by alternative. The miles of perennial stream and Conservation and Restoration Reaches in ACECs are summarized in Table 4- 141 and Table 4- 142 in the *Special Status Fish and Aquatic Invertebrates* section.

Table 4- 94. Priority Reaches in ACECs by Alternative (Miles)

Priority Rating [A]	Alternative						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
Bruneau-Jarbidge ACEC							
Priority 1	21	21		5	28		
Priority 2	0	0		0	2		
Priority 3	37	37		28	41		
Total	**58**	**58**		**33**	**71**		
Jarbidge Foothills ACEC							
Priority 1					27	9	
Priority 2					19	4	
Priority 3					24	7	
Total					**70**	**20**	
Middle Snake ACEC							
Priority 1		0					0
Priority 2		5					5
Priority 3		5					5
Total		**10**					**10**
Sagebrush Sea ACEC							
Priority 1							75
Priority 2							54
Priority 3							73
Total							**202**
Salmon Falls Creek ACEC							
Priority 1	<1	<1		<1			
Priority 2	0	0		0			
Priority 3	0	0		0			
Total	**<1**	**<1**		**<1**			
Total under ACEC Management	**59**	**69**	**0**	**34**	**143**	**93**	**212**

[A] There is no PFC data available for the Lower Bruneau Canyon ACEC.
Notes:
Shaded cells indicate the ACEC would not be designated in that alternative.
Riparian areas in the Lower Bruneau Canyon and Sand Point ACECs do not have PFC data and therefore do not have priority ratings.

Impacts from Management Specific to the No Action Alternative

The designation of the Bruneau-Jarbidge, Salmon Falls Creek, and Sand Point ACECs reduced the level of impacts to PFC ratings in approximately 138 miles of perennial streams. The Bruneau-Jarbidge ACEC includes 107 miles of perennial streams, while the Salmon Falls Creek ACEC includes approximately 31 miles. The overall result of ACEC management direction is that those riparian areas are in relatively good condition. The impacts that have occurred are primarily related to recreational uses and an increased incidence of invasive plants. The No Action Alternative would not include the guidance in the ARMS for improving PFC and HC ratings which support attaining or moving toward achieving riparian objectives. This alternative is the least likely of all alternatives except Alternative II to improve riparian condition over the life of the plan.

Impacts from Management Specific to Alternative I

Alternative I would include 152 perennial stream miles in five ACECs. All actions implemented to improve resource values in these ACECS would comply with the ARMS, which would improve PFC ratings and promote attaining or moving toward riparian objectives.

Bruneau-Jarbidge ACEC
This ACEC encompasses 107 miles of perennial streams. This includes 21 miles of Priority 1 reaches, no Priority 2 reaches, and 37 miles of Priority 3 reaches (Table 4- 94). The proposed management changes for this ACEC would affect the same miles as the No Action Alternatives. The treatment of noxious weeds and invasive plants in RCAs would maintain native vegetation and improve PFC ratings for riparian areas and wetlands. Identifying the ACEC as a Critical Suppression Area would reduce the potential for effects from wildland fire and fire suppression. Monitoring recreation uses in the ACEC would ensure management changes could be made before recreation-related impacts increase to levels that would locally reduce PFC ratings. Closing the ACEC to mineral leasing and salable mineral development and recommending the ACEC be withdrawn from locatable exploration and development would eliminate the potential for HC and PFC ratings to be reduced due to minerals exploration or development. The management direction under Alternative I for the Bruneau-Jarbidge ACEC would comply with the ARMS and is expected to maintain or improve HC and PFC ratings in the ACEC.

Lower Bruneau Canyon ACEC
The Lower Bruneau Canyon ACEC would encompass a 2-mile reach of the lower Bruneau River. There is no PFC data for this section of the river. Priorities for the ACEC include restoring native upland and riparian plant communities and treating noxious weeds and invasive plants, which would improve upland and riparian vegetation communities in the ACEC. Identifying the ACEC as a Critical Suppression Area would improve upland and riparian vegetation. The ACEC would continue to be available for livestock grazing; however, these effects would continue to be mitigated through implementation of ESA consultation requirements for Bruneau hot springsnail. Closing the ACEC to mineral leasing and salable mineral development would eliminate the potential for impacts from these uses. Not recommending the ACEC be withdrawn from locatable exploration and development could result in effects to HC or PFC ratings if locatable minerals exploration and development occurs.

Middle Snake ACEC
The Middle Snake ACEC would encompass a 12-mile reach of the Snake River. This ACEC contains no Priority 1 reaches, 5 miles of Priority 2 reaches, and 5 miles of Priority 3 reaches (Table 4- 94). The ACEC would be a high priority for noxious weed and invasive plant treatments, which would maintain and improve upland and riparian vegetation communities in the ACEC. Livestock trailing through the ACEC would be allowed in the designated trailing corridor, but livestock would not be allowed to remain in the ACEC overnight. Some livestock grazing-related reduction in PFC ratings could occur in the Asquena Pasture along 8 miles of the Snake River, but livestock grazing impacts should be reduced in the remainder of the ACEC. Many of the livestock grazing-related effects to the Snake River would continue to be mitigated through ESA consultation requirements for Snake River snails. Identifying the ACEC as a Critical Suppression Area and complying with ESA consultation guidance would improve upland and riparian vegetation and reduce the potential for fire suppression to reduce PFC rating for the Snake River. Monitoring recreational uses and making adjustments where use levels are impairing the relevant and important values of the ACEC would reduce recreation-related impacts to PFC ratings for the Snake River over time. Some recreation-related impacts to streamside vegetation and water quality would likely continue to occur. The WSR portions of the Snake River in the ACEC would be a ROW avoidance area, so the free-flowing nature of the river in these segments would be maintained or protected. The river segments that are not WSR segments could potentially have impacts from new ROWs, but the guidance in the ARMS would be used to reduce impacts to PFC ratings from these land uses. Closing the ACEC to mineral leasing and salable mineral development and recommending the ACEC be withdrawn from locatable exploration and development would eliminate the potential for impacts from these uses.

Salmon Falls Creek ACEC
The ACEC would include a 31-mile section of Salmon Falls Creek, 0.4 miles of which have PFC data (Table 4- 94). Identifying the ACEC as a high priority for the treatment of noxious weeds and

invasive plants would reduce the potential for non-native vegetation to displace native vegetation in riparian areas and result in improved PFC ratings. Identifying the ACEC as a Critical Suppression Area would reduce the potential for reducing PFC ratings from wildland fire and fire suppression activities in riparian areas. The ACEC would remain closed to livestock grazing, which would ensure that PFC ratings would not decline due to livestock grazing in the ACEC. Closing the ACEC to mineral leasing and salable mineral development would eliminate the potential for HC and PFC ratings to be reduced due to these uses. Not recommending the ACEC be withdrawn from locatable exploration and development could result in a reduction in HC and PFC ratings. The management direction under Alternative I for Salmon Falls Creek ACEC would comply with the ARMS and is expected to maintain or improve HC and PFC ratings in the ACEC.

Impacts from Management Specific to Alternative II

In Alternative III, existing ACEC designations would be removed, and no ACECs would be designated. Some riparian areas would continue to be managed according to the guidance for WSA designations, ESA consultation requirements, and the ARMS. The areas that would not be identified as an ACEC would be expected to have an increase in route density, which increases the potential for changes in vegetation due to weed introductions, human-caused fire, erosion to riparian areas, and increases in recreation-related impacts to RCAs, all of which can reduce PFC ratings. Increases in infrastructure would also be expected to occur as a result of increases in ROWs, commercial activities, range infrastructure, or recreation developments, which would pose an increased risk for a reduction in PFC ratings. The development of mineral resources (i.e., leasable, salable, and locatable) would not occur in WSA or WSR designations, but would be expected to occur in other locations. Even though these activities would comply with the ARMS, they could still reduce PFC ratings for riparian areas and wetlands if they were to occur in RCAs. Riparian areas not designated as an ACEC, that are not encompassed by other special designations (e.g., WSA, WSR) would be at greater risk for a reduction in PFC ratings than riparian areas in other special designations, especially Priority 1 or 2 reaches.

Impacts from Management Specific to Alternative III

Alternative III would include 82 perennial stream miles in five ACECs. All actions implemented to improve resource values in these ACECS would comply with the ARMS, which would improve PFC ratings and promote attaining or moving toward riparian objectives.

<u>Bruneau-Jarbidge ACEC</u>
In Alternative III, the Bruneau-Jarbidge ACEC would be smaller than in the No Action Alternative and Alternative I and would only encompass 51 miles of perennial streams. The boundary would not include the East Fork of the Jarbidge River, the Jarbidge River above the confluence with the East Fork, upper and lower portions of the Bruneau River, and lower Clover Creek. This ACEC includes 5 miles of Priority 1 reaches, no Priority 2 reaches, and 28 miles of Priority 3 reaches. The effects of this ACEC on riparian areas and wetlands are similar to those described for Alternative I. The guidance in the ARMS would be applied under this alternative, so actions in the ACEC, such as weed treatments, travel restrictions, and management changes to reduce recreational effects, would be conducted to maintain or improve riparian PFC ratings.

<u>Salmon Falls Creek ACEC</u>
In Alternative III, the Salmon Falls Creek ACEC would be managed the same as in Alternative I; therefore, the impacts are the same as those described for Alternative I.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV would include five ACECs. Alternative IV-A would include 191 miles of perennial streams, while Alternative IV-B (the Preferred Alternative) would include 159 miles of perennial streams. Alternative IV-A includes 21 miles of redband trout streams in need of restoration, while Alternative IV-B includes 4 miles of redband trout streams needing restoration. This alternative also includes all Bruneau hot springsnail and bull trout habitat in the planning area and 2 miles of the Snake River in ACECs. All actions implemented to improve resource values in these ACECS would comply with the ARMS, which would improve PFC ratings and promote attaining or moving toward riparian objectives.

Bruneau-Jarbidge ACEC

Under Alternative IV, the Bruneau-Jarbidge ACEC would be larger than in the No Action Alternative and Alternatives I and III, encompassing 119 miles of perennial streams. This ACEC would include 28 miles of Priority 1 reaches, 2 miles of Priority 2 reaches, and 41 miles of Priority 3 reaches (Table 4- 94).

The ACEC includes riparian areas in the Bruneau River and Jarbidge River Watersheds, and portions of lower Clover Creek. The effects of this ACEC on riparian areas are the same as described for Alternative I, except more riparian areas would be included.

The management guidance for this ACEC includes monitoring juniper encroachment in the riparian area and considering juniper treatments to improve PFC ratings. This would allow for taking corrective action to maintain appropriate juniper density in RCAs. Any action taken in RCAs would be conducted according to the ARMS and ESA consultation to ensure all appropriate mitigation is incorporated into the project design. Management direction for this ACEC also includes adjusting livestock seasons of use or stocking rates on a pasture-specific basis to minimize conflicts with bull trout spawning (late August through early November). These actions would reduce the potential for a reduction in PFC ratings and likely improve PFC ratings to the extent possible. Evaluating range infrastructure on a case-by-case basis for retention, modification, or removal and authorizing new infrastructure to the extent it maintains or improves PFC ratings would provide additional measures to reduce impacts to riparian areas and wetlands. This expanded ACEC would facilitate more improvement in PFC ratings than the No Action Alternatives and Alternatives I, II, and III.

Jarbidge Foothills ACEC

Under Alternative IV-A, the Jarbidge Foothills ACEC would include all of the redband trout streams (70 miles) within the tributaries that drain the Jarbidge Foothills between the East Fork of the Jarbidge River and Salmon Falls Creek and south of the Three Creek Highway. Of these streams, 27 miles are Priority 1 reaches, 19 miles are Priority 2 reaches, and 24 are Priority 3 reaches (Table 4- 94). This ACEC encompasses the most riparian area of all ACECs except the Sagebrush Sea ACEC, with a large portion Priority 1 and 2 reaches. The ARMS provides guidance for improving HC and PFC ratings for fish-bearing streams that would maintain or improve condition over time. Although restoration projects could locally reduce PFC ratings in the short term, these effects would likely be outweighed by the improved PFC ratings in the long term. This would contribute to Priority 1 and 2 reaches moving toward or achieving PFC in the life of the plan.

The ACEC would be a high priority for noxious weed and invasive plant treatments, which would maintain native vegetation in RCAs and contribute to improved PFC ratings. Monitoring recreation uses would ensure recreation-related impacts do not result in a further reduction in PFC ratings as recreation use increases over time. Identifying the ACEC as a Critical Suppression Area would minimize the potential for PFC ratings to be reduced from wildland fire, especially in Priority 1 and 2 reaches. The guidance in the ARMS for fire suppression would reduce impacts to PFC and HC ratings in the ACEC and promote attaining or moving toward riparian objectives.

The ACEC would be available for salable mineral development; the use of existing pits would be emphasized before creating new ones. Any new pits would be developed according to the guidance in the ARMS, which would minimize the potential to reduce PFC ratings. The ACEC would be open to leasable and locatable mineral exploration and development. Any mineral development would comply with the guidance in the ARMS to reduce the potential for effects to riparian areas and wetlands. It is possible that some component of a leasable or locatable project would enter an RCA, such as for a new road crossing or some other form of ROW authorization, that would not comply with the guidance in the ARMS and result in a reduction in PFC ratings.

Under Alternative IV-B, the Jarbidge Foothills ACEC would be managed similar to Alternative IV-A, except it would include only 38 miles of perennial streams, half the perennial streams in

Alternative IV-A. In Alternative IV-B, this ACEC would include 9 miles of Priority 1 reaches, 40 miles of Priority 2 reaches, and 7 miles of Priority 3 reaches. The types of impacts are the same as in Alternative IV-A, but would apply to fewer miles of perennial streams.

Lower Bruneau Canyon ACEC
Under Alternative IV, the Lower Bruneau Canyon ACEC would be managed the same as in Alternative I; therefore, the impacts to riparian areas and wetlands are the same.

Impacts from Management Specific to Alternative V

Alternative V would include five ACECs for a total of 968,000 acres of ACEC management, the most acreage of ACEC designation of any alternative. These ACECs would encompass 272 miles of perennial streams.

Lower Bruneau Canyon ACEC
In Alternative V, the Lower Bruneau Canyon ACEC would be managed the same as in Alternative I, except that livestock grazing would not be allowed in the ACEC. This would contribute to a reduction in ground disturbance in the ACEC and improve PFC ratings.

Middle Snake ACEC
In Alternative V, the Middle Snake ACEC would be managed the same as in Alternative I, except that livestock grazing would not be allowed in the Asquena pasture. Livestock trailing would still be allowed through the ACEC with no overnight stay. This reduced grazing would locally improve PFC ratings for riparian areas and wetlands along the portions of the Snake River. Other impacts are the same as described for Alternative I.

Sagebrush Sea ACEC
In Alternative V, 958,000 acres of public land would be designated as the Sagebrush Sea ACEC. The ACEC would encompass the southern two-thirds of the planning area and would include the areas in the Inside Desert, Jarbidge Foothills, and Salmon Falls Creek ACECs and most of the Bruneau-Jarbidge ACEC. This area encompasses 258 perennial stream miles. The Sagebrush Sea ACEC contains 75 miles of Priority 1 reaches, 54 miles of Priority 2 reaches, and 73 miles of Priority 3 reaches (Table 4- 94).

The management guidance for the Sagebrush Sea ACEC would emphasize restoration actions to improve PFC ratings. The management for this ACEC would all have similar effects as described for the ACECs it encompasses. The primary difference would be in the extent of the area affected, which is significantly larger than the other ACECs. The ARMS would be used to identify areas in need of restoration. BMPs and other conservation measures would be used to reduce impacts during restoration activities. Any of these actions could have short-term impacts that would be outweighed by the long-term restoration improvements. This is expected to promote the attainment of objectives for Priority 1 and 2 reaches.

The Sagebrush Sea ACEC includes management direction for vegetation treatments to result in no net loss of native vegetation. This would limit the use of other suitable plants with faster growth rates as intermediate cover while native vegetation recovers. It also could limit the ability to conduct rehabilitation if the native seed is not available for several years, allowing soil erosion. Recovery of native plants could take a long time to achieve, if at all, and would be complicated by fire frequency. Wildland fires could still result in a reduction in PFC ratings due to a net loss of native vegetation despite management direction to reduce fire frequency and intensity. Burned areas would continue to be susceptible to invasion by noxious weeds and invasive plants. Maintaining riparian areas at PFC would reduce the risk for noxious weeds and invasive plants to invade riparian areas and wetlands.

Livestock grazing in the Sagebrush Sea ACEC would be reduced to 10% to 20% use, which would improve native plant communities in areas that were open to livestock grazing. This would be a substantial change in the amount of livestock grazing in the planning area and would reduce livestock grazing effects to PFC ratings for riparian areas and wetlands that are accessible to livestock. Streambank stability and vegetation vigor and density would probably increase at a faster rate in the ACEC than any of the other alternatives. There also could be a decrease in route density as there would be less maintenance of allotment infrastructure in the ACEC.

Within the Sagebrush Sea ACEC, livestock infrastructure such as water troughs, corrals, and routes would be removed in reference areas. Removing the livestock infrastructure from riparian reference areas would comply with the direction in the ARMS and improve PFC ratings. Although there could be short-term effects from removing these structures and their associated roads, these impacts would be outweighed by the improvements in PFC ratings from removing livestock infrastructure in these areas.

The Sagebrush Sea ACEC would include areas that would be available for salable, leasable, and locatable mineral development. All mineral development projects would comply with the ARMS, which would not allow mineral development in RCAs unless it would improve HC ratings or riparian functional condition. This is expected reduce the potential for minerals projects to affect riparian areas.

Summary of Direct and Indirect Impacts

The impact analysis for riparian areas and wetlands focused on resource uses that posed the greatest risk of reducing PFC ratings: Conditional Suppression Areas, areas open to livestock grazing, areas not in a SRMA, areas open to cross-country motorized vehicle use, areas open to ROW and wind energy development, areas open to mineral exploration and development, and areas not within ACECs. The more miles of priority reaches in these areas, the greater the risk for reduction in PFC rating. For all action alternatives, the guidance in the ARMS would be used to minimize the risk to PFC ratings. The summary of impacts discussed below focuses on the resource uses that have the greatest likelihood to reduce PFC ratings or prevent the attainment of the riparian objectives.

To summarize impacts for each alternative, the miles of priority reaches from Table 4-95 were used to rank alternatives according to their potential to impact PFC ratings. A ranking of 1 indicates the alternative with the most risk of decreasing PFC ratings, the least potential for improving PFC ratings, or the least potential for attaining riparian objectives. A ranking of 6 indicates the alternative with the least risk of decreasing PFC ratings, the most potential for improving PFC ratings, or the most potential for attaining riparian objectives. Numeric values of 2 through 5 indicate where the other alternatives occur in relation to each other for their impact to riparian areas. Resource uses that impact the same amount of riparian area were given the same ranking.

Table 4-95. Summary of Impacts to Riparian Restoration (Priority 1 and 2) and Conservation (Priority 3) Reaches by Alternative (Miles)

Indicator [A]	Alternative						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
Wildland Fire Ecology and Management							
Critical Suppression							
Improve	140	80	34	68	98	82	137
Maintain	85	67	22	62	78	73	84
Conditional Suppression							
Decline	0	75	165	92	45	65	<1
Livestock Grazing							
Unavailable to Grazing							
Improve	22	58	40	40	52	51	77
Maintain	36	42	37	37	41	41	59

Indicator [A]	Alternative						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
Available to Grazing							
Decline	165	123	145	145	130	131	87
Riparian Reference Areas							
Improve	0	18	7	7	18		23
Recreation							
Improve	N/A	69	7	7	25		7
Maintain	N/A	70	30	30	44		29
Decline	N/A	84	186	186	154		167
Travel and Transportation							
Improve	31	48	33	34	51		60
Maintain	87	174	189	189	171		161
Decline	104	0	0	0	0		0
Land Use Authorizations							
ROWs							
Improve	N/A	45	43	45	63		63
Maintain	60	131	126	126	134		213
Decline	163	47	54	52	26		53
Potential Wind Development Areas							
Maintain	14	2	17	2	2		0
Decline	28	4	29	4	3		1
Oil and Gas Leasing in Potential Oil and Gas Areas							
Decline	N/A	36	54	53	38		34
Improve	N/A	17	0	1	15		19
Geothermal Leasing in Potential Geothermal Areas							
Improve	N/A	92	45	45	95	93	93
Decline	N/A	134	184	182	132	134	133
Salable Minerals							
Improve	N/A	83	43	74	91	90	89
Decline	N/A	135	176	144	127	129	131
Locatable Minerals (Recommended for Withdrawal)							
Improve	N/A	83	61	66	84		65
Decline	N/A	140	162	157	139		158
Areas of Critical Environmental Concern							
Improve	22	26	0	6	78	42	133
Maintain	38	44	0	30	68	51	80
Decline	163	153	0	187	77	130	10

[A] The following is the baseline number of miles for each of the categories in the table:
Total Perennial Stream Miles in Planning Area = 316
Total Miles of Streams with PFC Ratings (Riparian Priority Reaches) in Planning Area = 225
Total Miles of Conservation and Restoration Reaches with PFC Data = 39
Note: N/A is used under No Action when allocation data are not spatially depicted, and therefore, the miles of priority reaches cannot be determined.

Impacts from the No Action Alternative

The ARMS would not be implemented under the No Action Alternative. Currently, 140 miles of riparian areas are in a reduced condition. This alternative would have the greatest potential for a further reduction in HC and PFC ratings of all alternatives. The entire planning area would be managed for full suppression which would not focus suppression activities on Restoration Reaches in the event of multiple fire ignitions. This alternative has the most miles of Restoration Reaches vulnerable to impacts from livestock grazing. No reference areas would be established to compare condition in grazed and ungrazed riparian areas. No SRMAs would reduce recreation impacts to PFC ratings from current and future recreation use. The planning area would continue to be open to cross-country travel resulting in the greatest expected increase in route density and greatest potential for a decline in PFC ratings of all alternatives. The majority of the planning area would be available for land use authorizations and minerals exploration and development. The ARMS would not be applied to actions in the No Action Alternative which would result in the greatest potential for management actions to reduce HC and PFC ratings of all alternatives. Without the guidance in the ARMS, the No Action Alternative is expected to result in the fewest miles of riparian areas attaining PFC over the life of the plan of all alternatives.

Overall, the No Action Alternative would result in major adverse impacts to riparian areas and wetlands.

Impacts from Alternative I

The ARMS would be applied to all actions in Alternative I and would minimize the potential to reduce PFC ratings. In Alternative I, the ARMS would be used to maintain 85 miles of stream at PFC, achieve 60 miles of PFC, and have 80 miles of stream moving toward PFC over the life of the plan. Alternative I would rank third for the potential to facilitate the attainment of riparian objectives in the life of the plan when all action for resource uses are considered for their impacts to riparian areas.

Alternative I would have more miles of Restoration Reaches in vulnerable to impacts from wildland fire than the No Action Alternative and Alternatives IV and V, but fewer than Alternatives II and III. Overall, livestock grazing in Alternative I would pose a greater risk for impacts to riparian areas and wetlands than Alternatives IV and V, but less than what would occur in the other alternatives. Alternative I would have more expected decreases in route density than Alternatives II and III, but less than Alternatives IV and V which would improve PFC ratings and support riparian objectives. Alternative I would have the most miles of riparian Restoration Reaches within SRMAs of all alternative which would improve PFC ratings related to recreation impacts. Leasable minerals in Alternative I would have the second least amount of risk to riparian areas of all alternatives. ACEC management guidance for Alternative I is expected to result in more miles of riparian area achieving or moving toward PFC than Alternatives II, III and the No Action Alternative and less than Alternatives IV and V.

Overall, Alternative I would result in moderate adverse impacts to riparian areas and wetlands.

Impacts from Alternative II

The ARMS would be applied to all actions in Alternative II and would minimize the potential to reduce PFC ratings. In Alternative II, the ARMS would be used to achieve 85 miles of stream at PFC and 140 miles of stream to be moving toward PFC over the life of the plan. This rate of riparian improvement is slower than all of the other action alternatives. Alternative II is the least likely to facilitate the movement towards riparian objectives of all action alternatives. Overall, Alternative II would result in the fewest miles of riparian area rates as PFC over the life of the plan of all alternatives except the No Action Alternative.

In Alternative II, the Critical Suppression Areas would include the fewest miles of Restoration Reaches of all action alternatives and would have the most potential for a further reduction in riparian condition from wildland fire. Substantially more livestock grazing would occur in Alternative II than under any other alternative which would have the greatest potential for livestock to reduce PFC ratings of all alternatives. Livestock grazing in Alternative II is expected to result in the fewest miles moving toward PFC in areas accessible to livestock grazing than the other action alternatives except for the No Action Alternative. In Alternative II, areas with travel limited to designated routes and ways would include the most miles of riparian area not at PFC of all alternatives. Route density would be expected to increase in 85% of the TMAs which would pose the most risk to PFC ratings of any action alternative. Alternative II would have the greatest potential to result in a decline in PFC ratings from ROW avoidance areas of all alternatives. Alternative II includes the most miles of PFC ratings in areas open to potential leasable, salable, and locatable mineral development and the greatest potential for a decline in riparian condition of all alternatives. No ACECs would be designated under this alternative which would result in the most Restoration Reaches vulnerable to a decline in condition of all alternatives.

Overall, Alternative II would result in major adverse impacts to riparian areas and wetlands.

Impacts from Alternative III

The ARMS would be applied to all actions in Alternative III and would minimize the potential to reduce PFC ratings. The ARMS would be used to maintain 85 miles of stream at PFC, achieve 98 miles of PFC, and move 42 miles of stream toward PFC over the life of the plan. In Alternative III, the attainment of the riparian objectives is less likely to occur than Alternative I because the amount of riparian improvement required to meet the objectives is greater in Alternative III while accommodating an increased level of authorized resource use in addition to the enhanced wildland fire suppression capabilities. This alternative would achieve riparian objectives slower than Alternatives I, IV and V, but faster than the No Action Alternative and Alternative II.

In Alternative III, more fire suppression-related infrastructure would be created than in all other alternatives which would increase impacts to PFC ratings over the long-term where the infrastructure is in RCAs. Alternative III would have the greatest risk to PFC ratings from enhanced wildland fire suppression infrastructure of any of the action alternatives. The improved response time from the enhanced fire suppression infrastructure could reduce the impacts from wildland fire on riparian areas. Alternative III authorizes livestock grazing on the same amount of riparian area as Alternative II but fewer AUMs. Livestock grazing in Alternative III would have a greater potential for a decline in PFC ratings than Alternatives I, IV and V, but less than what could occur in Alternative II and the No Action Alternative. ROWs and leasable and locatable mineral development in Alternative III would have the same potential to result in a decline in PFC ratings as Alternative II, the most of all action alternatives. Alternative III would have the fewest miles of riparian area in an ACEC of all alternatives except for Alternative II.

Overall, Alternative III would result in localized, major adverse impacts due to increased fire-related infrastructure; however, some areas could experience localized, moderate beneficial impacts if they were restored to act as greenstrips.

Impacts from Alternative IV (the Preferred Alternative)

The ARMS would be applied to all actions in Alternative IV and would minimize the potential to reduce PFC ratings. In Alternative IV, the ARMS would be used to maintain or improve the same miles of riparian area as Alternative III, but would have fewer authorized land uses and less wildland fire infrastructure. The rate of riparian improvement in Alternative IV would be faster than what is expected for the No Action Alternative and Alternatives I, II, and III. This alternative is the most likely to achieve the objective of 98 miles of riparian area currently not at PFC achieving PFC. Active restoration is more likely to achieve restoration objectives and in a shorter timeframe than passive restoration. Overall, Alternative IV is more likely to facilitate the movement towards or the attainment of riparian objectives than all other alternatives.

This alternative has the second most miles of riparian area in Critical Suppression Areas not at PFC of all alternatives. Alternative IV-A would be the second most likely alternative for riparian objectives to be met in the life of the plan due to the critical suppression emphasis. Alternative IV would have more miles of riparian area not at PFC available to livestock grazing than Alternative I and V but less than the No Action Alternative and Alternatives II and III. Alternative IV would have more improvement in riparian condition than Alternative I and V, but less than the other alternatives. Alternative IV would have more roads closed to motorized vehicle use than Alternatives I through III, and approximately half of what would be closed under Alternative V. Alternative IV would result in more improvement of riparian area currently being impacted by roads than in the No Action Alternative and Alternatives I, II, and III. Alternative IV would have more impacts from ROWs and leasable minerals development than Alternative V, but less than the other alternatives. Alternative IV would have more miles of riparian area within ACECs moving toward or achieving PFC than the No Action Alternative and Alternatives I, II and III, but fewer than Alternative V.

Overall, Alternative IV would result in localized, moderate adverse impacts in the short term from restoration treatments leading to major beneficial impacts in the long-term.

Impacts from Alternative V

The ARMS would be applied to all actions in Alternative V and would minimize the potential to reduce PFC ratings. In Alternative V, the ARMS would be used to maintain or improve the same miles of riparian area as Alternatives III and IV, but would have the fewest authorized land uses of all alternatives. The rate of riparian improvement for Alternative V would be faster than for the No Action Alternative and Alternatives I, II, and III, but slower than Alternative IV. Passive restoration techniques would have fewer short-term impacts, but longer timeframes for riparian objectives to be met. Alternative V is more likely to facilitate the movement towards the attainment of riparian objectives than the No Action Alternative and Alternatives I, II and III. Alternative V would result in the same improvements in PFC ratings as Alternative IV, but at a slower rate due to the passive restoration techniques.

Alternative V includes the most miles of riparian area not at PFC in Critical Suppression Areas of all action alternatives and would have the least amount of fire suppression infrastructure of all alternatives. Alternative V would have the least amount of riparian areas open to livestock grazing of all alternatives. The level of livestock use in Alternative V would be substantially less than under all other alternatives and is expected to have the most improvement in riparian ratings where riparian condition is related to livestock grazing. Alternative V would have the greatest expected decrease in motorized use of all alternatives and the most improvement in PFC ratings where roads occur in the RCA. Alternative V would have the most miles of riparian area not at PFC in ROW avoidance and exclusion areas of all alternatives. Leasable minerals in Alternative V would have the second least amount of risk to PFC ratings of all alternatives which is the same as for Alternative I. Alternative V would include the most miles of riparian area not at PFC within an ACEC of all alternatives.

Alternative V would result in major beneficial impacts in the long-term due to natural recovery after the reduction of resource uses.

Cumulative Impacts

Past, Present, and Reasonably Foreseeable Actions

This assessment considers the effects of past, present, and reasonably foreseeable actions on Federal, State, and private lands in and adjacent to the planning area in addition to the management proposed in the alternatives. Management actions in the planning area could influence portions of the following three primary watersheds: Bruneau River, Salmon Falls Creek, and Snake River. These primary watersheds include lands administered by BLM’s Bruneau, Burley, and Shoshone FOs; the Jarbidge Ranger District of the Humboldt-Toiyabe National Forest; Hagerman Fossil Beds National Monument; and IDL and the Nevada Division of State Lands. These watersheds also include private inholdings and two military withdrawal areas. Actions and activities in the identified watersheds that have influenced riparian condition in the past and have the potential to influence riparian condition in the future were considered in this cumulative effects assessment.

Riparian areas and wetland are focus areas for many uses and, as a result, have been locally degraded over time. Factors that have contributed to current riparian condition include increases in the amount of noxious weeds and invasive plants, wildland fire and fire suppression, livestock grazing, recreational uses, road construction and use, and the diversion of surface water. All of these factors have reduced PFC condition in the analysis area over time and are expected to continue to influence riparian condition in the future. Activities on State and private land may continue to influence PFC ratings on the public land. As human population increases over time, the use of surface water that support riparian areas and wetlands is expected to increase.

Past, present, and reasonably foreseeable actions for the following resources and resource uses cumulatively affect riparian areas and wetlands:

- Noxious Weeds and Invasive Plants
- Wildland Fire Ecology and Management
- Livestock Grazing
- Transportation and Travel
- Land Use Authorizations
- Minerals

These actions are described in detail in the *Introduction* to this chapter.

Summary of Cumulative Impacts

Cumulative Impacts from the No Action Alternative

Management actions implemented under the No Action Alternative, combined with actions on State and private lands, have contributed to the current condition of riparian areas and wetlands in the planning area. The No Action Alternative would not include the guidance in the ARMS for riparian recovery which would reduce the likelihood for the 140 miles of riparian area not at PFC to improve over the life of the plan. Some of this impaired condition is due to dewatering of streams for private land uses under legal water rights granted by the State of Idaho. Noxious weed and invasive plants have increased in the planning area under the 1987 Jarbidge RMP. This increase in the occurrence of noxious weeds in the planning area may have contributed to the spread of noxious weeds to adjacent Federal, State, and private lands. Conversely, the areas adjacent to the planning area have been and are likely to continue to be a source of noxious weeds in the planning area. The occurrence and frequency of large wildland fires and fire suppression activities has also increased on Federal, State, and private land in the analysis area, partially as a result of the increase in invasive plants as well as the increase in off-road motorized recreation and the open designation for cross-country motorized vehicle use for the planning area. Trails, primitive roads, and infrastructure from uses such as livestock grazing, energy development activities, or minerals exploration or development are expected to result in a cumulative increase in impacts to riparian and wetland condition ratings. Impacts associated with resource uses under the No Action Alternative are expected to maintain or result in a cumulative decrease in riparian condition in the analysis area over time.

Cumulative Impacts from Alternative I

In Alternative I, riparian and wetland condition in the planning area would be expected to improve over the life of the plan. Management actions or authorized uses in RCAs could result in cumulative effects in addition to impacts from existing actions and uses. Restoration activities in the planning area could have short-term cumulative effects to PFC ratings in the analysis area but would improve riparian and wetland condition in the long-term.

Wildland fires and fire suppression are expected to continue on Federal, State, and private land in the analysis area. The development of new water sources for fire suppression in addition to existing water uses on Federal, State, and private land would increase impacts to riparian areas and wetlands. Building new roads and guard stations and creating fuel breaks in addition to those on Federal, State, and private land in the analysis area would also increase disturbances to riparian areas or wetlands.

Livestock grazing on Federal, State, and private lands in the analysis area would continue to impact riparian and wetlands. As portions of Federal lands become unavailable for livestock grazing, the level of livestock use on State and private lands are expected to increase. Areas where fencing or topography is insufficient to contain livestock grazing on State or private land would continue to pose an increased risk for cumulative impacts to riparian areas and wetlands on Federal land.

Proposed changes in travel management would limit motorized travel to designated routes or ways and would reduce the number of new roads pioneered into RCAs, the spread of noxious weeds, and the potential for human-caused fires. However, the anticipated increase in recreational use, combined with the authorization of cross-country motorized vehicle use for permit, lease, and ROW holders would continue to pose an increased risk for a cumulative increase in roads, the spread of noxious weeds and invasive plants, and the potential for human-caused fires.

Uses such as oil and gas, wind energy, and geothermal development in the analysis area would create new roads and infrastructure on Federal, State, and private land in addition to existing roads and infrastructure. All of these activities would increase demands on surface and groundwater for project construction, operation, and maintenance that would result in additional impacts to riparian and wetland condition. Overall, these actions would have cumulative impacts to riparian areas and wetlands in the analysis area.

The cumulative impacts from implementing the restoration guidance in the ARMS in Alternative I are expected to improve riparian and wetland condition more than is expected to occur in the No Action Alternative.

Cumulative Impacts from Alternative II

In Alternative II, riparian and wetland condition may be maintained but would likely be locally reduced below the existing condition over the life of the plan. Management strategies most beneficial to commodity uses such as livestock grazing, transportation and travel, land use authorizations, energy development, and minerals exploration would be emphasized.

Improving roads and stream crossings and building new roads and guard stations are expected to increase road densities over the life of the plan in addition to the existing roads and infrastructure. Creating fuel breaks may help reduce fire size and intensity, but these areas could provide a source of noxious weed and invasive plants that could enter riparian areas and wetlands.

Alternative II would include fuels treatments using prescribed burning and targeted grazing in addition to a substantial increase in permitted livestock grazing. This would be concurrent with an increase in areas available for oil and gas leasing, wind energy development, geothermal leasing, existing and new range infrastructure, existing and new water developments, and ROWs. All of these activities would result in an incremental increase in impacts to riparian and wetland condition. Several small wind projects exist on private land in the northern portion of the planning area, and a large wind energy project (China Mountain) is proposed in the southern portion of the planning area. These actions may continue to increase on State and private in the life of the plan and have additional effects to riparian areas and wetlands on Federal lands.

Implementation of the ARMS would moderate impacts to riparian areas and wetlands from authorized uses, but the guidance would not moderate impacts from similar actions on State and private lands in the planning area or on Federal lands adjacent to the planning area. The cumulative impacts from implementing the restoration guidance in the ARMS in Alternative II are expected to result in less improvement in riparian and wetland condition than the No Action Alternative and Alternative I because of the overall increased land uses.

Cumulative Impacts from Alternative III

In Alternative III, riparian and wetland condition may be maintained but would likely be reduced below the existing condition over the life of the plan. Management strategies most beneficial for enhancing fire suppression capabilities, managing fuels, and reducing wildland fire would be emphasized and would occur concurrently with uses such as livestock grazing, recreation, transportation and travel, land use authorizations, energy development, and minerals exploration. The potential increase in total AUMs once upland vegetation objectives are achieved may impact a larger percentage of riparian areas and wetlands in the planning area than all other alternatives except Alternative II. All other public land uses in Alternative III would be similar to Alternative II

The greatest increase in road and other infrastructure to enhance fire suppression is expected to occur in VMA B, which has first priority for fire suppression during multiple ignitions and has the second most miles of riparian area not at PFC in the planning area. These new roads would result in an a cumulative increase in roads in addition to existing roads currently used for other public land uses and the existing roads on State and private land. Fire response time would be shortened as a result of these additional actions and fewer miles of riparian area would be affected by wildland fire. These additional roads, particularly of the roads in RCAs, are expected to have an increase in uses by other public land users and contribute to a cumulative increase in the spread of noxious weeds and invasive plants and human-caused fires over the long-term. There would be fewer acres of noxious weeds treated in Alternative III than all alternatives. Similar increases in route density on Federal, State, and private lands in the analysis area are expected. New water developments created to enhance fire suppression would occur simultaneously with the private land irrigation and livestock watering developments and would increase water demand on existing surface and groundwater resources. These increased water demands would primarily occur in VMA B where water resources are already limited.

Implementation of the ARMS would moderate some of the impacts to riparian areas and wetlands in the planning area, but it would not moderate similar actions on State and private land in the planning area or from adjacent Federal lands. Alternative III is likely to result in some improvement in riparian and wetland condition due to implementing the restoration guidance in the ARMS, but the amount of improvement would be limited by the increased fire suppression infrastructure in addition to the current levels of authorized public land uses. Alternative III would result in less improvement in riparian and wetland condition than Alternative I, but more than the No Action Alternative and Alternative II. The likelihood of meeting riparian objectives over the life of the plan is less in this alternative than Alternatives I, IV, and V.

Cumulative Impacts from Alternative IV (the Preferred Alternative)

Alternative IV has fewer authorized public land uses and more active restoration of riparian areas and wetlands than Alternatives I, II, and III. The increased fire suppression emphasis would be expected to result in fewer cumulative impacts from wildland fire on riparian areas and wetlands and a reduced potential for wildland fire to spread onto adjacent State and private lands. VMA C and D have first and second priority for fire suppression during multiple ignitions and contain 68% of all the riparian areas not at PFC for the planning area. Alternative IV has the most weed treatments of all alternatives and would reduce the spread of noxious weeds and invasive plants in the analysis area. The cumulative effects of transportation and travel actions would be similar to Alternative I. Establishing the Bruneau-Jaribdge and Jarbidge Foothills ACECs would encompass half (75 miles) of the total miles of riparian areas not currently at PFC and would reduce impacts to these riparian areas.

Impacts to riparian areas and wetlands in the analysis area are expected to continue. Implementation of the ARMS would moderate impacts to riparian areas and wetlands in the planning area from the above actions but would not moderate similar actions on State and private land in the planning area or on Federal lands adjacent to the planning area. Alternative IV would result in improved riparian condition throughout the planning area and is the most likely to achieve riparian objectives in the life of the plan of all alternatives.

Cumulative Impacts from Alternative V

Alternative V relies on natural recovery rates for riparian areas not at PFC with limited active restoration. This alternative would have least amount of public land uses of all alternatives and the fewest cumulative effects to riparian areas and wetlands. Alternative V includes no additional infrastructure and the least amount of permitted grazing of all alternatives including the No Action Alternative. This is expected to result in fewer cumulative effects to riparian areas and wetlands from livestock grazing in the planning area than in any other alternative. Grazing impacts could substantially increase on State and private land and result in cumulative effects to riparian condition on Federal land.

Designating the Sagebrush Sea ACEC as a Critical Suppression Area with management objectives that include minimizing public land uses would reduce the potential for impacts to riparian area and wetlands not at PFC and promote the maintenance of riparian areas currently at PFC. Large contiguous ACECs adjacent to WSA, WSR, or non-WSA lands managed for wilderness characteristics would decrease the potential for cumulative impacts to riparian areas and wetlands on the public land.

Impacts to riparian areas and wetlands in the analysis area are expected to continue. Implementation of the ARMS would moderate impacts to riparian areas and wetlands in the planning area from the above actions but would not moderate similar actions on State and private land in the planning area or on Federal lands adjacent to the planning area. Alternative V would result in improved riparian condition throughout the planning area but at a slower rate of recovery than Alternative IV.

4.3.6. Fish and Wildlife

4.3.6.1. Fish

Analysis Methods

Indicators

The following indicators were used for the analysis of impacts to fish:

- **Riparian condition as determined through Proper Functioning Condition (PFC) Ratings** – PFC is qualitative assessment of the physical function of stream, wetland, lake, reservoir, and other areas associated with riparian-wetland vegetation. PFC is assessed for the following riparian features: hydrology, riparian vegetation, and erosion/deposition.

- **Habitat condition for special status fish species as determined through Habitat Condition (HC) Ratings** – HC ratings encompasses streambank stability, streambank cover, stream substrate condition (including spawning fine sediments), water temperature (maximums for juvenile rearing), pool volume, pool quality, migration barriers (present, absent), width-to-depth ratio, habitat complexity, and relative fish abundance. The HC rating and its relationship to stream condition for special status fish are assessed in detail in the *Special Status Fish and Aquatic Invertebrates* section.

Methods and Assumptions

Impacts to fish from management in the following sections of Chapter 2 were analyzed in detail: *Fish*, *Water Resources*, *Riparian Areas and Wetlands*, *Special Status Species*, *Noxious Weeds and Invasive Plants*, *Wildland Fire Ecology and Management*, *Livestock Grazing*, *Recreation*, *Transportation and Travel*, *Land Use Authorizations*, *Minerals*, and *Areas of Critical Environmental Concern*. Management from the remaining sections was not analyzed in detail because the management did not vary measurably between alternatives or impact the indicator for fish. **Impacts from management for fish** can be found under *Impacts from Fish Actions* in the *Tribal Rights and Interests*, *Transportation and Travel*, and *Economic Conditions* sections.

This analysis assesses the impacts of management actions on non-special status fish in the planning area, such as sculpin (Cottidae), suckers (Catostomidae), and minnows (Cyprinidae). These fish are native to the planning area and coexist with special status fish such as redband trout and bull trout. The terminology used in this section collectively refers to sculpin, suckers, and minnows as “native non-game fish.” These native non-game fish are not managed through fishing regulations, but are recognized as an important component of the aquatic ecosystem. The term “game fish” refers to fish that are managed through fishing regulations by the State of Idaho or the State of Nevada.

The *Analysis of the Management Situation for the Jarbidge Planning Area* summarizes the distribution of all fish in the planning area (BLM, 2007a). This document identifies known areas where native non-game fish coexist with special status fish and where the native non-game fish exist independently. The streams known to contain only native non-game fish are identified in Table 4- 96. The stream miles in Table 4- 96 are estimates of where native non-game fish occur during some time of the year. The miles of stream may vary seasonally or during various streamflow conditions. The miles in the table are likely an overestimate of areas where only native non-game fish occur in the planning area.

The impact analysis for native non-game fish compares the relevant management actions in Chapter 2 to the objectives to maintain or improve HC and PFC ratings in conformance with the Appendix D (Aquatic and Riparian Management Strategy, referred to as “the ARMS” throughout this section). Management actions were assessed for their potential to contribute to attaining the objectives in the ARMS, to have a neutral effect, or to reduce the likelihood the objectives would be achieved. The assessment considers how the conservation and restoration watersheds in the ARMS would impact native non-game fish where they co-exist with special status fish and where they exist independently (Table 4- 96).

Table 4- 96. Estimate of Stream Miles Containing Only Native Non-Game Fish and their PFC Priority Rating

Stream	Miles Occupied by Native Non-Game Fish	PFC Priority 1 Miles	PFC Priority 2 Miles	PFC Priority 3 Miles
Barbour Creek	<1	N/A	N/A	N/A
Tuana Gulch	5	1	3	1
Big Flat Creek	4	0	1	1
Clover Creek [A]	43	17	23	3
Salmon Falls Creek	20	N/A	N/A	N/A
Total	**72**	**18**	**27**	**5**

[A] Most of the miles in Clover Creek are dewatered due to private land irrigation.
Note: 70% of the streams containing only native non-game fish have associated PFC ratings; N/A denotes streams without PFC data.

Where special status aquatic species and native non-game fish coexist, management actions that would reduce or improve HC and PFC ratings for special status aquatic species would also reduce or improve habitat for native non-game fish. Therefore, the impacts of resources and resource uses on special status aquatic species would have the same impacts to native non-game fish where these species coexist. Impacts to special status aquatic species are analyzed in detail in the *Special Status Fish and Aquatic Invertebrates* section and are incorporated here as appropriate. In riparian areas without HC data that are occupied by native non-game fish, the expected impacts would be the same as if they contained special status fish. Where HC data are not available, the impact analysis uses the riparian PFC assessments and considers how the priorities for riparian restoration and maintenance would impact native non-game fish. Impacts to riparian areas are analyzed in detail in the *Riparian Areas and Wetlands* section and are incorporated here as appropriate.

The literature indicates that native non-game fish such as sculpin, suckers, and minnows can tolerate warm water temperatures, higher levels of instream fine sediments, and lower flow conditions that salmonids (Sigler & Sigler, 1987). Although these native non-game fish can tolerate warmer water temperatures than salmonids, they also are known to exist in streams that contain salmonids (BLM, 2007a). The analysis for native non-game fish is based on the primary assumption that the management actions in the ARMS to conserve and restore special status fish habitat (based on HC ratings) and riparian condition (based on PFC ratings) would also meet the needs of native non-game fish. It is also assumed that management actions that have the potential to degrade, maintain, or improve habitats for special status fish would have the same potential effects to native non-game fish.

The life history requirements and habitat preference for Wood River sculpin are assumed to be similar to those for other species of sculpin in the planning area (i.e., Shorthead, Mottled, and Paiute). Research conducted by Meyer et al. (2008) and Zaroban (2008, in press) supports this general comparison.

Direct and Indirect Impacts

Impacts from Fish, Special Status Fish and Aquatic Invertebrates, Water Resources, and Riparian Areas and Wetlands Actions

Native non-game fish differ from special status fish in that they can tolerate warmer water temperatures and smaller, shallower streams. However, when the instream HC and riparian PFC ratings improve, the habitat conditions for native non-game fish also improve. The relationship between native non-game fish and water resources is similar to that identified for special status fish (see *Impacts from Water Resources Actions* in the *Special Status Fish and Aquatic Invertebrates* section). Like special status fish, native non-game fish have habitat requirements that generally include stream channels with low instream fine sediments, cool water temperatures, suitable streamflows for successful spawning and fish passage, and water quality with minimal nutrient contamination.

The relationship between native non-game fish and riparian vegetation communities is the same as that identified for special status fish (see *Impacts from Riparian Areas and Wetlands Actions* in the *Special Status Fish and Aquatic Invertebrates* section). Native non-game fish can be found in stream reaches with little riparian vegetation. In these stream reaches, native non-game fish are at an increased risk of predation and mortality due to a lack of cover, elevated water temperatures, and reduced streamflows. Stream reaches with limited riparian vegetation would not support all of the life cycle requirements of native non-game fish. These fish would select habitats with streamside shading and overhead cover if these habitats are accessible. When the riparian PFC ratings improve, the habitat conditions for native non-game fish also improve.

The impacts to water quality, riparian areas, and special status fish habitat from these actions are analyzed in detail in the *Water Resources, Riparian Areas and Wetlands*, and *Special Status Fish and Aquatic Invertebrates* sections, respectively; results of those analyses are summarized here as they relate to native non-game fish.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative does not include guidance for improving habitat conditions for streams containing native non-game fish or for improving water quality or quantity for native non-game fish. Compliance with State water quality standards would reduce the potential for impacts to native non-game fish. The management guidance in the No Action Alternative does not include the guidance in the ARMS and is expected to have more risk of reducing HC and PFC ratings of streams containing native non-game fish than the other alternatives.

Impacts from Management Common to All Action Alternatives

All action alternatives use the guidance in the ARMS to achieve riparian and wetland management objectives. The ARMS outlines priorities for riparian restoration based on the HC and PFC ratings. The conservation and restoration guidance in the ARMS would improve water quality in 303(d)-listed streams as HC and PFC ratings improve. Improvements in the instream (HC) rating and riparian (PFC) ratings would also improve habitat for native non-game fish.

Impacts from Management Specific to Alternative I

In Alternative I, actions to improve habitat for special status fish would also reduce impacts to native non-game fish where these species coexist. For areas where native non-game fish exist independently, the guidance in the ARMS would be used to improve HC and PFC ratings and reduce impacts to RCAs. The rate of riparian improvement in Alternative I would be slower than in Alternatives III, IV, and V, but faster than Alternative II. Alternative I is expected to have more improvement in water quality than the No Action Alternative and Alternative II, but less than Alternatives III, IV, and V.

Impacts from Management Specific to Alternative II

In Alternative II, actions to improve habitats for special status fish would also reduce impacts to native non-game fish where these species coexist. For areas where native non-game fish exist independently, the guidance in the ARMS would be used to improve HC and PFC ratings and reduce impacts to non-game fish. The rate of riparian improvement in Alternative II would be faster than the No Action Alternative, but slower than all of the other action alternatives, and would result in more miles of streams being in a condition that is less than PFC. This would reduce the rate of improvement in HC rating over the life of the plan. Alternative II is more likely to facilitate the movement toward riparian objectives than the No Action Alternative, but less likely to achieve riparian objectives than Alternatives I, III, IV, and V. This alternative is expected to have more improvement in water quality than the No Action Alternative, but less than the other action alternatives.

Impacts from Management Specific to Alternative III

In Alternative III, actions to improve habitats for special status fish would also reduce impacts to native non-game fish where these species coexist. For areas where native non-game fish exist independently, the guidance in the ARMS would be used to improve HC and PFC ratings and reduce impacts to non-game fish. Alternative III would have more risks to HC and PFC ratings in RCAs containing native non-game fish than Alternatives IV and V, but less than the No Action Alternative and Alternatives I and II. The rate of riparian improvement in Alternative III is slower than Alternatives IV and V and faster than Alternatives I and II. Some fire-related actions, such as fuels treatments in the RCA, could result in a long-term reduction in HC and PFC ratings in RCAs containing native non-game fish. With the guidance in the ARMS, water quality in native non-game fish-bearing streams should improve, but some actions would pose an increased risk of localized impacts to water quality in RCAs with native non-game fish.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

In Alternative IV, actions to improve habitats for special status fish would also reduce impacts to native non-game fish where these species coexist. For areas where native non-game fish exist independently, the guidance in the ARMS would be used to improve HC and PFC ratings and reduce impacts to non-game fish. The rate of riparian improvement in Alternative IV is similar to Alternative III and V, but faster than Alternative I and II. Active restoration activities could have short-term reductions in water quality in streams with native non-game fish, but are expected to improve water quality over time. Alternative IV would result in more miles of stream achieving PFC and HC Conservation rating over the life of the plan than under Alternative I and II. Active restoration activities in the RCA could have more short-term adverse effects to HC and PFC ratings, but there is likely to be more improvement to these indicators and at a faster rate than what would be expected from passive restoration.

Impacts from Management Specific to Alternative V

In Alternative V, actions to improve habitats for special status fish would also reduce impacts to native non-game fish where these species coexist. For areas where native non-game fish exist independently, the guidance in the ARMS would be used to improve HC and PFC ratings and reduce impacts to non-game fish. The rate of riparian improvement is similar to what would occur in Alternative III and IV and faster that would occur in Alternatives I and II. Passive restoration would have fewer impacts to water quality in native non-game fish habitats and longer habitat recovery timeframes than active restoration. Limiting the priorities for restoration to FAR-DN and NF stream reaches could preclude restoration techniques that would improve native non-game fish habitats.

Impacts from Noxious Weeds and Invasive Plants Actions

The relationship between native non-game fish and noxious weeds and invasive plants is the same as described for special status fish and riparian areas and wetlands (see *Impacts from Noxious Weeds and Invasive Plants Actions* in the *Special Status Fish and Aquatic Invertebrates* and *Riparian Areas and Wetlands* sections). The results of the analyses of impacts to riparian areas and special status fish habitat from noxious weeds and invasive plants actions are incorporated here as they relate to native non-game fish; these analyses are documented under *Impacts from Noxious Weeds and Invasive Plant Actions* in the *Riparian Areas and Wetlands* and *Special Status Fish and Aquatic Invertebrates* sections.

Impacts from Management Specific to the No Action Alternative

There is no management emphasis to prevent the increase of noxious weeds in RCAs. Noxious weed and invasive plant populations would likely increase under the No Action Alternative and would impact native non-game fish habitats.

Impacts from Management Common to the No Action and All Action Alternatives

The No Action Alternative and all action alternatives include guidance to comply with ESA consultation requirements, conservation agreements for special status species, and current BLM policy for noxious weed and invasive plant treatments. This direction would reduce impacts to native non-game fish where they coexist with ESA-listed or other special status fish.

Impacts from Management Common to All Action Alternatives

Management actions to reduce the occurrence and spread of noxious weeds and invasive plants would be accomplished according to current BLM policy. All action alternatives use the guidance in the ARMS to achieve riparian and fish management objectives. The ARMS prioritizes areas for riparian restoration based on the HC and PFC ratings. The conservation and restoration guidance in the ARMS would improve water quality in 303(d)-listed streams as HC and PFC ratings improve. Improvements in the instream (HC) rating and riparian (PFC) ratings would improve instream and riparian condition in streams containing native non-game fish.

Impacts from Management Specific to Alternative I

Alternative I would reduce the threats to native non-game fish from noxious weed invasions in RCAs. Targeted grazing in RCAs to reduce noxious weeds and invasive plants could reduce HC and PFC ratings in native non-game fish habitats. Noxious weed and invasive plant treatments in Alternative I would have fewer risks of reducing condition of non-game fish habitat than the other alternatives.

Impacts from Management Specific to Alternative II

Targeted grazing and prescribed fire in RCAs to reduce noxious weeds and invasive plants could reduce HC and PFC ratings in native non-game fish habitats. The effects of noxious weed and invasive plant treatments on native non-game fish would be similar to Alternative I, except more acres would be treated. Alternative II would have more risks of reducing condition of native non-game fish habitats than the No Action Alternative and Alternative III but fewer than the other action alternatives.

Impacts from Management Specific to Alternative III

This alternative would have the fewest acres of noxious weed and invasive plant treatments of any action alternative. This could result in an increase in noxious weeds and invasive plants in RCAs containing native non-game fish over time.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV would have the greatest number of weed treatment acres of any alternative. Alternative IV would pose the greatest risk of noxious weed and invasive plant treatments in RCAs impacting native non-game fish of all alternatives, but the risk of reducing HC and PFC ratings due to increases in noxious weeds and invasive plants would be reduced.

Impacts from Management Specific to Alternative V

Alternative V would have fewer acres of noxious weeds and invasive plants treated than Alternative IV, but more than the No Action Alternative and Alternatives I, II, and III. The risk of reducing HC and PFC ratings in RCAs containing native non-game fish due to increases in noxious weeds and invasive plants would be more than in Alternative IV, but less than in the other alternatives.

Impacts from Wildland Fire Ecology and Management Actions

The relationship between native non-game fish and wildland fire ecology and management is similar to that described for special status fish and riparian areas and wetlands (see *Impacts from Wildland Fire Ecology and Management Actions* in the *Special Status Fish and Aquatic Invertebrates* and *Riparian Areas and Wetlands* sections). RCAs containing native non-game fish in Critical Suppression Areas are expected to have fewer risks to HC and PFC ratings due to the increased suppression emphasis than riparian areas in Conditional Suppression Areas. Uncharacteristic wildland fires can result in local extirpations of fish populations; re-population depends on fish migrating back from downstream rearing or nearby tributary habitats. If there are no migration barriers and suitable spawning habitats are accessible, fish populations can rebound in a relatively short amount of time (Burton, 2005). Among taxonomic groups, percids, cyprinids, and centrarchids recovered relatively quickly from pulse disturbances related to fire, whereas catostomids were intermediate in recovery, and salmonid fishes were the slowest to recover (Dunham, et al., 2003). The results of the analyses of impacts to riparian areas and special status fish habitat from wildland fire ecology and management actions are incorporated here as they relate to native non-game fish; these analyses are documented under *Impacts from Wildland Fire Ecology and Management Actions* in the *Riparian Areas and Wetlands* and *Special Status Fish and Aquatic Invertebrates* sections.

Impacts from Management Specific to the No Action Alternative

The current management provides limited direction for minimizing impacts to aquatic habitats, riparian areas, or water quality from wildland fire suppression activities. This could result in short-term reductions in HC and PFC ratings in RCAs containing native non-game fish.

Impacts from Management Common to All Action Alternatives

All action alternatives include using the guidance in the ARMS for fire suppression in riparian areas and would reduce the potential effects from the suppression and prescribed fire activities on HC and PFC ratings in streams containing native non-game fish.

Impacts from Management Specific to Alternative I

Alternative I would encompass more miles of streams with HC and PFC data in Critical Suppression Areas and would have fewer risks of reducing HC ratings in RCAs containing native non-game fish than Alternative II and III, but more than Alternatives IV and V. This alternative would rank third highest for the risk of reducing HC and PFC ratings of riparian areas in Critical Suppression Areas.

Impacts from Management Specific to Alternative II

Alternative II would encompass the fewest miles of streams with HC and PFC data in Critical Suppression Areas and would have the most risk of reducing HC ratings in RCAs containing native non-game fish of all alternatives. Fire suppression infrastructure would have fewer risks of reducing HC and PFC ratings in RCAs containing native non-game fish than Alternative III, but more than the other alternatives.

Impacts from Management Specific to Alternative III

Alternative III would have more miles of streams with HC and PFC data in Critical Suppression Areas than Alternative II, but less than the other alternatives. This alternative would have the most fire suppression infrastructure and would pose the most risks of reducing HC and PFC ratings in RCAs containing native non-game fish of all alternatives. This alternative would rank highest for risk of reducing HC and PFC ratings in RCAs containing native non-game fish.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV would have more miles of streams with HC and PFC data containing native non-game fish in Critical Suppression Areas than Alternatives I, II, and III, but fewer than Alternative V. In Alternative IV, critical suppression emphasis for the Jarbidge Foothills ACEC would include more of the native non-game fish habitat in Alternative IV-A than in Alternative IV-B (the Preferred Alternative). Overall, Alternative IV would be ranked second lowest for risk of reducing HC and PFC ratings in RCAs containing native non-game fish based on location of Critical Suppression Areas.

Impacts from Management Specific to Alternative V

Alternative V would have the least amount of risk of reducing HC and PFC ratings of Priority 1 and 2 reaches based on their inclusion in Critical Suppression Areas of all the action alternatives This alternative would have less fire suppression infrastructure and less watershed disturbance than any of the other action alternatives and would have the least potential to reduce HC and PFC ratings of any alternative.

Impacts from Livestock Grazing Actions

The relationship between native non-game fish and livestock grazing is the same as identified for special status fish and riparian areas and wetlands (see *Impacts from Livestock Grazing Actions* in the *Special Status Fish and Aquatic Invertebrates* and *Riparian Areas and Wetlands* sections). The results of the analyses of impacts to riparian areas and special status fish habitat from livestock grazing actions are incorporated here as they relate to native non-game fish; these analyses are documented under *Impacts from Livestock Grazing Actions* in the *Riparian Areas and Wetlands* and *Special Status Fish and Aquatic Invertebrates* sections.

Although there is limited research on the changes in fish populations resulting from exclosures, one study indicated a strong preference by salmonids for exclosed stream reaches and a strong preference by warm-water fish species for the unfenced stream reaches within the first year of life (Bayley & Li, 2008). Generally, improving HC and PFC ratings would improve RCA condition and promote a variety of habitats for special status and native non-game fish.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative includes limited management guidance for maintaining or improving riparian areas and for using fences to protect riparian condition. The No Action Alternative does not include guidance for improving riparian condition specifically for native non-game fish.

Impacts from Management Common to All Action Alternatives

All action alternatives would comply with the guidance in the ARMS to improve instream and riparian conditions. Livestock grazing on all allotments would comply with the guidance in the ARMS to adjust authorizations and yearly operating plans to maintain or improve riparian condition. Impacts to HC and PFC ratings in streams containing native non-game fish are expected to decrease as a result of implementing the direction in the ARMS as it pertains to livestock grazing. The creation of riparian reference areas that are excluded from livestock grazing and other public land uses would improve HC and PFC ratings and improve RCA condition for streams containing native non-game fish.

Impacts from Management Specific to Alternative I

Alternative I would have more miles of Restoration Reaches in areas available to grazing than Alternative IV and V, the same as Alternatives II and III, and fewer than the No Action Alternative. Alternative I would have more miles of PFC Priority 1 and 2 reaches at risk for a reduction in PFC rating due to livestock grazing than Alternative V, but less than Alternatives II, III, and IV. Livestock grazing in Alternative I would pose a greater risk of reducing HC and PFC ratings in streams containing native non-game fish than Alternatives IV and V, but less than in the other alternatives.

Impacts from Management Specific to Alternative II

Alternative II poses the greatest risk for grazing impacts to native non-game fish of any of the alternatives due to the miles of stream available to livestock grazing and the total AUMs that could be authorized once upland vegetation objectives have been met. Alternative II would pose the most risk of reducing HC and PFC ratings and is expected to result in fewer miles of riparian area moving toward PFC in areas accessible to livestock grazing than the other alternatives except the No Action Alternative.

Impacts from Management Specific to Alternative III

In Alternative III, the impacts to native non-game fish would be less than in Alternative II but more than in the other action alternatives. Livestock grazing in Alternative III would pose a greater risk to HC and PFC ratings than Alternatives I, IV, and V, but less than in the No Action Alternative and Alternative II.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

The impacts from livestock grazing on HC ratings in Alternative IV are more than Alternative V, but less than in the other alternatives. Alternative IV would have more miles of PFC Priority 1 and 2 reaches in areas available to livestock grazing than Alternatives I and V, but less than the No Action Alternative and Alternatives II and III. The impacts to native non-game fish from Alternative IV would be more than Alternative V, but less than the No Action Alternative and Alternatives II and III.

Impacts from Management Specific to Alternative V

In Alternative V, the fewest miles of native non-game fish-bearing streams would be available for livestock grazing of any alternative. The level of livestock use in Alternative V would be substantially less than under all other alternatives. This alternative is expected to result in the most improvement in HC and PFC ratings for streams containing native non-game fish habitat of any of the alternatives.

Impacts from Recreation Actions

The relationship between native non-game fish and recreation is the same as identified for special status fish and riparian areas and wetlands (see *Impacts from Recreation Actions* in the *Special Status Fish and Aquatic Invertebrates* and *Riparian Areas and Wetlands* sections). The results of the analyses of impacts to riparian areas and special status fish habitat from recreation actions are incorporated here as they relate to native non-game fish; these analyses are documented under *Impacts from Recreation Actions* in the *Riparian Areas and Wetlands* and *Special Status Fish and Aquatic Invertebrates* sections. In general, the impacts from recreation can be locally significant to streams containing native non-game fish.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative provides limited guidance that would reduce recreation-related impacts to native non-game fish.

Impacts from Management Common to All Action Alternatives

Recreation activities in RCAs would follow the guidelines in the ARMS. The ARMS includes guidance for reducing impacts to RCAs from existing and new recreation sites. SRMA management would reduce recreation impacts to RCAs containing native non-game fish.

Impacts from Management Specific to Alternative I

In Alternative I, the SRMA management is expected to reduce recreation-related impacts to RCAs containing native non-game fish and result in the most miles of special status fish habitat improved within an SRMA of all alternatives.

Impacts from Management Specific to Alternative II

Alternative II would have fewer miles of streams with HC and PFC data included in an SRMA than Alternatives I, III, and IV, but more than Alternative V. The effects of SRMA management on RCAs containing native non-game fish are the same as Alternative I except to a lesser extent as fewer SRMAs would be designated.

Impacts from Management Specific to Alternative III

Alternative III would have the same miles of streams with HC and PFC data in an SRMA as Alternatives II and V, but fewer miles of Restoration Reaches and PFC Priority 1 and 2 reaches in an SRMA than Alternatives I and IV. Alternative III would have more risk to native non-game fish than Alternatives I and IV.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

In Alternative IV, SRMA management would encompass fewer miles of native non-game fish-bearing stream with HC data than Alternative I, but more than Alternatives II, III, and V. Alternative IV has more miles of PFC Priority 1 and 2 reaches in an SRMA than Alternatives II and III, but less than Alternative I.

Impacts from Management Specific to Alternative V

Alternative V would have the fewest miles of stream managed within SRMAs of any of the alternatives. This alternative would have the same miles of native non-game fish-bearing stream with HC and PFC data as Alternatives II and III, but less than Alternatives I and IV. This alternative would have the fewest miles of native non-game fish habitat in an SRMA of all alternatives.

Impacts from Transportation and Travel Actions

The relationship between native non-game fish and travel and transportation is similar to those identified for special status fish and riparian areas and wetlands (see *Impacts from Transportation and Travel Actions* in the *Special Status Fish and Aquatic Invertebrates* and *Riparian Areas and Wetlands* sections). The results of the analyses of impacts to riparian areas and special status fish habitat from transportation and travel actions are incorporated here as they relate to native non-game fish; these analyses are documented under *Impacts from Transportation and Travel Actions* in the *Riparian Areas and Wetlands* and *Special Status Fish and Aquatic Invertebrates* sections.

Where roads cross streams, culverts can restrict passage of fish migrating between seasonal habitats. The majority of research has focused on salmonids. The effect of culverts on movements of small-bodied, weak swimming species is largely unknown. Culverts that have a small outlet drop and a low gradient, contain natural substrate, have low water velocities similar to those of natural reaches, and provide in-culvert conditions may allow for adequate passage of most small-bodied, weak swimming fish (i.e., suckers and minnows) (Rosenthal, 2007). Bridges are likely preferred by native non-game fish because they usually cause less modification of the stream channel than do culverts, and they are often the best way to assure fish passage.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative identifies areas as open to cross-country motorized vehicle use, limited to designated routes or inventoried ways, and closed to motorized vehicle use. There are 216 miles of roads in RCAs (Table 4- 127).These roads have locally reduced HC and PFC ratings by contributing fine sediment to native non-game fish-bearing streams. Areas designated as open to cross-country motorized vehicle use encompass 88 miles of Restoration Reaches and PFC Priority 1 and 2 reaches, the most miles of all alternatives.

Impacts from Management Common to All Action Alternatives

Transportation and travel-related activities in RCAs would follow the guidelines in the ARMS. The ARMS includes guidance for reducing impacts to RCAs from existing and new roads in the RCA. Travel limitations and closures would reduce impacts to HC and PFC ratings from road within RCAs containing native non-game fish.

Impacts from Management Specific to Alternative I

Alternative I would reduce route density more than Alternatives II and III, but less than Alternatives IV and V. In general, any decrease in route density in RCAs would benefit native non-game fish. Alternative I would have more miles of PFC Priority 1 and 2 reaches in areas with travel limitations than the No Action Alternative and Alternatives IV and V, but less than Alternatives II and III. Limiting travel to designated routes or ways in RCAs would reduce impacts to HC and PFC ratings for streams containing native non-game fish.

Impacts from Management Specific to Alternative II

Alternative II would increase route density more than any alternative, increasing the risk for reducing HC and PFC ratings in streams containing native non-game fish. There would be more miles of PFC Priority 1 and 2 reaches in areas closed to motorized vehicle use than the No Action Alternative, but less than the other action alternatives. Alternative II would have the same miles of PFC Priority 1 and 2 reaches in areas limited to designated routes or ways as Alternative III, but more than the No Action Alternative and Alternatives I, IV, and V.

Impacts from Management Specific to Alternative III

In Alternative III, there would be no reduction in route density because routes would be maintained for fire suppression. The result would be a slower rate of recovery from road-related impacts to native non-game fish than the other action alternatives.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV would reduce route density more than the No Action Alternative and Alternatives I, II, and III and is more likely to reduce impacts to HC and PFC ratings in RCAs containing native non-game fish. Alternative IV would have more areas closed to motorized vehicle use than Alternatives I, II, and III, but approximately half of what would be closed under Alternative V. A reduction in route density would improve HC and PFC ratings over the life of the plan. This alternative would have the most short-term impacts to HC and PFC ratings, but the fastest recovery of all the alternatives.

Impacts from Management Specific to Alternative V

Alternative V would have the greatest decrease in motorized use of all alternatives. This alternative would result in a significant reduction in route density over the life of the plan and have a major benefit to HC and PFC ratings in RCAs containing native non-game fish. This alternative would result in a significant reduction in road-related impacts to riparian areas and wetlands.

Impacts from Land Use Authorizations Actions

The relationship between native non-game fish and land use authorizations is the same as identified for special status fish and riparian areas and wetlands (see *Impacts from Land Use Authorization Actions* in the *Special Status Fish and Aquatic Invertebrates* and *Riparian Areas and Wetlands* sections). The results of the analyses of impacts to riparian areas and special status fish habitat from land use authorizations actions are incorporated here as they relate to native non-game fish; these analyses are documented under *Impacts from Land Use Authorizations Actions* in the *Riparian Areas and Wetlands* and *Special Status Fish and Aquatic Invertebrates* sections.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative includes limited guidance for ROWs to avoid riparian areas to the extent possible. This management direction does not provide sufficient guidance for preventing utility corridor development or infrastructure in native non-game fish habitats and does not provide direction for improving native non-game fish habitat where utility corridors or wind energy development could occur.

Impacts from Management Common to the No Action and All Action Alternatives

The No Action Alternative and all action alternatives would adopt the programmatic policies and BMPs for the wind energy development program. The adoption of this guidance would reduce the potential for wind energy projects to impact RCAs containing native non-game fish.

Impacts from Management Common to All Action Alternatives

ROWs on public land would follow the guidance in the ARMS, which includes management direction for restoring and improving HC and PFC ratings to improve instream and riparian condition. This guidance is expected to reduce impacts to HC and PFC ratings in habitats containing native non-game fish from ROWs and energy development projects on public land.

Impacts from Management Specific to Alternative I

In Alternative I, ROW avoidance and exclusion areas would encompass the same miles of streams with HC data as Alternatives II and III, but fewer miles than Alternatives IV and V. The ROW avoidance areas would encompass the same miles of PFC Priority 1 and 2 reaches as Alternatives II, III, and IV, but fewer miles than Alternative V. Alternative I would have the same miles of Restoration Reaches and PFC Priority 1 and 2 reaches in potential wind development areas as Alternatives III and IV. The potential wind development areas would have the same risk of reducing HC and PFC ratings in RCAs containing native non-game fish as Alternatives III and IV, more than Alternative V, and less than the No Action Alternative and Alternative II.

Impacts from Management Specific to Alternative II

In Alternative II, the ROW avoidance and exclusion areas would encompass the same miles of streams with HC and PFC data containing native non-game fish as Alternatives I and III. Along with the No Action Alternative, the potential wind development areas in Alternative II would have the most risk to RCAs containing native non-game fish areas of all alternatives.

Impacts from Management Specific to Alternative III

In Alternative III, the ROW avoidance and exclusion areas would encompass the same miles of Restoration Reaches and PFC Priority 1 and 2 reaches as Alternatives I and II, but fewer miles than Alternatives IV and V. The risk of reducing HC and PFC ratings of RCAs containing native non-game fish in potential wind development areas for Alternative III would be the same as for Alternatives I and IV and more than Alternative V. Alternative III would have less risk to native non-game fish than the No Action Alternative and Alternative II.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

In Alternative IV, the ROW avoidance and exclusion areas would encompass the more miles of Restoration Reaches and PFC Priority 1 and 2 reaches and have fewer risks of reducing HC and PFC ratings of RCAs containing native non-game fish than Alternatives I, II, and III, but more than Alternative V. The risk of reducing HC and PFC ratings of RCAs containing native non-game fish in potential wind development areas for Alternative IV would be the same as for Alternatives I and II, more than Alternative V, and less than the No Action Alternative.

Impacts from Management Specific to Alternative V

In Alternative V, the ROW avoidance areas would encompass more miles of Restoration Reaches and have fewer risks to RCAs containing native non-game fish than any alternative. The ROW exclusion areas would encompass the same miles of Restoration Reaches as Alternative IV and would have fewer risks of decreasing condition of RCAs containing native non-game fish than the No Action Alternative and Alternatives I, II, and III. The potential wind development areas in Alternative V would have the least potential for reducing HC and PFC ratings in RCAs containing native non-game fish of any alternative.

Impacts from Minerals Actions

The relationship between native non-game fish and minerals exploration and development is the same as described for special status fish and riparian areas and wetlands (see *Impacts from Minerals Actions* in the *Special Status Fish and Aquatic Invertebrates* and *Riparian Areas and Wetlands* sections). The results of the analyses of impacts to riparian areas and special status fish habitat from minerals actions are incorporated here as they relate to native non-game fish; these analyses are documented under *Impacts from Minerals Actions* in the *Riparian Areas and Wetlands* and *Special Status Fish and Aquatic Invertebrates* sections.

As described in those sections, according to the RFDS for oil and gas development (Appendix U), approximately 90 acres of surface disturbance are expected to occur in the planning area as a result of oil and gas exploration and development over the life of the plan. This is less than 0.1% of the potential oil and gas areas that would be available for oil and gas leasing. Similarly, according to the RFDS for geothermal development (Appendix V), between 185 and 230 acres of surface disturbance are expected to occur in the planning area as a result of geothermal exploration and development over the life of the plan. This is less than 0.1% of the potential geothermal areas that would be available for geothermal leasing.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative includes management guidance for leasable, salable, and locatable minerals. Use restrictions provide some guidance for native non-game fish in the Jarbidge River, Bruneau River, and Salmon Falls Creek Canyon and its tributaries where these fish coexist with redband trout. The acreage on which salable mineral development occurs is expected to increase from approximately 1,300 acres to approximately 2,300 acres over the life of the plan. This is approximately 0.2% of the area available for salable mineral development. No development has taken place in RCAs to date. The allocation for locatable minerals recommended the Bruneau-Jarbidge and Sand Point ACEC, designated wilderness, and the Bruneau, Jarbidge and Salmon Falls Creek Canyons be withdrawn from mineral entry, which would protect native non-game fish in these areas. Demand for locatable minerals in the planning area is not expected to change from present levels.

Impacts from Management Common to All Action Alternatives

All action alternatives use the guidance in the ARMS to achieve riparian and fish management objectives. The ARMS prioritizes areas for riparian restoration based on the HC and PFC ratings. The conservation and restoration guidance in the ARMS would improve HC and PFC ratings in RCAs containing native non-game fish and would minimize the potential for new minerals exploration and development to reduce HC and PFC ratings in RCA containing native non-game fish.

Impacts from Management Specific to Alternative I

Alternative I would have the same risk of reducing HC ratings of RCAs containing native non-game fish from oil and gas leasing as Alternatives IV and V and less risk than Alternatives II and III. Alternative I would have less risk of reducing PFC ratings than Alternatives II, III, and IV and the same as Alternative V.

Alternative I would have fewer risks of reducing HC and PFC ratings of RCAs containing native non-game fish from areas open to geothermal leasing than Alternatives II and III, but more than Alternatives IV and V.

Alternative I would have fewer risks of reducing HC and PFC ratings of RCAs containing native non–game fish from areas open to salable mineral development than Alternatives II and III, but more than Alternatives IV and V. The acreage on which salable mineral development occurs is expected to increase from approximately 1,300 acres to approximately 2,300 acres over the life of the plan. This is approximately 0.2% of the area available for salable mineral development. No development has taken place in RCAs to date.

Alternative I would have the same risk of reducing HC ratings of RCAs containing native non-game fish in areas recommended to be withdrawn from locatable mineral development as Alternatives II, III, and V, more risk than Alternative IV, and less risk than the No Action Alternative. Alternative I would have fewer risks of reducing PFC ratings of RCAs containing native non-game fish in areas recommended to be withdrawn from locatable mineral development than all alternatives. Demand for locatable minerals in the planning area is not expected to change from present levels.

Impacts from Management Specific to Alternative II

Alternative II would have the greatest number of perennial stream miles containing native non-game fish in areas open to oil and gas leasing of all alternatives. Alternative II has the most risk to RCAs containing native non-game fish in areas open to oil and gas leasing of all alternatives.

Alternative II would have the most risk of reducing HC ratings in RCAs containing native non-game fish for areas open to geothermal leasing of all alternatives. Alternative II would have the same number of miles of PFC Priority 1 and 2 reaches in areas open to geothermal leasing as Alternative III, the most miles of all action alternatives.

Alternative II would have the most risk of reducing HC and PFC ratings in RCAs containing native non-game fish open to salable minerals development than of all alternatives. The acreage on which salable mineral development occurs is expected to increase from approximately 1,300 acres to approximately 3,300 acres over the life of the plan. This is approximately 0.2% of the area available for salable mineral development.

The miles of streams with HC data containing native non-game fish in areas recommended to be withdrawn from locatable mineral development would be the same as for Alternatives I, III, and V, but more than Alternative IV and less than the No Action Alternative. Alternative II would have the fewest miles of streams with PFC data in areas recommended to be withdrawn from locatable mineral development and therefore the more risk of reducing PFC ratings than the No Action Alternative and Alternatives I, IV, and V and the same risk as Alternative III. Demand for locatable minerals in the planning area is not expected to change from present levels.

Impacts from Management Specific to Alternative III

The impacts to HC and PFC ratings from oil and gas leasing in Alternative III are the same as described for Alternative II.

Alternative III would have fewer risks of reducing HC ratings in RCAs containing native non-game fish in areas open to geothermal leasing than Alternatives II, but more than the other alternatives. Alternative III would have the same risks of reducing PFC ratings as Alternative II and more risk than in the other alternatives.

Alternative III would have fewer miles of streams with HC and PFC data containing native non-game fish open to salable minerals development than Alternative II, but more than the other alternatives. The acreage on which salable mineral development occurs is expected to increase from approximately 1,300 acres to approximately 3,300 acres over the life of the plan. This is approximately 0.2% of the area available for salable mineral development.

Alternative III would have the same risk of reducing HC ratings for RCAs containing native non-game fish in areas recommended to be withdrawn from locatable mineral development as Alternatives I, II, and V, more risk than Alternative IV, and less risk than the No Action Alternative. Alternative III would have the same risks of reducing PFC ratings for RCAs containing native non-game fish in areas recommended to be withdrawn from locatable mineral development as Alternative II and more than all alternatives. Demand for locatable minerals in the planning area is not expected to change from present levels.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV would have the same miles of streams with HC data and the same risks to RCAs containing native non-game fish from oil and gas leasing as Alternatives I and V, but less risk than Alternatives II and III. Alternative IV would have less risk of reducing PFC ratings than Alternatives II and III, but more than Alternatives I and V.

Alternative IV has the fewest miles of streams with HC data and poses the least risk to RCAs containing native non-game fish from geothermal development of all the alternatives. Alternative IV would have fewer risks of reducing PFC ratings than Alternatives II and III and the same as Alternatives II and V.

Alternative IV would have the fewest miles of streams with HC and PFC data containing native non-game fish in areas open to salable mineral development of all alternatives. The acreage on which salable mineral development occurs is expected to increase from approximately 1,300 acres to approximately 2,300 acres over the life of the plan. This is approximately 0.2% of the area available for salable mineral development. No development has taken place in RCAs to date.

Alternative IV would have less risk of reducing HC ratings for RCAs containing native non-game fish in areas recommended to be withdrawn from locatable mineral development than the other alternatives. Alternative IV would have fewer risks of reducing PFC ratings for RCAs containing native non-game fish in areas recommended to be withdrawn from locatable mineral development than the No Action Alternative and Alternatives II, III, and V, but more than Alternative I. Demand for locatable minerals in the planning area is not expected to change from present levels.

Impacts from Management Specific to Alternative V

The miles of streams with HC data in areas open to oil and gas leasing are the same as for Alternatives I and IV. Alternative V would have fewer risks of reducing HC ratings in RCAs containing native non-game fish that Alternatives II and III. Alternative V would have the least amount of risk of reducing PFC ratings of all alternatives.

Alternative V would have slightly more risks of reducing HC ratings for RCAs containing native non-game fish from geothermal development than Alternative IV. The risks of reducing PFC ratings for Alternative V are the same as Alternatives I and IV.

This alternative would have the same miles of streams with HC and PFC data containing native non-game fish in areas open to salable mineral development as Alternative IV. The acreage on which salable mineral development occurs is expected to increase from approximately 1,300 acres to approximately 2,300 acres over the life of the plan. This is approximately 0.2% of the area available for salable mineral development. No development has taken place in RCAs to date.

The miles of Restoration Reaches in areas recommended to be withdrawn from locatable mineral development are the same for all action alternatives. Alternative V would have the least amount of streams with PFC data containing native non-game fish in areas recommended to be withdrawn from locatable mineral development of all alternatives.

Alternative V would have the same risk of reducing HC ratings for RCAs containing native non-game fish in areas recommended to be withdrawn from locatable mineral development as Alternatives I, II, and III, less risk than the No Action Alternative, and more risk than Alternative IV. Alternative V would have fewer risks of reducing PFC ratings for RCAs containing native non-game fish in areas recommended to be withdrawn from locatable mineral development than all alternatives. Demand for locatable minerals in the planning area is not expected to change from present levels.

Impacts from Areas of Critical Environmental Concern Actions

The relationship between native non-game fish and ACECs is the same as identified for special status fish and riparian areas and wetlands (see *Impacts from Areas of Critical Environmental Concern Actions* in the *Special Status Fish and Aquatic Invertebrates* and *Riparian Areas and Wetlands* sections). The results of the analyses of impacts to riparian areas and special status fish habitat from ACEC actions are incorporated here as they relate to native non-game fish; these analyses are documented under *Impacts from Areas of Critical Environmental Concern Actions* in the *Riparian Areas and Wetlands* and *Special Status Fish and Aquatic Invertebrates* sections.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative would designate three ACECs, reducing impacts to HC and PFC ratings for special status aquatic species habitats. Native non-game fish also benefit from the designation of these ACECs because they coexist with special status fish.

Impacts from Management Specific to Alternative I

Alternative I would include more miles of native non-game fish habitat within an ACEC than Alternatives II and III, but fewer miles than Alternative IV and V. ACEC management guidance for Alternative I is expected to result in more miles of riparian area achieving or moving toward PFC than the No Action Alternative and Alternatives II and III, but fewer miles than Alternatives IV and V.

Impacts from Management Specific to Alternative II

No ACECs would be designated in Alternative II. In some locations, riparian areas and water quality would continue to be managed based on WSA designation or WSR suitability or eligibility. Riparian areas not included in an ACEC would be at an increased risk for a reduction in HC and PFC ratings, which could reduce habitat conditions for native non-game fish. Without ACEC designation, riparian areas containing native non-game fish would be at greater risk for a reduction in HC and PFC ratings than if they were included within an ACEC.

Impacts from Management Specific to Alternative III

This alternative would have the fewest perennial stream miles with HC data and the least amount of native non-game fish habitat included within an ACEC of all alternatives, with the exception of Alternative II. Alternative III would have more miles of PFC Priority 1 and 2 reaches containing native non-game fish in an ACEC than Alternative II but less than the other alternatives.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV would have more miles of streams with HC data in an ACEC than the No Action Alternative and Alternatives I, II, and III, but fewer than Alternative V. ACECs in this alternative would encompass fewer miles of native non-game fish habitat than in Alternative V, but more than the other alternatives. Alternative IV would have more miles of riparian areas moving toward or achieving PFC than the No Action Alternative and Alternatives I, II, and III, but fewer than Alternative V.

Impacts from Management Specific to Alternative V

Alternative V would have the most acres designated as an ACEC and the most stream miles containing native non-game fish within ACECs of any alternative. Alternative V would include the most miles of Restoration Reaches and PFC Priority 1 and 2 reaches in designated ACECs of all alternatives.

Summary of Direct and Indirect Impacts

The direct and indirect effects of the management actions for each of the alternatives were analyzed for their potential to affect RCAs containing native non-game fish. The potential effects to instream conditions (HC ratings) and riparian conditions (PFC ratings) were the primary indictors used for the analysis. All alternatives are required to maintain water quality in non-303(d) listed streams and improve water quality in streams that are 303(d) listed for impaired water quality, which would promote water quality conditions that would sustain native non-game fish in the planning area. All action alternatives include management guidance to comply with the ARMS, which would improve HC and PFC ratings and therefore would improve native non-game fish habitat over the life of the plan.

Native non-game fish coexist with special status aquatic species in a majority of the streams in the planning area. Therefore, the management actions with potential to impact special status aquatic species would also impact native non-game fish. For this reason, the summary of impacts for the alternatives for native non-game fish is the same as in the *Special Status Fish and Aquatic Invertebrates* section (Table 4- 143). The identified impacts are based on the 39 miles of streams with HC data for the planning area.

The management actions with the potential to impact PFC ratings for RCAs containing native non-game fish would also impact HC ratings. Therefore, the summary of impacts for the alternatives for riparian areas would be the same as would be expected for HC ratings in RCAs containing native non-game fish (*Riparian Areas and Wetlands* section, Table 4-95).Because there is considerably more PFC data (245 miles) than HC data (39 miles), both indicators were used to identify impacts and rankings. Although the affected miles of streams with HC and PFC data vary by alternative, the overall impacts to HC and PFC ratings for native non-game fish are the same.

Impacts from the No Action Alternative

The No Action Alternative is expected to result in the fewest miles of improvement in Restoration Reaches and riparian areas attaining PFC over the life of the plan of all alternatives. This alternative would have the most risk to native non-game fish of all alternatives. The No Action Alternative is expected to result in the fewest miles of 303(d)-listed streams attaining PFC over the life of the plan of all alternatives.

Overall, the No Action Alternative would result in minor adverse impacts to fish.

Impacts from Alternative I

The ARMS would be applied to all actions in Alternative I and would reduce the risk of reducing HC and PFC ratings for streams containing native non–game fish. This alternative would have less risk of reducing HC and PFC ratings than the No Action Alternative and Alternatives II and III, but more risk than Alternatives IV and V. Improvements in HC and PFC ratings are expected to be faster in Alternative I than for Alternative II, but slower than Alternatives III, IV, and V. The rate of improvement in water quality for Alternative I is expected to be faster than for Alternative II, but slower than Alternatives III, IV, and V. More improvement in water quality is expected in Alternative I than in Alternative II, but less than in Alternatives III, IV, and V.

Overall, Alternative I would result in minor adverse impacts to fish resources.

Impacts from Alternative II

The ARMS would be applied to all actions in Alternative II and would reduce the risk of reducing HC and PFC ratings for streams containing native non-game fish. Alternative II is more likely to facilitate streams moving towards the attainment of riparian objectives than the No Action Alternative, but less likely than Alternatives I, III, IV, and V during the life of the plan. This alternative would have less risk of reducing HC and PFC ratings than the No Action Alternative, but more risk than all other action alternatives. The amount of improvement in water quality for this alternative is expected to be more than the No Action Alternative, but less than all other action alternatives.

Overall, Alternative II would result in minor adverse impacts to fish resources.

Impacts from Alternative III

The ARMS would be applied to all actions in Alternative III and would reduce the risk of reducing HC and PFC ratings for streams containing native non-game fish. Alternative III is more likely to facilitate streams moving the movement towards the attainment of riparian objectives and improving HC ratings in the life of the plan than the No Action Alternative and Alternatives I and II, but less likely than Alternatives IV and V. This alternative would achieve riparian objectives slower than Alternatives IV and V, but faster than the No Action Alternative and Alternatives I and II. Alternative III would have less risk of reducing HC and

PFC ratings than the No Action Alternative and Alternative II, but more risk than the other alternatives. The amount of improvement in water quality for this alternative is expected to be more than the No Action Alternative and Alternatives I and II, but the same as Alternatives IV and V.

Overall, Alternative III would result in minor adverse impacts to fish resources.

Impacts from Alternative IV (the Preferred Alternative)

The ARMS would be applied to all actions in Alternative IV and would reduce the risk of reducing HC and PFC ratings for streams containing native non-game fish. Overall, Alternative IV is more likely to facilitate streams moving towards or attaining riparian objectives than the other alternatives. This alternative would have less risk of reducing HC and PFC ratings than the No Action Alternative and Alternatives I, II, and III, but more risk than Alternative V. Alternative IV has the greatest likelihood for a portion of Priority 1 and 2 reaches to achieve PFC within the life of the plan.

Overall, Alternative IV would result in minor beneficial impacts to fish resources.

Impacts from Alternative V

The ARMS would be applied to all actions in Alternative V and would reduce the risk of reducing HC and PFC ratings for streams containing native non-game fish. This alternative would have less risk of reducing HC and PFC ratings than all other action alternatives. Alternative V is more likely to facilitate streams moving towards the attainment of riparian objectives than the No Action Alternative and Alternatives I, II, and III. Alternative V would result in the same improvements in PFC ratings as Alternative IV, but at a slower rate due to the passive restoration techniques. Alternative V would have the least amount of public land uses of all alternatives, resulting in a slower rate of improvement in HC and PFC ratings across a broader area than expected for Alternative IV. Passive restoration techniques would have fewer short-term impacts, but longer timeframes for achieving riparian objectives and State water quality standards.

Overall, Alternative V would result in minor beneficial impacts to fish resources.

Cumulative Impacts

Past, Present, and Reasonably Foreseeable Actions

This cumulative impacts assessment considers the effects of past, present, and reasonably foreseeable actions on Federal, State, and private lands in and adjacent to the planning area in addition to the management actions proposed by the alternatives. Management actions in the planning area could influence portions of the following three primary watersheds: Bruneau River, Salmon Falls Creek, and Snake River. These primary watersheds include lands administered by BLM's Bruneau, Burley, Shoshone, and Wells (NV) FOs; the Jarbidge Ranger District of the Humboldt-Toiyabe National Forest; Hagerman Fossil Beds National Monument; and State lands. These watersheds also include private inholdings and two military withdrawal areas. Management actions and activities within the identified watersheds that have influenced instream and riparian condition in the past and have the potential to influence instream and riparian condition in the future were considered in this cumulative impacts assessment.

The past, present, and reasonably foreseeable future actions with the potential to impact native non-game fish in the planning area are the same as described in the *Cumulative Impacts* sections for *Special Status Fish and Aquatic Invertebrates*, *Riparian Areas and Wetlands*, and *Water Resources*.

Summary of Cumulative Impacts

Cumulative Impacts from the No Action Alternative

The No Action Alternative provides guidance to comply with the Clean Water Act, which requires restoration and maintenance the chemical, physical, and biological integrity of the nation's surface waters. Compliance with the Clean Water Act would maintain or improve surface water resources in Idaho and Nevada and ensure the protection of the beneficial uses of water including cold water fish, recreation, and agriculture. Actions implemented under the No Action Alternative would maintain RCA conditions for native non-game fish but do not provide specific guidance for improving RCA conditions where instream and riparian conditions are not functioning properly. Instream and riparian habitats that are functioning at reduced levels and are not expected to improve under the No Action Alternative. This could result in cumulative impacts to native non-game fish and their habitats over the life of the plan.

Cumulative Impacts from Alternative I

All management actions implemented in Alternative I would use the guidance in the ARMS to maintain or improve instream and riparian condition, comply with the Clean Water Act, and comply with ESA requirements for riparian areas containing special status aquatic species. The cumulative impacts from implementing this management guidance are expected to improve instream and riparian condition for streams containing native non-game fish. When combined with ongoing Federal, State, and private land activities in the analysis area, the management proposed in Alternative I would rank third in cumulative risk for a potential decrease HC and PFC ratings. Alternative I would have less potential for cumulative impacts to native non-game fish than the No Action Alternative and Alternatives II and III, but more risk than Alternatives IV and V.

Cumulative Impacts from Alternative II

All management actions implemented in Alternative II would use the guidance in the ARMS to maintain or improve instream and riparian condition, comply with the Clean Water Act, and comply with ESA requirements for riparian areas containing special status aquatic species. The cumulative impacts from implementing this management guidance are expected to improve instream and riparian condition for streams containing native non-game fish. When combined with ongoing Federal, State, and private land activities in the analysis area, the management proposed in Alternative II would rank second in cumulative risk for a potential decrease HC and PFC ratings. Alternative II would have less potential for cumulative impacts to native non-game fish than the No Action Alternative, but more risk than Alternatives III, IV, and V.

Cumulative Impacts from Alternative III

All management actions implemented in Alternative III would use the guidance in the ARMS to maintain or improve instream and riparian condition, comply with the Clean Water Act, and comply with ESA requirements for riparian areas containing special status aquatic species. The cumulative impacts from implementing this management guidance are expected to improve instream and riparian condition for streams containing native non-game fish. When combined with ongoing Federal, State, and private land activities in the analysis area, the management proposed in Alternative III would rank fourth in cumulative risk for a potential decrease HC and PFC ratings. Alternative III would have less potential for cumulative impacts to native non-game fish than the No Action Alternative and Alternative II, but more risk than Alternatives I, IV, and V.

Cumulative Impacts from Alternative IV (the Preferred Alternative)

All management actions implemented in Alternative IV would use the guidance in the ARMS to maintain or improve instream and riparian condition, comply with the Clean Water Act, and comply with ESA requirements for riparian areas containing special status aquatic species. The cumulative impacts from implementing this management guidance are expected to improve instream and riparian condition for streams containing native non-game fish. When combined with ongoing Federal, State, and private land activities in the analysis area, the management proposed in Alternative IV would rank fifth in cumulative risk for a potential decrease HC and PFC ratings. Alternative IV would have less potential for cumulative impacts to native non-game fish than the No Action Alternative and Alternatives I, II, and III, but more than Alternative V.

Cumulative Impacts from Alternative V

All management actions implemented in Alternative V would use the guidance in the ARMS to maintain or improve instream and riparian condition, comply with the Clean Water Act, and comply with ESA requirements for riparian areas containing special status aquatic species. The cumulative impacts from implementing this management guidance are expected to improve instream and riparian condition for streams containing native non-game fish. When combined with ongoing Federal, State, and private land activities in the analysis area, the management proposed in Alternative V would have the least amount of risk for a decrease in HC and PFC ratings in streams containing native on-game fish of all alternatives.

4.3.6.2. Wildlife

Analysis Methods

Indicators

The following indicators were used for the analysis of impacts to wildlife:

- **Acres with active restoration of shrubs and forbs on big game winter range** – This indicator quantifies differences in restoration of big game winter range and qualitatively assesses relative amounts of disturbance, timing of disturbance, or infrastructure.

- **Miles of riparian areas managed to achieve or exceed proper functioning condition (PFC)** – This indicator quantifies the relative condition of habitat specific to the riparian guild and qualifies recovery time.

- **Acres of habitat for wildlife guilds** – This indicator quantifies relative amounts of habitat for wildlife guilds by analyzing changes to the plant communities that provide that habitat.

- **Habitat fragmentation due to size of habitat patches for wildlife guilds and distance between patches** – This indicator assesses one component of habitat fragmentation, habitat connectivity, and provides a qualitative comparison to changes in patch size and distance between patches. For example, as the amount of shrubland habitat increases and the distance between shrubland patches decreases, connectivity would improve for the sagebrush steppe guild wildlife. For wildlife species that use large blocks of contiguous habitat, small islands of habitat may be functionally smaller than their physical size (Porneluzi & Faaborg, 1999; Shepherd III, 2006). Islands or fragmented habitat likely function as wildlife population sinks where reproduction is less than mortality (Donovan, et al., 1995; Porneluzi & Faaborg, 1999; Rogers, et al., 1997). The variance in the data is high, so the analysis is for relative comparison purposes only.

- **Habitat fragmentation due to infrastructure and human disturbance** – This indicator assesses the other component of habitat fragmentation. The baseline amount and density (miles per square mile) of infrastructure (e.g., ROWs, powerlines, communications towers, types of routes, fences, and livestock watering areas such as troughs, ponds, and canals) were determined using GIS data. A qualitative comparison assesses relative expected changes in infrastructure. Infrastructure contributes to habitat fragmentation (Forman & Alexander, 1998; Pitman, et al., 2005; Sawyer, et al., 2007). Power poles, fences, and communications towers provide raptors and raven additional perching and nesting sites (Steenhof, et al., 1993) and may alter habitat use by some wildlife (Pitman, et al., 2005) or increase predation locally at some distance from the structure (Armentrout & Hall, 2006). Roads often create discrete abrupt edges. Some birds nest at lower densities near roads compared similar habitat without roads and other birds such as horned lark are attracted to the open area and may compete with shrubland birds (Ingelfinger & Anderson, 2004). Increased human presence for access, recreation (Cassirer, et al., 1992; Miller, et al., 1998, 2001) or during maintenance can displace wildlife. This indicator qualitatively compares amounts of infrastructure and areas open or closed to such structures by alternative.

- **Areas with temporal and spatial restrictions that benefit wildlife** (e.g., miles of road closure or with seasonal restrictions, acres with minerals restrictions, acres designated for motorized recreation, or acres unavailable for livestock grazing or with seasonal restrictions, seasonal or temporal guidance limiting human disturbance for maintenance, noxious weed treatment or restoration) – This indicator compares areas with more or less disturbance to wildlife (e.g., amount of big game winter range where project construction or routine maintenance is scheduled to avoid the winter).

- **Relative amount of herbaceous cover for wildlife** – This indicator would be used to compare amounts of herbaceous cover available to wildlife for nesting, thermal, or security cover between alternatives. Amounts of cover have been linked to habitat use and nest success (Connelly, et al., 2000; Dechant, et al., 1999; Holloran, et al., 2005; Loft, et al., 1987; Swanson, et al., 1982).

- **Priority wildlife species** – Planning regulations require that priority wildlife species be identified. Wildlife species identified as priority for habitat management can be used to gauge qualitative differences in types of habitats used by priority species between alternatives.

- **Acres in the Sikes Act Wildlife Program (Wildlife Tracts)** – Wildlife Tracts were initially created to help mitigate loss of wildlife habitat from public land being conveyed into private ownership in the 1970s and 1980s. The emphasis of Wildlife Tracts was initially for upland game (e.g., pheasant, quail, gray partridge, cottontail), but other wildlife benefit as well. The areas retained as Wildlife Tracts were intentionally intermingled with or adjacent to land going into private ownership to provide islands of habitat to sustain wildlife moving from agricultural land following harvest through the winter. Adjacent farm land typically has little cover after harvest until the planted crops began growing in the late spring. Management of Wildlife Tracts is primarily to provide nesting and winter habitat.

- **Acres targeted for treatment and control and changes in the prescriptive thresholds (acceptable level) of noxious weeds and invasive plants** – These indicators would be used to compare the relative effects of noxious weeds and invasive plants between alternatives with respect to habitat quality. Deer and elk use declines in areas infested with noxious weeds (DiTomaso, 2000).

Impacts were not analyzed for every indicator in every section of this analysis; only those indicators relevant to the management in each section were used.

Methods and Assumptions

Impacts to wildlife from management in the following sections of Chapter 2 were analyzed in detail: *Wildlife*, *Vegetation Communities* (including *Upland Vegetation* and *Riparian Areas and Wetlands*), *Noxious Weeds and Invasive Plants*, *Wildland Fire Ecology and Management*, *Livestock Grazing*, *Recreation*, *Transportation and Travel*, *Land Use Authorizations*, *Minerals*, and *Areas of Critical Environmental Concern*. Management from the remaining sections was not analyzed in detail because the management did not vary measurably between alternatives or impact the indicator for wildlife. **Impacts from management for wildlife** can be found under *Impacts from Wildlife Actions* in the *Tribal Rights and Interests*, *Climate Change*, *Transportation and Travel*, *Land Use Authorizations*, and *Economic Conditions* sections.

GIS data layers were used to conduct analyses to compare the existing wildlife resource baseline conditions by alternative. In some instances, the analysis was a quantitative comparison, such as acres of big game winter range within a particular ACEC. Other comparisons, such as the relative amount of new routes, mineral development, or infrastructure, were qualitative because these areas have not been specifically identified.

The following assumptions were used in the analyses:

- Increases in sagebrush patch size and decreases in distance between sagebrush patches are beneficial for sage-grouse and sagebrush steppe guild wildlife. To facilitate sagebrush steppe guild wildlife species dispersal, connectivity, and habitat suitability, larger patches of sagebrush steppe and mountain mahogany/mountain shrub are preferable to smaller patches of habitat. The probability of a species becoming locally extinct is greater if a patch is small or of low habitat quality (Dramstad, et al., 1996). Habitat patches of the same type and in close proximity are more desirable than patches that are farther apart (Hanser & Huntly, 2006; Knick & Rotenberry, 1995; Shepherd III, 2006). Research in eastern Washington has documented higher predation of eggs and nestlings in agriculturally fragmented sagebrush steppe habitat compared to continuous sagebrush steppe habitat (Vander Haegen, et al., 2002). Small fragments of habitat are less likely to maintain species over time compared to large patches of habitat (Crooks, et al., 2001).

- Restored upland areas may take more than two decades to function similarly to intact habitat, depending on the specific plant community (Baker, 2006; Connelly, et al., 2004; Crawford, et al., 2004; Wright, et al., 1979). Such upland areas include sagebrush steppe, mountain mahogany/mountain shrub, and aspen. It is also assumed that dominant late-seral grasses in the planning area will typically recover to pre-treatment density and production in five or more years (Wright, et al., 1979).
- Some components of riparian areas can respond rapidly to restoration. Depending on the type of riparian community and degree of past disturbance, the herbaceous component of riparian areas can begin recovery in less than four years (Clary, 1999; Dobkin, et al., 1998; Schulz & Leininger, 1991). However, some woody species have longer times to full recovery (Dobkin, et al., 1998; Schulz & Leininger, 1991).
- For analyses purposes, all treatments would be implemented within five years; however, implementation is dependent on funding, labor, equipment and other factors, which would extend actual implementation beyond ten years. The impacts of treatments may appear a considerable amount of time after implementation. For example, the long-term impact of sagebrush habitat recovery occurs 10 to 15 years after seeding or planting as shrubs reach a size and density suitable for nesting by sage-grouse.
- Infrastructure such as powerlines, towers, poles, roads, fences, and corrals contribute to habitat fragmentation, wildlife displacement, avian predation, and wildlife collision mortality (Beck & Mitchell, 2000; Connelly, et al., 2004; Harrington & Conover, 2006; Jantz & Goetz, 2008; Pitman, et al., 2005; Rowland, et al., 2000; Steenhof, et al., 1993; Wolfe, et al., 2007). As livestock AUMs increase, additional fences, water pipelines, and troughs are likely to increase to improve management and distribution of livestock.
- Wildland fire will continue to burn large areas of intact habitat as well as restored habitat over the life of the plan, hindering and complicating shrubland restoration and recovery efforts. Natural fire return usually exceeds 20 years in most shrublands (Baker, 2006; Connelly, et al., 2004; Howard, 1999; Idaho Sage-grouse Advisory Committee, 2006; McMurry, 1986; Steinberg, 2002), 30 years in aspen (Howard, 1996), and 30 years in mountain mahogany (Gucker, 2006) and mountain shrub communities (Johnson, 2000).
- Human disturbance or occupancy can cause displacement and temporal or spatial habitat fragmentation or abandonment (Cassirer, et al., 1992; Jantz & Goetz, 2008).
- Increases in habitat for sagebrush steppe guild species will result in a decrease in habitat for grassland guild species as shrub cover and height increases (McAdoo, et al., 1989).
- All species within a guild will react in a similar manner to disturbances or habitat changes (Wisdom, et al., 2000). Individuals within a species may respond differently to the same disturbance or habitat change.
- Current year and/or residual herbaceous vegetation influences wildlife habitat quality (Barnett & Crawford, 1994; Connelly, et al., 2000; Gregg, et al., 2008; Loft, et al., 1987).
- Changes in habitat are expected to affect wildlife distribution, species composition, and population numbers; however, population numbers may decline or increase for reasons not related to habitat and not part of the analysis, such as natural population cycles (Best, 1996; Sera & Early, 2003), disease (Krausman & Bowyer, 2003; Marra, et al., 2004), or prey abundance (Dechant, et al., 1999).
- Effects of a specific project may extend beyond the actual project footprint (Arnett, et al., 2008; Ingelfinger & Anderson, 2004; Pitman, et al., 2005).
- Assumptions in the *Upland Vegetation* section also apply to this analysis as they relate to restoring or maintaining plant communities.
- Miles of trails and primitive roads are a conservative estimate due to limited inventory, which underestimates overall route density. Anticipated changes in miles of route density are proportional or qualitative, so the exact number of miles is not necessary for the analysis for wildlife.

Direct and Indirect Impacts

Impacts from Wildlife Actions

The following indicators were used to analyze the impacts of wildlife actions on wildlife habitat:

- Priority wildlife species
- Acres of habitat for wildlife guilds
- Habitat fragmentation due to size of habitat patches for wildlife guilds and distance between patches
- Acres of Wildlife Tracts
- Acres of big game winter range

Impacts from Management Specific to the No Action Alternative

Mule deer, pronghorn, California bighorn sheep (bighorn sheep), and Sensitive species are priority wildlife species for habitat management in the No Action Alternative. Sensitive species would have the highest priority for habitat management. Because no Sensitive species are in the grassland guild, habitat management would be more focused on improving sagebrush steppe, mountain mahogany/mountain shrub and riparian habitats. Options for treating canyonland guild habitat are limited by topography and stony soils.

Improvement of habitat for the sagebrush steppe, mountain mahogany/mountain shrub and riparian guild habitats because of the priority of special status species, would also improve habitat for mule deer and a lesser extent pronghorn.

Identified crucial winter range for mule deer and pronghorn would remain at approximately 212,000 acres. Approximately 124,000 acres (58%) of winter range presently lacks a browse component important for both mule deer and pronghorn due to wildland fires. The No Action Alternative provides limited direction for habitat restoration for wildlife; however, it directs including planting palatable shrubs on crucial mule deer winter range when palatable shrubs are less than 30% (by weight). Establishing bitterbrush, sagebrush and other shrubs on mule deer or pronghorn crucial winter range would slow the loss of mountain mahogany/mountain shrub and sagebrush steppe guild habitat long term. The expected trend for mule deer and pronghorn crucial winter range under the No Action Alternative is a continued transformation into grassland over the long term, resulting in fewer mule deer and pronghorn. The impact would be major at the local scale and moderate at the planning area scale long term. Sagebrush steppe and mountain mahogany/mountain shrub guild habitat would also continue to shift to grassland guild habitat under the No Action Alternative, primarily due to wildland fire. This would increase the distance between patches of these habitats and reduce patch size. The reduction in sagebrush steppe and mountain mahogany/mountain shrub guild habitat may result in major local and moderate planning area scale long term population reductions for some bird species such as sage thrasher, sagebrush vole, least chipmunk, vesper sparrow, gray flycatcher green-tailed towhee, spotted towhee, and other species.

The number of acres in Wildlife Tracts is expected to maintain habitat for upland game. The acres and configuration of BLM-managed Wildlife Tracts under the No Action Alternative would remain at approximately 13,000 acres. The Wildlife Tracts would continue to be managed primarily for pheasants, gray partridge, and other upland game. Because many of the tracts are small (40 acres), they likely function as population sinks. Management is impaired for several of the tracts as they lack access. Fences delineate Wildlife Tract boundaries and protect habitat within the tract from damage from activities such as cross-country motorized travel, dumping, and unauthorized livestock grazing. Guzzlers would provide water to a number of wildlife species including upland game, songbirds, and some mammals. Planting shrubs and forbs would provide additional cover year round as well as for nesting, improving wildlife habitat for a number of wildlife species including the sagebrush steppe guild. Long term effects of management of the Wildlife Tracts would be negligible increase at the local scale and negligible decrease at the planning area scale for upland game and wildlife in the sagebrush steppe guild.

Impacts from Management Common to All Action Alternatives

Habitat improvement in most cases is directly linked to priorities in the *Vegetation Communities* section. Maintaining or improving habitat for big game is expected to benefit the sagebrush steppe and mountain mahogany/mountain shrub guilds. Management of habitat for species identified by the Idaho Comprehensive Wildlife Conservation Strategy, Intermountain Joint Venture, and Partners In Flight is expected to provide for habitat maintenance and restoration for species in several wildlife guilds including sagebrush steppe, mountain mahogany/mountain shrub, and riparian habitats.

Impacts from Management Specific to Alternative I

Mule deer and special status species, including sage-grouse and bighorn sheep, would be priority wildlife species in this alternative. In the short term, habitat restoration would maintain habitat for the grassland guild. There would be an overall long-term decline in habitat for the grassland guild as shrubs establish and mature and begin to influence the site. As sagebrush steppe and mountain mahogany/mountain shrub habitat patch sizes increase, the distance between patches is expected to decrease, primarily benefitting wildlife in the sagebrush steppe and mountain mahogany/mountain shrub guilds. Restoration of mule deer winter habitat is expected to increase habitat for the sagebrush steppe and mountain mahogany/mountain shrub guilds in the long term.

In this alternative, Wildlife Tracts would be reconfigured and the acreage would be increased by 49% (7,000 acres) compared to the No Action Alternative. Realigning the tracts would provide wildlife larger blocks of habitat, which may improve survival and reproduction of wildlife using the tracts. Realigning the tracts would reduce the cost of fencing, restoration and improve management efficiencies. It is anticipated that a management plan would be prepared for the Wildlife Tracts including specific projects (e.g., fences, guzzlers, and habitat restoration) and priorities for projects to improve grassland and sagebrush steppe guild habitats. In the short term, effects from management of Wildlife Tracts would be minor at the local scale and negligible at the planning area scale. Overall effects from management of Wildlife Tracts to upland game would be moderate increase at the local and negligible increase at the planning scale long-term.

Impacts from Management Specific to Alternative II

Priority wildlife species for habitat management would be special status wildlife species, with a focus on sage-grouse and other sagebrush obligate special status wildlife species. Because of the long-term, natural recovery and episodic establishment of native shrubs due to climatic factors (Howard, 1999; McMurry, 1986), the habitat acreage for the mountain mahogany/mountain shrub and sagebrush steppe guilds is expected to continue to be reduced from the present levels due to future wildland fires. Management of habitat for sage-grouse and other special status species could coincidently benefit mule deer and pronghorn. Patch size is expected to decrease and distance between patches for sagebrush steppe and mountain mahogany/mountain shrub is expected increase more rapidly compared to the No Action Alternative. The effects of habitat conversion from shrubland to grassland would be a major decrease at the local scale and moderate decrease at the planning area scale for sagebrush steppe, mountain mahogany/mountain shrub guilds. However, grassland guild habitat and the associated wildlife species would increase. Increases are expected to be moderate at the local scale and minor at the landscape scale.

The acreage in the Wildlife Tracts would be reduced by approximately 4,000 acres (27%) compared to the No Action Alternative, reducing habitat for upland game and other wildlife. Tract realignment is expected to be minimal under this alternative. Small Wildlife Tracts would continue to function as populations sinks, minimizing management effects to wildlife. Overall effects of management of Wildlife Tracts, in both the short and long term, would be moderate decrease at the local scale and minor decrease at the planning area scale.

Impacts from Management Specific to Alternative III

Priority wildlife species for habitat management would be special status wildlife species, with a focus on sage-grouse. Other sagebrush obligate species would benefit from management of sage-grouse habitat. Overall, habitat for the sagebrush steppe and mountain mahogany/mountain shrub guilds would increase long term; whereas, habitat for the grassland guild would decline as shrubs reestablish and mature and patches of sagebrush steppe habitat expand. Large patches of sagebrush steppe and mountain mahogany/mountain shrub would increase slowly in the long term due to improved fire suppression Management of habitat for sage-grouse would also benefit mule deer and pronghorn to some degree, increasing winter range in the long term. Effects would be moderate at the local scale and minor at the planning area scales.

The acreage in Wildlife Tracts would increase by 300 acres (2%), and the tracts would be realigned. Impacts of tract realignment are addressed in *Impacts from Management Specific to Alternative I*. Realignment and improved management would increase Wildlife Tract size allowing for more effective restoration and reducing or eliminating population sink impacts. Effects to upland game habitat would be less than in Alternative I, but greater than the No Action Alternative and Alternative II. Long-term effects of management of the Wildlife Tracts would be minor increase at the local scale and negligible increase at the planning area scale for upland game and wildlife in the sagebrush steppe guild.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Sage-grouse, other special status species, mule deer, and pronghorn would be the priority species for wildlife habitat management in Alternative IV. Mule deer and pronghorn winter range would be restored, with priority given to winter range in ACECs. Over time, active restoration would increase patch size for sagebrush steppe and mountain mahogany/mountain shrub habitats and reduce the distance between patches as islands of habitat are connected.

The acreage in Wildlife Tracts would increase by 300 acres (2%), and the tracts would be realigned. The effects of realigning the Wildlife Tracts would be the same as addressed in *Impacts from Management Specific to Alternative III*.

Impacts from Management Specific to Alternative V

Management of special status wildlife species habitat would be a high priority, with impacts similar to Alternative III. Mule deer and pronghorn winter range would be improved in areas that overlap restored special status species habitat. Active restoration acres for this alternative would be greater than the No Action Alternative.

Impacts of realigning and increasing the acreage in the Wildlife Tracts would be the same as in Alternative III.

Summary

Changing the wildlife species priority for habitat management changes the focus of restoration and to a lesser extent fire suppression between the alternatives. Mule deer, pronghorn, and other big game would benefit most in Alternatives I and IV (Table 4- 97).

Mule deer and pronghorn are expected to benefit to a lesser degree when priority is given to managing special status species habitat (Alternatives II, III, and V). Sagebrush steppe and mountain mahogany/mountain shrub guilds would benefit most in Alternative IV and somewhat less in Alternatives I, III, and V. Sagebrush steppe and mountain mahogany/mountain shrub guild wildlife would benefit from increases in shrub establishment. Habitat and species abundance in the grassland guild are expected to decline over time in Alternatives I, III, IV, and V as shrubs increase in grassland area. Acres of habitat for the grassland guild would increase in Alternative II corresponding with a decline in sagebrush steppe guild habitat over time. The most grassland guild habitat would be actively maintained in Alternative II, followed by the No Action Alternative. Sagebrush steppe guild wildlife would have lower survival and reproduction in fragmented habitat (Vander Haegen, et al., 2002). The population sink effect could be partially offset or obscured by immigration, particularly for migratory birds (Porneluzi & Faaborg, 1999). Although Alternative III provides for active habitat restoration, some of the vegetation treatments (e.g., fuel breaks) would fragment some larger remaining blocks of habitat in grassland, mountain mahogany/mountain shrub, and sagebrush steppe habitats. Restoration in Alternatives I and IV should substantially shift habitat in favor of species in the sagebrush steppe guild, resulting in a decline for grassland guild habitat and species over time.

Table 4- 97. Trends in Impacts for Wildlife Habitat Indicators

Indicator	Alternative					
	No Action	I	II	III	IV	V
Acres of sagebrush steppe (% change)	↓ [B]	↑ [C, D] 84.4%	↓ [B, C] <1%	↑ [C, D] 47.0%	↑ [C, D] 121.8%	↑ [C, D] 56.0%
Acres of mountain mahogany/mountain shrub [A]	↓ [B]	↓ [B]	↓ [B, C]	↑ [C]	↑ [C]	↑ [C]
Acres of grassland (% change)	↑ [B]	↓ [C] 33.7%	↑ [B, C] 10.8%	↓ [C] 21.1%	↓ [C] 60.5%	↓ [C] 45.9%
Trend in riparian condition	↗	↗	→	↗	↑	↑
Acres of big game restoration	↘ [B]	↑ [C, D]	↓ [B]	→ [C, D]	↑ [C, D]	↑ [C, D]
Size of Wildlife Tracts (% change)	→ 0%	↑ 49.1%	↓ 26.7%	↗ 2.5%	↗ 2.5%	↗ 2.5%
Change in shrubland habitat patch size [F]	↘ [B]	↑ [C]	↓ [B]	→ [D]	↑ [C, D]	↑ [C, D]
Change in distance between habitat patches	↑ [B]	↘ [B, C]	↑ [B]	→ [C, E]	↓ [C, D]	↓ [C, D]

Symbols: → =Generally no change, ↑ =increase, ↓ =decrease, ↗ =slight increase, ↘ =slight decrease
[A] Mountain mahogany/mountain shrub guild habitat were not separated in the vegetation treatment analysis
[B] Trend is the result of wildland fire.
[C] Trend is the result of restoration activities.
[D] Trend is the result of suppression activities.
[E] Trend is the result of infrastructure.
[F] Shrublands include sagebrush steppe and mountain mahogany/mountain shrub.

Impacts from Vegetation Communities Actions

Vegetation structure, composition, and cover affect wildlife species composition, abundance, and distribution within broad plant communities. Aspen provide more structure for nesting (e.g., tree trunks for cavity nesting species and branches) and foraging compared to grassland. Changes in vegetation communities from one VSG to another (e.g., Native Grassland to Native Shrubland) alter the associated wildlife composition (Knick & Rotenberry, 1995; McAdoo, et al., 1989).For example, as shrub cover and height increase so does use of the habitat by shrub-nesting birds. Conversely, the removal of shrub cover eliminates the nesting structure for shrub-nesting species. Shrub restoration would improve habitat for the sagebrush steppe, riparian, and mountain mahogany/mountain shrub guilds. Smaller patches of shrubland linking large habitat areas (stepping stone connectivity) restore movement routes for wildlife (Dramstad, et al., 1996) in the sagebrush steppe, mountain mahogany/mountain shrub, and riparian guilds. As restored shrubland habitats and patches mature and increase, grassland guild habitat would decrease.

The following indicators were used to analyze the impacts of vegetation communities actions on wildlife habitat:

- Acres of habitat for wildlife guilds
- Habitat fragmentation due to size of habitat patches for wildlife guilds and distance between patches
- Miles of riparian areas managed to achieve or exceed PFC

Impacts of using targeted grazing as a vegetation treatment tool are discussed under *Impacts from Livestock Grazing Actions*.

Impacts from Management Specific to the No Action Alternative

Management in the No Action Alternative has resulted in a decrease in the amount of sagebrush steppe habitat and an increase in the amount of grassland habitat. Wildland fire and subsequent seeding contributed substantially to this change. Sagebrush steppe and mountain mahogany/mountain shrub guild habitat patch sizes have decreased and the distances between patches have increased. Most of the remaining sagebrush steppe habitat occurs in patches (or islands) with substantial distances between patches. As distances increase, the ability of small mammals and some other wildlife to move between patches is compromised and can lead to extirpation of species in the patches (Hanser & Huntly, 2006). Because the distances between sagebrush steppe patches are relatively far, patches are not expected to be recolonized if a species is extirpated. Given that shrubs are an important component of sagebrush steppe habitat, there has also been a corresponding loss of nesting habitat for sagebrush steppe guild birds.

In the southern part of the planning area, the reduction of sagebrush steppe and mountain mahogany/ mountain shrub guild habitat has reduced mule deer and pronghorn crucial winter ranges and increased the distance between remaining crucial winter range. The effect of this habitat loss has not been quantified for mule deer or pronghorn populations in the planning area, but the winter distribution of big game has been altered. Mortality to wintering mule deer or pronghorn is expected to be higher during winters with substantial snow, which results in greater energy requirements for movement.

Prescribed burning, mechanical treatments (e.g., mowing, Dixie harrowing, and brush beating), or large chemical treatments in sagebrush steppe and mountain mahogany/mountain shrub guild habitats would have long-term impacts due to the time it takes shrubs or trees to re-establish to pre-treatment levels. Prescribed fires would typically be conducted from July to October. Prescribed burning during these times is expected to minimize most impacts to most wildlife, regardless of guild. However, human disturbance, as well as fire and smoke during the prescribed burn, could displace some wildlife temporarily. The chance of fire escaping is greater in July into early September. Escaped fires would burn more area, reducing habitat for all guilds for at least one year for grassland and substantially longer for other guild habitats. The influence of treatments on structure and gross scale changes in grasses and shrubs is discussed in the *Upland Vegetation* section.

Vegetation treatments would be scheduled to minimize or reduce human disturbance during important seasons for wildlife to the extent practical. Important wildlife periods include winter for most wildlife, late spring for nesting birds, and birthing for big game. The use of heavy equipment (e.g., tractors, bull dozers, rangeland drills, and mowers), transport vehicles, and support crews is expected to temporarily displace wildlife during treatments. Seeding efforts in the fall are expected to have the least impact on wildlife. Winter seeding of sagebrush and associated human activity (e.g., aircraft, vehicles, and noise) may temporarily displace some wildlife from treatment areas and result in an increase in energy expenditure. Drill seeding and shrub planting are usually conducted in the fall, which avoids the bird breeding season. However, drill seeding can result in damage to rodent burrows and wildlife in burrow when disks cut the soil to plant seed. Using depth bands, which limit the depth the disk cuts, can reduce this effect. Impacts to burrowing animals are short term and localized to the treatment area. Some mechanical treatments (e.g., mowing for fuels reductions) are expected to be conducted in May and early June, which overlaps bird nesting. Individual nests and their contents are likely to be damaged by the mechanical treatments at this time. Because most songbird birds nest two or more times in a season, the majority of birds with damaged nests either would have nested prior to treatment or would be able to nest again. Human disturbance impacts are expected to be localized and of short duration. Short-term effects would be offset by long-term improvement of habitat.

Herbicide treatments would reduce plant cover and alter species composition at the site treated in the short term. Some drift is expected which would similarly affect vegetation adjoining the treated area. Decreases in vegetation and changes in plant species composition could reduce the arthropod prey base used by both bats and birds. Herbicide treatment typically occurs after fire, usually the following spring, to reduce invasive annuals. The treated area is then seeded in the fall. Herbicides such as Glyphosate are believed to have low toxicity to wildlife, but sublethal effects are poorly researched (Cravey, 2005). The effect of short-term herbicide treatments is a major reduction of vegetative cover at the local scale, but minor or negligible reductions at the landscape scale due to the relatively small area treated. The effects of long-term herbicide treatments are minor, due to vegetative recovery, at the local scale and negligible at the planning area scale. Establishment of a diverse perennial plant community following treatment would improve habitat for the grassland species in the short term (three to five years post treatment) and effects may persist long term.

Targeted grazing has been recommended for use as part of an integrated management strategy to help control some noxious weeds and invasive plants (Frost, et al., 2008). However, impacts to wildlife and wildlife use of habitat have been minimally researched. The timing of targeted grazing, frequently during the bolt stage of noxious weeds, overlaps the nesting period of birds. Concentrated herds of goats or sheep restricted to specific areas could result in trampling of ground nests or dislodging some eggs or nests in low shrubs. Birds which lose or abandon nests are likely to renest. Impacts of trampling on rodent burrows and the mammals and reptiles using burrows are unknown. In sandier soils, burrows could be collapsed by trampling, potentially harming the species inside. Burrow collapse in loamy soils should be less due to texture, unless the soil is wet or the burrow is shallow. Human disturbance (i.e., herders, dogs, water hauling) associated with targeted grazing may also displace some wildlife from the adjoining areas. Impacts to wildlife or their habitat from targeted grazing are minor and short term at the local scale, and negligible in the short-term at the landscape scale.

Although these impacts could occur, any proposal to use targeted grazing would take these potential impacts into account. The degree to which these impacts are likely would vary depending on the specific proposal. The decision whether to use targeted grazing would take the potential impacts and the potential benefits at that specific location into consideration.

Riparian fencing and some woody species planting were done to meet the preserve protect and restore natural function of riparian areas. Habitat for riparian guild wildlife would continue to improve in the fenced riparian areas.

Timing vegetation treatments with consideration for plant physiology, critical growing period, and reproductive times is expected to reduce impacts to wildlife; for example, bird nesting overlaps to some extent the boot stage in growing grasses.

These impacts are expected to continue if the No Action Alternative were to continue to be implemented.

Impacts from Management Specific to Alternative I

Some of the restoration activities in VMAs B, C, and D would focus on big game winter range by increasing shrubs on roughly 231,000 acres. In the long term, restoration would increase patch size, primarily for the sagebrush steppe guild and to a lesser extent to the mountain mahogany/mountain shrub guild. As patch size increases, the distance between patches should decrease, facilitating habitat connectivity for wildlife. In the long term, mule deer and pronghorn numbers may increase.

The shift of grassland (native perennial, non-native perennial, or some annual) to sagebrush steppe would result in a decrease in grassland guild and a corresponding increase in sagebrush steppe guild habitats. As the shrubs establish the patch size of sagebrush steppe would increase with a corresponding decrease in distance between patches. Vegetation treatments that convert annual grassland to non-native perennial grassland would not increase overall grassland guild habitat. However, seeding mid-size bunch grasses could improve habitat quality for the grassland guild by altering grass structure (height and growth form) compared to annual grasses. In Montana, areas with tall dense cheatgrass were apparently abandoned by most grassland birds (Hendricks, et al., 2007). Some invasive annual forbs may decrease long term following treatment. Overall effects could be moderate to major in the treatment area at the local scale and minor at the landscape scale in the short term. Long term effects at the local and landscape scale would be minor.

Riparian guild habitat would improve in the long term through implementation of riparian and fish restoration efforts. Projects that include planting willows or trees provide stream shading and improve nesting structure, hiding cover, and foraging habitat for wildlife species in the riparian guild. Beaver reintroductions in some watersheds would result in the creation of more ponds that could be used by waterfowl, some shorebirds, and amphibians. Beaver would reduce woody vegetation near the creek in the short term by cutting trees and willows. In the long term, raised water tables and trapped sediment in ponds could encourage the establishment of additional woody species and expand riparian areas. Beaver would probably not be reintroduced in creeks in the bottoms canyons where the riparian area has limited chance to expand. Active restoration would be greater than in the No Action Alternative and Alternative II, but less than in Alternatives III or IV. Improvement in the unfenced areas would be achieved through management changes including following BMPs for livestock grazing in the ARMS. Approximately 58 miles of riparian areas rated lower than PFC would also be in areas unavailable for livestock grazing; this would allow for more rapid recovery of riparian guild habitat compared to riparian areas readily accessible by livestock. This would help increase habitat structure for riparian guild wildlife.

Seasonal impacts and effects of treatment method (e.g., mowing, drill seeding, herbicide use) of vegetation treatments to wildlife are the same as described in *Impacts from Management Specific to the No Action Alternative*.

Alternative I does not allow prescribed fire, therefore no impacts would occur to any guild wildlife or their habitat from this activity.

Impacts from Management Specific to Alternative II

In Alternative II, big game winter range would not actively be restored. Increases in shrubs in native grassland would occur through natural recovery in the long term. Increases in distance between sagebrush habitat patches and decreases in habitat patch size would negligible at both the local and planning area scale in the short term. In the long term, limited restoration may result in minor increase in sagebrush steppe habitat patch size.

Treated annual grassland would be converted to non-native perennial grassland, rather than converted back to sagebrush steppe habitat. Periodic treatment of non-native perennial grasslands to reduce shrubs would maintain higher amounts of grassland guild habitat and proportionately limit or decrease sagebrush steppe habitat (e.g., loss of small islands of sagebrush steppe within the grassland). This would continue to result in a long term net reduction of sagebrush steppe wildlife and concurrent increase in grassland habitat. Distance between patches of sagebrush habitat is expected to increase.

Little riparian guild habitat would be actively restored in Alternative II and beaver would not be transplanted, slowing some functions that generally maintain current riparian habitat. Beaver may naturally establish in some watersheds resulting in the same impacts as described for reintroduced beaver. The BMPs in the ARMS are expected to help move riparian areas toward PFC over time, but no additional miles of riparian areas would reach PFC. The 40 miles of riparian guild habitat in areas unavailable for livestock grazing are expected to improve more rapidly than riparian habitat available for grazing, thereby reducing distance between patches of habitat with similar structure for the riparian guild. About 48 miles of riparian habitat currently at PFC would be maintained at PFC in areas available for livestock grazing.

Seasonal impacts and effects of methods used during vegetation treatments to wildlife are the same as described in *Impacts from Management Specific to the No Action Alternative*.

Impacts from Management Specific to Alternative III

Vegetation treatments identified in Alternative III, including establishing shrubs as part of vegetation or fuels treatments, should increase the amount of sagebrush steppe guild habitat over time. The treatments would reduce the distance between sagebrush steppe habitat patches and increase habitat patch size. Increases in patch size may be partially negated by the construction of fuel breaks through some patches of sagebrush steppe and mountain mahogany/mountain shrub guild habitats. Vegetated fuel breaks could change fuel type and continuity, theoretically helping to reduce fire size or spread. Shrub-establishing treatments in big game winter range would improve big game habitat. As sagebrush steppe guild habitat increases, grassland guild habitat would decrease.

Impacts of the shift from annual grassland to non-native plant communities would be the same as those discussed under *Impacts from Management Specific to Alternative I*.

Approximately, 133,000 acres of big game winter range would be restored, portions of it would be in the mountain mahogany/mountain shrub where as the remaining portion would be sagebrush steppe guild habitat.

Unvegetated fuel breaks would contribute to habitat fragmentation at the local scale in the grassland, mountain mahogany/mountain shrub, and sagebrush steppe guild habitats. Unvegetated fuel breaks would reduce habitat patch size and possibly create behavioral barriers to movement for some species such as small reptiles or mammals. Because unvegetated fuel breaks lack cover, small animal species that are vulnerable to predators might avoid open spaces in order to evade predation (Andrews & Gibbons, 2005). Unvegetated fuel breaks may aid in reducing the size of wildland fires by facilitating suppression.

Active restoration and beaver reintroductions would move riparian guild habitat to PFC faster than Alternative I. Approximately 26 miles (67%) more riparian habitat would be actively restored in Alternative III compared to Alternative I increasing riparian patch size and reducing distance between patches.

Seasonal impacts and effects of treatment method during vegetation treatments to wildlife are the same as described in *Impacts from Management Specific to the No Action Alternative*.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV would actively restore more sagebrush steppe and mountain mahogany/mountain shrub guild habitat compared to the No Action Alternative. Approximately 307,000 acres of big game winter range is identified for restoration, improving winter habitat for big game. Over time, patches of suitable big game habitat would increase, reducing the distances between patches of suitable big game winter range, potentially allowing mule deer and pronghorn numbers to increase. Planting forbs in areas where they are presently limited would also enhance habitat for big game and other wildlife by improving forage quality. Annuals grasslands would be converted to primarily sagebrush steppe if they are adjacent to native plant communities or non-native perennial grassland if adjacent or surrounded by non-native seedings. The effects on sagebrush steppe and mountain mahogany/mountain shrub guild habitats would be similar to those described for Alternative I.

Active restoration of riparian guild habitat would be the highest (104 miles) of all the alternatives, improving riparian guild habitat most rapidly. Overall, riparian habitat patch size and habitat structure and function (e.g., willows, trees, forbs, sedges) would be improved long term. The effects of reintroducing beaver would be the same as described in Alternative I

Seasonal impacts and effects of treatment method during vegetation treatments to wildlife are the same as described in *Impacts from Management Specific to the No Action Alternative*.

Impacts from Management Specific to Alternative V

Vegetation treatments in Alternative V are expected to be less aggressive because this alternative would incorporate more natural recovery processes. Shrub reestablishment under this alternative would occur over a longer period of time due to a lack of shrub seed source in parts of the planning area. Limited active shrub reestablishment would occur in both native grassland and non-native perennial grassland. Over the long term, assuming minimal wildland fire, this would reduce the distance between similar habitat patches and increase patch size, primarily for wildlife in the sagebrush steppe guild. Approximately 133,000 acres of big game winter range would be restored as in Alternative V, resulting impacts similar to those described in Alternative III.

Using only native plant species for restoration would provide plants used by local wildlife, regardless of guild. Limiting restoration to native species is expected to reduce the amount of acres treated in part due to plant material costs and availability.

Changing annual grassland to sagebrush steppe would increase habitat for sagebrush steppe guild wildlife while decreasing habitat for the grassland guild. Because of the low precipitation zone and reliance on native plant materials, restoration could be difficult achieve extending restoration. Effects would be moderate short term at the local scale and negligible at the planning area scale. In the long term habitat change would be minor at the local and negligible at landscape scales.

As riparian guild habitat attains PFC, the distance between similar patches of riparian guild habitat would decline. Active restoration of riparian guild habitat would exceed the restoration efforts in the No Action Alternative and Alternatives I and II. Riparian habitat categorized as FAR or FAR-DN would be more actively restored, reducing the distance between similar patches of habitat for riparian guild wildlife. Because beaver would not be reintroduced, the riparian habitat would not be affected by this action.

Alternative V would not allow the use of herbicides to treat annual grasslands to establish perennial vegetation. In the short term potential impacts to herbaceous cover, arthropod prey base and potential sublethal impacts to wildlife would be avoided. Any long term improvement in habitat structure would also be eliminated.

Summary

Alternatives I, II, and III would convert portions of annual grassland to non-native perennial grassland improving habitat structure of grassland guild wildlife. A change from annual grass to non-native perennial grass or annual grass to native grassland is not expected to result in a change in the total amount of grassland guild habitat; however, the quality (structure) of the habitat is expected to improve. Alternatives I, III, IV, and V would shift vegetation communities from non-native perennial grassland toward shrubland over time (Table 4- 98). Alternatives I and IV contain the most active restoration. The impacts of active restoration are expected to be moderate to negligible to wildlife in the short term, depending on the type of treatment. In the long term, treatments are expected to increase sagebrush steppe patch size and reduce distances between similar habitat patches. Habitat for the sagebrush steppe guild would increase more than mountain mahogany/mountain shrub habitat because more acres have the potential to support sagebrush steppe communities. Alternative II would retain the highest amount of habitat for the grassland guild. Alternative III would include the creation of unvegetated fuel breaks, which contribute to habitat fragmentation by creating long linear strips through larger blocks of habitat and, for some wildlife, isolating patches of habitat.

Table 4- 98. Vegetation Treatments by Alternative

Category	Alternative					
	No Action	I	II	III	IV	V
Change Annual to Native Shrubland	→	→	→	→	↑ [B]	↗ [B]
Change Annual to Non-Native Perennial	→	↗ [B]	↑ [B]	↑ [B]	↑ [B]	→ [B]
Change Non-Native Perennial to Native Shrubland	↗ [C]	↑ [B, D]	→ [E]	↗ [B]	↑ [B, D]	↗ [B, D]
Change Native Grassland to Native Shrubland	↗ [B, D]	↑ [B, D]	↗ [C]	↗ [B, D]	↑ [B, D]	↗ [B, D]
Acres of big game winter range restored [A]	→	↗	→	↗	↑	↗
Miles of riparian areas to achieve PFC	48	145	48	183	183	183
Miles of Active Riparian Habitat Restoration	→	≈39 ↗	0 →	≈65 ↗	≈104 ↑	≈52 ↗

Symbols: →=No change, ↑=increase, ↓=decrease, ↗=slight increase, ↘=slight decrease
[A] The RMP did not specifically address winter range restoration but identified restoration of existing burns within the winter range area.
[B] The trend is a result of restoration activities.
[C] The trend is a result of natural recovery in the long term.
[D] The trend is a result of suppression activities.
[E] The trend is a result of maintaining seedings.

Vegetation treatments in Alternatives I and IV would target more acres of big game winter range for restoration than the other alternatives. Alternative I restore would restore about 70,000 acres less big game winter range than Alternatives IV. Alternatives III and V would restore approximately 100,000 acres less big game winter range than Alternative I, while Alternative II would not actively restore any big game winter range. The No Action Alternative lacks a specific big game restoration objective in the vegetation section, however, it provides for vegetation treatment where unacceptable wildlife habitat condition exist. To meet

The amount of riparian guild habitat restored would vary by alternative (Table 4- 98). No active restoration would occur in Alternative II, maintaining the current amount of riparian guild habitat in the current condition. Alternative IV has active restoration on a little over 100 miles of riparian area. Alternative V has about half the restoration of Alternative IV. The difference in active riparian restoration between Alternatives I, III, and V is 26 miles. Since beaver would not be reintroduced in Alternatives II and V, those impacts would not occur.

Impacts from Noxious Weeds and Invasive Plants Actions

Invasive annual grasses increase fire size and shorten the fire return interval in upland vegetation communities (Brooks, et al., 2004; D'Antonio & Vitousek, 1992; Idaho Sage-grouse Advisory Committee, 2006; Pellant, 1990). Invasive species may reduce native plant diversity and abundance (Ehrenfeld, 2003), reducing habitat quality as well as wildlife species and abundance. Invasive species can spread rapidly along high disturbance corridors (Gelbard & Belnap, 2003) and watering locations (Brooks & Berry, 2006). A reduction of shrubland habitats is expected to affect the sagebrush steppe and mountain mahogany/mountain shrub guilds. Reductions in sagebrush steppe habitat may also reduce habitat patch size and increase the distance between patches. Habitat for the grassland guild would likely increase.

Invasive plants (e.g., purple loosestrife, reed canarygrass, and others) in riparian areas reduce native plant diversity (Maurer & Zedler, 2002), affecting habitat quality and influencing the associated wildlife species composition and abundance. Invasive riparian plants such as Russian olive, tamarisk, and reed canary grass would have similar impacts to the riparian guild wildlife as noxious weeds. Because many of the riparian areas occur in canyons, increases in noxious weeds and invasive species may also impact canyonland guild wildlife. As noxious weeds or invasive plants reduce the diversity of plant communities, the associated arthropod (i.e., insects, spiders) diversity and abundance are expected to change. Bat numbers or species may decline with these changes to plant communities that support their prey base.

Currently, the majority of noxious weed treatments are spot treatments of small infestations. Treatments for invasive plants would occur over large areas (hundreds of acres) and are addressed under *Impacts from Vegetation Communities Actions*.

The following indicators were used to analyze the impacts of noxious weeds and invasive plants actions on wildlife habitat:

- Acres of habitat for wildlife guilds
- Habitat fragmentation due to size of habitat patches for wildlife guilds and distance between patches
- Acres targeted for treatment or control
- Changes in the prescriptive thresholds (acceptable levels) of noxious weeds and invasive plants

Spot treatment of noxious weeds would involve accessing the area to be treated by foot or vehicle. Digging and pulling would be accomplished manually. Backpack sprayers or sprayers mounted on OHVs would be used to treat small infestations. Regardless of method, some wildlife would be temporarily displaced by the human activity. Noxious weed treatment could occur in all guild habitats. If treatments occur during nesting (late April into early July), there is a potential to damage some nests. During the early part of the nesting period most birds would make another nesting attempt, however, additional nesting attempts are less likely late in the breeding period. Effects to reptiles, birds, or small mammals would be localized to the treatment site and considered negligible. Most areas are treated in less than one day. The disturbance effects are expected to be negligible at the local scale and landscape scale in the short term. Following the manufacturer's label instructions and following FWS consultation guidance would avoid impacts to amphibians.

Impacts from Management Specific to the No Action Alternative

Based on the past trends, noxious weeds are expected to continue to increase under the No Action Alternative. Increases of noxious weeds like purple loosestrife, perennial pepperweed, and Canadian thistle are expected in riparian areas under the No Action Alternative. Invasive annuals (e.g., cheatgrass) are also expected to increase. The No Action Alternative identified no target treatment acreage or acceptable levels for noxious weeds or invasive plants. As noxious weeds and invasive plants increase and the plant species diversity decreases (DiTomaso, 2000), wildlife use typically declines.

Impacts from Management Common to All Action Alternatives

Inventory of noxious weeds would result in some temporary disturbance to wildlife. The disturbance would be short in duration, less than one day in a specific area. Some wildlife would be temporarily displaced by the human activity, but impacts are expected to be negligible at the local- and planning area-scales in the short and long term.

Impacts from Management Specific to Alternative I

Active treatment of noxious weeds and invasive plants is expected to be greater in Alternative I compared to the No Action Alternative. Overall, a reduction of more than 10% of noxious weeds and invasive plants and the application of treatments on an estimated 250,000 acres is expected improve the quality of habitat for all wildlife guilds in the treated areas. Native plant communities would be managed to keep invasive plants at less than 5% cover, helping to maintain habitat quality. The conversion of invasive annual grasses to non-native or native grass is not expected to affect the overall amount of habitat for the grassland guild. Conversion of sagebrush steppe or mountain mahogany/mountain shrub habitat to grassland to treat invasive species would reduce patch size and increase the distance between shrubland habitats. Refer to the *Vegetation Communities* section of Chapter 2 for details on acreage of annual grassland to be treated by VMA.

Impacts from Management Specific to Alternative II

Alternative II would have three priorities for the treatment of noxious weeds: riparian areas, special status species habitat, and native plant communities. The amount of localized human disturbance from chemical treatment and targeted grazing would increase compared to No Action Alternative due to weed treatment on an estimated 250,000 acres. Noxious weeds and invasive plant treatments on big game winter range could occur to the extent that the winter range overlaps special status species habitat, riparian areas, or native plant communities. Invasive plants could comprise up to 10% cover in native plant communities and 15% cover in non-native plant communities. The amount of noxious weeds and invasive plants would decrease habitat quality across all guild habitats long term. Cheatgrass provides more continuous fine fuel which increases wildland fire spread (D'Antonio & Vitousek, 1992; Pellant, 1990; Vitousek, 1990), thereby reducing patch size and increasing distance between shrubland habitats.

Impacts from Management Specific to Alternative III

Alternative III would have the least acreage for treatment of noxious weeds and invasive plants of the action alternatives. Alternative III includes treatment of roads, fuel breaks, and areas with high wildland fire occurrence as priorities for noxious weed and invasive species treatments. Treatment in these areas may provide some limited protection to adjacent habitat. Focusing on roads, fuel breaks, and areas with high wildland fire occurrence would reduce the overall treatment amount by 50,000 acres compared to Alternatives I and II. Because noxious weeds and invasive plant treatment in riparian areas and native plant communities would not be priorities, noxious weeds and invasive plants would increase in these areas, affecting habitat quality for the riparian guild in the long term. Invasive plants in native and non-native plant communities would be managed to comprise less than 5% cover. For the sagebrush steppe and mountain mahogany/mountain shrub guilds, increases in invasive species would result in decreases in patch size and increase the distance between patches of similar habitat from wildland fires.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV would contain the largest treatment area, overall reduction goal (50%), and acreage targeted for treatment (450,000 acres). Big game winter range would be treated to the extent that it overlaps other priority areas including special designations, riparian areas, special status species habitat, or native plant communities. As in Alternative I, the threshold for invasive plants is less than 5% cover in native plant communities helping to maintain habitat quality. The chance that noxious weeds would degrade habitat quality is somewhat reduced due to the larger control area. Effects of Alternative IV are an improvement over the No Action Alternative due to increased treatment.

Impacts from Management Specific to Alternative V

The noxious weed and invasive plant treatment area would be about 33% less than Alternative IV, but Alternative V has the same acceptable levels of noxious weeds and invasive plants in native and non-native plant communities. Long-term treatment of noxious weed and invasive plant treatment in Alternative V would improve habitat for all guilds over the No Action Alternative.

Summary

All action alternatives establish control acreages, an overall change in the goal for noxious weeds and invasive plants, and criteria to establish priority areas for noxious weed and invasive plant treatment. This direction is absent in the No Action Alternative. All action alternatives also provide an acceptable level (e.g., threshold) for the amount of noxious weeds and invasive species allowable in native and non-native plant communities. Alternatives I and II are similar in the amount of acres for control and target control on more acres than Alternative III, but less than Alternative IV and V. Riparian areas or native plant communities are not treatment priorities in Alternative III. This may result in an increase in noxious weeds or invasive plants in these areas, which would affect habitat for the riparian guild. Alternative II has the highest threshold for noxious weeds and invasive plants. Increases in invasive plants in sagebrush steppe and mountain mahogany/mountain shrub habitats not only influence habitat quality, but may lead to an increase in wildland fire, which would further fragment habitat. Large-scale treatments of invasive plants in all alternatives would occur primarily in grassland habitat. Impacts to the grassland guild habitat from such treatments are expected to be short term before the treated areas provide suitable grassland habitat. Large invasive plant treatments in sagebrush steppe or mountain mahogany/mountain shrub habitats would decrease habitat patch sizes, increase the distance between habitat patches, and degrade habitats in both the short and long term. Full recovery of these habitats following treatment may take longer than 20 years. However, treatment of invasive plants in guild habitats is better than allowing the invasive plants to continue to expand.

Impacts from Wildland Fire Ecology and Management Actions

Wildland fire can rapidly alter habitat over large areas (greater than 10,000 acres). Fire suppression activities (e.g., back burns, dozer lines, or retardant drops) may adversely affect habitat for several years; however, these actions limit wildland fire size in many cases. Mortality to individual wildlife can result from back burns or fire line construction. Fuels treatments help restore more natural fire cycles and, in the case of fuel breaks, hinder fire spread. In some cases, fuel breaks contribute to habitat fragmentation by converting shrubland habitats to grassland habitat. More information regarding fuels is contained in the *Wildland Fire Ecology and Management* section. Impacts of fuels treatments other than fuel breaks (e.g., restoration, noxious weeds and invasive species treatments) have already been addressed under *Impacts from Vegetation Communities Actions* and *Impacts from Noxious Weeds and Invasive Plants Actions*; these impacts are not discussed further in this section to avoid repetition.

The following indicators were used to analyze the impacts of wildland fire ecology and management actions on wildlife habitat:

- Acres of habitat for wildlife guilds
- Habitat fragmentation due to size of habitat patches for wildlife guilds and distance between patches
- Habitat fragmentation due to infrastructure and human disturbance
- Areas with temporal and spatial restrictions that benefit wildlife

Impacts from Management Specific to the No Action Alternative

All big game winter range and wildlife guild habitats are in full suppression areas in the No Action Alternative; suppression priority across the planning area is based on the highest value, which is subjective and may not consider rehabilitation costs, likelihood of successful rehabilitation, or various resource values.

Assuming the current trend in wildland fire would continue, impacts to habitat would continue under the No Action Alternative; riparian areas would continue to be affected by fire, sagebrush steppe, and mountain mahogany/mountain shrub habitats would continue to be reduced in size, and the distance between patches would increase both short and long term. Wildland fire would burn in canyonland habitat, increasing the prevalence of invasive species and reducing habitat quality for canyonland guild wildlife.

Suppression vehicles can damage habitat and, in some instances, result in mortality to wildlife. Ground squirrels and other burrow-using species can be affected during fire line construction with bull dozers. The use of heavy equipment, including heavy engines and water tenders, and retardant during fire suppression may directly affect some wildlife and their habitat, regardless of guild. Effects of these activities are minor at the local scale and negligible at the landscape scale both short and long term. To the extent suppression actions keep fires from burning large acres of habitat, suppression activities reduce fire impacts to the adjacent unburned habitats and limit converting sagebrush steppe, mountain mahogany/mountain shrub guild habitats, or big game winter range to grassland.

Fuels and ES&BAR seed mixes in the No Action Alternative can contain native and some non-native perennial species, including forbs. The use of native and non-native species allows restoration or rehabilitation seed mixes to be site specific depending on variables like soils, elevation, and precipitation. Desirable forbs are generally limited in sagebrush steppe and grasslands the planning area. Non-native forbs readily consumed by a variety of wildlife, such as alfalfa, clover, and yarrow, can be included in seed mixes in all guild habitats. Some non-native grasses compete well with invasive plants and can provide tall herbaceous cover used by some nesting birds in the grassland guild.

Temporary fences are frequently constructed following fire to protect burned areas, new seedings, or restoration projects, and allow continued use of unburned areas. Temporary fences can be a source of wildlife mortality and, depending on their placement, further fragment habitat. Temporary fence construction could occur year round.

Impacts from Management Common to All Action Alternatives

BMPs for wildland fire suppression are expected to reduce or mitigate impacts of wildland fire to wildlife. Wildland fire BMPs, which minimize burn outs and suppress fire in unburned islands of habitat within the fire perimeter once the fire is contained, are expected to reduce the amount of habitat altered by wildland fire. Minimizing some fire suppression activities, such as refueling areas and camps in riparian areas, is expected to benefit wildlife in the riparian guild. Fire line construction and active suppression would continue to occur in riparian areas, minimizing direct loss to wildland fire. ES&BAR plans would evaluate ephemeral and intermittent drainages to determine whether or not erosion structures would be needed to reduce sediment transport to riparian areas to protect water quality and riparian guild habitat.

Impacts from Management Specific to Alternative I

Because key sage-grouse habitat is part of the Critical Suppression Area, fires in most sagebrush steppe habitat would be rapidly suppressed, inhibiting additional habitat loss. VMA C would have the highest vegetation priority for fire suppression in Alternative I. From a wildlife habitat perspective, VMA C contains a substantial amount of habitat for the sagebrush steppe and grassland guilds. Riparian and canyonland guild habitats are also present. The high priority for fire suppression in VMA C should minimize future sagebrush steppe fragmentation in this area. Fires in big game winter range would be a high priority for suppression to the extent that big game winter range overlaps VMA C, ACECs, native plant communities, or key sage-grouse habitat. Big game winter range in VMA C is expected to have less fragmentation than other VMAs. An increase in grassland habitat and corresponding decrease in sagebrush steppe habitat in VMA A is expected because the area has no key sage-grouse habitat and a relatively small acreage in ACECs. Compared to other VMAs, little sagebrush steppe habitat remains in VMA A.

Including WUI as a critical suppression priority can divert resources for fire suppression away from wildland fires in sagebrush steppe, mountain mahogany/mountain shrub, aspen, canyonland, and riparian guild habitat and in big game winter range. The diversion of suppression resources allows fires in these habitats to potentially become larger, converting them to grassland, reducing habitat patch size, and increasing the distance between similar habitats

Because key sage-grouse habitat is identified as a Critical Suppression Area, suppression in key sage-grouse habitat should keep fires smaller, resulting in less sagebrush steppe guild habitat from being converted to grassland. Key sage-grouse habitat is present in VMAs B, C, and D.

Suppression of fires in ACECs is expected to keep the fires small, reducing the amount of sagebrush steppe and, to a lesser extent, canyonland guild habitat from being dominated by annual grasses. Riparian areas that burn usually are not dominated by annual grasses. Habitat structure (mature trees and willows) should recover in the long term.

Constructing guard stations and helipads and improving or creating new airstrips and routes to reduce fire suppression response time would fragment habitat and create periodic human disturbance during maintenance or use. Human activity would be prolonged in close proximity to the guard stations during the fire season. Some wildlife would gradually habituate to activity at guard stations, but others would be permanently displaced. Scheduling periodic routine maintenance of helipads and access roads after 9:00 AM during the breeding and nesting periods and avoiding winter periods to the extent practical would minimize disturbance impacts to wildlife in all guilds near the facilities.

Roads, stream crossings, and draft sites would be improved or created to reduce response time, and a variety of water sources would be developed to improve water availability for fire suppression. The primary impact of creating new roads, stream crossings, and water sources would be decreased habitat patch size and increased human disturbance, leading to increased habitat fragmentation, depending on the location. Improved stream crossings would have a localized impact on riparian guild habitat and, depending on location, impact habitat for the canyonland guild. Depending on the type of crossing, stream crossings could result in barriers to amphibian movements. Roads with steep fill slopes, primarily of coarse rock, and a culvert that increases water velocity would be more of a barrier than a hardened stream bottom in which water flow is not accelerated. Erosion on hillside roads leading to riparian areas contributes additional sediment into streams. Improved stream crossings would also result in additional use by the public, increasing sediment into the streams through erosion and dust. Increases in noxious weeds or invasive plants along the disturbance corridors are expected to contribute to riparian guild habitat degradation; however, improved access would facilitate noxious weed treatment. Improving portions of some existing roads would reduce route braiding, which damages habitat and increases wildland fire risk. Additionally, improved roads should reduce the response time to fires, keeping fire size smaller. Effects to the riparian guild habitat would be moderate to minor at the local scale both short and long term. At the landscape scale, effects are expected to be negligible short and long term due to the relatively small areas impacted. Effects to canyonland guild habitat are expected to be minor both short and long term at the planning area scale.

Routes could be closed or restricted during times of high fire danger to reduce the chance of human-caused wildland fire. Route closures or restrictions would benefit wildlife habitat to the extent human-caused fires are reduced. A reduction in wildland fire would benefit the sagebrush steppe and grassland guilds. During fire restrictions or closures, human activity would decline, also reducing potential disturbance to wildlife during the restriction period.

It is anticipated that approximately 300 miles of 300-foot wide fuel breaks would be created in Alternative I (11,000 acres total). Fuel breaks would be configured to follow existing disturbance corridors (i.e., roads, powerlines). Fuel breaks and subsequent management (i.e., mowing or targeted grazing) may promote noxious weeds and invasive plants because of repeated surface disturbance. Invasive plants are expected to subsequently spread to adjacent areas, gradually degrading wildlife habitat. Fuel breaks would use native and non-native species, the impacts from which on guild habitats are described under *Impacts Specific to the No Action Alternative.*

To the extent the fuel breaks are in grassland habitat, they continue to provide grassland habitat; therefore, impacts to grassland species are expected to be minimal. Fuel breaks that reduce or fragment sagebrush steppe or mountain mahogany/mountain shrub habitats would reduce patch size. The change in vegetative cover in a 300-foot wide fuel break would likely make some small wildlife vulnerable to predation or create a behavioral barrier to movements. Changes in small mammal or rodent abundance or diversity would lag behind treatment. Because sagebrush steppe songbirds avoid habitat edges

(Ingelfinger & Anderson, 2004), the reduction of habitat is roughly an additional 660 feet wider than the fuel break itself. Fuel breaks in grassland habitat configured to protect sagebrush steppe, canyonland, or riparian habitats may provide some protection to wildlife in those guilds from future fires.

Fuel break maintenance would be scheduled to minimize impacts to wildlife to the extent possible. Some forms of fuel break maintenance (i.e., mowing or targeted grazing) would likely be scheduled to occur in late May to late June to maximize fine fuels reduction. Loss of eggs, damage to nests, and nest abandonment may occur in the treatment areas. Most pronghorn and mule deer would be temporarily displaced while the fuel breaks are being maintained due to increased human activities. Because of the relatively small acreage involved and relatively short time period for maintenance, the impacts of fuel breaks are considered minor to local wildlife populations in the short term and negligible in the long term. At the landscape scale, effects would be negligible both short and long term.

Modifying existing water pipelines to improve suppression capability would result in some loss of habitat. New storage tanks, ponds or hydrants may result in a negligible loss of habitat at the specific site. Water storage ponds may benefit amphibians. Other species associated with the riparian guild (e.g., ducks, phalaropes, other birds and bats) could also be provided habitat if wetland vegetation is planted to stabilize banks and the ponds are fenced. However, ponds may also encourage mosquitoes carrying West Nile Virus which could increase mortality on some birds. New water pipelines would contribute to decreasing habitat patch size resulting in additional habitat fragmentation and increasing human disturbance into new areas.

Effects of temporary fences would be the same as described under *Impacts from Management Specific to the No Action Alternative*.

Impacts from Management Specific to Alternative II

Because VMA A would be a high priority for fire suppression in Alternative II, fire size is expected increase in VMAs B, C, and D when multiple fires occur. Short- and long-term effects of this suppression priority would include a decrease in big game winter range, canyonland, and mountain mahogany/mountain shrub habitats in VMAs C and D. Fires in VMAs C and D would also contribute to reduced patch sizes and increased distances between similar habitat patches. Conversely, habitat for grassland guild wildlife would increase in the short term and long term in VMAs C and D.

The majority of the riparian habitats in the planning area are found in VMAs C and D. Fires that burn riparian areas are expected to reduce habitat quality and structure for the riparian guild in both the short and long-term. A substantial portion of the canyonland guild habitat is also present in VMAs C and D. Fires on the steep canyon slopes would facilitate an increase in cheatgrass distribution and abundance, reducing habitat quality for canyonland guild wildlife.

The effects of improving and creating new water pipelines, storage ponds, roads, and stream crossings for fire suppression would be the same as in Alternative I. Routes would not be closed or restricted during periods of high fire danger, increasing the risk of human-caused fires in wildlife habitat for the sagebrush steppe and grassland guilds.

It is anticipated that approximately 350 miles of 300-foot wide fuel breaks (13,000 acres) would be created in Alternative II. Impacts of constructing and maintaining fuel breaks would be the same as described in *Impacts from Management Specific to Alternative I*, but would cover another 50 miles (about 2,000 acres).

Fuel breaks would be seeded primarily with fire tolerant non-native species (i.e., Siberian wheatgrass, crested wheatgrass, and forage kochia). Some wildlife has been reported to consume forage kochia (Harrison, et al., 2000); however, the ability of forage kochia to provide habitat structure for shrub-nesting birds is poorly documented. The effect of planting forage kochia would be to somewhat decrease acreage of grassland habitat with little improvement of habitat for sagebrush steppe wildlife.

The effects of temporary fences would be the same as described under *Impacts from Management Specific to the No Action Alternative*.

Because no ACECs are present in Alternative II, habitat for canyonland and riparian guilds are potentially more vulnerable to large wildland fires. Including key sage-grouse habitat in Critical Suppression Areas would have the same affects as Alternative I.

Impacts from Management Specific to Alternative III

The effects of VMAs B having the highest suppression priority would be similar to Alternative II. Some key sage-grouse habitat is present, but the majority of VMA B is classified as perennial grassland which is a Type 1 Restoration Area in the *Conservation Plan for the Greater Sage-grouse in Idaho (Idaho Sage-grouse Advisory Committee, 2006)*. High suppression priority in this area would help protect existing and restored habitat.

The effects of improving existing or creating new routes, stream crossings, draft sites, and water pipelines would be the same as described in Alternative I. The effects of route restrictions or closures during high fire danger periods were assessed in *Impacts from Management Specific to Alternative I*. Because more routes are likely affected in Alternative III, there is a decreased risk for human-caused wildland fire. Limiting or prohibiting some uses during high fire danger would also help reduce the chance of human caused wildland fires.

Approximately 600 miles of 500-foot wide fuel breaks would be created in Alternative III. Fire breaks of this width would increase the distance between patches and reduce the number of large patches. Approximately 420 miles of vegetated fuel breaks (25,000 acres) would be seeded primarily with native and non-native fire tolerant species. The impacts of using native and non-native seed on guild habitats are described under *Impacts Specific to the No Action Alternative.* Approximately 180 miles of unvegetated fuel breaks (11,000 acres) are expected to increase habitat fragmentation wherever constructed. Unvegetated fuel breaks have minimal habitat value because they do not provide cover and food. Because of the lack of vegetative cover, unvegetated fuel breaks may form movement barriers for small mammals and reptiles, reducing metapopulation characteristics including dispersal and recolonization (Dramstad, et al., 1996). Small animals crossing fuel breaks are expected to have a lower survival rate due to increased predation from the lack of cover.

One of the criteria for fire break location is to protect important special status species habitat from future fires. To the extent fuel breaks stop or slow wildland fires, the fuel breaks may protect habitat for all wildlife guilds. Wider fuel breaks, particularly unvegetated ones, should be more effective than narrow fuel breaks at slowing or stopping fires.

The effects of temporary fences would be the same as discussed under *Impacts from Management Specific to the No Action Alternative*.

The portion primarily canyonland with some sagebrush steppe in the Bruneau-Jarbidge ACEC would be a Critical Suppression Area. Rapid suppression in the Bruneau-Jarbidge ACEC should help keep fire size small in the long term, helping to minimize decreases in sagebrush steppe patch size or corresponding increases in the distance between habitat patches.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

VMA C would have the first priority for fire suppression in Alternative IV, which should help reduce fire size in this VMA. The higher priority for suppression is expected to minimize habitat alteration and fragmentation due to wildland fire.

The impacts of route closures and restrictions during periods of fire danger to wildlife habitat are presented in *Impacts from Management Specific to Alternative I*.

The effects of the construction and maintenance of 300 miles of 300-foot wide fuel breaks (11,000 acres), new or improved roads, stream crossings, water pipelines, hydrants, and storage ponds would be the same as in Alternative I. Impacts of using native and non-native seed on wildlife habitat are addressed in *Impacts from Management Specific to the No Action Alternative*.

The effects of temporary fences would be the same as described under *Impacts from Management Specific to the No Action Alternative*. Because temporary fences would not be allowed in pastures with native plant communities, wildlife in those habitats would not be affected by this action.

Impacts from Management Specific to Alternative V

VMA C is the priority for fire suppression in Alternative V; therefore, impacts to wildlife habitat would be the same as for Alternative IV. Alternative V suppression priorities would provide for the largest amount of big game winter range included in Critical Suppression Areas. Alternative V proposes the second largest acreage for restoration (Table 4- 100). Fire suppression, in conjunction with restoration, should increase the reestablishment of shrubs for big game, sagebrush steppe, and mountain mahogany/mountain shrub guild habitats. Long-term impacts of restoration would be similar, but greater than the No Action Alternative.

Because no new routes would be created but some existing routes would be improved, fire suppression response time would be somewhat faster than in the No Action Alternative, but may be less than the other Action Alternatives. Impacts of route closures and restrictions during periods of fire danger to wildlife habitat are presented under *Impacts from Management Specific to Alternative I*. New water pipelines would not be created to enhance fire suppression, which would prevent a reduction in patch size from this management activity. Existing hydrants and water storage for fire suppression would be maintained resulting in no new effects. Existing stream crossings could be improved resulting in some damage to riparian habitat. Because new stream crossings or draft sites would not be constructed and existing crossing would be improved, less riparian habitat would be damaged compared to Alternatives I, II, III, or IV.

Although other facilities would not be constructed, response time and subsequently fire size should be somewhat reduced compared to No Action Alternative due to the improvement of existing routes. More habitat may potentially burn in Alternative V compared to Alternatives I, II, III and IV, due to less fire suppression infrastructure (e.g., guard stations, additional routes).

The effects of construction and maintenance of 200 miles of 300-foot wide fuel breaks (7,000 acres) would be greater than for the No Action Alternative because of the increased acreage treated and maintained, but would be lower than in the other action alternatives. Fuels and ES&BAR seed mixes under Alternative V would contain only native species. From a wildlife perspective, relying solely on native seed mixes and plants for restoration and rehabilitation may reduce the likelihood of improving habitat. Native forb seed or plants are produced in limited quantities for most species and have a high cost. Furthermore, successfully establishing native forbs is difficult in drier sites. Establishing a variety of native forbs would enhance habitat quality for a variety of wildlife.

WUI and ACECs, approximately 78% of the planning area, are Critical Suppression Areas in Alternative V. This includes all of VMAs C and D, a large portion of VMA B, and a several thousand acres of VMA A, reducing the effectiveness of identifying critical areas. Although key sage-grouse habitat is in the Critical Suppression Area, ACECs include thousands to hundreds of thousands of acres of other habitats (Table 4- 111). The large Critical Suppression Area, coupled with fewer improved roads, no new guard stations and other suppression infrastructure, may result in larger fires. This would increase habitat for the grassland guild and decrease habitat patch size for sagebrush steppe, mountain mahogany/mountain shrub and canyonland habitats.

Temporary fences would not be allowed in Alternative V; therefore, impacts of temporary fences on wildlife described above would not occur.

Summary

The No Action Alternative identifies the entire planning area for full suppression (Table 4- 99); however, the highest value is subjective, providing little benefit in setting fire suppression priorities. The majority of the remaining sage-grouse key habitat is located in VMAs C and D. All of the mountain mahogany/ mountain shrub and aspen guild habitats are in VMA D. The amount of restoration toward FRCC 1 is highest in Alternative IV and least in Alternative II. Alternative III provides for the most acres of fuel breaks, including nearly 11,000 acres that would not be vegetated (Table 4- 100). Fuel break widths are 500 feet in Alternative III and 300 feet in the other action alternatives.

Table 4- 99. Guild Habitat in Critical Suppression Areas by Alternative (Acres)

Guild Habitat	Alternative						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
Big Game Winter Range	0	295,000	67,000	283,000	358,000	336,000	643,000
Aspen	0	3,000	400	3,000	3,000	3,000	3,000
Canyonland	0	36,000	84,000	27,000	39,000	37,000	43,000
Duneland	0	100	100	100	100	100	100
Grassland	0	135,000	79,000	133,000	197,000	174,000	573,000
Mountain Mahogany/ Mountain Shrub	0	9,000	2,000	9,000	11,000	10,000	11,000
Sagebrush Steppe	0	294,000	79,000	293,000	340,000	326,000	432,000
Total [A]	0	481,000	172,000	469,000	594,000	555,000	1,067,000
Riparian (miles)	0	152	58	136	184	161	240
[A] The total is not a sum of the acres in each column because big game winter range overlaps other habitat types.							

Table 4- 100. Fire Suppression, FRCC/Fuels Projects, and ES&BAR Activities

Category		Alternative					
		No Action	I	II	III	IV	V
Total Fuel Breaks	Acres	➔	11,000	13,000	25,000	11,000	7,000
	Miles		300	400	400	300	200
Unvegetated Fuel Breaks	Acres	0	0	0	11,000	0	0
	Miles	0	0	0	200	0	0
Fuel Breaks Locations		No new planned	Along disturbance corridors	To protect facilities and habitat	Strategic, habitat protection	Protect restoration areas	Along existing roads
FRCC/Fuels Restoration (acres)		➔	380,000	100,000	250,000	650,000	410,000
Closures/Restrictions of Routes During Fire Season			Yes	No	Yes, most restrictive	Yes	Yes
Seed Mix		Mix [A]	Mix	Primarily non-native perennial	Mix	Mix	Native
Temporary Fences		Yes	Yes	Yes	Yes	Yes	No
Symbols:➔=No change, 🡅=increase, 🡥=limited increase, 🡇=decrease [A] Mix of native & non-native perennial							

Impacts from Livestock Grazing Actions

Livestock grazing management activities may change wildlife use of habitat through displacement (Bissonette & Steinkamp, 1996; Kie, 1996; Loft, et al., 1993; Loft, et al., 1991; Stewart, et al., 2002), human disturbance (e.g., riders and dogs moving or herding livestock, placing salt or supplements, monitoring livestock, or maintaining infrastructure), and alteration of habitat quality or structure (Loft, et al., 1987).

Livestock grazing reduces herbaceous cover (Loft, et al., 1987) and may influence plant species composition and abundance in riparian areas (Kauffman, et al., 1983) and uplands (Reynolds & Trost, 1980). The degree of impact is dependent on stocking rate, season of use, use levels, and other management practices. As the amount of AUMs increase, the amount of residual herbaceous cover would be reduced because of increased consumption and trampling by livestock. For ocular estimates in southwestern Montana, half of the forage removed was not eaten by sheep but was trampled (Laycock, et al., 1972). Cattle trampling impacts to vegetation height are not well documented but occur to some extent. The change in residual cover from increasing AUMs or utilization is not uniform (Connelly, et al., 2004). Residual cover is expected to be further reduced by the issuance of TNR. As livestock utilization increases, residual grass heights decline and utilization is more uniform (Ralphs, et al., 1990).

Potential impacts of livestock grazing on ground-nesting birds occur in the late spring (April) through early summer (late June); guild habitats that would be impacted include grassland, sagebrush steppe, and mountain mahogany/mountain shrub. The impacts, both positive and negative, of livestock grazing on wildlife are contentious (Connelly, et al., 2004). Nest success for a number of ground-nesting birds is influenced by residual cover. As a general rule, the less cover, the lower the nesting success for most species due to predation, nest parasitism, and climatic factors (Clark, et al., 1999; Connelly, et al., 2004; Dechant, et al., 1998; Dechant, et al., 1999; Swanson, 1998). Nesting cover requirements for ground-nesting songbirds have had limited research in Idaho and sagebrush steppe habitats in general. Scientific literature generally indicates that a relatively small portion of bird nests on the ground are actually trampled by livestock (Renfrew & Ribic, 2003), but trampling may be additive to other forms of nest failure (Renfrew, et al., 2005). In one study, trampling by livestock resulted in substantial nest failure (Walsberg, 2005); however, in other studies, nest trampling has been minor. Holechek et al. summarized a number of studies indicating positive and negative impacts of grazing to nesting birds (Holecheck, et al., 1982). Livestock are known to flush birds from nests (Coates, 2007), which could increase detection of nests by avian predators or cowbirds. Robel et al. noted parental bird behavior may attract brown-headed cowbirds and avian predators to nests (Robel, et al., 2003); whereas, odor and thermal differences potentially attract snakes and mammalian nest predators. Reducing cover at the nest site may alter the micro-climate at the nest making odors travel farther and increasing predation by mammals. In New Mexico, brown-headed cowbirds travel roughly two to more than four miles from pastures being grazed by livestock to parasitize nests in ungrazed areas (Goguen & Mathews, 2001). Pastures grazed outside the nesting season would not impact nesting songbirds.

Bighorn sheep (Bissonette & Steinkamp, 1996), mule deer (Loft, et al., 1991), and elk (Stewart, et al., 2002) are known to be displaced to some degree by livestock. Typically, big game return to previously occupied areas after livestock removal (Stewart, et al., 2002). Impacts of displacement are greater during the winter when deer, bighorn sheep, pronghorn, and elk are more energetically stressed (Byers, 2003; Geist, 1982; Krausman & Bowyer, 2003; Mackie, et al., 2003), as big game species minimize energy expenditure during the winter to increase survival (Geist, 1982). Big game may be displaced to lesser quality habitat or areas that have higher predation (Geist, 1982).Mule deer displaced from winter range by livestock during the winter may have increased energy requirements or incur higher mortality. In Idaho, mortality for fawns over winter is variable, but about twice that of doe mule deer (Unsworth, et al., 1999), with malnutrition the primary cause of death in some years. Snow 15 to 18 inches deep can preclude use by mule deer (Gilbert, et al., 1970; Poole & Mowat, 2005). Increases in energy use for movement (Parker, et al., 1984), thermoregulation, and basic metabolic function during the winter are factors in the difference in mortality between adult female mule deer and fawns (Hobbs, 1989).

A number of research studies have shown the nutritional quality of browse (Alpe, et al., 1999) and grass (Pitt, 1986; Wambolt & Payne, 1986; Westenskow-Wall, et al., 1994) can be improved for a period of time by livestock grazing on winter range. Periodic (once every three to five years) moderate spring grazing by livestock in big game winter range is reported to promote the establishment of desired shrubs for browse (Austin, 2000), by reducing grass competition to shrub seedlings and increasing shrub canopy (Ganskopp, et al., 1999). Browse species that would benefit wildlife include antelope bitterbrush, serviceberry, chokecherry, and sagebrush; increases in bitterbrush would enhance habitat for big game and wildlife in the mountain mahogany/mountain shrub guild. Not all shrubs respond the same to browsing intensity. Browsing on bitterbrush in the late spring has been shown to increase shoot biomass, whereas sagebrush branches can be killed by heavy simulated browsing or clipping (Bilbrough & Richards, 1993). Ganskopp et al. reported livestock graze primarily on grasses in the spring and early summer, consuming minor amounts of browse (Ganskopp, et al., 1999). Summer and fall grazing tends to increase the amount of young bitterbrush consumed by livestock (Ganskopp, et al., 1999), reducing the amount of browse and other forage available to wintering big game (Wambolt, et al., 1997; Westenskow-Wall, et al., 1994). In late fall, vegetative growth has ceased due to a decline in temperature. Competition for vegetation is expected to be greater when snow covers the grasses and big game and livestock consume browse. Range infrastructure associated with livestock grazing management can influence habitat degradation and fragmentation (Connelly, et al., 2004; Ingelfinger & Anderson, 2004; Jantz & Goetz, 2008; Pitman, et al., 2005; Rowland, et al., 2000), and wildlife mortality (Beck & Mitchell, 2000; Connelly, et al., 2004; Harrington & Conover, 2006).

Stock ponds and water storage reservoirs provide water in areas that historically lacked water for amphibians, bats, songbirds, waterfowl, coyotes, and big game. Rosenstock et al. wrote that livestock waters may influence distribution and possibly abundance of big game, upland game, and other wildlife, such as bats in arid environments. Wildlife readily drinks from artificial water sources (Rosenstock, et al., 1999). In some instances water in ponds becomes stagnant or contaminated. Sage-grouse rarely die from stagnant *Salmonella*-contaminated water, other bacteria or pathogens associated with livestock (Connelly, et al., 2004). Wildlife use of artificial water sources does not necessarily indicate a requirement by wildlife for that water source (Broyles, 1995; Burkett & Thompson, 1994). Larger ponds with longer-term reliable water and emergent vegetation support more frogs than small ponds. Fenced water storage reservoirs and ponds provide habitat for waterfowl and shorebird nesting in part due to emergent and upland vegetation within the fenced area. Because troughs are primarily filled when livestock are present, many of them are dry during the summer when water is potentially more limiting. The value of livestock water to wildlife is influenced by the season, vegetation in proximity to the pond/trough, and adjacent habitat and other factors.

West Nile Virus (WNV) is carried by infected mosquitoes in several species (*Culex tarsalis, C. pipiens, Aedes vexans, Coquillettidia perturbans)* (Marra, et al., 2004) found in southern Idaho (Ada County Mosquito Abatement District, 2007). WNV can be lethal to ravens, crows, jays, hawks, owls, eagles, gulls, sage-grouse, and a variety of songbirds (Marra, et al., 2004). Mosquitoes in the genus *Culex* are the main insect carriers of WNV for transmitting the virus in birds (Marra, et al., 2004). Although mosquito species commonly occur in permanent or semi-permanent ponds, some species can also hatch in ephemeral small pools and animal tracks (Ada County Mosquito Abatement District, 2007). Mosquitoes breeding in ephemeral water usually have a rapid life cycle, maturing in as few as 7 days (Ada County Mosquito Abatement District, 2007). Areas where organic material is concentrated in stagnant water provide ideal breeding conditions for *Culex*, *Aedes,* and other mosquitoes (Marra, et al., 2004). Although there has been concern that livestock waters may provide breeding habitat for mosquitoes carrying WNV (FWS, 2008), this has not been researched to date. leaving impacts speculative.

Fences in sagebrush steppe, mountain mahogany/mountain shrub, riparian, or aspen habitats may result in some physical damage to the vegetation near the fence from vehicles or trailing livestock. Livestock trailing and vehicle use along fences contribute to creating linear routes. Ecological effects of fences on songbirds, including songbirds in sagebrush steppe habitats, are poorly understood (Freilich, et al., 2003). Although fences provide perch sites for songbirds during the breeding season, they also provide perches for raptors, ravens, magpies, and brown-headed cowbirds, which may increase nest predation. Avoidance of habitat edges may be an evolved or immediate response to a perceived or actual higher risk of predation or parasitism associated with edges (McCloskey & Thompson, 2000; Renfrew, et al., 2005) or competition with birds that use edges (Ingelfinger & Anderson, 2004). Mortality of a variety of wildlife species, including birds, has been documented in fences (Allen & Ramirez, 1990; Connelly, et al., 2004) and big game (Wolfe, et al., 2007). Mortality may be higher for larger birds such as hawks, owls, and waterfowl (Allen & Ramirez, 1990) than smaller birds.

Powerlines are used to supply energy for pumping water from some wells for livestock in the planning area. Powerlines and associated primitive roads increase habitat fragmentation. Powerlines provide additional nest sites and perches for raptors and ravens (Knight & Kawashima, 1993; Steenhof, et al., 1993). Small buildings associated with diesel generators to pump water from wells also provide avian predators perch sites.

The following indicators were used to analyze the impacts of livestock grazing actions on wildlife habitat:

- Habitat fragmentation due to size of habitat patches for wildlife guilds and distance between patches: This indicator was used to qualitatively analyze impacts of different levels of livestock grazing infrastructure. A qualitative analysis was used because specific changes in range infrastructure (i.e., fences, corrals, pipelines, and troughs) are not known.
- Areas with temporal and spatial restrictions that benefit wildlife: This indicator was used to qualitatively assess effects of seasons of use on wildlife during important times of the year including winter, breeding, and nesting periods.
- Relative amount of herbaceous cover for wildlife: This indicator was used to assess impacts of changes in livestock AUMs, potential TNR, and livestock utilization levels for the alternatives.

Table 4- 101 identifies the number of acres available for livestock grazing in each guild habitat by alternative.

Table 4- 101. Guild Habitat Available for Livestock Grazing by Alternative (Acres)

Guild Habitat	Alternatives						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
Aspen	3,000	3,000	3,000	3,000	3,000	3,000	2,000
Canyonland	17,000	14,000	14,000	14,000	14,000	14,000	10,000
Duneland	600	600	600	600	600	600	0
Grassland	836,000	819,000	833,000	831,000	782,000	802,000	699,000
Mountain Mahogany/ Mountain Shrub	11,000	10,000	11,000	11,000	10,000	10,000	5,000
Sagebrush Steppe	450,000	438,000	448,000	447,000	415,000	426,000	349,000
NA	5,000	5,000	5,000	5,000	5,000	5,000	2,000
Total	1,322,600	1,289,600	1,314,600	1,311,600	1,229,600	1,260,600	1,067,000
Note: Acres do not include guild habitat for the grazed portion of the Saylor Creek Range.							

Impacts from Management Specific to the No Action Alternative

About 116 miles of riparian areas rated as FAR-UP or lower would be available for grazing. Recovery of riparian areas to PFC would be slowed in these riparian areas, limiting the quality of habitat for riparian guild species unless special management occurs.

Approximately 200,000 AUMs of grazing are presently authorized. The highest number of AUMs allowed under the No Action Alternative would be about 260,000, a roughly 30% increase from current levels. The effects of issuing permits for 260,000 AUMs have not yet occurred.

In the No Action Alternative, winter livestock use on big game winter range has increased since 1987 in a few allotments. Changing grazing permits to allow winter livestock grazing on big game winter range is expected to continue. Permit changes to include late fall and winter grazing would increase livestock competition for forage and displacement of big game. Issuance of TNR on big game winter range is expected to increase the effects of displacement and competition for forage.

The amount of range infrastructure is expected to increase in the No Action Alternative. Range infrastructure has increased the density of linear features (e.g., fences, primitive roads) in all guild habitats with the possible exception of the canyonland guild. Although fences are used by number of bird species as perches, perching habitat is rarely a limiting habitat factor. Fences restrict livestock movements and allow pastures to be rested during portions of the year, including during nesting and in the winter, helping to reduce wildlife displacement. Fences and water pipelines contribute to a reduction in patch size, which increases habitat fragmentation. Fences, water pipelines, and water troughs not only fragment habitat, but increase access to areas that previously had little human disturbance. Human disturbance associated with livestock grazing includes checking livestock, project maintenance, placing salt or supplements, and herding or moving livestock between pastures. These types of disturbances are temporary and limited spatially.

Generally, the impacts of roads associated with range infrastructure (e.g., pipelines and fences) have been additive to impacts of other roads, reducing habitat patch size and increasing habitat fragmentation. Electric power has been used to pump water from some of the wells for livestock water pipelines, resulting in an increase in powerlines and additional fragmentation.

Wildlife escape ramps would be required for all water troughs and open water storage tanks, reducing impacts to wildlife. Wildlife ramps provide an escape, which reduces mortality to wildlife trapped in troughs including birds, bats, and small mammals (Rosenstock, et al., 1999).

Approximately, 450,000 of sagebrush steppe, 830,000 acres of grassland, and essentially all of the aspen, mountain mahogany/mountain shrub, and duneland habitat is available for grazing (Table 4- 101). Livestock use in grassland creates a mosaic of short and tall grass habitats to meet requirements of a variety of grassland guild birds for nesting and foraging. Wildlife in all guilds is exposed to some degree of disturbance from livestock while livestock are in specific pastures. Effects are generally minor at the local scale. Although some pastures are grazed during nesting, wintering, or other important seasonal period, many pastures are not, reducing the effects at the landscape scale.

In the No Action Alternative, approximately, 51,000 acres are not available for livestock grazing. The majority of the unavailable area is canyonland habitat in the Bruneau and Jarbidge Canyons. Approximately 13,000 acres is categorized as sagebrush steppe, however due to slopes use by some sagebrush obligate wildlife is reduced. Guild habitats in the unavailable area would not be directly impacted by grazing (i.e., trampled burrows, disturbed nests, displacement). At the landscape scale, the unavailable areas are small (3% of the planning area), so benefits to wildlife would be negligible.

Impacts from Management Common to All Action Alternatives

The seasonal considerations are expected to reduce disturbance to wildlife at important times of the year. Adjusting fences to specifications should reduce some wildlife movement conflicts. The ARMS is expected to reduce some impacts of livestock on habitat used by the riparian guild.

There has been little research on impacts of multi-year drought on wildlife. Drought during a single year can result in changes in food habits, movements and subsequent survival in deer (Anthony, 1976), ground squirrels (Van Horne, et al., 1997) and some birds (George, et al., 1992). Drought not only impacts vegetation, but can also alter the insect prey base used by birds, lizards and some small mammals (George, et al., 1992) or bats. Drought management guidelines are expected to minimize effects of livestock grazing during drought on plant communities. The guidelines do not ensure adequate residual herbaceous height for some wildlife, primarily several ground nesting birds, during drought.

Periodic intensive use during the spring or early summer should help maintain and promote browse on big game winter range.

Impacts from Management Specific to Alternative I

Livestock exclusion would accelerate riparian vegetation recovery (Dobkin, et al., 1998; Kauffman, et al., 1983) in the approximately 58 miles of riparian areas presently rated as FAR-UP or lower that would be unavailable for livestock grazing. Habitat for riparian guild wildlife would improve as riparian areas recover. Recovery of the approximately 80 miles of riparian guild habitat available for grazing would be slowed in these riparian areas limiting the quality of habitat for riparian guild species, unless special management occurs. Management may include fencing to exclude livestock until recovery has been attained.

Based on vegetation allocation levels and treatments in areas available for livestock grazing, Alternative I would result in a maximum AUM increase of about 34% over the present level. Changes in permitted use would not necessarily correlate to changes in the effect of livestock grazing on a particular area within an allotment due to the uneven distribution of use (Connelly, et al., 2004). TNR could be granted in addition to the permitted AUMs. For analysis purposes, it is estimated that utilization levels would be established at 30% to 40% on native grasses in order to achieve resource objectives. At these utilization levels, residual grass heights (upright stems and overhanging leaves) would average from 2.5 to 3.5 inches for

Idaho fescue (20-inch ungrazed height), 6 to 7 inches for bluebunch wheatgrass (24-inch ungrazed height) and 3 to 4 inches for Sandberg bluegrass (18-inch ungrazed height) depending on the dominant grass species present and precipitation. For analysis purposes, it is estimated that non-native perennial pastures would have a 40% to 50% use level. Crested wheatgrass (24-inch ungrazed height) residual grass height would vary between 5.5 to 7 inches. Grazing on plants and across the pasture is typically uneven, and heights of individual grazed plants would vary with partially grazed and ungrazed plants. Grasses under shrubs are generally taller and may benefit from physical protection or shade (Tate, et al., 2004), soil moisture recharge (Ryel, et al., 2003), or hydraulic lift (Ryel, et al., 2002). Because cattle tend to remain near water in the summer when shade is not available, utilization is usually higher near water sources and decreases with distance from water (Vallentine, 2001). Cooler temperatures and more precipitation in the spring, fall, and winter allow livestock to disperse away from water sources.

Periodically, grazing at a 70% utilization level would be allowed in non-native perennial seedings to reduce wolf plants (Ganskopp, et al., 1992). Seventy percent use of crested wheatgrass 24 inches tall, would provide an average residual height of less than 3 inches. Less variation in grass height is expected in pastures grazed to 70% due to more uniform grazing. It may take two or more years for grass to provide the same structure (density of stems and overhanging leaves) after 70% use occurs for some grassland guild birds. This is due primarily to the development of adequate seed stalks that provide cover for some grassland guild birds. Nest success for ground-nesting birds in grasslands may decline due to the combination of increased AUMs and the utilization levels. Increases in invasive plants and noxious weeds following disturbance of soils by livestock at the 70% use level would likely degrade the habitat quality for grassland guild wildlife in the long term.

Any targeted grazing used as a vegetation treatment tool would be in addition to permitted AUMs and TNR. Treatment areas would be grazed intensely in either small locations for noxious weed treatment or in linear strips for fuels reduction. Depending on the grazing prescription and class of livestock, herders, water hauling, or temporary fencing would be used to keep the livestock limited to the treatment area. Grazing levels would likely be intensive (greater than 70%) in order to meet treatment objectives. For either fuel load reduction or noxious weed treatment, the timing of targeted grazing could overlap bird nesting. Intensive grazing would reduce cover for most ground-nesting birds and increase the chance of nest trampling in the treatment area. The intensively grazed areas would not provide suitable habitat for several grassland-nesting birds in the short term. Human activity associated with targeted grazing (i.e., vehicles, water hauling, herders, dogs) would displace some wildlife from the treatment area. To the extent targeted grazing reduces fire size or loss of additional sagebrush steppe, it would help maintain or increase sagebrush steppe patch size in the long term. If there is a shrub seed source present, targeted grazing may encourage shrub reestablishment due to suppressed competition by herbaceous vegetation.

Impacts of winter livestock grazing on winter range were addressed for the No Action Alternative. The effects could exceed those in the No Action Alternative due to expected changes in season of use on grazing permits. TNR, including during the winter, could be issued in pastures with less than 50% big game winter range. Over 600,000 acres in the planning area would not be eligible for TNR because they contain more than 50% big game winter range. TNR would likely be issued on over 700,000 acres where big game habitat constitutes less than 50% of the pasture acreage. The effects of displacement of big game would be the similar to the No Action Alternative. The amount of TNR is expected to vary between years, but the use levels would be similar.

Managing livestock to allow reproduction of aspen suckers will help maintain aspen guild habitat in the long term. Aspen habitat would not decrease but increases would be minimal due to site potential; therefore, aspen guild wildlife populations should to remain static.

With the increase in AUMs in Alternative I, additional fences, pipelines, and water troughs would likely be developed to improve livestock distribution in some allotments. The effects of range infrastructure would be similar to the No Action Alternative. The majority of new infrastructure would be developed in grassland habitat; however, some projects would also be in sagebrush steppe and mountain mahogany/mountain shrub guild habitats. Additional fencing would be constructed to delineate and protect reference areas and other areas unavailable for livestock grazing. A few fences would be located in riparian guild habitat, sagebrush steppe, and mountain mahogany /mountain shrub guild habitat.

Additional wildlife mortality would occur from collisions with fences. Infrastructure development would also result in additional primitive roads for construction and maintenance.

For a few allotments, additional water trough and pipelines developments may divert water from springs or creeks. In the southwest US, water diversions contribute to lowering water tables, (Stromberg, et al., 1996) reducing riparian habitat. Diverting water from springs would likely have a similar impact in localized sites in the planning area. Water table declines are magnified by drought. Water taken from upland wells to supply pipelines would not impact riparian areas due to the distance from surface water sources and depth at which water is removed. This increase in range infrastructure would further fragment habitat reducing habitat patch size.

All pastures would be managed to provide a variety of residual herbaceous heights to meet that various nesting requirements of ground nesting birds. Because a portion of the birds in all the guilds nest on the ground, this should manage habitat for all guilds.

The area unavailable for grazing is about 67% larger than the No Action Alternative or roughly 6% of the area. The majority of the increased acreage is Wildlife Tracts and the Middle Snake ACEC with a small amount in reference areas. The amount of sagebrush steppe habitat unavailable for grazing is roughly doubled compared to the No Action Alternative. The reference areas are, small (≈40 acres) and scattered. The entire acreage could be within 330 feet (100 meters) of fences, potentially reducing some benefits to wildlife. Fencing to exclude livestock access may result in localized changes in predation. Even though ungrazed improvement to wildlife habitat would be localized negligible in both the short and long-term.

Impacts from Management Specific to Alternative II

The approximately 40 miles of riparian areas rated as FAR-UP or lower would be unavailable for livestock grazing and would more rapidly attain PFC. Full recovery of riparian habitat within these areas (e.g., mature willows, banks stabilized by sedge and rush) would improve for the riparian guild in the long term. Outside reference areas, improvement in riparian habitat would occur due to the ARMS, but more slowly than riparian areas unavailable for livestock grazing, unless special management is applied.

Based on vegetation allocation levels and treatments in areas available for livestock grazing, Alternative II represents a maximum increase of 139% over the current level of AUMs. Additional TNR could be granted. Grazing non-native perennial areas to 50% to 60% (estimated utilization for analysis purposes) would result in a 4 to 5.5 inches average residual vegetation height. Grazed vegetation height is expected to be more uniform than the No Action Alternative and Alternative I. Utilization levels at 40% to 50% in native areas (estimate for analysis purposes) would leave average residual grass heights of 2.2 to 2.7 inches for Idaho fescue, 5 to 6 inches for bluebunch wheatgrass, and 3 to 4 inches for Sandberg bluegrass. Average grass height would be reduced in habitats for all guilds. Due to topographic factors (e.g., steep, rocky terrain), residual cover in the canyonland guild is expected to receive less livestock grazing.

Targeted grazing would be allowed to be used as a tool for vegetation treatments; effects would be the same as described for Alternative I. Grazing by more livestock is expected to occur in the late fall through winter on big game winter range due the increase in AUMs and issuance of TNR. As in the No Action Alternative, there are no TNR seasonal restrictions on grazing big game winter range. The time of year (Ganskopp, et al., 1999) and snow depth would increase livestock use of browse. Competition for forage on winter range is likely to increase due to vegetation being consumed by livestock. In order to maintain the level of AUMs, the majority of the big game winter range burned in the past would be managed as either native grassland or non-native perennial grassland. Use of winter range by livestock during the winter would not be restricted by any seasonal constraints. Livestock and associated human disturbance are likely displace some wintering big game to less desirable habitat which may result in decreased fawn survival or reduced reproduction (Sawyer, et al., 2006), reducing populations in the long term.

Because AUMs are substantially higher than in the No Action Alternative, more fences and water troughs would be constructed to improve livestock management. Additional fences would be constructed to establish reference areas and other areas unavailable for livestock grazing. The increase in range infrastructure is expected to further reduce habitat patch size and contribute to fragmentation.

Areas available and unavailable for livestock grazing are similar to the No Action Alternative (Table 4-101), therefore impacts should be similar. Effects of the fenced reference areas would be the same as described in Alternative I.

Grazing guidelines to ensure long term aspen survival and recruitment are lacking in Alternative II. As a result some aspen stands are expected to decline over time, reducing available habitat and habitat patch size for the aspen guild. Effects are considered moderate at the local scale and minor at the landscape scale long term.

Only allotments with more than 50% native vegetation would be required to provide a mosaic or residual herbaceous heights for ground nesting birds. More uniform grazing coupled with an increase in AUMs would be detrimental to maintaining diverse wildlife species composition in for primarily the grassland guild. Habitat would be less suitable for species such as northern harrier, short-eared owl, Savannah sparrow, grasshopper sparrow, The effects of 70% utilization on burrowing mammals, lizards, snakes, or other burrow dwelling wildlife is not known; however, pastures with sandier soils are more likely to have burrows collapsed and loamy soils (Holmes, et al., 2003).

Impacts from Management Specific to Alternative III

Alternative III has same amount of riparian areas rated as FAR-UP or lower unavailable to grazing as Alternative II; therefore, the impacts would be the same as described for Alternative II. Big game winter range that overlaps priority areas for restoration for special status species would improve more quickly than areas which are allowed to recover at a natural rate.

Based on vegetation allocation levels and treatments in areas available for livestock grazing, Alternative III represents a 91% increase in AUMs over the current level of AUMs. Additional AUMs may be granted as TNR. Estimated utilization levels on key native grass species would be the same as in Alternative I; therefore, impacts are expected to be the same. Estimated utilization of non-native perennial grasses would be the same as in Alternative II; therefore, those impacts are expected to be the same as described for Alternative II.

Targeted grazing would be allowed to be used as a tool for vegetation treatments; the effects would be the same as described for Alternative I.

TNR would not be authorized in pastures with more than 50% big game winter range; the effects would be the same as described in Alternative I. Livestock use of big game winter range during the winter would be allowed with effects similar to Alternative II. Providing a mosaic residual herbaceous height for ground nesting birds would only be applied in pastures with greater than 50% native grass. Effects to wildlife in the more uniformly used pastures would be the same as in Alternative II.

Additional range infrastructure would be constructed to enhance livestock distribution. Additional fences would also be needed to fence reference areas and other areas unavailable for livestock grazing. Additional fences may increase mortality to some wildlife. Water pipelines, troughs, and fences are expected to reduce habitat patch size increasing fragmentation.

The areas available and unavailable for livestock grazing are very similar to Alternative II (Table 4- 101). The small increase (2,000 acres) in Alternative III in area unavailable for grazing is widely scattered; therefore, the impacts would be similar to Alternative II. Areas grazed by livestock would incur the same impacts described in the No Action Alternative.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Riparian areas rated as FAR-UP or lower unavailable for livestock grazing would increase to roughly 52 and 51 miles for Alternatives IV-A and IV-B (the Preferred Alternative), respectively. Habitat for riparian guild species in these areas is expected to improve more rapidly than outside exclosures due to less bank alteration from grazing. The level of fencing and effects would be similar to Alternative I.

Based on vegetation allocation levels and treatments in areas available for livestock grazing, Alternatives IV-A and IV-B represent a decrease in AUMs of 30% and 27%, respectively, compared to current AUMs.

Estimated utilization levels of 20% to 30% on grasses in native plant communities and 30% to 40% on grasses in non-native grassland would provide adequate nesting cover, unlike estimated utilization levels for Alternatives I, II, and III. The approximate residual grass height would be 5 to 6.5 inches for Sandberg bluegrass, 7 to 8.5 inches for bluebunch wheatgrass, and 4 to 6 inches for Idaho fescue; crested wheatgrass would have 5 to 6.5 inches of residual herbaceous vegetation height. Because of the lighter use on crested wheatgrass, more grass would retain seed stalks from prior years, increasing cover and structure for the grassland guild.

Targeted grazing would be allowed to be used as a tool for vegetation treatments; the effects would be the same as described for Alternative I.

TNR would not be authorized in pastures with more than 50% big game winter range; the effects would be the same as described in Alternative I. As in Alternative I, special management for livestock in aspen and providing a variety of residual herbaceous heights in all allotments would be similar to the effects as described in Alternative I.

Additional fencing would be required to establish reference areas and other areas unavailable for livestock grazing. A limited amount of range infrastructure would be constructed to address various resource concerns (i.e., riparian, cultural) and enhance livestock distribution. Impacts are expected to be less than those described for the No Action Alternative and Alternatives I, II, and III.

In Alternative IV-A, the area unavailable to grazing would increase nearly 190% more than the No Action Alternative. The Inside Desert ACEC would not be grazed and unneeded cross fences would be removed. Primarily, this ACEC contains grassland guild habitat. Grassland guild species that prefer tall nesting cover would benefit most in the short term. The effect would be moderate at the local scale, but minor at the landscape scale in both the short and long term. Habitat within the Inside Desert ACEC would be strongly influenced by restoration over time. Grassland birds preferring to nest or forage in shorter grass areas would still have mosaics of habitat to use in adjoining grazed pastures. In Alternative IV-B, the unavailable area decreases by a little over 32,000 acres, but would still be about 124% larger than the No Action Alternative. The decrease is due to the reduced size of the Inside Desert ACEC. Overall impacts would be similar to Alternative IV-B, but benefits would be somewhat reduced. Acres of guild habitat in areas available and unavailable for livestock grazing are presented in Table 4- 101.

Reference area size is increased to about 160 acres, limiting direct impacts to wildlife within the reference area. Of this about 80 acres would be more than 330 feet from the fence. Fences could still alter predation and survival of wildlife near the fence both within and outside the reference area. Although the size of individual reference areas increases, potential benefits to wildlife within the reference area would be minor at the local scale in both the short and long term.

Impacts from Management Specific to Alternative V

Riparian areas rated as FAR-UP or lower unavailable to livestock grazing would increase to about 77 miles. Recovery of riparian areas in exclosures would occur at a more rapid rate than outside the exclosures. The lower stocking rate and elimination of TNR should allow riparian guild habitat outside of the exclosures to recover more rapidly than in the No Action Alternative.

Alternative V would limit livestock utilization levels to 10% to 20% within the Sagebrush Sea ACEC, 20% to 30% on native plant communities, and 30% to 40% in non-native perennial grasslands in order to achieve resource objectives. Based on vegetation allocation levels and treatments in areas available for livestock grazing, Alternative V represents an estimated decrease in AUMs of 49% compared to current AUMs. Average residual grass heights would vary from 5 to 9 inches for Sandberg bluegrass, 7 to 11 inches for bluebunch wheatgrass, and 4 to 8 inches for Idaho fescue. Lower AUMs, coupled with the absence of TNR and targeted grazing, would increase residual nesting cover for ground-nesting birds in all guilds. These levels of livestock grazing would still provide suitable habitat for those grassland guild birds that prefer less herbaceous height. Like Alternative I livestock would be managed allowing aspen recruitment and long term survival with the same impacts to the aspen guild.

Targeted grazing would not be allowed to be used as a tool for vegetation treatments; therefore, the effects described for Alternative I would not occur.

Grazing permits would be changed to remove livestock grazing on big game winter range from December through March, eliminating displacement of big game during an important seasonal period. In addition, TNR would not be allowed anywhere in the planning area. Human disturbance associated with livestock grazing would also be reduced.

Unneeded fences or other grazing infrastructure would be removed, reducing human-caused habitat fragmentation in the long term. An increase in habitat patch size in the sagebrush steppe and mountain mahogany/mountain shrub guilds and a reduction in the distance between patches of habitat would be gradual. Fence removal is expected to reduce some wildlife mortality.

Because the reference areas are pasture sized in Alternative V, miles of fence are expected to decrease. If any interior exclosures, corrals, or water troughs are present in the reference areas, they could be removed. Pipelines, water troughs, and fences would remain outside the reference areas to protect resources and manage livestock. A limited amount of new fencing or fence realignment would be constructed to protect resources. Impacts of new fence would partially offset effects of removing interior exclosures or fences.

In Alternative V, approximately 22% of the planning area would not be grazed, approximately 500% more than in the No Action Alternative. Although the reference areas are variable in size, several of them are several thousand acres in size and contain several guild habitats. The areas are large enough that fences would have minimal influence on wildlife well within the reference area. The most guild habitat for all guilds would be ungrazed in Alternative V. For the grassland guild, species preferring taller cover are expected to increase. Ground squirrels and other native herbivores are expected to provide some short grass habitat in ungrazed reference areas.

Summary

Overall, range infrastructure is expected to increase in the No Action Alternatives and Alternatives I, II, and III to more intensively manage and improve livestock distribution, contributing to a decrease in habitat patch size and resulting in more habitat fragmentation (Table 4- 102). The amount of water pipeline for livestock management in Alternatives IV-A and IV-B should remain approximately the same, but fencing would increase in part due to fencing reference areas.

Alternatives II and III would manage pastures classified as native to provide a variety of residual herbaceous heights. Alternative II would result in the shortest residual herbaceous height over the largest area. Wildlife using areas with shorter cover could increase whereas wildlife preferring tall cover may decrease. Residual herbaceous heights would be taller in Alternative III than in Alternative II; short residual herbaceous height would also occur over a smaller area in Alternative III than Alternative II. The trend of increasing height and decreasing impact area would continue through Alternatives I, followed by Alternatives IV-A and IV-B. Finally, residual herbaceous height would tallest over a the largest area in Alternative V due to the combination of the fewest AUMs grazed, most conservative utilization guidelines and least amount of potential new infrastructure.

The No Action Alternative would have the fewest miles of riparian areas rated as NF, FAR-DN, FAR, or FAR-UP unavailable for livestock grazing, followed by Alternative II and Alternative III at 40 miles (Table 4- 102), with the most in Alternative V.

Seasonal and spatial restrictions for nesting raptors are present in Alternatives III, IV, and V; whereas, only Alternative V has seasonal and spatial restrictions on livestock grazing on big game winter range during the winter.

The No Action Alternative lacks reference areas; whereas, all action alternatives contain some reference areas. Reference area size (40 acres) is the same in Alternative I, II, and III, potentially reducing the value as reference sites. Alternative IV contains larger (160 acres reference areas) as well as a large ungrazed Inside Desert ACEC: 73,000 acres in IV-A and 41,000 acres in IV-B. The size of the reference areas in

Alternative V are variable but larger than all action alternatives and would provide the most ungrazed guild habitat. New fences would not have to be constructed minimizing additional habitat fragmentation due to infrastructure.

Table 4- 102. Comparing of Impacts to Wildlife and Guild Habitat from Livestock Grazing Actions by Alternative

Category	Alternative						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
Change in Water Pipeline Density	↗	↗	↑	↑	→	→	↘
Change in Water Trough Density	↗	↗	↑	↑	→	→	↘
New Permanent Fences	Yes	CBC	Yes	CBC	CBC	CBC	CBC
Change in Fence Density	↗	↗	↑	↗	↗	↗	→
Change in New Spring or Reservoir Water Developments	↗	↗	↑	↗	→	→	→
Management for Variety of Residual Cover Heights	No	All	If >50% Native	If >50% Native	All	All	All
Change in Residual Cover	↘	↘	↓	↘	↗	↗	↑
Seasonal Restriction for Raptor Breeding	No	No	No	03/01-05/01	03/01-05/01	03/01-05/01	03/01-05/01
Miles of Riparian Areas Rated FAR-UP or Lower Available for Livestock Grazing [A]	116	80	98	98	86	87	61
Miles of Riparian Areas Rated FAR-UP or Lower Unavailable for Livestock Grazing [A]	22	58	40	40	52	51	77
Seasonal Restriction for Big Game Winter Range	No	No	No	No	No	No	Yes
Change in Winter Livestock Grazing on Big Game Winter Range	↗	↗	↑	↗	↘	↘	↓

[A] Does not include Salmon Falls Creek, or Bruneau River
CBC= case by case basis
Symbols:→=No change expected, ↑=increase, ↗=limited increase, ↘=limited decrease, ↓=decrease

Impacts from Recreation Actions

Human disturbance can influence wildlife behavior (Borkowski, et al., 2006; Cassirer, et al., 1992; Freddy, et al., 1986; Miller, et al., 1998) and habitat use (Cassirer, et al., 1992; Ingelfinger & Anderson, 2004; Jantz & Goetz, 2008; Miller, et al., 1998; Pitman, et al., 2005). Boyle and Sampson summarized effects of nonconsumptive recreation on wildlife as including disturbance, displacement, and damage to habitat. Impacts to wildlife are influenced by time of year, type and duration of disturbance, frequency of disturbance, proximity of humans to wildlife when detected, and other factors (Boyle & Samson, 1985). Wildlife responses to recreation also differ by species or groups of species (Boyle & Samson, 1985). Wildlife habituated to human activity appear to have a minor response to recreation. Some forms of winter recreation may also result in a change in predator access and use of habitat (Bunnell, et al., 2006).

The following indicators were used to analyze the impacts of recreation actions on wildlife habitat:

- Habitat fragmentation due to size of habitat patches for wildlife guilds and distance between patches: This indicator was used to assess effects of SRMA type on wildlife.
- Habitat fragmentation due to human disturbance: This indicator was used to assess effects of SRMA type on wildlife.
- Areas with temporal or spatial restrictions that benefit wildlife: This indicator was used to assess relative differences in human disturbances for SRPs.

Table 4- 103 identifies the number of acres of wildlife guild habitat is each SRMA.

Table 4- 103. Wildlife Guild Habitat in SRMAs (Acres)

SRMA	Guild Habitat [A]					
	Aspen	Canyon-land	Grassland	Mountain Mahogany / Mountain Shrub	Riparian (miles)	Sagebrush Steppe
Balanced Rock	0	0	400	0	1	0
Bruneau-Jarbidge	0	11,000	600	0	29	3,000
Canyonlands	<100	86,000	86,000	300	35	46,000
Deadman/Yahoo (expanded)	0	0	31,000	0	<1	5,000
Hagerman-Owsley[B]	0	0	2,000	0	<1	1,000
Jarbidge Foothills	3,000	6,000	22,000	10,000	70	95,000
Jarbidge Forks	0	2,000	0	0	7	200
Little Pilgrim	0	<100	0	0	2	300
Salmon Falls Reservoir	0	200	0	0	<1	4,000
Yahoo	0	0	2,000	0	<1	1,000

[A] No duneland habitat was mapped in these SRMAs.
[B] Specific boundaries were not identified in the 1987 Jarbidge RMP; the Yahoo SRMA was used as a proxy to generate acres.

Impacts from Management Specific to the No Action Alternative

The focus of the Bruneau-Jarbidge SRMA is primitive, dispersed recreation. The vast majority of the SRMA receives little use. Over 11,000 acres of the SRMA are canyonland guild habitat with a little less than 3,000 acres of sagebrush steppe guild habitat (Table 4- 103). Nearly 29 miles of riparian habitat are present. Human disturbance from whitewater recreation is limited to campsites in or near the riparian areas. The effects to wildlife in the riparian and canyonland guilds would continue to be minimal due to the timing and short length of the whitewater season; however, recreators can temporarily disturb individual mule deer, bighorn sheep, and other species in the riparian and canyonland guilds.

The Hagerman-Owsley SRMA is primarily focused on motorized recreation. More than half of the wildlife habitat in the SRMA is categorized as grassland (2,000 acres; Table 4- 103); the remaining is sagebrush steppe habitat with an understory dominated by cheatgrass. Cross-country motorized vehicle use has created numerous routes fragmenting the remaining sagebrush steppe habitat. Trails down steep slopes cross Yahoo Creek in three locations, damaging riparian habitat. Hill climbing has created gullies on some of the sandy soils and reduced or eliminated vegetation on other soil types. The numerous routes in the uplands increase the amount of invasive plants. Birds nesting in the grassland areas are expected to have a lower nest success due to human disturbance and, in some instances, nests may be destroyed by cross-country motorized vehicle use. Some wildlife, primarily small mammals and reptiles, incur mortality from cross-country motorized vehicle use. Due to the relatively small size of the SRMA, impacts to wildlife and habitat are localized and considered minor at a landscape scale.

The focus of the Jarbidge Forks SRMA is principally fishing and camping during the summer and fall. The Jarbidge Forks SRMA has over 1,000 acres of canyonland habitat, with about 6.5 miles of riparian habitat (Table 4- 103). Human disturbance in this SRMA is more common due to good access and the proximity of Murphy Hot Springs and a road to the town of Jarbidge. The bulk of the recreation in the SRMA occurs at a few locations in the riparian area in the summer and fall. Human disturbance in this SRMA is localized and has a negligible impact on the majority of birds and small mammals present.

Impacts from Management Common to All Action Alternatives

SRP stipulations or restrictions would include timing constraints to minimize disturbance during important wildlife periods and habitats, as appropriate. When SRP events are scheduled to avoid important wildlife seasons or time of day, impacts of human disturbance are reduced. For SRPs that use routes, such as mountain bike races, routes could be configured to follow existing disturbance corridors and avoid sagebrush steppe, mountain mahogany, and aspen habitats. Restricting these types of SRPs to existing disturbance corridors reduces additional damage to habitat in all guilds along the route. By focusing SRPs for motorized use in areas that can withstand periodic intense use, such as annual or non-native perennial grasslands, habitat patch size could be maintained and additional fragmentation to sagebrush steppe, riparian, duneland, or other habitats could be avoided. Wildlife would be displaced temporarily by increased human activity associated with SRPs. From the late spring through fall, mortality could occur to some reptiles, small mammals, or birds due to being struck by vehicles or tires. Although some wildlife mortality would occur, its effects on populations of reptiles, birds and small mammals would be negligible at the planning area scale.

Impacts from Management Specific to Alternative I

Human disturbance would continue to increase in the Balanced Rock SRMA due to its proximity to local population centers. Topography limits most human activity to or near the riparian area at the bottom of the canyon. The majority of the SRMA is grassland guild habitat (Table 4- 103). Most of the grassland is on the upland plateau adjacent to the canyon. Although human use may increase, additional impacts to wildlife in riparian and canyonland guild habitats would be minimal at a landscape scale due to the small area involved. The effects would include isolated damage to vegetation along the trail. Some wildlife may be temporarily displaced. Birds in grassland and forest ecosystems in Colorado generally avoided nesting near trails, with habitat specialists more influenced by trails than habitat generalists (Miller, et al., 1998). A similar impact is expected near the trail in the Balanced Rock SRMA.

Impacts from the Bruneau-Jarbidge SRMA would be the same as described under *Impacts from Management Specific to the No Action Alternative*.

The Canyonlands SRMA would have a primitive recreation focus. Overall, recreation use in the Canyonlands SRMA is not expected to increase substantially; therefore, effects to wildlife in this SRMA are considered negligible at the landscape scale.

The focus of the Deadman/Yahoo SRMA would be motorized recreation. Some cross-country motorized vehicle use would be present at designated hill climb sites and open areas connected by designated routes. This is expected to reduce some of the habitat fragmentation in grassland guild habitat. The vast majority of the wildlife habitat in this SRMA is grassland (about 86%; Table 4- 103), with cheatgrass present or dominant. Existing sagebrush steppe habitat in the Deadman/Yahoo SRMA occurs in small, scattered patches separated by grassland. Noise associated with motorized recreation displaces some wildlife species. The limited number of open areas and designated routes would maintain or possibly reduce the existing levels of habitat fragmentation of grassland guild habitat. Undesignated routes[6] are expected to gradually re-vegetate, increasing habitat patch size and reducing habitat fragmentation for the grassland guild in the long term.

The Jarbidge Foothills SRMA would be focused on primitive recreation. The Jarbidge Foothills SRMA contains about 113,000 acres of big game winter range (Table 4- 104). It also includes the majority of the aspen and mountain mahogany/mountain shrub guild habitat. Riparian areas are present along several streams in the SRMA. During the summer, human disturbance is associated with dispersed recreation (e.g., vehicle use on roads or primitive roads, hiking, camping and horseback riding). These uses are expected to continue if the SRMA was designated and are not expected to change appreciably. Noise would usually be of short duration and would not result in long term wildlife displacement or disturbance.

The impacts of the Jarbidge Forks SRMA on wildlife are discussed under *Impacts from Management Specific to the No Action Alternative*.

The Little Pilgrim SRMA is currently used year round by recreators, primarily for fishing. The vast majority of the habitat in this SRMA consists of sagebrush steppe habitat with a limited amount of grassland and canyonland guild habitat (Table 4- 103). The SRMA lies along the Snake River where changing water flow results in a minimal riparian area. The focus of this SRMA would be to provide a limited amount of development to protect resources. Existing use has resulted in braided and new routes created by

[6] Undesignated routes are routes that are currently in use, but would not be designated under a specific alternative.

recreators. As a result, sagebrush steppe habitat is being fragmented, reducing habitat patch size. Noxious weeds and invasive species that degrade habitat are present and increasing. Improving the access road by graveling and providing facilities such as vault toilets, barriers, and delineating parking areas would limit future habitat damage. Over time, vegetation is expected to increase on routes closed from less use or restoration increasing habitat patch size, thereby reducing the distance between patches of similar habitat at the local scale. Impacts of specific improvements would be analyzed in more detail prior to development.

The vast majority of human activity in the Salmon Falls Reservoir SRMA currently occurs near the shoreline. Because of changing water levels in the reservoir, riparian habitat along the shore is generally absent. The nearly 5,000 acres of habitat in the SRMA is sagebrush steppe guild habitat. Portions of access roads to some of the more popular sites have parallel routes created to avoid ruts, rocks, or “powdered” areas, contributing to the expansion of cheatgrass and habitat fragmentation. Development in this SRMA would be limited to minor improvement of designated access roads, parking areas, barriers, and vault toilets. Improvement of designated routes would reduce parallel routes, thereby reducing the distance between habitat patches at the local scale. Impacts of improving roads could increase use in the area which could increase vehicle mortality to reptiles or small mammals. Effects to reptiles or small mammals within the SRMA would be localized and minor. Effects of site-specific projects would be analyzed in more detail for each Recreation Management Zone (RMZ).

Impacts from Management Specific to Alternative II

Impacts from the Bruneau-Jarbidge and Jarbidge Forks SRMAs would be the same as described under *Impacts from Management Specific to the No Action Alternative*. Impacts from the Little Pilgrim and Salmon Falls Reservoir SRMAs would be the same as described under *Impacts from Management Specific to Alternative I*.

Impacts from Management Specific to Alternative III

Impacts from the Bruneau-Jarbidge and Jarbidge Forks SRMAs would be the same as described under *Impacts from Management Specific to the No Action Alternative*. Impacts from the Balanced Rock, Deadman/Yahoo, Jarbidge Foothills, and Salmon Falls Reservoir SRMAs would be the same as described under *Impacts from Management Specific to Alternative I*; however, the Deadman/Yahoo SRMA would be approximately 1,500 acres smaller.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Impacts from the Bruneau-Jarbidge and Jarbidge Forks SRMAs would be the same as described under *Impacts from Management Specific to the No Action Alternative*. Impacts from the Canyonlands, Deadman/Yahoo, and Salmon Falls Reservoir SRMAs to wildlife and habitat would be the same as described under *Impacts from Management Specific to Alternative I*; however, the Deadman/Yahoo SRMA would be approximately 1,500 acres smaller.

Impacts from Management Specific to Alternative V

Impacts from the Bruneau-Jarbidge, Jarbidge Forks, and Yahoo SRMAs would be similar to those described under *Impacts from Management Specific to the No Action Alternative*. Impacts from the Salmon Falls Reservoir SRMA would be the same as described under *Impacts from Management Specific to Alternative I*.

Summary

SRMAs that focus on primitive recreation are expected to help maintain low levels of recreation-related impacts to wildlife. Alternative I contains the most SRMA acreage. The Canyonlands and Jarbidge Foothills SRMAs contain the most big game winter range; the proposed management for these SRMAs would generally be compatible with big game. Alternative V contains the least amount of big game winter range in SRMAs followed by Alternatives II, III, and the No Action Alternative (Table 4- 104). SRMAs in Alternative I include the most big game winter range.

Table 4- 104. Big Game Winter Range and Guild Habitat in SRMAs by Alternative (Acres)

Guild Habitat	Alternative					
	No Action	I	II	III	IV	V
Big Game Winter Range	34,000	275,000	21,000	21,000	161,000	16,000
Aspen	0	3,000	0	0	<100	0
Canyonland	13,000	36,000	11,000	13,000	30,000	13,000
Grassland	2,000	139,000	600	31,000	117,000	2,000
Mountain Mahogany/ Mountain Shrub	0	10,000	0	0	300	0
Riparian area (miles)	60	149	64	65	91	61
Sagebrush Steppe	4,000	154,000	8,000	12,000	58,000	4,000

The No Action Alternative and Alternative V provide the same acreage of SRMA devoted to motorized recreation. Alternatives I, II, and IV would include the Deadman/Yahoo SRMA, with more than 34,000 acres for motorized recreation. The sagebrush steppe habitat in both the Deadman/Yahoo and Yahoo SRMAs is fragmented with an understory primarily of invasive plants, which reduces its use by sagebrush steppe guild wildlife.

Limited development at the Little Pilgrim and Salmon Falls Reservoir SRMAs is expected to reduce resource damage presently being caused by recreation. These effects would occur in Alternatives I and III and Alternatives I, II, III, and IV, respectively.

Impacts from Transportation and Travel Actions

Routes and route density fragment habitat, influence wildlife habitat use (Barton & Holmes, 2007; Ingelfinger & Anderson, 2004; Jantz & Goetz, 2008; Lyon & Anderson, 2003; Pitman, et al., 2005; Rowland, et al., 2000), and can be a source of wildlife mortality (Andrews & Gibbons, 2005; Connelly, et al., 2004; Harrington & Conover, 2006; Pitman, et al., 2005; Wolfe, et al., 2007).

Research on road impacts in sagebrush steppe habitat (Wyoming big sagebrush) in Wyoming found 39% to 60% reduction of sagebrush steppe bird nests, specifically sage sparrow and Brewer’s sparrow, within 100 meters of low traffic volume (less than 12 vehicles per day) dirt roads (Ingelfinger & Anderson, 2004). The full impact area where reduced habitat use occurred was substantially larger than the footprint of the actual roadbed. Ingelfinger and Anderson reported that vehicle traffic alone may not be the only cause of sagebrush obligates avoiding habitat near roads in sagebrush steppe, but attributed decreased use to avoiding the habitat edge and possibly due to increased competition from other bird species using open habitat (Ingelfinger & Anderson, 2004).

The majority of human-caused wildland fires occur near roads (Connelly, et al., 2004). The continued increase in routes is expected to contribute to more human-caused fires, which would further reduce habitat for sagebrush steppe and mountain mahogany/mountain shrub guilds.

Invasive plants and noxious weeds are likely to expand from the disturbed areas along roads, degrading adjoining habitat.

Coyotes and other predators readily use routes (Frey & Conover, 2006), in part for the ease of travel (James & Stuart-Smith, 2000), which may increase predation near the routes. Routes also increase access for hunters, resulting in greater hunting pressure and increased game mortality (Gratson & Whitman, 2000; Hayes, et al., 2002). Finally, because roads absorb heat, they are used by reptiles for basking in the mornings and evenings (Andrews & Gibbons, 2005) from spring through early fall, which make reptiles vulnerable to mortality from vehicles at these times.

The following indicators were used to analyze the impacts of transportation and travel actions on wildlife habitat:

- Habitat fragmentation due to size of habitat patches for wildlife guilds and distance between patches: This indicator was used to analyze effects regarding the management of transportation and travel to the extent they change access or affect habitat fragmentation.

- Habitat fragmentation due to infrastructure and human disturbance: The location of the road in relationship to habitat and amount of use also influences wildlife use of habitat (Eigenbrod, et al., 2008).

The purpose of the TMAs and whether or not authorizations for cross-country motorized vehicle use are granted to permit holders are factors considered to determine whether the route density trend is anticipated to remain static, increase, or decrease by alternative. More detailed analysis specific to designated routes, wildlife, and the TMAs will occur in subsequent travel plans.

Table 4- 105 identifies the number of acres of winter range and changes in route density for each TMA.

Table 4- 105. Baseline and Anticipated Route Density by TMA in Big Game Winter Range

TMA	Acres of Winter Range	Route Density by Route Type [A]			Total Route Density [A]
		Roads	Primitive Roads	Inventoried Trails	
Bruneau Desert	569,000	0.27 ↑	1.49 ↑	0.42 ↗	1.87↑
Canyonlands	218,000	0.08 ↑	0.93 ↘	0.27 ↓	1.28 ↘
Devil Creek	409,000	0.24 ↑	1.53 →	NI	1.78→
Jarbidge Foothills	157,000	0.33 ↑	1.36 ↘	0.42 ↓	2.11↘
Snake River	3,000	0.33 ↑	2.43 ↘	NI	2.76↘
West Side	293,000	0.11 ↑	1.09 →	0.20↘	1.40→

[A] Numbers reflect baseline route density in miles of route per square mile. Arrows depict anticipated change in route density due to management contained within the alternative.
Symbols:→=No change, ↑=increase, ↗=limited increase, ↘=limited decrease, ↓=decrease
NI=None inventoried.

Impacts from Management Specific to the No Action Alternative

Approximately 25,000 acres of the planning area would remain closed to cross-country motorized vehicle use, limiting damage to habitat from this activity. The majority of the planning area would be open for cross-country motorized vehicle use. Routes would continue to be created, contributing to habitat fragmentation and a reduction in habitat patch size. Motorized vehicles could be used to travel cross-country to retrieve game in areas open to cross-country motorized vehicle use. Various permit holders could also drive cross-country, creating new primitive routes.

Impacts from Management Common to All Action Alternatives

Management and route designation guidelines for wildlife are expected to reduce or help mitigate impacts of transportation and travel on wildlife and wildlife habitat. Construction and routine maintenance of designated routes would be conducted to avoid important periods for big game. Seasonal restrictions on some designated routes may occur in big game winter range. To the extent that some routes are closed seasonally, human activity and motorized vehicle use associated with those routes would be reduced.

The majority of the roads receive some type of scheduled maintenance, which includes grading, crowning, spreading gravel, pulling ditches, and installing culverts. The majority of the maintenance is conducted in the late spring while the roads still contain some moisture. The majority of the road maintenance is typically conducted from 9:00 AM or later through the late afternoon. Road maintenance may disrupt some breeding or nesting birds in close proximity to the road. This disturbance is usually minor and, because the road grader is moving, lasts for a short duration (a few minutes). New roads reduce and fragment whatever guild habitat is present. The impacts of the road to wildlife can extend well past the physically disturbed area.

Impacts from Management Specific to Alternative I

Four of the five TMAs in Alternative I would contain big game winter range. The Canyonlands and Jarbidge Foothills TMAs would be managed to reduce route density, reducing habitat fragmentation in the long term. All aspen and mountain mahogany/mountain shrub guild habitats and the majority of big game winter range are in these TMAs (Table 4- 105). Decreases in routes are expected in the Canyonlands

TMA, as routes into the WSA are reduced. Restoring closed routes is expected to reduce overall habitat loss and fragmentation in the long term (Switalski, et al., 2004). If routes recover through natural processes, effects of reduction in patch size from the closed routes, even if not used, would continue long term.

The number of acres closed to motorized vehicle use in Alternative I would be more than double acres closed in the No Action Alternative, whereas the number of acres open to cross-country motorized vehicle use would be less than 1% of the open area in the No Action Alternative. Within areas open to cross-country motorized vehicle use, habitat is expected to remain fragmented through continued cross-country motorized vehicle use. Some trails and primitive roads are less likely to be designated in this alternative (Table 4- 105). Lease, permit, and ROW holders permit holders driving cross-country may partially offset or negate any benefits of reducing routes.

A decrease in primitive roads and trails is expected, although some primitive roads would be upgraded to improve fire suppression and access to facilities. Upgrading roads would, at a minimum, involve blading the surface and spot graveling. It may also include the creation of ditches and graveling the entire road surface. New roads and stream crossings for suppression and maintenance of fire breaks, helipads, and other infrastructure would decrease habitat patch size and increase disturbance. These roads may also facilitate more effective fire suppression on a broader scale. Invasive species are expected to increase along roadways and spread to adjacent uplands, reducing habitat quality.

Allowing cross-country motorized vehicle use within 300 feet of a road (600 feet total width) for game retrieval would result in minor damage to vegetation, including shrubs. Cross-country motorized vehicle use for game retrieval could facilitate the spread noxious weeds and invasive species or start fires. Some early big game hunting seasons begin in late August and early September when the fire hazard can be high. Habitat is not expected to be further fragmented by routes in the WSA, where cross-country motorized vehicle use for game retrieval would not be allowed.

Impacts from Management Specific to Alternative II

Both TMAs in Alternative II contain big game winter range and have the smallest number of acres closed to motorized vehicle use and no areas open to cross-country motorized vehicle use (Table 4- 105). Although travel would be restricted to designated routes in Alternative II, the miles of routes are expected to increase due to development of additional commercial uses and range infrastructure. Impacts of ROWs for wind development, powerlines, communication sites, and other commercial facilities are addressed under *Impacts from Land Use Authorizations Actions*. Increases in the number of routes are expected to further reduce habitat patch size for all guilds. The effects of cross-country motorized vehicle use by lease, permit, and ROW holders could also further decrease habitat patch size and increase habitat fragmentation. Authorizations for special activities allowing motorized vehicle to be driven cross-country in limited or closed areas would result in additional habitat fragmentation. Effects would depend on where the authorization is granted, the frequency with which motorized vehicles are driven cross country, and the number of vehicles included in the authorization. Impacts of game retrieval are expected to be similar to those in the No Action Alternative. A reduction in habitat patch size and disturbance would increase most for grassland and sagebrush steppe guilds, which also coincide with areas available for land use authorizations. Increased roads would result in additional wildlife mortality caused by motorized vehicles. Any reduction in routes in Alternative II would likely be associated with the WSA. The improvement of routes for fire suppression would be the same as in Alternative I.

Impacts from Management Specific to Alternative III

Three of the five TMAs in Alternative III contain big game winter range (Table 4- 105). None of these TMAs would be managed to reduce route density. As a result of new roads to reduce fire response time and to access and maintain new fire infrastructure, habitat would be split by roads reducing habitat patch size, thereby increasing habitat fragmentation. The effects of improving and creating new roads and other infrastructure for fire suppression would be the same as discussed under *Impacts from Management Specific to Alternative I*. The number of improved or new routes would likely be greater than in the No Action Alternative. Cross-country motorized vehicle use for game retrieval would be prohibited, reducing damage to habitat for sagebrush steppe and mountain mahogany/mountain shrub guilds. The number of acres closed to motorized vehicle use would be less 2% of the planning area, a size similar to the No Action Alternative. The number of acres open to cross-country motorized vehicle use in Alternative III would be less than the No Action Alternative and similar to Alternative I. Overall, impacts from Alternative III should be similar to those in Alternative I. To the extent some existing primitive roads and OHV trails are closed through the CTTMP, habitat fragmentation would increase less than in the No Action Alternative and Alternative II in the long term. Projected increases in habitat patch size following route closure and vegetation recovery would be partially offset or negated by various permit, lease, or ROW holders driving motorized vehicles cross-country with authorization.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV would create the same TMAs as Alternative I. The number of acres closed to motorized vehicle use would be about three times higher than the No Action Alternative. Vegetation is expected to re-establish on user-created routes over time in areas closed to motorized vehicle use. The effects of transportation and travel management actions on fire suppression would be the same as in Alternative I. Cross-country motorized vehicle use for game retrieval would be prohibited, resulting in less damage, primarily in sagebrush steppe guild habitat. Permit and ROW holders could be granted exemptions to the use of motorized vehicles for cross-country travel prohibition. These exemptions would partially offset projected decreases in route density.

Impacts from Management Specific to Alternative V

Alternative V would create five TMAs, three of which would contain big game winter range. The Devil Creek, Jarbidge Foothills, and West Side TMAs contain big game winter range (Table 4- 105). These TMAs would be managed to reduce route density, resulting in increased habitat patch size and decreased habitat fragmentation in the long term. Travel plans in these TMAs are expected to result in the closure of some primitive roads and trails. Route density in big game winter range should decrease following route closure as closed routes re-establish vegetation. Lease, permit, and ROW holders would be required to stay on designated routes, resulting in a reduction in route density. Alternative V would have the largest number of acres closed to motorized vehicle use, an area approximately six times larger than in the No Action Alternative. The number of acres open to cross-country motorized vehicle use in Alternative V would be less than 1% of the number of acres in the No Action Alternative. Closed routes would gradually revegetate, reducing habitat fragmentation in sagebrush steppe, grassland, and mountain mahogany/mountain shrub guilds. To the extent that closed routes are actively restored, recovery and benefits of route closure would be accelerated (Switalski, et al., 2004).

Summary

The No Action Alternative would have the largest number of acres open to cross-country motorized vehicle use. Cross-country motorized vehicle use would continue to contribute to decreasing habitat patch size for all habitat guilds, with the possible exception of the canyonland guild, which is generally inaccessible by motorized vehicle. Alternatives I, III, and IV would have nearly identical acreage open to cross-country motorized vehicle use, with fewer acres open in Alternative V. Alternative II would have no areas open to cross-country motorized vehicle use, but would have the largest amount of new roads.

Alternative II, followed by the No Action Alternative and Alternative III, would have the smallest number of acres closed to motorized vehicle use. The area closed to motorized vehicle use in Alternative I would be more than twice that of the No Action Alternative. Alternative IV would have approximately three times the acreage closed to motorized vehicle use compared to the No Action and Alternative III. The number of acres closed to motorized vehicle cross country travel in Alternative V would be just over 10% of the planning area and nearly double that of Alternative IV.

Decreasing route density would be a goal for some TMAs in Alternatives I, IV, and V. Continued cross-country motorized vehicle use by lease, ROW, and permit holders who are granted authorizations in Alternatives I, II, III, and IV would partially offset or negate route reductions. Alternative V would not grant authorizations and would result in the most improvement to habitat and would increase habitat patch size in the long term. Additionally, a prohibition against cross-country motorized vehicle use to retrieve game in Alternatives III, IV, and V would help minimize habitat damage and fragmentation from this activity.

Closed routes in sagebrush steppe and mountain mahogany/mountain shrub guild habitats should revegetate over time decreasing habitat fragmentation and increasing patch size.

Impacts from Land Use Authorizations Actions

Land use authorizations that result in increased route densities and infrastructure (e.g., towers, powerlines, roads, turbines) contribute to direct habitat loss, degradation, and fragmentation and wildlife disturbance and mortality (American Society of Mammalogists, 2008; Andrews & Gibbons, 2005; Arnett, et al., 2007; Barclay, et al., 2007; Connelly, et al., 2004; Harrington & Conover, 2006; Ingelfinger & Anderson, 2004; Jantz & Goetz, 2008; Lyon & Anderson, 2003; Pitman, et al., 2005; Rowland, et al., 2000; Steenhof, et al., 1993; Wisdom, et al., 2000; Wolfe, et al., 2007). The impacts on habitat fragmentation depend on the specific location and scale of the project (i.e., wind energy development would have more impacts than a communication site due to the larger project footprint).

In southern Idaho, powerlines provide raptors and ravens with increased nest and perching sites (Steenhof, et al., 1993). Raptors are known to use the perch sites for hunting (Steenhof, et al., 1993), which may change predation in nearby uplands. Research on prairie chickens in Kansas indicates taller structures (e.g., buildings, center pivots, powerlines) or roads displace prairie chickens over 250 feet from roads and nearly 0.75 miles from buildings (Pitman, et al., 2005). Connelly et al. express similar concern regarding influence of tall structures on sage-grouse (Connelly, et al., 2004). In addition to potential displacement of some wildlife powerlines, communication sites, meteorological towers and wind turbines are a collision or other hazard to a number of bird and bat species (Adams, 2007; Arnett, et al., 2008; Arnett, et al., 2007; Barclay, et al., 2007).

The following indicators were used to analyze the impacts of land use authorizations actions on wildlife habitat:

- Habitat fragmentation due to size of habitat patches for wildlife guilds and distance between patches
- Habitat fragmentation due to infrastructure and human disturbance
- Acres of habitat for wildlife guilds

The acreage excluded from land use authorizations was also considered in the analyses.

BLM has and will continue to issue ROWs for roads. Effects of roads on wildlife are addressed under *Impacts from Transportation and Travel Actions*.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative classified over 110,000 acres as utility avoidance areas which were to be managed similar to exclusions areas. The IMP for the WSAs makes the approximately 94,000 acres of WSAs utility corridor exclusion areas. The No Action Alternative allows for a number of land use authorizations. The No Action Alternative would result in additional habitat fragmentation due to ground disturbance associated with ROWs for roads, powerlines, and other utilities, as well as other land use authorizations.

Restricting wind energy development from wildlife habitat where adverse impacts could not be mitigated would help protect habitat and reduce habitat fragmentation, Wind energy development in the southeastern portion of the planning area would reduce habitat patch size for the sagebrush steppe and mountain mahogany/mountain shrub guilds and increase habitat fragmentation on crucial mule deer and pronghorn winter range. Increased human activity would also displace some wildlife from the area. Reduction in habitat effects are expected to be substantially larger than the area actually disturbed. For roads the effect is at least 660 feet (Ingelfinger & Anderson, 2004) for some sagebrush nesting birds. For wintering mule deer the distance could be farther, 0.6 miles (Sawyer, et al., 2006), depending on the amount of human activity. Avoidance distances for some wildlife species are not known.

Four corridors have potential for utility development in the No Action Alternative. Total acres of habitat for each guild in the potential utility corridors are listed in Table 4- 106. The No Action Alternative does not recommend that new ROWs be limited to existing disturbance corridors where practical. The lack of guidance would contribute to increased habitat fragmentation and disturbance because it is more economical to construct utilities in straight lines, potentially bisecting intact habitat. Guilds that use grassland, sagebrush steppe, and mountain mahogany/mountain shrub habitats would be the most impacted by new ROWs. Each corridor includes at least one maintained road or primitive road as well as numerous other routes that facilitate access for initial construction and maintenance.

Impacts from Management Common to the No Action and All Action Alternatives

All alternatives allow for installation of new communications facilities. To the extent possible, communication sites would be co-located to help minimize the number of sites, towers, and access roads, reducing some habitat fragmentation.

New land use authorizations including wind turbines, powerlines, fiber optic cables, communication sites, and road ROWs are expected to further fragment habitat for the sagebrush steppe, mountain shrub/mountain mahogany, aspen, and grassland guilds. Some ground- and shrub-nesting birds would be displaced by roads (Ingelfinger & Anderson, 2004; Lyon & Anderson, 2003; Pitman, et al., 2005), associated for the construction and maintenance of infrastructure approved in land use authorizations. Impacts to riparian and canyonland guilds are expected to be minimal due to the ARMS and topographic limitations.

In 2008, BLM revised its wind energy policy and included BMPs (Instruction Memorandum [IM] 2009-043). The BLM wind energy BMPs provide guidance regarding avoiding the use of guy wires on permanent meteorological towers, which could reduce the collision risk to birds and bats. However, temporary towers are allowed to use guy wires. The guy wires on temporary towers are to be periodically inspected to determine whether permanent markers are necessary to increase visibility (IM 2009-043). Temporary new meteorological towers within key sage-grouse habitat, important restoration areas, or known seasonal concentration areas, if guyed, are to have permanent markers attached for their entire length. Meteorological towers are not to be placed within 2 miles of active leks unless there is visual obstruction that reduces the visibility of the tower (IM-ID-2009-006). Even with markers, guy wires remain a collision hazard for birds at night or during times when visibility is limited (i.e., clouds, fog.).

To reduce disruption to wildlife, construction for both wind testing and, if the wind is suitable, the wind development project would be scheduled to avoid wildlife reproductive activities or other important behaviors and be consistent with sage-grouse management strategies. To help reduce habitat fragmentation existing roads are to be used to the extent feasible. Towers are not to be placed where turbines would pose a significant risk to raptors. Turbines are not to be placed near known bat hibernation, breeding, maternity/nursery colonies or pathways between colonies and feeding areas. However, this information on bat movements is lacking for the planning area. Bats such as the spotted bat naturally occurring in low numbers and isolated populations are more vulnerable localized extirpation (Luce & Keinhath, 2007).

Two BMPs apply to operational wind farms. One BMP requires that the authorized officer be notified immediately when wildlife impacts, including mortality, are observed. This BMP could provide BLM information regarding wildlife impacted that may be used to identify specific turbine locations resulting in the most wildlife impacts. However, the BMPs do not require adaptive management to change operations in the event specific turbine or location has a high amount of mortality. A second BMP requires employees, contractors, or site visitors be instructed to avoid harassing or disturbing wildlife. This BMP may reduce harassment of wildlife from employees but does not address other displacement concerns, During a study in Wyoming regarding oil and gas field development, mule deer increased the avoidance distance each year of a 3 year study from approximately 1.7 miles (2.7 km) the first year, to approximately 1.9 miles (3.1 km) the second year and approximately 2.3 miles (3.7 km) the third year (Sawyer, et al., 2006).

Impacts from Management Common to All Action Alternatives

Management actions for wildlife, including spatial and temporal considerations during construction and maintenance, would reduce impacts to wildlife habitat in the duneland, grassland, and sagebrush steppe guilds. The ARMS would minimize impacts to riparian guild habitat.

Impacts from Management Specific to Alternative I

Alternative I would exclude ROWs from approximately 95,000 acres. Approximately 99% of the exclusion area lies within WSAs. The approximately 380,000 acres not within an ROW avoidance or exclusion area depend on BMPs, stipulations, or mitigation to limit reducing habitat patch size or increasing habitat fragmentation. Guidance in Alternative I includes placing new ROWs in existing disturbance corridors where practical, which would help mitigate some disturbance impacts and would help reduce habitat fragmentation as a result of new projects.

The potential utility development area for Alternative I would include approximately 71,000 acres. Over 55,000 acres are grassland guild habitat, with about 13,500 acres of sagebrush steppe guild habitat (Table 4- 106). The majority of the sagebrush steppe guild habitat occurs in the Jarbidge Nevada corridor. Raptors and ravens use power poles, towers, and other tall structures as hunting perches and nest sites, which may increase predation on birds and small mammals in nearby habitats (Steenhof, et al., 1993).

Alternative I would have just over 60,000 acres of potential wind development areas, about 62% fewer than the No Action Alternative. Acres of guild habitat in potential wind development areas are listed in Table 4- 107. Development of wind energy in the northeastern portion of the planning area would potentially affect primarily grassland guild habitat. Much of the grassland habitat in the area is a seeded non-native perennial grass with varying amounts of annual grass. Roads, turbines, permanent meteorological towers and other infrastructure would reduce acres of habitat and divide large blocks of habitat into smaller areas, thereby increasing habitat fragmentation. Little research, other than documenting mortality rates, has been done to examine impacts of wind energy projects on grassland species use of habitat (i.e., do birds, mammals or reptiles occur in the same densities and have the same mortality or reproductive fitness as a similar area without a wind farm). The effects to grassland guild wildlife are considered minor to moderate at the local scale in both the short and long term. At the planning area scale, effects would be negligible to minor in both short and long term.

Impacts from Management Specific to Alternative II

The ROW exclusion area in Alternative II would be approximately 1% smaller and the ROW avoidance area would be approximately 2% smaller than Alternative I.

The potential utility development area in Alternative II also would provide an additional 6,000 acres (11%) in one new utility corridor. The new utility corridor would include an additional 1,000 acres of grassland and 5,000 acres of sagebrush steppe guild habitat. Table 4- 106 lists the acreage of each guild habitat within the potential utility development area. Because there are no guidelines for locating new land use authorizations along existing disturbance corridors, habitat fragmentation impacts would increase, and habitat patch size would decrease.

The potential wind development area would increase by 4% compared to the No Action Alternative. The approximate acreage of guild habitat present in the potential wind development area in Alternative II is listed in Table 4- 107. The best quality wind resource is generally in the southeastern part of the planning area. Development for wind energy in this area could fragment big game winter range and sagebrush steppe guild habitat. Human activity and infrastructure including roads are expected to fragment big game habitat and possibly displace wintering big game (Sawyer, et al., 2006).

Impacts from Management Specific to Alternative III

The ROW exclusion areas, potential utility development area, and potential wind development area in Alternative III would be the same as in Alternative I; therefore, the impacts are expected to be the same. Because the majority of the vegetation in the potential utility development area is grassland, the grassland guild habitat would have increased fragmentation. Guidance is included to site new land use authorizations in existing disturbance corridors, resulting in the same effects as Alternative I.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV would increase the amount of ROW exclusion areas by approximately 53,000 acres (56%) as compared to Alternative I. The potential wind development area would be 62% smaller than in the No Action Alternative. Acreage of guild habitat in the potential wind development area is presented in Table

4- 107. Expanding the exclusion area and reducing the potential wind development area reduces the potential for decreasing patch size as a result of new land use authorizations. The effects of guidance in Alternative IV limiting new land use authorization to existing disturbed areas would be the same as in Alternative I.

Impacts from Management Specific to Alternative V

Alternative V would have the same ROW exclusion area as Alternative IV. The potential utility development area would be 30% smaller than in Alternative I. The potential wind development area would be nearly 42,000 acres, or about 73% smaller than the No Action Alternative. Impacts of locating new land use authorizations in existing disturbance corridors would be the same as in Alternative I. The potential wind development area would be the lowest in Alternative V, with nearly two-thirds of the acreage in grassland habitat.

Summary

Only WSAs would be excluded from aboveground ROWs in the No Action Alternative. ROW exclusion areas in Alternatives I, II, and III would be similar in size (less than 1,000 acres difference). In Alternatives IV and V, the ROW exclusion area would be increased by nearly 49,000 acres as compared to Alternatives I, II, and III. The No Action Alternative and Alternatives I and V would have the same number of utility corridors in the same location. Guidance in Alternatives I, III, IV, and V would provide for wind energy development in areas vegetated by annual and non-native perennial vegetation (e.g., grasslands). Alternative II would have the largest potential wind development area, whereas Alternative V would have the smallest potential wind development area. Guidance for following existing disturbance corridors to help minimize future habitat fragmentation would be present in Alternatives I, III, IV, and V. Guidance regarding construction and routine maintenance is included in the No Action Alternative and Alternative V.

Table 4- 106. Guild Habitat in Potential Utility Development Areas by Alternative (Acres)

Guild Habitat	Alternative					
	No Action	I	II	III	IV	V
Canyonland	700	900	900	900	600	600
Duneland	0	0	0	0	0	0
Grassland	55,000	55,000	56,000	55,000	55,000	46,000
Mountain Mahogany/ Mountain Shrub	<100	<100	<100	<100	0	0
Sagebrush Steppe	18,000	13,000	18,000	13,000	13,000	13,000
Note: No Aspen guild habitat is present in potential utility development areas.						

Table 4- 107. Guild Habitat in Potential Wind Development Areas [A] by Alternative (Acres)

Guild Habitat	Alternative					
	No Action	I	II	III	IV	V
Aspen	3,000	0	3,000	0	0	0
Canyonland	4,000	400	4,000	400	400	0
Grassland	56,000	36,000	59,000	36,000	36,000	30,000
Mountain Mahogany/ Mountain Shrub	8,000	0	8,000	0	0	0
Sagebrush Steppe	74,000	22,000	75,000	22,000	21,000	11,000
[A] Includes only areas with marginal or greater potential for wind energy. Note: No Duneland guild habitat is present in potential wind development areas						

Impacts from Minerals Actions

Extraction of mineral resources alters wildlife habitat (Ingelfinger & Anderson, 2004) and wildlife use of habitat (Lyon & Anderson, 2003). Human disturbance such as heavy equipment operation, drilling, blasting, and crushing, and infrastructure such as access routes, pipelines, overburden piles, and fences associated with mineral activities may alter wildlife habitat and use in areas with leasable, salable, or locatable mineral exploration, development, or production. The likelihood of leasable or locatable minerals being found in quantities suitable for commercial development is low in the planning area.

Few amphibian species breed in both brackish (saline) water and freshwater (Gomez-Mestres & Tejedo, 2003). Amphibians in Idaho breed only in fresh water (Nussbaum, et al., 1983). Frogs and other amphibians are attracted to and breed in water stored in a variety of ponds, including dredge ponds, stock ponds, oxbows (Bull & Hayes, 2000) and agricultural ponds (Knutson, et al., 2004). Frogs and toads are expected to attempt to use water storage or reserve ponds as habitat for breeding. It is not known if water the quality of discharge water from oil or natural wells would be suitable for amphibian reproduction and development, or result in decreased survival of adults, eggs, or tadpoles.

Water used for mineral extraction can be re-injected into the ground, but in some instances water has been placed in ponds. Reserve pits with water, oil and other material attract insects, birds or bats, which become mired and frequently die. Netting and other practices can preclude wildlife access and minimize mortality. Oil or gas wells may produce water along with the oil or gas. Zou et al. reported that ponds created with coalbed methane development provided mosquito breeding habitat and resulted in sage-grouse mortality from WNV in parts of Montana and Wyoming (Zou, et al., 2006). WNV causes mortality to a wide variety of other birds. WNV could suppress local populations of bird species (i.e., crows, jays, magpies, etc.) more susceptible to the virus.

The majority of the locatable mineral withdrawal recommendations are located within canyons, including portions of the Bruneau and Jarbidge Rivers and Salmon Falls Creek. No sites within the planning area were identified as having a moderate or higher probability of having extractable quantities of locatable minerals; therefore, impacts are not further assessed.

Table 4- 108 through Table 4- 110 identify the areas open to mineral development by guild habitat in each alternative.

Table 4- 108. Guild Habitat in Areas Open for Mineral Leasing in Potential Oil and Gas Areas by Alternative (Acres)

Guild Habitat	Alternative				
	I	II	III	IV	V
Aspen	2,000	2,000	2,000	2,000	2,000
Canyonland	4,000	4,000	4,000	2,000	2,000
Duneland	0	0	0	0	0
Grassland	21,000	21,000	21,000	18,000	18,000
Mountain Mahogany/ Mountain Shrub	7,000	7,000	7,000	6,000	6,000
Sagebrush Steppe	61,000	62,000	62,000	48,000	48,000
NA	200	200	200	200	200
Total Guild Habitat Acres	**95,200**	**96,200**	**96,200**	**76,200**	**76,200**
Note: Acres include areas available with and without restrictions such as No Surface Occupancy, seasonal restrictions, and controlled surface use restrictions. Acres are for surface BLM management.					

Table 4- 109. Guild Habitat in Potential Geothermal Areas by Alternative (Acres)

Guild Habitat	Alternative				
	I	II	III	IV	V
Aspen	0	0	0	0	0
Canyonland	<100	300	200	100	<100
Duneland	600	600	600	600	600
Grassland	300,000	305,000	304,000	302,000	300,000
Mountain Mahogany/ Mountain Shrub	0	100	100	100	0
Sagebrush Steppe	48,000	53,000	53,000	52,000	48,000
Total Guild Habitat Acres	**348,600**	**359,000**	**357,900**	**354,800**	**348,600**
Note: Acres include areas open with and without restrictions such as No Surface Occupancy, seasonal restrictions, and controlled surface use restrictions. Acres are for surface BLM management.					

Table 4- 110. Guild Habitat in Areas Open for Salable Mineral Exploration and Development by Alternative (Acres)

Guild Habitat	Alternative					
	I	II	III	IV		V
				IV-A	IV-B	
Aspen	3,000	3,000	3,000	3,000		3,000
Canyonland	10,000	21,000	14,000	7,000		9,000
Duneland	600	600	600	600		600
Grassland	785,000	819,000	804,000	741,000	761,000	788,000
Mountain Mahogany/ Mountain Shrub	11,000	11,000	11,000	5,000	10,000	10,000
Sagebrush Steppe	381,000	419,000	400,000	341,000	352,000	369,000
Total Guild Habitat Acres	**1,190,600**	**1,273,600**	**1,232,600**	**1,097,600**	**1,133,600**	**1,179,600**
Note: Acres are for surface BLM management.						

The following indicators were used to analyze the impacts of minerals actions on wildlife habitat:
- Habitat fragmentation due to size of habitat patches for wildlife guilds and distance between patches
- Habitat fragmentation due to infrastructure and human disturbance
- Areas with temporal and spatial restrictions that benefit wildlife

Impacts from Management Specific to the No Action Alternative

At this time, there are no leasable minerals extraction operations in the planning area, however, interest has recently been expressed to explore for oil and gas in the southeastern portion of the planning. The analysis focuses on the smaller area with some potential for oil and gas development. The potential oil and gas areas are substantially smaller (approximately 380,000 acres) than the entire area available for extracting leasable minerals. Oil and gas exploration would contribute to the creation of primitive roads or new roads and localized damage to guild habitat where holes are drilled. Following exploration direct habitat loss would be about 60 acres if a five-well oil field were developed. Roads, directly impacting five acres per mile, would become new linear features reducing and dividing patch size, thereby increasing habitat fragmentation in both the short and long term. Indirect road impacts would be substantially wider for birds in the sagebrush steppe guild (total width 660 feet) or an additional 75 acres per mile (Ingelfinger & Anderson, 2004). Increased human disturbance and infrastructure could displace wildlife from a substantially larger area. Long-term human disturbance (e.g., noise from pumps, vehicle traffic) would continue for the entire time oil or gas is extracted and during subsequent reclamation, compounding habitat fragmentation effects. Because specific projects to extract leasable minerals have not been identified, a more detailed site-specific analysis would be conducted for each new project.

Development of an oil or gas field in the Cedar Creek/China Mountain area would directly reduce habitat for the sagebrush steppe and mountain mahogany/mountain shrub guilds. Some sagebrush-obligate birds nest in much lower densities within a belt 660 feet of roads (Ingelfinger & Anderson, 2004) compared to the same habitat at a farther distance. The Cedar Creek/China Mountain area also contains winter range for mule deer and pronghorn. Mule deer generally avoid areas within 1.7 to 2.3 miles of well pads, in areas which had traditionally had high use prior to gas field development (Sawyer, et al., 2006). Timing restrictions effective during exploration and construction, are much less effective once the well pads are in production because of noise and human disturbance (Sawyer, et al., 2006). If the mule deer avoid oil and gas production to the same extent in the planning area the indirect impact area could exceed 11,000 acres.

Mule deer or pronghorn winter range is lacking in the northern portion of the planning area. If an oil or gas field was developed in the northern area, big game winter range would not be impacted. Impacts specifically for oil or gas development and infrastructure on grassland guild species are less studied.

According to the RFDS for oil and gas development (Appendix U), approximately 90 acres of surface disturbance are expected to occur in the planning area as a result of oil and gas exploration and development over the life of the plan. This is less than 0.1% of the potential oil and gas areas that would be available for oil and gas leasing.

Extraction or use of geothermal resources would require additional infrastructure (e.g., buildings to house turbines, new roads for access and powerlines). Infrastructure would contribute direct losses of habitat (footprint acres) and indirect loss of habitat from displacement. Additionally, human activity would increase in the area during exploration, construction, operation, and maintenance, also contributing to displacement of some wildlife species. The analysis focuses on the smaller area with potential for geothermal development. The potential geothermal areas are smaller (approximately 536,000 acres) than the entire area available for extracting leasable minerals. According to the RFDS for geothermal development (Appendix V), between 185 and 230 acres of surface disturbance are expected to occur in the planning area as a result of geothermal exploration and development over the life of the plan. This is less than 0.1% of the potential geothermal areas that would be available for geothermal leasing.

The acreage on which salable mineral development occurs is expected to increase from approximately 1,300 acres to approximately 2,300 acres over the life of the plan. This is approximately 0.2% of the planning area. Extraction of salable mineral sites would have a relatively small impact on wildlife habitat. Salable mineral sites, including gravel pit areas and associated roads, become barren due to removal or damage to vegetation and compaction, resulting in a loss habitat while the site is active. New roads associated with new mineral sites would contribute to a decrease in habitat patch size and result in an increase in habitat fragmentation. Because of repeated disturbance, gravel pits can be a source of invasive species and noxious weeds, which degrade adjoining wildlife guild habitat. To the extent reclamation is successful, habitat recovery occurs over the long term. New roads would increase access to sites where salable minerals are extracted.

Seasonal or temporal guidance on operations (e.g., blasting, crushing) would help mitigate some human disturbance impacts to wildlife at important time periods. Expansion of existing gravel pits may reduce the amount of guild habitat locally, but would be negligible at the landscape scale. Because existing roads would be used, an increase in roads would not occur from gravel pit expansion. The specific wildlife guild affected depends on the location. All guild habitats have the potential to be impacted.

Impacts from Management Common to All Action Alternatives

Following guidelines in the ARMS could reduce impacts of minerals activities on riparian guild habitat, because the guidelines limit disturbance in the floodplain and damage to riparian habitat.

Impacts from Management Specific to Alternative I

The majority of the area available for leasable mineral development has approximately 794,000 acres of grassland habitat and 391,000 acres of sagebrush steppe guild habitat. The analysis focuses on the smaller area with potential for oil and gas development. The potential oil and gas areas are substantially smaller (approximately 380,000 acres) than the entire area available for extracting leasable minerals. Table 4- 108 lists the acres of guild habitat available for leasing in the potential oil and gas area for all action alternatives. However, according to the RFDS for oil and gas development (Appendix U), approximately 90 acres of surface disturbance are expected to occur in the planning area as a result of oil and gas exploration and development over the life of the plan. This is less than 0.1% of the potential oil and gas areas that would be available for oil and gas leasing.

Under Alternative I, grassland guild habitat dominates (nearly 300,000 acres; 86%), whereas sagebrush steppe guild habitat covers about 48,000 acres (14%) of the areas with medium or high potential for geothermal development. Aspen, canyonland, duneland, and mountain mahogany/mountain shrub guild habitats occur on less than 1% of the potential geothermal development area. Acres of guild habitat are presented in Table 4- 109. The area with the highest potential for geothermal resource development is in the northwestern portion of the planning area and totals approximately 6,000 acres. Over 97% of the high geothermal potential area is grassland guild habitat and less than 2% is sagebrush steppe guild habitat. A more specific breakdown of guild habitat acres in areas classified as high, medium, and low for potential geothermal extraction can be found in *Impacts from Minerals Actions* in the *Special Status Wildlife Species* section. However, according to the RFDS for geothermal development (Appendix V), between

185 and 230 acres of surface disturbance are expected to occur in the planning area as a result of geothermal exploration and development over the life of the plan. This is less than 0.1% of the potential geothermal areas that would be available for geothermal leasing.

Some new roads would be created during the exploration stage for either oil and gas or geothermal resources. The roads would reduce habitat and likely split habitat, resulting in reduced patch size and increasing the amount of fragmentation. Impacts of new infrastructure associated with oil and gas or geothermal resources would be similar to those presented for the No Action Alternative.

Approximately 179,000 acres would be closed to the extraction of salable mineral resources, whereas about 1,286,000 acres would be open. Ground disturbance associated with extraction of salable mineral resources are expected to reduce habitat an additional 1,000 acres from current levels, primarily from the expansion of existing gravel pits. In Alternative I, it is estimated salable mineral development would occur on a total of 2,300 acres over the life of the plan, approximately 0.2% of the area available for salable mineral development. New and expanded gravel pits are expected to negligibly decrease available habitat primarily in grassland and sagebrush steppe guilds at the planning area scale. Grassland guild habitat occurs on a majority of the area available for salable mineral extraction (Table 4- 110). Due to the geology of most of the planning area, some of the new pits will likely require blasting and crushing to produce suitable gravel, creating noise and human disturbance and temporarily displacing wildlife from the immediate area. Depending on the location, seasonal site-specific constraints could be added to mitigate disturbance impacts during the extraction or preparation of salable minerals. Blasting or crushing could be required to be scheduled to avoid winter for pits in or near big game winter range or the raptor nesting period if nest sites are in close proximity to the pit. Alternative I could allow the seasonal wildlife restrictions to be exempted, waived, or modified, increasing disturbance impacts to wildlife.

Impacts from Management Specific to Alternative II

The portion of the potential oil and gas areas that would be available for leasing is slightly larger (approximately 1,700 acres; Table 4- 108) than Alternative I. The primary difference is that Alternative II would not require seasonal constraints for exploration and during construction for the extraction of leasable minerals. The lack of constraints would increase human disturbance at important seasonal times to wildlife in all guilds and wintering big game during exploration and construction phases. Once developed, oil and gas or geothermal energy production would continue year round potentially expanding the indirect impact area. However, according to the RFDS for oil and gas development (Appendix U), approximately 90 acres of surface disturbance are expected to occur in the planning area as a result of oil and gas exploration and development over the life of the plan. This is less than 0.1% of the potential oil and gas areas that would be available for oil and gas leasing. Similarly, according to the RFDS for geothermal development (Appendix V), between 185 and 230 acres of surface disturbance are expected to occur in the planning area as a result of geothermal exploration and development over the life of the plan. This is less than 0.1% of the potential geothermal areas that would be available for geothermal leasing.

Impacts from Management Specific to Alternative III

Alternative III is very similar to Alternative II in the size of potential oil and gas and geothermal resource extraction areas and lack of wildlife seasonal constraints. Impacts of Alternative III would be similar to Alternative II.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

In Alternative IV, the portion of the potential oil and gas areas that would be available for leasing is about 19% smaller compared to Alternative I (Table 4- 108). The portion of the potential geothermal areas that would be available for leasing is a little less than 2% larger than Alternative I (Table 4- 109). Like Alternative I, seasonal constraints can be applied to help reduce impacts to wintering big game. The effects of additional roads, whether from oil and gas or geothermal resource exploration and extraction, would contribute to habitat loss and decrease in habitat patch size. Accompanying displacement due to human disturbance or infrastructure would further reduce or fragment habitat. However, according to the RFDS for oil and gas development (Appendix U), approximately 90 acres of surface disturbance are expected to occur in the planning area as a result of oil and gas exploration and development over the life of the plan. This is less than 0.1% of the potential oil and gas areas that would be available for oil and gas leasing. Similarly, according to the RFDS for geothermal development (Appendix V), between 185 and 230 acres of surface disturbance are expected to occur in the planning area as a result of geothermal exploration and development over the life of the plan. This is less than 0.1% of the potential geothermal areas that would be available for geothermal leasing.

Impacts from Management Specific to Alternative V

The portion of the potential oil and gas areas that would be available for leasing in Alternative V is the same as in Alternative IV; however, the portion of the potential geothermal areas that would be available for leasing is nearly (14 acres less) identical to Alternative I (Table 4- 109). Overall, effects of Alternative V are similar to Alternative IV.

Summary

Areas closed to mineral leasing and salable mineral development would be largest in Alternative IV-A, followed by Alternatives IV-B, V, and I. Alternative II would have the most areas open for mineral leasing and salable mineral development, but Alternative III would have about 1,200 fewer acres with NSO restrictions than Alternative II. Among the action alternatives, Alternative I would have the most acres with NSO restrictions while Alternative III would have the least; however, the difference in acreage is minor, approximately 4,300 acres.

The projected acreage disturbed due to salable mineral extraction, primarily gravel pits, would be lowest in the No Action Alternative and highest in Alternatives II and III. The difference in acreage would be 2,000 acres. At a landscape scale, this change is considered negligible.

Alternative II would have the fewest acres recommended for locatable mineral withdrawal, followed by Alternative V, the No Action Alternative, and Alternatives III and I.

Impacts from Areas of Critical Environmental Concern Actions

Management for ACECs with relevant and important wildlife values includes specific actions for wildlife. ACECs are priorities for restoration, critical fire suppression, and noxious weed treatment, activities expected to directly benefit wildlife and wildlife habitat.

The effects of ACEC management are related to their priority for vegetation restoration and any special management requirements or restrictions. The impact of ACEC management is analyzed to the extent that special management for individual ACECs affect acreage of guild habitat, habitat fragmentation, restoration, important wildlife seasonal periods, or otherwise influence habitat.

The following indicators were used to analyze impacts of ACEC actions on wildlife habitat:

- Habitat fragmentation due to size of habitat patches for wildlife guilds and distance between patches
- Habitat fragmentation due to infrastructure and human disturbance

Impacts from Management Specific to the No Action Alternative

Three ACECs would continue to be designated in the No Action Alternative: Bruneau-Jarbidge, Salmon Falls Creek, and Sand Point. Restoration of bighorn sheep habitat burned in the Murphy Complex Fires in the Bruneau-Jarbidge ACEC would benefit bighorn sheep. Bighorn sheep are primarily grazers, but a variety of shrubs and forbs are included in their diet, depending on the time of year; planting grasses, forbs, and shrubs would help meet bighorn sheep dietary needs. Restoration of the 33,000 acres of big game winter range could increase habitat patch size and reduce fragmentation in the long term (Table 4-111). Reestablishing shrubs in the Bruneau-Jarbidge ACEC would reduce the distance between patches of shrub steppe habitat and increase patch size of sagebrush steppe habitat in the long term. Habitat quality for canyonland and sagebrush steppe guilds would increase over time. Restoration would increase patch size for the sagebrush steppe and mountain mahogany/mountain shrub guilds and decrease grassland guild habitat.

Closing the Sand Point ACEC to salable mineral development and mineral leasing would provide protection for wildlife habitat in the ACEC by helping maintain habitat patch size and disturbance. Livestock grazing is permitted, but the majority of the ACEC lies within a riparian pasture grazed on alternate years. This would continue to facilitate the recovery of riparian guild habitat.

The Salmon Falls Creek ACEC is generally protected from changes due to its steep topography. The majority of wildlife in this ACEC is associated with the canyonland and riparian guilds. The No Action Alternative would include the closure of the ACEC to salable mineral development, mineral leasing, and livestock grazing. The grazing closure would minimize social displacement of wildlife within the ACEC. Habitat conditions are not expected to change appreciably in this ACEC.

Motorized vehicles would be limited to designated routes in all of the ACECs, which minimizes disturbance, helps prevent habitat fragmentation from new user created routes, and maintains habitat patch size.

Impacts from Management Specific to Alternative I

Approximately 84,000 acres of big game winter range would be improved by restoration where it overlaps the ACECs (Table 4- 111). The majority of the big game winter range is in the Bruneau-Jarbidge ACEC. In the long term, habitat restoration would increase patch size, decrease distance between habitat patches, and help reduce habitat fragmentation. Habitat restoration in the Lower Bruneau Canyon ACEC would be a high priority and would improve approximately 700 acres of habitat for canyonland and sagebrush steppe guilds. Restoration of roughly 200 acres of habitat in the Middle Snake ACEC would enhance sagebrush steppe guild.

Placing salt or supplements within the Bruneau-Jarbidge and the Lower Bruneau Canyon ACECs would be prohibited. This restriction would help minimize habitat degradation by reducing the risk of invasive species, as invasive plant species (e.g., cheatgrass, bur buttercup) establish in high disturbance areas (Brooks & Berry, 2006) and may spread to adjacent uplands in arid areas. ACECs would be in Critical Suppression Areas, which would help reduce future habitat fragmentation due to wildland fire. ACECs would be a priority for the control of invasive plants and noxious weeds. New water pipelines for livestock would be prohibited in ACECs, which would help minimize habitat fragmentation and the spread of invasive plants. All ACECs would be considered utility avoidance areas. Utilities may be allowed to the extent they do not impact the relevant and important values of the ACEC. Impacts of utility avoidance are to minimize future habitat loss and fragmentation resulting from ground disturbance associated with ROWs. Oil and gas, geothermal, or other leasable mineral extraction in any of the ACECs would be allowed with NSO restrictions, limiting habitat fragmentation and human disturbance.

Impacts from Management Specific to Alternative II

Alternative II would not designate any new ACECs and would remove the ACEC designation from the three existing ACECs. Roads, primitive roads, and trails would be expected to increase, primarily in the portions of the Bruneau-Jarbidge ACEC that do not overlap WSA. Infrastructure for livestock grazing, including livestock troughs, associated pipelines, fences, and primitive roads, would likely expand, increasing human disturbance in sagebrush steppe and canyonland guild habitat near the Bruneau and Jarbidge Canyons. Placement of salt or other supplements would only be limited in areas containing Type I special status species habitat. Because of increased infrastructure for commercial activities and improved access for fire suppression and other administrative purposes, a number of new gravel pits could be created and some existing gravel pits expanded. Salable or leasable mineral extraction in areas that lack ACEC management or restriction could contribute to a net habitat loss, a decrease in habitat patch size, and an increase habitat fragmentation. The effects of mineral development to wildlife and wildlife habitat are addressed under *Impacts from Minerals Actions*. In some instances, mineral development may occur in areas that were prohibited in the No Action Alternative.

Impacts from Management Specific to Alternative III

The Bruneau-Jarbidge ACEC would be reduced by about 18,000 acres in Alternative III and would be contained within the current WSA boundary. Compared to the No Action Alternative, less sagebrush steppe habitat, including big game winter range, would be included in this ACEC. Because the WSA does not cover the entire existing Bruneau-Jarbidge ACEC, increased impacts, including a decline in habitat patch size due to roads and fuel breaks, would likely occur in upland sagebrush steppe portions of the East Fork of the Jarbidge River, a small part of the Jarbidge River, adjacent to the southern part of the Bruneau Canyon, and adjacent uplands along the northern part of Bruneau River. Compared to the No Action Alternative, approximately 12,800 fewer acres of sagebrush steppe guild habitat would be within the Bruneau-Jarbidge ACEC.

Impacts of management for both the Salmon Falls Creek and Sand Point ACECs are addressed in under *Impacts from Management Specific to the No Action Alternative*.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Overall, Alternatives IV-A and IV-B (the Preferred Alternative) would contain just over 5 times and 3 times, respectively, more sagebrush steppe under ACEC management (Table 4- 111), primarily in the Bruneau-Jarbidge and Jarbidge Foothills ACECs. The Bruneau-Jarbidge ACEC would be a little more than 44% larger in Alternative IV than in the No Action Alternative; however, the overall effects of management (e.g., route designation, minerals, land use authorizations) would be similar to the No Action Alternative. Existing livestock waters in the ACEC would be evaluated on a case-by-case basis to determine if they should be retained, relocated, or removed. Removal of troughs could result in an increase in effective habitat patch size or improved habitat quality for some species (e.g., sage-grouse) in the area due to reduced utilization and trampling of vegetation, trailing, and related disturbance associated with troughs.

The effects of the Sand Point ACEC management are addressed under *Management Specific to the No Action Alternative*.

Infrastructure associated with livestock grazing, primarily fences and water troughs, would be removed in the Inside Desert ACEC. The Inside Desert ACEC in Alternative IV-B would be about 44% smaller than in Alternative IV-A. The removal of fences may reduce wildlife mortality, principally bird collisions. Removal of water troughs would somewhat shift wildlife distribution in the area, primarily pronghorn and bats, toward the Jarbidge, Bruneau, or Clover Creek canyons or toward the foothills to the south. Because a number of troughs lack water during the summer and early fall, the change in distribution would be minor. The restoration of priority ACECs would result in increases to sagebrush steppe habitat patch size and reduce the distance between patches, enlarging available habitat for the sagebrush steppe guild within the ACEC. Conversely, habitat for the grassland guild in the ACEC would be reduced. Planting forbs to improve habitat for slickspot peppergrass pollinators would improve habitat quality for a variety of wildlife species in the sagebrush steppe and grassland guilds.

Alternative IV-B would include approximately 54% less mountain mahogany/mountain shrub, 62% less aspen, and 33% less sagebrush steppe habitat (Table 4- 111) than Alternative IV-A, most of which are present in the Jarbidge Foothills ACEC. The size of Jarbidge Foothills ACEC would be 136,000 acres in Alternative IV-A and 66,000 acres in Alternative IV-B. Management of the ACEC in both alternatives would be similar and result in similar effects on wildlife habitat. Restoration of habitat in the ACEC would benefit sagebrush steppe and mountain mahogany/mountain shrub guild wildlife by increasing habitat patch size for these guilds. Wildland fires have reduced big game winter range within the ACEC. Restoration would increase habitat patch size, reduce the distance between habitat patches, and improve winter range for mule deer and pronghorn. In conjunction with management actions for transportation and travel, closure of some primitive roads and trails could reduce route density helping to reduce habitat fragmentation long term.

Two salable mineral development sites for decorative rock are present in the Jarbidge Foothills ACEC in Alternative IV-A, but are outside the boundary in Alternative IV-B. New routes have been created from one of the decorative rock areas, damaging big game winter range habitat as well as habitat for the sagebrush steppe guild wildlife. Alternative IV provides that new salable minerals pits would be minimized within ACEC; however, a larger acreage big winter range, sagebrush steppe and mountain mahogany/mountain shrub guild habitats would have added protection in Alternative IV-A. Seasonal constraints could be added to existing pits to limit human disturbance on mule deer and pronghorn winter range. No gravel pits or leasable minerals are known to be present in the Jarbidge Foothills ACEC;

however, portions of the potential oil and gas area overlap the Jarbidge Foothills ACEC. Impacts of oil or gas development to wildlife within the proposed Jarbidge Foothills ACEC would be the same as described under *Impacts from Minerals Actions*.

Invasive plants and noxious weeds are present along several primitive routes and cross-country motorized vehicle trails and are expanding to adjoining areas. The closure of some routes and the priority for noxious weed and invasive plant treatment could reduce habitat degradation by limiting the continued expansion of invasive plants.

Impacts from Management Specific to Alternative V

Alternative V would designate four ACECs and the largest acreage of ACECs of any of the alternatives. Impacts from the Sand Point ACEC are analyzed under *Impacts from Management Specific to the No Action Alternative*. The Lower Bruneau Canyon and Middle Snake ACECs are addressed under *Impacts from Management Specific to Alternative I*.

The Sagebrush Sea ACEC would cover about 70% of the planning area. Nearly all of the big game winter range in the planning area would be encompassed by this ACEC. The ACEC would cover the entire Inside Desert, Jarbidge Foothills, Salmon Falls Creek, and the vast majority of the Bruneau-Jarbidge ACECs. Extraction of salable minerals would be authorized; however, guidance emphasizes the expansion existing salable mineral sources rather than development of new sources. This guidance reduces habitat fragmentation associated with new gravel pits.

Restoration of habitat within the Sagebrush Sea ACEC would be a combination of active restoration and natural recovery. Because of the smaller amount of active restoration, habitat patch size and the distance between patches would gradually change. Actively restored areas would recover more rapidly than natural recovery areas, increasing habitat patch size and reducing the distance between patches of similar habitat. Increases in sagebrush steppe and mountain mahogany/mountain shrub habitats through natural recovery and active restoration would benefit wildlife in these guilds. Because there would be a substantially lower stocking rate, some range infrastructure may be removed, reducing wildlife mortality and habitat fragmentation and degradation.

Summary

Habitat restoration is a key component for all ACECs. The combination of restoration of annual grassland and non-native perennial grassland and changing native grassland to native shrubland is expected to improve habitat for the sagebrush steppe guild. The No Action Alternative would designate 88,732 acres of ACEC (Table 4- 111), or 6% in the planning area. Alternative I would increase the total acreage in ACECs by approximately 9,000 acres (Table 4- 111) to about 7% of the planning area. Alternative II would contain no ACECs. Alternative III would decrease the acreage in ACECs by over 28,000 acres (Table 4- 111) to a little over 4% of the planning area. The total acreage in ACECs in Alternatives IV-A and IV-B are 334,685 acres and 232,000 acres or a little over 24% and 17% of the planning area, respectively. A little over 70% of the planning areas would be classified as ACEC in Alternative V, the vast majority in the Sagebrush Sea ACEC. The size of the Bruneau-Jarbidge ACEC would be the same in No Action Alternative and Alternative I, reduced by roughly a third in Alternative III, and increased by over 40% in Alternatives IV-A and IV-B. The acreage of big game winter range within ACECs would be greatest in Alternative V, followed by Alternatives IV-A, IV-B, I, III, and the No Action Alternative. Table 4-111 also provides the total wildlife guild acreage by alternative.

Alternatives containing the Bruneau-Jarbidge, Inside Desert, Jarbidge Foothills, Lower Bruneau Canyon, and Salmon Falls Creek ACECs would facilitate restoration of big game winter range because of the priority for restoration in ACECs. Long-term habitat for wildlife species in the grassland guild would gradually decline as habitat shifts from grassland to shrubland. Habitat restoration would increase patch size and decrease the distance between patches of sagebrush steppe and mountain mahogany/mountain shrub habitats.

Table 4- 111. Big Game Winter Range and Guild Habitat in ACECs by Alternative (Acres)

Guild Habitat	Alternative						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
Big Game Winter Range	33,000	84,000	0	55,000	252,000	180,000	630,000
Aspen	0	0	0	0	3,000	1,000	3,000
Canyonland	30,000	30,000	0	19,000	37,000	37,000	42,000
Duneland	0	0	0	0	0	0	0
Grassland	23,000	26,000	0	19,000	104,000	69,000	517,000
Mountain Mahogany/ Mountain Shrub	500	600	0	500	10,000	5,000	11,000
Not Identified	100	300	0	100	700	300	2,000
Sagebrush Steppe	35,000	40,000	0	22,000	180,000	121,000	392,000
Riparian (miles)	91	102	0	50	154	120	215
Total [A]	**88,600**	**96,900**	**0**	**60,600**	**334,700**	**233,300**	**967,000**

[A] Acres of big game winter range is not included in ACEC total to eliminate double counting

Most ACECs limit new infrastructure, particularly water pipelines for livestock grazing. This would help minimize habitat fragmentation and degradation. In all but the Jarbidge Foothills and Sagebrush Sea ACECs, the placement of salt or supplements for livestock would be limited to locations outside the ACEC. In the long term, this restriction is expected to slow the spread of invasive species that degrade habitat for all wildlife guilds. Fences and water troughs would be removed in the Inside Desert ACEC in Alternative IV. Fences and water troughs would be static to somewhat reduced in Alternative V.

Because ACECs are avoidance areas in the No Action Alternative and Alternatives I, III, and IV, ACEC designation would limit some land use authorizations including roads, powerlines, communication sites and renewable energy projects. None of existing gravel pits or decorative rock areas are in the existing ACECs or the majority of the proposed ACECs. The Sagebrush Sea ACEC in Alternative V would contain four active gravel pits and two decorative rock sites. The Sagebrush Sea ACEC would include the most habitat for the aspen, canyonland, mountain mahogany/mountain shrub, sagebrush steppe and riparian guilds. Effects of land use authorizations and mineral development to wildlife are addressed under *Impacts from Land Use Authorizations Actions* and *Impacts from Minerals Actions*. Salable mineral sources would be allowed to continue but not expand in the Middle Snake ACEC in Alternative I. New salable mineral sources may be authorized in the Sagebrush Sea ACEC in Alternative V.

Summary of Direct and Indirect Impacts

Impacts from the No Action Alternative

Sagebrush steppe and mountain mahogany/mountain shrub habitats would continue to decrease while habitat fragmentation would increase from a combination of factors including wildland fires, land use authorizations, cross-country motorized vehicle use, and range infrastructure. Grassland guild habitat would increase in size, but have additional roads, communication sites, utility lines, water pipelines and fences. Riparian conditions should gradually move toward PFC due to changes in livestock management or fencing. An increase in salable mineral extraction would occur to improve some of the existing roads and constructed facilities permitted through land use authorizations. These factors would also decrease and fragment big game habitat. Grazing on big game winter range during the winter would displace big game and potentially result in increased forage competition between big game and livestock during the late fall and winter. Existing ACEC management would continue to provide limited protection for big game winter range. Special status species habitat would be a high priority for restoration followed by habitat for mule deer and pronghorn. Overall, the No Action Alternative is better than Alternative II for big game as well as the canyonland, riparian, mountain mahogany/mountain shrub, and sagebrush steppe guilds. Maintenance of the acreage of non-native perennial grass seeding identified for each MUA would help retain substantial area for the grassland guild, but not as much as Alternative II. The No Action Alternative is second least favorable for the sagebrush steppe, mountain mahogany/mountain shrub, and riparian habitat guilds, but second most favorable for grassland guild habitat.

Continued management under the No Action Alternative is expected to result in a minor beneficial impact to grassland and riparian guilds and major adverse impacts to sagebrush steppe and mountain shrub/mountain mahogany guilds. Wildlife in the canyonland and aspen guilds would continue to experience minor adverse impacts.

Impacts from Alternative I

Impacts of implementing Alternative I would initially result in reduced patch size and distance between similar habitat patches for the sagebrush steppe and mountain mahogany/mountain shrub guild habitats. However, restoration targets in Alternative I would increase habitat patch size and reduce some of the distance between habitat patches for the sagebrush steppe and mountain mahogany/mountain shrub guilds over the long term as restored habitats establish and mature.

The effects of infrastructure to guild habitats would increase in this alternative because of the following:

- On a landscape scale, the impacts of targeted grazing on wildlife habitat are expected be relatively minor due to the small size of the treatment areas.
- The Critical Suppression Area includes roughly 290,000 acres of sagebrush steppe guild habitat.
- Habitat loss would increase following construction of roads, towers, powerlines, wind turbines, buildings and other infrastructure constructed following the issuance of various land use authorizations.
- Range infrastructure including fences, water pipelines, troughs, and accompanying construction and maintenance routes to change livestock distribution would increase. Fences may also be constructed to exclude livestock from reference areas and other areas unavailable for livestock grazing. Estimated utilization levels would provide a mix of residual grass heights. Temporary fencing and water troughs would be used to some degree with targeted grazing.
- Although cross-country motorized vehicle use would be prohibited to the general public, motorized vehicles being driven cross-country by various lease, ROW and permit holders granted an authorization would continue to use existing routes, inhibiting or preventing recovery of vegetation, and create new routes, increasing fragmentation of guild habitats.
- The area with potential for oil and gas development is third largest in Alternative I, whereas the available geothermal potential area classified as medium or high is second smallest (348,369 acres).

In conjunction with the travel management goals, the Canyonlands and Jarbidge Foothills SRMAs would reduce unauthorized OHV trails and, to a lesser extent, primitive roads and increase core habitat size for the sagebrush steppe guild and big game. Alternative I includes more than 71,000 acres with potential for utility development and 60,000 acres with potential for wind development. Management specific to ACECs would provide slightly more protection to riparian guild habitat and make riparian areas in ACECs a focus for restoration where needed. Upland restoration in ACECs would improve approximately 34,000 acres of big game winter range that occurs in ACECs. The impacts of winter grazing on big game winter range are expected to be similar to the No Action Alternative.

Overall, management under this alternative would result in major beneficial impacts to sagebrush steppe and mountain mahogany/mountain shrub guilds in the long term. Moderate benefits would occur in habitat for the riparian guild in the long term. Minor beneficial impacts would occur to the aspen and canyonland guilds in the long term. There would be a moderate adverse impact to the grassland guild.

Impacts from Alternative II

Critical Suppression Areas, fire suppression and range infrastructure, and disturbance due to land use authorizations interact to increase distance between patches and reduce habitat patch size. Alternative II would have the smallest ROW exclusion area, the largest acreage with potential for wind development, and minimal limitation on ROW routes, which will reduce habitat patch size, increase habitat fragmentation, and increase human disturbance in all wildlife guilds.

No SRMAs or TMAs would focus on increasing core habitat for wildlife, resulting in maintaining or increasing habitat fragmentation and human disturbance. Special management for ACECs would be removed as no ACECs would be designated. Cross-country motorized vehicle use by various permit, lease, and ROW holders would inhibit or prevent recovery of vegetation on closed routes and maintain fragmentation of guild habitats.

Alternative II would make the largest areas available for exploration and development of leasable, salable, and locatable minerals. New routes created for exploration for new leasable minerals would decrease habitat patch size and increase fragmentation and human disturbance.

Utilization and estimated AUM levels would result in less variation of residual cover for wildlife in all guilds, particularly the grassland guild. Alternative II would focus on shifting annual grassland to non-native perennial grassland. Control of shrubs in non-native perennial seedings would limit the expansion of shrubs, thereby maintaining the largest amount of habitat for the grassland guild. Restoration of wildlife habitat would focus on habitat for Endangered, Threatened, Proposed, and Candidate species (Idaho BLM Type 1) then other Idaho BLM Sensitive species (Idaho BLM Types 2 and 3). Reestablishment of browse in native grassland would be through natural recovery. Big game winter range would not be a restoration priority.

In Alternative II, the priority for fire suppression would be VMAs A and B. The largest remaining areas of sagebrush steppe and mountain mahogany/mountain shrub habitat are found in VMAs C and D. In multiple fire situations, diverting suppression resources to VMAs A and B could result in larger fires in the remaining sagebrush steppe habitat, which could reduce the habitat patch size and increase habitat fragmentation.

Seasonal restrictions for wildlife would be minimal in Alternative II for mineral exploration and extraction, livestock grazing, and authorized land uses (e.g., ROWs). Alternative II contains the smallest area closed in potential oil and gas areas. Alternative II has the largest acreage (359,000 acres) available rated as medium or high potential for geothermal resources.

Overall, Alternative II would be least favorable for wildlife in the sagebrush steppe, mountain mahogany/mountain shrub and riparian guilds, but maintain the most grassland guild habitat. Alternative II also is least favorable to mule deer and pronghorn due to overall loss and increased fragmentation of habitat from infrastructure associated with commodity uses and fire suppression/administrative purposes and associated increased human disturbance.

Overall, management from Alternative II would result in minor beneficial impacts to the grassland guild. Benefits to the grassland guild would be offset by major adverse impacts to the sagebrush steppe and mountain mahogany/mountain shrub guilds. Impacts to the aspen guild would be moderate and adverse. Impacts to the riparian guild would be minor and beneficial, whereas the canyonland guild would experience minor adverse impacts.

Impacts from Alternative III

Alternative III would provide for more restoration of sagebrush steppe and mountain mahogany/mountain shrub guild habitat than the No Action Alternative or Alternatives I and II. More big game winter range would be restored as part of restoration and fuels treatments. Because Alternative III would include the largest number of miles of fuel breaks, some new habitat fragmentation would created and be maintained. Fire suppression infrastructure and roads for fire suppression and other administrative purposes would contribute to habitat fragmentation and a reduction in habitat patch size. Fuel breaks and other suppression infrastructure may help reduce large wildland fires or slow their spread. Like Alternative II, suppression resource could be diverted away from VMAs C and D during multiple fire start to suppress fires in VMAs B and A, with the similar impacts. The acreage of sagebrush steppe guild habitat in Critical Suppression Areas would be similar to Alternative I.

Restoration of sagebrush steppe and riparian guild habitat would generally reduce fragmentation in the long term.

Additional fencing and other range infrastructure would increase in Alternative III due to an increase in AUMs and fences for reference exclosures increasing habitat fragmentation from infrastructure. Utilization levels would provide a similar amount of residual grass height for wildlife as Alternative I.

Alternative III closes the second smallest number of acres in the potential oil and gas area. The second largest number of acres classified as medium or high for potential geothermal resources are available in Alternative III (358,000 acres). Areas with potential for wind energy and utility development and ROW exclusion areas would be similar to Alternative I. New ROWs would follow existing disturbance corridors to the extent practical.

TMAs would not focus on increasing core habitat size for wildlife. One TMA would focus on motorized recreation in 34,000 acres. Cross-country motorized vehicle use by various permit, lease, and ROW holders would inhibit or prevent recovery of vegetation on closed routes and maintain fragmentation of guild habitats. The acreage in ACECs would be less than in the No Action Alternative because of a 28,000 acres decrease in size of the Bruneau-Jarbidge ACEC.

Special status species would be one of the considerations for habitat restoration and route designation.

Overall, Alternative III would result in moderate beneficial impacts to the sagebrush steppe, mountain mahogany/mountain shrub, and riparian guilds in the long term. Minor beneficial impacts would occur in the aspen and canyonland guild habitat in the long term. The grassland guild would experience moderate adverse impacts in the long term.

Impacts from Alternative IV (the Preferred Alternative)

Fences to enclose reference areas and some range infrastructure would be constructed to resolve resource issues increasing habitat fragmentation. Overall, increases in range infrastructure are expected to be less than in the No Action Alternative and Alternatives I, II, and III. The utilization levels (20% to 30% in native and 30% to 40% in non-native seedings) are expected to provide more residual cover for wildlife.

Nearly 340,000 acres of sagebrush steppe and mountain mahogany/mountain shrub guild habitats would be within Critical Suppression Areas. To enhance fire suppression capability, fuel breaks would be established and maintained, new roads and stream crossings would be constructed, existing and stream crossings roads would be improved and additional water sources would be installed.

The largest amount of active habitat restoration would occur in Alternative IV, improving sagebrush steppe, mountain mahogany/mountain shrub riparian guild habitats and big game habitat.

Alternative IV proposes 148,000 acres of ROW exclusion areas, About 175,000 acres is available for wind energy development, of which approximately 60,000 acres has potential to be developed with the current technology. New ROWs would be routed near existing disturbance corridors to the extent practical. Alternative IV would close about 20,000 acres in potential oil and gas areas. Alternative IV has the third greatest acreage available (355,000 acres) in areas classified as medium or high for potential geothermal resources.

Two TMAs focus on increasing core habitat size on approximately 1,016,000 acres, primarily in the Diamond A and the Jarbidge Foothills areas. Cross-country motorized vehicle use by various permit, lease, and ROW holders would inhibit or prevent recovery of vegetation on closed routes and maintain fragmentation of guild habitats. The Bruneau-Jarbidge and Canyonlands SRMAs focus on primitive recreation and would maintain low human disturbance levels.

Alternatives IV-A and IV-B (the Preferred Alternative) would designate over 334,000 acres and 230,000 acres of ACECs, respectively. The difference is due to changes in the size of the proposed Inside Desert and Jarbidge Foothills ACECs.

Special status species, mule deer, and pronghorn would be priorities for habitat management.

Overall, Alternative IV improves habitat most for sagebrush steppe, riparian, mountain mahogany/mountain shrub guild habitat. However, it would decrease habitat for the grassland guild more than the other alternatives. Big game winter range would increase indirectly through the restoration of other guild habitats.

Overall, management under Alternative IV would result in major beneficial impacts to the sagebrush steppe, mountain mahogany/mountain shrub, and riparian guilds in the long term. Minor beneficial impacts would occur in aspen and canyonland guild habitats in the long term. There would be moderate adverse impacts to the grassland guild in the long term.

Impacts from Alternative V

Alternative V would close the largest acreage to grazing and have the lowest estimated utilization levels of any of the alternatives. TNR and targeted grazing would not be used. The effect of this would be to leave the tallest residual herbaceous height for wildlife. New range infrastructure would be minimal due in part to the pasture-sized reference areas, which need no additional fencing.

Prioritizing fire suppression for VMAs C, D, B, and A should help reduce habitat fragmentation in remaining big game winter range as well as sagebrush steppe, mountain mahogany/mountain shrub, and aspen guild habitats. Approximately 443,000 acres of sagebrush steppe and mountain mahogany/mountain shrub guild habitats are in Critical Suppression Areas. Only existing roads and stream crossings would be improved to enhance fire suppression.

Vegetation treatments would be a combination of active restoration and natural recovery. Active restoration would increase shrubs in native grassland and convert annual grassland to sagebrush steppe. Special status species would be the priority for habitat management. Because of considerable overlap with sagebrush steppe and mountain mahogany/mountain shrub, big game habitat would also be improved.

Alternative V has the same acreage of the potential oil and gas closed as Alternative IV. Alternative V has the least acreage (348,000 acres) open in high or moderate potential geothermal resources areas. Two TMAs include objectives for increasing core habitat for wildlife. Lease, ROW, or permit holders would be required to stay on designated routes, which would help reduce habitat fragmentation as the closed routes establish vegetation over time. Approximately 968,000 acres would be designated as ACECs in Alternative V, however special management in the Sagebrush Seas ACEC is less restrictive than in Alternative IV.

Overall, management in Alternative V would result in moderate beneficial impacts to the sagebrush steppe, mountain mahogany/mountain shrub, and riparian guilds in the long term. Minor beneficial impacts would occur in aspen and canyonland guild habitats in the long term. Grassland guild habitat would experience a moderate adverse impact.

Cumulative Impacts

Past, Present, and Reasonably Foreseeable Actions

The cumulative impact analysis boundary includes the planning area and adjacent portions of BLM's Wells, Bruneau, Burley, and Shoshone FOs and the Jarbidge Ranger District of the Humboldt-Toiyabe National Forest. There is a substantial amount of private and State lands in the cumulative impacts analysis area.

Past, present, and reasonably foreseeable actions for the following resources and resource uses cumulatively affect wildlife:

- Upland Vegetation
- Wildlife
- Special Status Species
- Noxious Weeds and Invasive Plants
- Wildland Fire Ecology and Management
- Livestock Grazing
- Transportation and Travel
- Land Use Authorizations
- Minerals

These actions are described in detail in the *Introduction* to this chapter.

With regard to livestock grazing actions, and in addition to the discussion in the *Introduction*, livestock grazing contributes to the existence of cowbirds and starlings. Cowbirds are now widespread in most of the western United States, often occurring in areas with cattle. Livestock grazing occurs on and is expected to continue on Federal, State, and private lands. Livestock numbers are expected to increase or remain static on private lands and to remain static on public lands. Cowbirds forage in areas being grazed by livestock (Goguen & Mathews, 2001) and have been documented moving substantial distances (more than 4 miles) to parasitize the nests of a variety of songbirds (Goguen & Mathews, 2001). Cowbirds associated with livestock grazing on Federal, State, or private land would continue to parasitize songbird nests at current rates. Not all songbirds are equally vulnerable or affected by cowbird parasitism. Cowbirds and starlings would be present even without livestock grazing on BLM-managed land due to land uses on private lands. Not all songbirds are equally vulnerable or affected by cowbird parasitism (Lowther, 1993). Based on the numbers of nests parasitized, birds in the aspen, grassland, mountain mahogany/mountain shrub, and riparian guilds may be more influenced than those in the sagebrush steppe guild (Lowther, 1993)

Starlings forage in mown or grazed areas, dairies and feed lots, and are often seen in mixed flocks with blackbirds and cowbirds in agricultural settings. Within the planning area, starlings have been observed nesting in aspen stands 6 to 7 miles from ranches, as well as Salmon Falls Creek Canyon near agricultural areas and Murphy Hot Springs. Locally, starlings are associated with agriculture, primarily large dairies and a few livestock feeding operations on private lands. At these sites, starlings are present in flocks numbering in the thousands to tens of thousands. These sites provide feed to maintain high starling numbers, irrespective of grazing on BLM lands. Starlings offer intense competition with native birds for nesting cavities and result in reduced native cavity nesting bird populations in some areas (Cabe, 1993). Starlings would continue impacting cavity nesting birds primarily in aspen, riparian and canyonland guilds.

Summary of Cumulative Impacts

Cumulative Impacts from the No Action Alternative

The No Action Alternative is expected to result in continued habitat fragmentation for the sagebrush steppe and mountain mahogany/mountain shrub guilds from continued large wildland fire, pioneered trails and primitive roads, and various infrastructure (e.g., communication sites, wind energy facilities, fences). As in the planning area, large portions of the Wells FO are presently open to cross-country motorized vehicle use. Routes extend from the planning area to the adjoining Wells FO and Humboldt-Toiyabe National Forest, and new routes are being established. The combination of impacts is expected to promote invasive plants species, increase human-caused wildland fire, reduce habitat patch size, and increase the distance between patches of similar habitat, primarily for the sagebrush steppe and mountain mahogany/mountain shrub guilds. Habitat connectivity will likely decrease and impair the ability of wildlife species like the sagebrush vole to travel between locations. Continued loss of sagebrush steppe habitat is expected to contribute to the decline in several bird populations (e.g., sage thrasher, vesper sparrow) because of less habitat. Livestock grazing on big game winter range during the winter is expected to reduce forage for big game at a critical time of year. The impact to big game was enhanced by the Murphy Complex Fires.

Cumulative Impacts from Alternative I

Wildland fires are expected to burn both in the planning area and in adjacent FOs. Improving and constructing new roads and stream crossings to reduce travel time to suppress fires may help reduce fire size. Fuel breaks may also help reduce fire size. In addition to habitat fragmentation, disturbance corridors are expected to increase invasive annuals and noxious weeds, human access, and contribute to more frequent and possible larger fires. Increased infrastructure for fire would be in addition to infrastructure for land use authorizations and livestock grazing. Infrastructure on Federal, State, and private lands is expected to increase, increasing impacts to wildlife in all guilds. Habitat connectivity, particularly in the southern part of the planning area, is expected to increase over time in some areas due to restoration.

Cumulative Impacts from Alternative II

In Alternative II, habitat fragmentation is expected to be substantially increased because of less restoration and more infrastructure. Increased livestock grazing may reduce fire rate of spread by consuming fine fuels, it would also reduce the amount of cover for wildlife and could contribute to an increase in invasive annual plants from damage to biological soil crusts (Memmot, et al., 1998; Warren & Eldridge, 2001). Restoration back to sagebrush steppe or mountain mahogany/mountain shrub is expected to be minimal over the next 20 years. Some of the areas of expected development overlap important habitat for a number of wildlife species in the aspen, mountain mahogany/mountain shrub, and sagebrush steppe guilds as well as big game. Development and increased human disturbance in the area is expected to contribute to less connectivity for wildlife movements between the Burley, Bruneau, and Wells FOs as well as Forest Service lands. Infrastructure in the potential wind development area near the northern portion of the planning area, would affect primarily grassland guild wildlife. The northern portion

of the planning area is adjacent to several already developed sites and some potential sites on private land as well as the major electrical transmission lines. Fences, roads, agricultural fields, and buildings contribute to a highly fragmented habitat in the area, which are not projected to decrease in the near or long term.

Cumulative Impacts from Alternative III

Cumulative impacts in Alternative III are expected to be similar to Alternative II.

Cumulative Impacts from Alternative IV (the Preferred Alternative)

The Bruneau-Jarbidge, Inside Desert, and Jarbidge Foothills ACECs would likely help minimize habitat fragmentation over time due a higher priority for restoration. Where the ACECs in the planning area are near ACECs, WSAs, or Wilderness in adjacent Federal lands, larger blocks of land would have less human disturbance for wildlife in the sagebrush steppe, mountain mahogany/mountain shrub, aspen, and canyonlands guilds. The level of active restoration in Alternative IV is expected to maintain and improve connectivity for wildlife moving between the Bruneau, Burley, and Wells FOs as well as Forest Service lands over time.

Cumulative Impacts from Alternative V

Alternative V, with the least amount of livestock grazing with respect to both areas available and vegetation allocated, is expected to result in the most herbaceous cover for wildlife. Fire size and frequency are expected to be similar or perhaps increase, due to slower response times and an increase in fine fuels. Although some areas would be actively restored, a large part of the area would be managed for natural recovery. The interaction between fire and less active restoration would contribute to increased habitat fragmentation and reduced connectivity to adjoining public lands. Alternative V is expected to have the least amount of infrastructure for land use authorizations and livestock grazing.

4.3.7. Special Status Species

4.3.7.1. Special Status Plants

Analysis Methods

Indicators

The following indicators were used for the analysis of impacts to special status plants:

- **Numbers of plants or populations**

- **Acres of occupied or potential habitat** – Data for special status plants include the number of individuals at a given population or the number of populations within a geographic area. However, these metrics might not be fully representative of current or potential species status under a range of alternatives at a landscape scale. Numbers of individuals and even populations can be variable from year to year, particularly for annual species. Therefore, proposed management actions with landscape-level effects were assessed based on potential to increase or decreased occupied or potential habitat.

- **Potential for maintenance of seed banks** – Some species, particularly annuals, might not be present from year to year. These species rely on seed banks for long-term maintenance of populations during periods not favorable to survival of plants (Meyer, et al., 2005, 2006; Nunney, 2002). Therefore, some actions were assessed for ability to maintain seed banks in the light of short- and long-term impacts to existing and potential habitats.

Methods and Assumptions

Impacts to special status plants from management in the following sections of Chapter 2 were analyzed in detail: *Special Status Species*, *Upland Vegetation*, *Noxious Weeds and Invasive Plants*, *Wildland Fire Ecology and Management*, *Livestock Grazing*, *Transportation and Travel*, and *Areas of Critical Environmental Concern*. Management from the remaining sections was not analyzed in detail because the management did not vary measurably between alternatives or impact the indicator for special status plants. **Impacts from management for special status plants** can be found under *Impacts from Special Status Species* in the *Tribal Rights and Interests*, *Livestock Grazing*, *Transportation and Travel*, *Land Use Authorizations,* and *Leasable Minerals* sections.

Special status plants considered in this analysis are those listed under ESA as Threatened or Endangered or plants that are Candidates or Proposed for listing under the ESA (Idaho BLM Type 1; see the *Special Status Plants* section of Chapter 3); or those taxa that are designated by the Idaho BLM State Director as Sensitive (Idaho BLM Types 2-4) pursuant to *BLM Manual 6840 – Special Status Species Management*. Watch species (Idaho BLM Type 5) are mentioned in this analysis; however, this is not a protective designation under BLM policy.

Actions were assessed to determine if there would be direct or indirect impacts to special status plant populations or habitats. Assessment was based on location of potential impacts within specific geographic areas or VSGs relative to known special status plant populations or potential habitats.

The following species were grouped into the Desert Annual Guild for analysis purposes: Alkali cleomella, desert pincushion, rigid threadbush, spreading gilia, white eatonella, and white-margin waxplant. All of these species occur in salt desert shrub and/or Wyoming big sagebrush communities at low elevations. Occurrence of these annual plants can be highly variable from year to year and short in duration. Therefore, management actions are assessed relative to their impact to potential habitats and seed banks.

Direct impacts to special status plants include the physical disruption or removal of rooted plants or their seed bank or disruption of habitat occupied by plants. Physical disruption includes consumption by animals, crushing of vegetative parts (e.g., stems, roots, leaves) and reproductive parts (e.g., flowers, fruits, seeds), and chemical treatment resulting in death of the plant or failure of the plant to reproduce.

Indirect impacts include reduction or loss of suitable habitat resulting from soil surface disturbance; soil compaction; changes in soil chemistry; changes in soil food webs; disruption of hydrological processes; plant community changes such as modification of species composition and structure, including overstory, understory, and biological soil crusts; introduction and spread of noxious weeds or invasive plants; and disruption, reduction, or elimination of pollinator populations.

Assumptions used in this analysis are:

- The effects to special status plants are a subset of the effects to the plant community as a whole. The effects to special status plants can be qualified in terms of the effects to occupied or potential habitats.
- In general, native plant communities are more likely to support habitat for special status plants than annual, non-native perennial, or non-native understory communities.
- Special status plants would be managed according to existing law, regulation, and policy.

- Special status designation of any plant according to law, regulation, or policy is dynamic. This analysis considers current status of specially designated plants. Implementation of actions contained within the final plan would require consideration of plants with special status designation at that point in time. Because of the dynamic nature of special status designation, effects of management actions are sometimes discussed in general terms rather than for specific species.
- Conservation measures outlined in conservation plans, strategies, and agreements for special status species (Appendix G) would be followed.
- For analysis purposes, it is assumed that vegetation treatments would occur within the first five years of RMP implementation. Desired plant species composition and structure typically would occur within 15 to 20 years following restoration treatments intended to move areas towards the Native Shrubland VSG.
- With active management, adequate ground cover for site stabilization would occur within two to five years following surface-disturbing activities.
- All vegetation treatments would result in attainment of the stated objectives. Failed or partially-failed treatments would be identified through monitoring and re-treated utilizing adaptive management methods until the objectives are met.
- Since fire is an episodic event, it is assumed that untreated native vegetation as well as treated areas could burn within the life of the plan. It is assumed that areas identified as Critical Suppression Areas would be less likely to burn and that, should a fire occur, fire size would be smaller than for Conditional Suppression Areas. It is also assumed that areas identified in Conditional Suppression Areas would be more likely to burn.
- Cultivars of native species would be considered native. Communities dominated by native cultivars would be classified in the Native Grassland or Native Shrubland VSGs. In general, these communities would be expected to emulate native communities with respect to structural qualities and ecosystem processes.
- Noxious weeds and invasive plants would continue to be introduced into upland vegetation communities as a result of land uses and wildlife movements.
- Yearly climatic variability would influence the health and productivity of vegetation communities, but would be a common influence regardless of alternative.
- Natural successional processes would continue to occur in native plant communities throughout the life of the plan. For analysis purposes, natural processes are assumed to be consistent for all alternatives and are not accounted for here. All change represented in the analysis is assumed to be due to prescriptions described in the alternative’s actions.
- The degree of impact attributed to actions would be influenced by multiple factors including, but not limited to, current vegetation type and condition; the type, seasonal timing, and degree of disturbance; yearly climatic variability including temperature and precipitation; and other mitigating or constraining actions.
- Impacts that result from management actions, authorizations, or allocations that result in surface disturbance are assumed to occur in proportion to the area affected.

Direct and Indirect Impacts

Impacts from Special Status Species Actions

Impacts from Management Specific to the No Action Alternative

Management actions under the No Action Alternative are generally protective in nature and provide specific direction for consideration and protection of special status plants during project and livestock grazing management. These actions would have the overall effect of protecting and maintaining known special status plant populations.

Management actions directing the improvement of sage-grouse nesting habitat in MUA 10 through seeding and rehabilitation would have long-term impacts to known populations or potential habitat for special status plants in the Desert Annual Guild due to disturbance associated with sagebrush removal using fire or mechanical means. These actions would thin dense (greater than 30%) sagebrush canopies and create small-scale (1 to 10 acre), irregular openings. Thinning the sagebrush canopy could result in the reduction of shading and competition from sagebrush. However, this could increase potential for introduction or increase of invasive plants such as cheatgrass and, thus, competition with special status annual plants. Seeding using mixtures of grasses, forbs, and shrubs that benefit sage-grouse would result in short-term soil surface disturbance that could disrupt seed banks of annual special status plants. However, this action could also result in long-term habitat improvement through establishment of a more natural community structure and reduction of competition from invasive annual plants.

Actions that protect populations and habitat for bighorn sheep including restrictions on water developments, human uses, adverse habitat alteration, occupancy for oil and gas development, and conversion from cattle to sheep would generally protect special status plant populations and potential habitat that occur in bighorn sheep habitat including Cusick's primrose, Davis peppergrass, and spine-node milkvetch. Management actions protecting special status species in riparian areas, wetlands, and streams would provide general protection for potential habitat for American wood sage and chatterbox orchid.

Impacts from Management Common to the No Action and All Action Alternatives

Management common to the No Action Alternative and all action alternatives provides direction to follow conservation measures in biological opinions or letters of concurrence, which would be updated, revised, or replaced through future consultation with FWS. This action currently applies to slickspot peppergrass and would have the effect of providing consistent and current protective management for populations and habitat.

Impacts from Management Common to All Action Alternatives

Actions common to all alternatives for special status species define species that would be protected by proposed management. Management actions for monitoring and adaptive management would drive proactive protection and program development for special status plants. Specific direction for avoidance of special status species for activities related to leasable and salable mineral development, new communication sites, and ROW construction and maintenance activities would reduce the potential for direct disturbance of populations or habitat. Allowing activities to occur with mitigation for adverse effects could result in destruction of special status plants, populations, seed banks, or habitats in localized areas. This could result in long-term changes in distributions of special status plants and their habitats.

Actions for special status species in upland areas and riparian habitats would generally protect special status plants through guidance to maintain and improve habitats and minimizing direct disturbance to populations and habitats. Actions specific to special status terrestrial and aquatic animals would tend to indirectly protect special status plants by minimizing impacts to habitat. Short-term disturbance of potential habitats or seed banks could result from habitat improvement projects, particularly those that result in soil surface disturbance (e.g., seeding), but could also expand suitable habitats through long-term establishment of a more natural community structure and reduction of competition from invasive annual plants.

Impacts from Management Specific to Alternative I

Actions for special status species management in Alternative I would generally maintain or improve the status of special status plants and their habitats. Specific actions include adjustment of livestock management and type and location of range infrastructure and other facilities. Modifications in livestock management could reduce intensity or timing of use so that impacts to special status plants would be decreased or eliminated. This could include avoiding use during critical periods for growth, flowering, and seed set to allow persistence of existing plants and perpetuation of seed banks.

Identification and monitoring of special status plant pollinators would provide information to guide activities that could indirectly affect special status plants, including chemical control of insect pests (e.g., grasshoppers, Mormon crickets). Direction to reintroduce special status plants, where practical, into historical but currently unoccupied habitat could increase the number of populations or individuals in existing populations and could eventually lead to the lack of need for special management.

Direction to maintain or improve sage-grouse and other special status species habitat could have long-term indirect effects for special status plants, particularly those that occur in sagebrush habitats (Table 3-22). Maintenance of existing native shrubland communities would generally protect habitats for special status plants dependent on those habitats. Restoration projects in annual, non-native perennial, or non-native understory communities could result in disturbance by treatments, including chemicals or seeding, to special status plants or their seed banks. Conversion of these communities to native shrubland could result in long-term habitat improvement and expansion of potential habitat. The addition of forbs to existing native shrubland communities could indirectly affect special status plants through increases in food and habitat availability for pollinators, thus potentially increasing and diversifying pollinator populations.

Actions that protect populations and habitat for bighorn sheep, including restrictions on water developments, fences, sheep trailing, and conversion from cattle to sheep, would generally protect populations and potential habitat for special status plants within 1 mile of the Bruneau and Jarbidge Canyon rims. Special status plants in these areas include Cusick’s primrose, Davis peppergrass, and spine-node milkvetch. However, relocation of troughs and establishment of new troughs, reservoirs, permanent fences, and corrals in locations at least 1 mile from the canyon rims would shift potential disturbance from these developments to populations and habitats located further from the canyon rim. Special status plants affected by these actions would include Davis peppergrass, spine-node milkvetch, slickspot peppergrass, and special status plants in the Desert Annual Guild.

Impacts from Management Specific to Alternative II

Actions for special status species management in Alternative II would generally maintain or improve the status of special status plants and their habitats. The effects of livestock management actions would be the same as those described for Alternative I.

Alternative II differs from Alternative I through lack of specific direction to identify and monitor pollinators. The lack of identification and monitoring of pollinators could result in implementation of activities that could indirectly affect special status plants, including chemical control of insect pests. Alternative II also only allows the reintroduction of plants listed under ESA as Threatened or Endangered or plants that are Proposed or Candidates for listing under ESA. Reintroduction of Listed, Proposed, or Candidate plants could increase the number of populations or individuals in existing populations and could eventually lead to the lack of need for listing under the ESA. However, the lack of assisted reintroduction for other BLM Sensitive plants would not allow for more rapid expansion of populations than under natural conditions and would tend to contribute to the need for continued special management.

Allowing native grasslands to transition to native shrublands could expand potential habitat for special status plants associated with shrub communities (Table 3-22). The addition of forbs to existing native shrubland communities could indirectly affect special status plants by increasing food and habitat for pollinators, thus potentially increasing and diversifying pollinator populations. The lack of active restoration of annual, non-native perennial, and non-native understory communities would reduce short-term impacts to plants or seed banks due to treatments, but would limit long-term habitat improvement and expansion. The lack of livestock restrictions in bighorn sheep habitat could indirectly result in livestock-associated impacts to Cusick’s primrose, Davis peppergrass, and spine-node milkvetch (see *Impacts from Livestock Grazing Actions*).

Impacts from Management Specific to Alternative III

Actions for special status species management in Alternative III would generally maintain or improve the status of special status plants and their habitats. The effects of livestock management actions would be the same as those described for Alternative I.

Alternative III is identical to Alternative II regarding lack of specific direction to identify and monitor pollinators and by only allowing reintroduction of plants listed under ESA as Threatened or Endangered, or plants that are Proposed or Candidates for listing under ESA. The effects would be the same as those described for Alternative II.

The introduction of shrubs to native grassland communities could expand potential habitat for special status plants associated with shrub communities (Table 3-22). Protection of sagebrush communities through the establishment of extensive fuel breaks would protect existing populations and habitat, but could fragment potential habitat for special status plants. The lack of active restoration of annual, non-native perennial, and non-native understory communities would reduce short-term impacts to plants or seed banks due to treatments, but would limit long-term habitat improvement and expansion. The lack of livestock restrictions for bighorn sheep habitat could indirectly result in livestock-associated impacts to Cusick's primrose, Davis peppergrass, and spine-node milkvetch (see *Impacts from Livestock Grazing Actions*).

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Actions for special status species management in Alternative IV would generally maintain or improve the status of special status plants and their habitats. The effects of livestock management actions would be the same as those described for Alternative I.

Actions proposed under Alternative IV would expand potential habitat through active restoration of annual, non-native perennial, and non-native understory communities to native shrubland. Restoration projects could result in disturbance, including chemical, seeding, or prescribed fire treatments, to special status plants or their seed banks occurring in these communities. Re-establishment of special status plants in historically occupied, but currently unoccupied habitat, could expand and connect populations and could eventually result in a reduced need for special management. Identification and monitoring of special status plant pollinators would provide information to guide activities that could indirectly affect special status plants, including chemical control of insect pests (e.g., grasshoppers, Mormon crickets). The addition of forbs to existing native shrubland communities could indirectly affect special status plants by increasing food and habitat availability for pollinators, thus potentially increasing and diversifying pollinator populations.

Actions that protect populations and habitat for bighorn sheep, including restrictions on water developments, fences, sheep trailing, and conversion from cattle to sheep would generally protect populations and potential habitat for special status plants within 1 mile of the Bruneau and Jarbidge Canyon rims, including Cusick's primrose, Davis peppergrass, and spine-node milkvetch. However, relocation of troughs and establishment new troughs, reservoirs, permanent fences, and corrals in locations at least 1 mile from the canyon rims would shift potential disturbance from these developments to populations and habitats located further from the canyon rim. Special status plants affected by these actions would include Davis peppergrass, spine-node milkvetch, slickspot peppergrass, and special status plants in the Desert Annual Guild.

Impacts from Management Specific to Alternative V

The effects of Alternative V would be similar to those described for Alternative IV. Under Alternative V, habitat restoration for sage-grouse and other special status species would be less extensive. Treatments that would result in potential short-term impacts would occur primarily in annual communities. Limiting treatments in non-native perennial communities to the re-establishment of sagebrush and the absence of treatments in non-native understory communities would eliminate disturbance of existing special status plants and seed banks in those communities. However, this would also reduce potential native habitat relative to Alternatives I and IV.

Impacts from Upland Vegetation Actions

Most special status plants would be affected by actions that maintain a VSG or would result in conversion of one VSG to another. Treatments could directly affect individual plants, plant populations, or their seed banks. Treatments could also directly or indirectly affect the quantity and quality of occupied and/or potential habitat.

The impacts of upland vegetation communities actions were assessed by VMA based on anticipated change in the relative proportions of VSGs in the entire planning area between 2012 (projected vegetation coverage) and following implementation of all vegetation treatments. Short-term effects would be primarily for treatment implementation, which could include chemical, mechanical, biological, seeding, planting, prescribed fire, and targeted grazing treatments. These could result in removal of above-ground biomass or heating, burning, or physical disruption of root systems or seed banks. Treatments that occur during the active growing period in the spring would have greater potential for damaging or killing plants. Treatments occurring when special status plants are dormant would be less likely to damage or kill plants. These treatments would tend to affect perennial plants to a greater extent than annuals due to potential for disturbance to established plants and their root systems.

Long-term effects would be based on the expected outcome of vegetation treatments, as summarized in the *Upland Vegetation* section.

Impacts from Management Specific to the No Action Alternative

Under the No Action Alternative, there would be an increase in the relative proportion of non-native perennial communities through conversion of annual communities, and removal of shrubs in non-native understory communities. There would be little change in overall composition of VSGs or seral stages within the planning area (Table 4- 63 and Table 4- 64).

The No Action Alternative would likely maintain or decrease special status plant numbers or potential habitat as a result of vegetation treatments. Short-term effects would be primarily from treatment implementation, which could include chemical, mechanical, seeding, planting, and prescribed fire treatments. These could result in removal of above-ground biomass or heating, burning, or physical disruption of root systems or seed banks. Treatments applied during spring, including chemical treatments to suppress invasive annual plants, would have the greatest potential to damage or kill special status plants. In particular, chemical treatment could result in mortality of special status plants in the Desert Annual Guild and other low-elevation species, as treatment timing would likely coincide with the active growth period for these plants. Treatments occurring when special status plants are dormant, such as seeding, would be less likely to damage or kill annual plants. These treatments would tend to affect perennial plants to a greater extent than annuals due to the potential for disturbance to established plants and their root systems. Mechanical removal of shrub overstory is unlikely to directly affect special status plants, but could decrease potential habitat for special status plants that are ecologically tied to shrubland communities (Table 3-22).

In the long-term, treatments to convert annual communities to non-native perennial could reduce competition from invasive annual plants and provide a more stable environment. However, the resulting plant communities would be relatively homogenous in both species and structural diversity, which could limit potential habitat for special status plants that are ecologically tied to shrubland communities.

Impacts from Management Common to All Action Alternatives

Management actions common to all action alternatives provide guidance to reduce or eliminate improper uses or over-allocation of vegetation, particularly during vulnerable periods such as growing seasons, drought periods, or seeding establishment. These actions would indirectly protect special status plants or their habitats by reducing potential impacts of uses and maintaining acreages resulting from upland vegetation treatments.

Impacts from Management Specific to Alternative I

Upland vegetation actions proposed under Alternative I would increase the relative proportion of native shrubland through conversion of annual, non-native perennial, non-native understory, and native grassland communities. Actions proposed for Alternative I would decrease the relative proportion of communities dominated by uncharacteristic and early-seral native vegetation and increase the relative proportion of communities dominated by mid-seral native vegetation (Table 4- 63 and Table 4- 64).

Alternative I would likely maintain or increase special status plant numbers or potential habitat as a result of vegetation treatments. Under Alternative I, short-term effects of treatments would be similar to those described for the No Action Alternative but would also include biological and targeted grazing treatments and exclude prescribed fire. Biological treatments, including use of predatory insects or fungal or bacterial pathogens, would not likely result in impacts to special status plants. Such methods are usually targeted for specific species or groups and would need to be selected to eliminate potential impacts to special status plants, their pollinators, or habitats.

Targeted grazing would occur primarily in early spring to reduce fine fuels as well as populations of noxious weeds and invasive plants. This could result in short- or long-term control, depending on biology of the target plants. Special status plants in treatment areas could be impacted by removal of above-ground biomass or damage to plants by trampling. The effectiveness of targeted grazing for invasive annuals would be temporary and localized (Launchbaugh, et al., 2008; Vallentine & Stevens, 1994) and would need to be repeated yearly or coupled with other treatments (e.g., chemical, seeding with perennial plants) for long-term effect (Hempy-Mayer & Pyke, 2008). Targeted grazing would tend to affect special status plants in the Desert Annual Guild and other low-elevation species, as treatment timing would likely coincide with the active growth period for these plants.

Although these impacts could occur, any proposal to use targeted grazing would take these potential impacts into account. The degree to which these impacts are likely would vary depending on the specific proposal. The decision whether to use targeted grazing would take the potential impacts and the potential benefits at that specific location into consideration.

In the long-term, treatments that convert annual communities to non-native perennial and native grassland communities could reduce competition from invasive annual plants and provide a more stable environment. Conversion of annual, non-native perennial, non-native understory, and native grassland communities to native shrubland would enhance and expand potential habitat for special status plants that are ecologically tied to shrubland communities (Table 3-22).

Actions that would diversify species composition in non-native understory, native grassland, and native shrubland communities, particularly with forbs, could indirectly affect special status plants through increase of food and habitat availability for pollinators, thus potentially increasing and diversifying pollinator populations.

Reference areas proposed under Alternative I would exclude grazing from known populations of slickspot peppergrass and Greeley's wavewing. The effects of ungrazed reference areas are discussed under *Impacts from Livestock Grazing Actions*.

Management to maintain or improve the cover and composition of biological soil crusts in native grasslands and shrublands would improve potential habitat for special status plants and could reduce competition from noxious weeds or invasive plants. Research has indicated that biological soil crusts form a physical or chemical barrier to some weedy or invasive species and reduce potential for establishment (Gelbard & Belnap, 2003; Kaltenecker, et al., 1999). Biological soil crusts might also contribute to persistence of special status plants by providing favorable conditions for enhanced soil moisture and nutrients.

Impacts from Management Specific to Alternative II

The overall effect of actions proposed for upland vegetation in Alternative II would be similar to the No Action Alternative. Compared to the projected upland vegetation for 2012, the relative proportion of the Non-Native Perennial VSG would increase through the conversion of annual and non-native understory communities. The relative proportions of the Native Grassland and Native Shrubland VSGs would be maintained while enhancing diversity through seeding of late-seral grasses. Actions proposed in Alternative II are unlikely to change the current relative proportions of native plant community seral stages or uncharacteristic vegetation (Table 4- 63 and Table 4- 64).

The effects of treatments to convert annual and non-native understory communities to non-native perennial would be similar to those described for the No Action Alternative and Alternative I. Long-term effects would be the same as those described for the No Action Alternative. Alternative II includes the potential use of prescribed fire treatments in annual and non-native understory communities. Short-term effects to special status plants would include removal of above-ground biomass by fire and heating of soil that could burn or damage root systems and seed banks.

The impacts from interseeded late-seral grasses into native grassland and shrubland are anticipated to be short-term. Interseeding would have the long-term effect of diversifying herbaceous plant structure, which could enhance habitat for special status plants. Allowing conversion of native grassland to native shrubland through natural recruitment or inclusion of shrubs in ES&BAR treatments for burned native grassland and shrubland would maintain and potentially expand habitat for special status plants ecologically tied to shrubland communities. This effect would be slow, particularly in low elevation/low precipitation locations, and might not occur within the life of the plan (see the *Upland Vegetation* section).

Reference areas proposed under Alternative II would exclude grazing from known populations of slickspot peppergrass. The effects of ungrazed reference areas are discussed under *Impacts from Livestock Grazing Actions*.

Impacts from Management Specific to Alternative III

The overall effect of actions proposed for upland vegetation in Alternative III would be to reduce the amount and continuity of fine fuels throughout the planning area. This would be accomplished by increasing the relative proportion of non-native perennial communities through conversion of annual communities, and increasing the relative proportion of native shrubland communities through the addition of shrubs to native grassland communities. Treatments in native communities would decrease the relative proportion of early-seral, native communities and increase the relative proportion of mid-seral communities (Table 4- 63 and Table 4- 64).

The short-term effects of treatments used to convert annual communities to non-native perennial or native grassland would be similar to those described for the No Action Alternative, Alternative I (biological control and targeted grazing), and Alternative II (prescribed fire). The long-term effects would be similar to those described for the No Action Alternative.

Impacts to special status plants from treatments used to incorporate shrubs into existing native grassland are anticipated to be minimal. Shrubs would likely be seeded through aerial or ground application or hand planting. Ground application through broadcast or aerial seeding would not disturb special status plants or their seed banks. Interseeding could result in some soil surface disturbance and could disrupt existing plants or seed banks. This effect is expected to be short-term. The long-term effects of treatment would include enhancement and expansion of potential habitat for special status plants that are ecologically tied to shrubland communities (Table 3-22). These effects would be discontinuous over the landscape due to vegetation patchiness. Should fire occur, discontinuity of vegetation types could result in a mosaic of burn intensities and unburned patches that could function as refugia for native seed dispersal, including special status plants (Longland & Bateman, 2002; Whisenant, 1989).

Reference areas proposed under Alternative III would exclude grazing from known populations of slickspot peppergrass. The effects of ungrazed reference areas are discussed under *Impacts from Livestock Grazing Actions*.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

The overall effect of actions proposed for Alternative IV would be to create a landscape dominated by native vegetation with an emphasis on mid-seral shrubland communities and to increase the amount and continuity of communities dominated by shrubs. Actions would increase both the relative proportion and continuity of the Native Shrubland VSG through conversion of annual, non-native perennial, and non-native understory communities and diversification of native grassland communities. The addition of shrubs to existing non-native perennial communities would increase the relative proportion of the Non-Native Understory VSG. Increases in the relative proportion of mid-seral native shrubland communities would increase species diversity and structural complexity throughout the planning area (Table 4- 63 and Table 4- 64).

The short- and long-term treatment effects for special status plants, their seed banks, and potential habitat would be similar to those described for Alternative I. The short-term effects of treatment would be greater in Alternative IV compared to Alternative I due to a larger number of acres treated. The long-term effects would also cover a larger geographic area and would result in larger acreages of continuous native shrubland habitat compared to Alternative I. The effects of treatments to introduce shrubs into native grassland would be similar to those described for Alternative III. The short-term effects would include those of prescribed fire, as described for Alternative II, but would potentially be used in all plant community types.

Reference areas proposed under Alternative IV would exclude grazing from known populations of slickspot peppergrass and Greeley's wavewing. The effects of ungrazed reference areas are discussed under *Impacts from Livestock Grazing Actions*.

The effects of management to maintain or improve cover and composition of biological soil crusts would be similar to those described for Alternative I, but would extend to the entire planning area.

Impacts from Management Specific to Alternative V

The overall effect of actions proposed for upland vegetation in Alternative V would be to increase the amount and continuity of communities dominated by shrubs within the planning area through conversion of annual, non-native perennial, and native grassland communities. Increasing the relative proportion of the Non-Native Understory VSG would provide for added structural complexity in existing non-native perennial communities. Increasing the relative proportion of mid-seral native shrubland communities would increase species diversity and structural complexity throughout the planning area. Alternative V would not convert as much acreage of annual communities to perennial as Alternative IV (Table 4- 63 and Table 4- 64) and would rely on seeding techniques that would minimize soil surface disturbance. Treatments implemented under Alternative V would result in shrubland acreages similar to Alternative IV. However a larger proportion of the shrubland acreage would be non-native understory communities due to a more passive approach to adding structural diversity to existing plant communities. Chemical treatments would be minimal; targeted grazing would not be used under Alternative V.

Alternative V would result in the fewest short-term treatment effects to special status plants, their seed banks, and potential habitats due to actions to minimize soil disturbance and effects from chemical and grazing treatments. The long-term effects would be similar to those described for Alternative IV, but shrubland communities would include a larger proportion of non-native understory

Reference areas proposed under Alternative V would exclude grazing from known populations of Greeley's wavewing, calcareous buckwheat, matted cowpie buckwheat, Janish penstemon, and slickspot peppergrass. The effects of ungrazed reference areas are discussed under *Impacts from Livestock Grazing Actions*.

The effects of management to maintain or improve cover and composition of biological soil crusts would be the same as for Alternative IV.

Impacts from Noxious Weeds and Invasive Plants Actions

The introduction and spread of noxious weeds and invasive plants into native vegetation communities can result in direct impacts to special status plants through direct or indirect competition (Rosentreter, 1994) or indirect impacts resulting from changes in plant community structure or soil characteristics, including soil chemistry, structure, nutrients, or hydrology. Actions affecting noxious weeds and invasive plants could result in changes to existing occupied or potential habitat for special status plants. As noxious weed and invasive plant populations increase in size and frequency, they tend to reduce the diversity of surrounding native plant communities, altering the composition and community structure. As noxious weed and invasive plant populations are reduced, native vegetation is expected to increase in terms of acreage, cover, and diversity.

Management actions that would result in the conversion of the Annual VSG to other VSGs are addressed under *Impacts from Upland Vegetation Actions.* Since inventoried acres for noxious weeds and areas where invasive plants are not dominant are not available for the planning area, the effects of actions proposed for noxious weeds and invasive plants are addressed in the context of potential for introduction and spread, or potential to control, contain, or eradicate populations.

Impacts from Management Specific to the No Action Alternative

Management actions specific to the No Action Alternative provide no objectives or clear prioritizations for the inventory or control of noxious weeds and would likely result in increased occupied acreages and diversity of noxious weeds and invasive plants within the planning area. The No Action Alternative would incorporate current guidelines from biological opinions, Candidate Conservation Agreements, management plans for ACECs and other special designations, and other pertinent policies. This would impose treatment restrictions that would reduce potential for chemical or biological treatment impacting special status plants covered by these documents. However, this action would not extend to all special status plants and would not insure against inadvertent treatment.

Impacts from Management Common to All Action Alternatives

Management actions common to all action alternatives provide for proactive management to limit the introduction and spread of noxious weeds and invasive plants. An inventory would have the overall impact of quantifying existing conditions and providing a baseline for evaluation of risk for new invasions and spread of existing populations. Up-to-date inventories would also provide a basis for treatment prioritization. Appropriate prioritization and methods of control for treatments in or near special status species habitat would reduce the risk of introduction and spread and increase the potential for the control or eradication of noxious weeds and invasive plants, while reducing impacts to non-target plants, including special status plants.

Impacts from Management Specific to Alternative I

Management actions under Alternative I would control or eradicate noxious weeds and invasive plants in known special status plant habitats and potential habitats in special designations and native plant communities. The analysis of short- and long-term effects of vegetation treatments is discussed under *Impacts from Upland Vegetation Actions.*

Impacts from Management Specific to Alternative II

Management actions under Alternative II would control or eradicate noxious weeds and invasive plants in known special status plant habitats and potential habitats in riparian areas and native plant communities. The analysis of short- and long-term effects of vegetation treatments is discussed under *Impacts from Upland Vegetation Actions.*

Impacts from Management Specific to Alternative III

Management actions under Alternative III would control or eradicate noxious weeds and invasive plants in known special status plant habitats and potential habitats in special designations. However, since Alternative III would place the most focus on treatments to reduce fuel loads, it would do the least of all alternatives to reduce potential for introduction and spread, or control or eradicate noxious weeds in potential special status plant habitats. The analysis of short- and long-term effects of vegetation treatments is discussed under *Impacts from Upland Vegetation Actions.*

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Management actions under Alternative IV would control or eradicate noxious weeds and invasive plants in known special status plant habitats and potential habitats in special designations, riparian habitats, and native plant communities. Alternative IV would treat the most acreage and would have the greatest potential of all alternatives to reduce introduction and spread, and control or eradicate noxious weeds and invasive plants in occupied and potential special status plant habitats. The analysis of short- and long-term effects of vegetation treatments is discussed under *Impacts from Upland Vegetation Actions.*

Impacts from Management Specific to Alternative V

Management actions under Alternative V would control or eradicate noxious weeds and invasive plants in known special status plant habitats and potential habitats in special designations, riparian habitats, and native plant communities. Alternative V would treat the second largest acreage of the alternatives and would have intermediate potential to reduce introduction and spread, and control or eradicate noxious weeds and invasive plants in occupied and potential special status plant habitats. Methods prescribed under Alternative V are more passive than for other alternatives; therefore, treatment utilizing non-chemical means for control or eradication might require repeated application. Conversely, methods used to control or eradicate noxious weeds and invasive plants under Alternative V would tend to reduce the potential for treatment and impacts to non-target vegetation, including special status plants. The spread of noxious weeds and invasive plants in occupied or potential special status plant habitats could be reduced by lack of soil surface disturbance and seed transport associated with livestock grazing (see *Impacts from Livestock Grazing Actions* in the *Noxious Weeds and Invasive Plants* section*)*. The analysis of short- and long-term effects of vegetation treatments is discussed under *Impacts from Upland Vegetation Actions.*

Impacts from Wildland Fire Ecology and Management Actions

The effects of wildland fire management actions are primarily to the plant community as a whole and are discussed in the *Upland Vegetation* section. Critical Suppression Areas can result in protection of special status plants. Table 4- 112 identifies the special status plants within Critical Suppression Areas for each alternative.

Table 4- 112. Known Special Status Plant Populations in Critical Suppression Areas by Alternative

Species	Alternatives [A]					
	I	II	III	IV		V
				IV-A	IV-B	
Annual/Biennial Forbs						
Alkali cleomella [B]	X	X	X	X	X	X
Desert pincushion [B]						
Least phacelia						X
Rigid threadbush [B]	X		X	X	X	X
Slickspot peppergrass	X		X	X	X	X
Spreading gilia [B]	X		X	X	X	
White eatonella [B]						
White-margin waxplant [B]	X	X	X	X	X	X
Perennial Forbs						
American wood sage						
Broadleaf fleabane	X	X	X	X	X	X
Bruneau River phlox	X	X	X	X	X	X
Calcareous buckwheat	X	X	X	X	X	X
Chatterbox orchid	X	X	X	X	X	X
Cusick’s primrose	X			X	X	X
Davis peppergrass	X		X	X	X	X
Four-wing milkvetch	X		X	X	X	X
Greeley’s wavewing	X	X	X	X	X	X
Janish penstemon	X	X	X	X	X	X
Lewis buckwheat				X		X
Matted cowpie buckwheat	X	X	X	X	X	X
Newberry’s milkvetch	X		X	X	X	X
Owyhee milkvetch						
Packard’s cowpie buckwheat	X	X	X	X	X	X
Spine-node milkvetch	X	X	X	X	X	X
Two-headed onion	X		X	X	X	X
Non-Vascular Plants						
Earth lichen	X		X	X	X	X
Woven-spore lichen						

[A] The No Action Alternative identifies the entire planning area as Full Suppression; because of the lack of prioritization within the planning area, impacts are most similar to those in Conditional Suppression Areas.
[B] Desert Annual Guild
Source: Idaho Department of Fish and Game, Idaho Natural Heritage Program (INHP); and BLM field inventory.

Fire suppression priorities and activities could result in direct impacts to special status plants, including removal or disturbance of plants, their seed banks, or habitat due to fire suppression activities or burning. Post-fire ES&BAR activities or fuels reduction actions could result in physical disturbance of existing plants or seed banks, or modification of existing or potential habitat. The effects of specific treatments for some ES&BAR or fuels reduction actions are described in detail under *Impacts from Upland Vegetation Actions.*

Impacts from Management Specific to the No Action Alternative

Under the No Action Alternative, the entire planning area is under full suppression; therefore, there is no prioritization for wildland fire suppression. Lack of prioritization reduces the potential for critical resource needs to be identified and acted on in the event of multiple starts. Therefore, there is a higher potential for any location in the planning area to burn under the No Action Alternative compared to the action alternatives. This could also increase potential for burning of occupied or potential special status plant habitats.

Actions that would limit surface disturbance would reduce potential for disturbance or destruction of special status plants, seed banks, or occupied or potential habitat due to construction of new control lines.

Impacts from Management Common to All Action Alternatives

Most management common to all action alternatives would not directly affect special status plants, their seed banks, or occupied or potential habitat. The direction to use BMPs would reduce the potential for disturbance or destruction of known populations and occupied habitat from fire suppression activities; however, these protections would not occur if life or property are threatened and would not extend to potential habitats. Direction to consider resource values and management prescriptions for ACECs could reduce the potential for disturbance or destruction of special status plants or their habitats where they are a relevant and important value. The use of guidelines referenced in the ARMS would reduce the potential for disturbance or destruction of special status plants occurring in riparian habitats due to suppression activities or fuels treatments.

Utilizing seeding equipment, tools, or techniques that minimize soil disturbance would reduce the potential for disturbance or destruction of special status plants, or disturbance of seed banks or habitat. Resting areas with fuels or ES&BAR treatments from uses until objectives are met would increase the potential for success. This would also increase the potential for recovery of special status plants or habitats in treated areas.

Impacts from Management Specific to Alternative I

Wildland fire management actions proposed under Alternative I would maintain or slightly decrease occupied or potential habitat for special status plants. Alternative I identifies 481,000 acres (35% of the planning area) as Critical Suppression Areas with priorities in the WUI; the Bruneau-Jarbidge, Lower Bruneau Canyon, Middle Snake, and Salmon Falls Creek ACECs; and key sage-grouse habitat. Unburned patches of native grassland and native shrubland within the perimeter of an active fire would be protected, while unburned annual and non-native perennial communities would be allowed to burn. Based on suppression priorities in Alternative I, priority VSGs would be Native Grassland and Native Shrubland.

Known populations of 22 special status plants would be protected within Critical Suppression Areas (Table 4- 112). Multiple populations for some species occur within the Critical Suppression Areas. Not all populations occur in native plant communities; they might occur in annual, non-native perennial, non-native understory, or unvegetated areas within priority areas. Critical suppression priorities would protect 59% of native plant communities in the planning area prior to implementation of vegetation treatments and 52% of the planning area upon completion of proposed treatments (Table 4- 75).

Allowing wildland fire to burn annual and non-native perennial communities within the perimeter of an active fire would facilitate restoration of these communities to native shrubland. This could result in expansion of potential habitat for special status plants that are ecologically tied to native shrubland communities (Table 3-22).

Approximately 11,000 acres (less than 1% of the planning area) of vegetated fuel breaks would be installed under Alternative I. Fuel breaks placed to protect restoration and ES&BAR treatments would enhance the potential for treatment success and expansion of potential habitat for special status plants. However, fuel breaks also create linear disturbances that can facilitate introduction and spread of noxious weeds and invasive plants (Merriam, et al., 2006) into occupied and potential habitat. Actions to locate fuel breaks in existing disturbance corridors and to treat noxious weeds and invasive plants in fuels reduction projects would reduce this potential. The effects of fuels treatment methods are described under *Impacts from Upland Vegetation Actions.*

Soil surface disturbance associated with fire suppression activities (see the *Soil Resources* section) could disturb or destroy some special status plants or disturb seed banks or potential habitat. Occupied and potential habitat could be indirectly affected by the increased potential for the introduction and spread of noxious weeds and invasive plants resulting from fire suppression activities or burning. Application of MIST in slickspot peppergrass habitat would decrease the potential for inadvertent disturbance or destruction of plants or disturbance of seed banks or habitat due to fire suppression activities. Restriction of dozer blading within 300 feet of playas for protection of cultural resources would also protect populations of Davis peppergrass.

Impacts from Management Specific to Alternative II

Wildland fire management actions proposed under Alternative II would reduce the acres of occupied or potential habitat for special status plants. Alternative II identifies 172,000 acres (13% of the planning area) as Critical Suppression Areas with priorities in the WUI. Unburned patches of native and non-native perennial communities within the perimeter of an active fire would be protected, while unburned annual communities would be allowed to burn. Based on suppression priorities in Alternative II, priority VSGs would be Native Grassland and Non-Native Perennial.

Known populations of 13 special status plants would be protected within Critical Suppression Areas (Table 4- 112). Multiple populations for some species occur within the Critical Suppression Areas. Not all populations occur in native plant communities; they might occur in annual, non-native perennial, non-native understory, or unvegetated areas within priority areas. Critical suppression priorities would protect 23% of priority VSGs in the planning area prior to implementation of vegetation treatments and 20% of the planning area upon completion of proposed treatments (Table 4- 76).

Fire management priorities under Alternative II provide low levels of protection to resources outside of WUI. Native and non-native perennial grasslands would be relatively resilient if burned. Critical suppression priorities do not extend to either native shrubland or non-native understory communities under Alternative II; therefore, these areas would be more likely to burn, resulting in loss of shrubland habitats and occupied and potential habitat for special status plants with ecological ties to native shrublands.

Approximately 13,000 acres (less than 1% of the planning area) of vegetated fuel breaks would be installed under Alternative II. Fuel breaks placed to protect commercial facilities and in non-native perennial communities to protect native communities could protect some occupied and potential habitat for special status plants, but also could facilitate introduction and spread of noxious weeds and invasive plants into those habitats. Integration of noxious weed and invasive plant treatments into fuels reduction projects would reduce this potential. The effects of fuels treatment methods are described under *Impacts from Upland Vegetation Actions.*

Soil surface disturbance associated with fire suppression activities (see the *Soil Resources* section) could disturb or destroy some special status plants or disturb seed banks or potential habitat. Occupied and potential habitat could be indirectly affected by increased potential for introduction and spread of noxious weeds and invasive plants resulting from fire suppression activities or burning. Restricting dozer blading within 150 feet of playas for protection of cultural resources would also protect populations of Davis peppergrass.

Impacts from Management Specific to Alternative III

Wildland fire management actions proposed under Alternative III would maintain or slightly decrease occupied or potential habitat for special status plants. Alternative III identifies 469,000 acres (34% of the planning area) as Critical Suppression Areas with priorities in the WUI, the Bruneau-Jarbidge and Salmon Falls Creek ACECs, and key sage-grouse habitat. Unburned patches of native and non-native perennial communities within the perimeter of an active fire would be protected, while unburned annual communities would be allowed to burn. Based on suppression priorities in Alternative III, priority VSGs would be Native Shrubland (key sage-grouse habitat), Native Grassland, and Non-Native Perennial.

Known populations of 21 special status plants would be protected within Critical Suppression Areas (Table 4- 112). Multiple populations for some species occur within the Critical Suppression Areas. Not all populations occur in native plant communities; they might occur in annual, non-native perennial, non-native understory, or unvegetated areas within priority areas. Critical suppression priorities would protect 40% of priority VSGs in the planning area prior to implementation of vegetation treatments and 39% of the planning area upon completion of proposed treatments (Table 4- 77).

Fire management priorities for critical suppression would not fully protect the priority VSGs within the planning area. Native grassland and non-native perennial communities would be relatively resilient if burned. Alternative III would result in continued loss of shrubland habitats and occupied and potential habitat for special status plants with ecological ties to native shrublands.

Alternative III contains the largest network of fuel breaks, placed in strategic locations to disrupt continuity of fuels and to protect important resources such as sage-grouse and slickspot peppergrass habitat. Approximately 25,000 acres (2% of the planning area) of vegetated fuel breaks and 11,000 acres (less than 1% of the planning area) of unvegetated fuel breaks would be installed under Alternative III. This action could reduce the potential for disturbance of special status plants or their habitat associated with large fires. However, it would also create a network of linear disturbance areas that can facilitate introduction and spread of noxious weeds and invasive plants (Merriam, et al., 2006) into occupied or potential habitat. Treatment of noxious weeds and invasive plants in fuels reduction projects would reduce this potential. The effects of fuels treatment methods are described under *Impacts from Upland Vegetation Actions.*

Soil surface disturbance associated with fire suppression activities (see the *Soil Resources* section) could disturb or destroy some special status plants or disturb seed banks or potential habitat. Occupied and potential habitat could be indirectly affected by increased potential for introduction and spread of noxious weeds and invasive plants resulting from fire suppression activities or burning.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Wildland fire management actions proposed under Alternative IV would maintain or increase acreage of occupied or potential habitat for special status plants. Alternative IV-A identifies 594,000 acres (43% of the planning area) and Alternative IV-B (the Preferred Alternative) identifies 555,000 acres (40% of the planning area) as Critical Suppression Areas, with priorities in the WUI; the Bruneau-Jarbidge, Inside Desert, Jarbidge Foothills, and Lower Bruneau Canyon ACECs; and key sage-grouse habitat. Unburned patches of native grassland and native shrubland within the perimeter of an active fire would be protected, while unburned annual and non-native perennial communities would be allowed to burn. Based on suppression priorities in Alternative IV, priority VSGs would be Native Grassland and Shrubland.

Known populations of 23 and 22 special status plants would be protected within Critical Suppression Areas under Alternatives IV-A and IV-B, respectively (Table 4- 112). Multiple populations for some species occur within the Critical Suppression Areas. Not all populations occur in native plant communities; they might occur in annual, non-native perennial, non-native understory, or unvegetated areas within priority areas. Critical suppression priorities under Alternative IV-A would protect 73% of priority VSGs in the planning area prior to implementation of vegetation treatments and 58% of the planning area upon completion of proposed treatments; critical suppression priorities under Alternative IV-B would protect 68% and 54%, respectively (Table 4- 78). Populations, seed banks, and occupied and potential habitat for slickspot peppergrass would be protected within the Inside Desert ACEC. Alternative

IV-A would protect more of the area supporting populations, seed banks, and occupied and potential habitats compared to Alternative IV-B.

The effects of wildland fire management and fuels reduction actions would be similar to those described for Alternative I.

Impacts from Management Specific to Alternative V

Wildland fire management actions proposed under Alternative V would maintain or increase the acres of occupied or potential habitat for special status plants. Alternative V identifies 1,067,000 acres (78% of the planning area) as Critical Suppression Areas with priorities in the WUI; the Lower Bruneau Canyon, Middle Snake, and Sagebrush Sea ACECs; and key sage-grouse habitat. Unburned patches of native grassland and native shrubland within the perimeter of an active fire would be protected, while unburned annual and non-native perennial communities would be allowed to burn. Based on suppression priorities in Alternative V, priority VSGs would be Native Grassland and Shrubland.

Known populations of 23 special status plants would be protected within Critical Suppression Areas (Table 4- 112). Multiple populations for some species occur within the Critical Suppression Areas. Not all populations occur in native plant communities; they might occur in annual, non-native perennial, non-native understory, or unvegetated areas within priority areas. Critical suppression priorities would protect 100% of priority VSGs in the planning area prior to implementation of vegetation treatments and upon completion of proposed treatments (Table 4- 79). Critical suppression priorities would tend to reduce the risk of burning in native plant communities to the greatest extent of all the alternatives. This would reduce potential for burning special status plant occupied and potential habitat.

The effects of wildland fire management and fuels reduction actions would be similar to those described for Alternative I.

Approximately 7,000 acres (less than 1% of the planning area) of vegetated fuel breaks would be installed under Alternative V. Fuel breaks placed along roads would increasing the width of disturbance and the associated potential for introduction and spread of noxious weeds and invasive plants into occupied or potential habitat (Gelbard & Belnap, 2003; Gelbard & Harrison, 2003; Merriam, et al., 2006) (see *Impacts from Transportation and Travel Actions*). Treatment of noxious weeds and invasive plants in fuels reduction projects would reduce this potential. The effects of fuels treatment methods are described under *Impacts from Upland Vegetation Actions.*

Impacts from Livestock Grazing Actions

The effects of livestock grazing actions are primarily effects to the plant community as a whole and are discussed in the *Upland Vegetation* section. Livestock grazing can alter herbaceous cover and may influence species composition and structure of upland vegetation communities (Saab, et al., 1995), but the type and intensity of effects depend on factors such as type of livestock, stocking rate, season of use, use levels, and location and density of livestock facilities (e.g., fences, water, salt). The effects to special status plants can be direct (e.g., consumption, trampling, or uprooting of plants) or indirect (e.g., soil compaction, modification of soil nutrients or plant community composition and/or structure). Sheep would be more likely to consume forbs than cattle; however, trampling disturbance to forbs can be greater due to cattle than sheep (Vallentine, 2001).

Table 4- 113 identifies special status plants with populations in areas unavailable to livestock grazing; these populations would not experience impacts from livestock grazing. Bruneau River phlox is unaffected by livestock grazing due to occurrence of plants on vertical or overhanging canyon walls. For other special status plants, increased diversification of native plant communities (Anderson & Inouye, 2001) and biolgoical soil crusts (Ponzetti & McCune, 2001) that could occur with long-term exclusion from grazing could result in expansion of special status plant habitats. However, the extent and quality of recovery is dependent on numerous factors, as discussed in the *Upland Vegetation* section. Livestock grazing exclusion would not necessarily reduce competition to special status plants from existing populations of noxious weeds and invasive plants (see the *Noxious Weeds and Invasive Plants* section).

Table 4- 113. Known Special Status Plant Population in Areas Unavailable for Livestock Grazing by Alternative

Species	Alternative						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
Annual/Biennial Forbs							
Alkali cleomella[A]							
Desert pincushion[A]							
Least phacelia							
Rigid threadbush[A]	X	X	X	X	X	X	X
Slickspot peppergrass		X	X	X	X	X	X
Spreading gilia[A]	X	X	X	X	X	X	X
White eatonella[A]							
White-margin waxplant[A]	X	X	X	X	X	X	X
Perennial Forbs							
American wood sage							
Broadleaf fleabane							
Bruneau River phlox	X	X	X	X	X	X	X
Calcareous buckwheat	X	X	X	X	X	X	X
Chatterbox orchid	X	X	X	X	X	X	X
Cusick's primrose	X	X	X	X	X	X	X
Davis peppergrass							
Four-wing milkvetch	X	X	X	X	X	X	X
Greeley's wavewing		X			X	X	X
Janish penstemon	X	X	X	X	X	X	X
Lewis buckwheat							
Matted cowpie buckwheat	X	X	X	X	X	X	X
Newberry's milkvetch	X	X	X	X	X	X	X
Owyhee milkvetch							
Packard's cowpie buckwheat	X	X	X	X	X	X	X
Spine-node milkvetch	X	X	X	X	X	X	X
Two-headed onion	X	X	X	X	X	X	X
Non-Vascular Plants							
Earth lichen					X		
Woven-spore lichen							

[A] Desert Annual Guild
Data source: Idaho Department of Fish and Game, Idaho Natural Heritage Program (INHP); and BLM field inventory.

Impacts from Management Specific to the No Action Alternative

Under the No Action Alternative, 1,414,000 acres (97%) of the planning area would be available for livestock grazing and 51,000 acres (3%) of the planning area would be unavailable. Under the No Action Alternative, populations of 12 special status plants would be located in areas unavailable for grazing (Table 4- 113).

Allocations would remain as current; AUMs would increase with available forage due to completion of vegetation treatments. The effects of allocations to vegetation communities are described in the *Upland Vegetation* section. Allocations would be expected to maintain or decrease numbers of special status plants or populations as well as acres of occupied or potential habitat throughout the planning area. Local impacts of allocations on special status plants and occupied or potential habitats would be dependent on grazing systems, including rotations, seasons of use, and stocking rates. These impacts to special status plants and their habitats would be analyzed in detail for specific implementation-level grazing actions.

Increases in the miles of pipelines and fences and numbers of reservoirs, wells, or springs would result in increased density of linear disturbance and disturbed areas radiating from watering points and mineral supplement locations. The installation and maintenance of pipelines results in linear disturbance from burial and, unless pipelines are installed along existing roads, formation and maintenance of primitive roads through repeated use. Higher density of disturbed areas could increase the potential for direct or indirect effects to special status plants through trampling or consumption or competition with noxious weeds and invasive plants (see the *Upland Vegetation* section). Actions that exclude livestock from reservoirs and springs and prohibit placement of salting, feeding, holding facilities, or stock driveways in riparian areas would reduce the potential for disturbance or destruction of special status plants associated with those habitats (Table 3-22).

Impacts from Management Common to All Action Alternatives

Management actions for livestock grazing common to all action alternatives provide guidance and design criteria for implementation-level planning to reduce resource impacts. These actions would help maintain or improve plant community species diversity, structural complexity, and ecological function in upland and riparian plant communities and therefore would likely maintain or increase occupied or potential habitat for special status plants.

Impacts from Management Specific to Alternative I

Under Alternative I, 1,381,000 acres (94%) of the planning area would be available for livestock grazing and 84,000 acres (6%) of the planning area would be unavailable. Populations of 18 special status plants would be located in areas unavailable for grazing (Table 4- 113). Monitoring of special status plant populations and their habitats inside and outside of reference areas would provide information on livestock grazing impacts relative to plant community dynamics.

Livestock allocations under Alternative I would be similar to those described for the No Action Alternative. However, since use would be allocated over about 3% less acreage in the planning area, impacts could be spread over a slightly smaller area. This effect would be minor on the scale of the planning area.

The effects of allocations, estimated utilization levels, TNR, and actions to manage sage-grouse and big game habitat to vegetation communities are described in the *Upland Vegetation* section*.* These actions would be expected to maintain or decrease numbers of special status plants or populations and acres of occupied or potential habitat on the scale of the planning area. Proposed management under Alternative I would tend to maintain static conditions with some localized and periodic heavy use that could leave vegetation communities vulnerable to noxious weed and invasive plant introduction and spread. Local impacts of allocations on special status plants and occupied or potential habitats would be dependent on grazing systems, including rotations, seasons of use, and stocking rates. These impacts to special status plants and their habitats would be analyzed in detail for specific implementation-level grazing actions.

The impacts of targeted grazing to special status plants are described under *Impacts from Upland Vegetation Actions.*

The number, type, and density of range infrastructure developments under Alternative I would be similar to the No Action Alternative; however, locations could be modified to meet resource objectives. The effects of range infrastructure developments would be similar to those described for the No Action Alternative. Direction to locate minerals, supplements, new troughs, new reservoirs, and new holding facilities more than 300 feet from playas would reduce the potential for concentrated use in areas supporting Davis peppergrass. Prohibitions against new pipelines in WSAs; eligible, suitable, and designated WSRs; and ACECs would reduce potential for noxious weed and invasive plant introduction and spread in special status plant habitats.

The removal of fences could result in short-term disturbance due to access for removal of posts, wire, and other components. The long-term effects of fence removal to special status plants or their habitats would be dependent on continued use of established primitive roads and/or trails by humans and/or livestock, but could include recovery of vegetation adjacent to the former fence line. Recovery of plant communities in general and special status plants or their habitats in the vicinity of fence removal could be facilitated by treatment of noxious weeds and invasive plants.

The impacts described above would be moderated by implementation of management proposed for special status species common to all alternatives and for this alternative specifically (see *Impacts from Special Status Species Actions*).

Impacts from Management Specific to Alternative II

Under Alternative II, 1,406,000 acres (96%) of the planning area would be available for livestock grazing and 59,000 acres (4%) of the planning area would be unavailable. Populations of 16 special status plants would be located in areas unavailable for grazing (Table 4- 113). The impacts from reference areas would be similar to Alternative I; however, the opportunity for determining landscape-level grazing effects to special status plants and their habitats would be somewhat reduced under Alternative II due to reduced number and size of reference areas.

Increased allocations and anticipated increases in number and density of livestock infrastructure developments to support proposed allocations under Alternative II would result in a higher density of disturbed areas compared to the No Action Alternative.

The effects of allocations, estimated utilization levels, Reserve Common Allotments, TNR, and actions to manage sage-grouse habitat to vegetation communities are described in the *Upland Vegetation* section. These actions would be expected to decrease the number of special status plants or populations and acres of occupied or potential habitat on the scale of the planning area. Proposed management under Alternative II would tend to maintain static to downward-trending conditions with some localized and periodic heavy use that could leave vegetation communities vulnerable to noxious weed and invasive plant introduction and spread. While Reserve Common Allotments would not likely be located in slickspot peppergrass habitat, establishment in other locations could result in impacts to other special status plants. Local impacts of allocations on special status plants and occupied or potential habitats would be dependent on grazing systems, including rotations, seasons of use, and stocking rates. These impacts to special status plants and their habitats would be analyzed in detail for specific implementation-level grazing actions.

The impacts of targeted grazing to special status plants are described under *Impacts from Upland Vegetation Actions.*

The impacts described above would be moderated by implementation of management proposed for special status species common to all alternatives and for this alternative specifically (see *Impacts from Special Status Species Actions*).

Impacts from Management Specific to Alternative III

Under Alternative III, 1,404,000 acres (96%) of the planning area would be available for livestock grazing and 61,000 acres (4%) of the planning area would be unavailable. Populations of 16 special status plants would be located in areas unavailable for grazing (Table 4- 113). The impacts from reference areas would be similar to Alternative I; however, the opportunity for determining landscape-level grazing effects to special status plants and their habitats would be somewhat reduced under Alternative III due to reduced size of reference areas.

The effects of proposed allocations and infrastructure development would occur at a higher density within areas available to grazing compared to the No Action Alternative and Alternative I, but at a lower density compared to Alternative II. The effects of construction, installation, maintenance, and use of developments would be similar to those described for the No Action Alternative. The effects of fence removal or relocation would be similar to those described for Alternative I.

The effects of allocations, estimated utilization levels, Reserve Common Allotments, TNR, and actions to manage sage-grouse habitat to vegetation communities are described in the *Upland Vegetation* section. These actions would be expected to decrease the number of special status plants or populations and acres of occupied or potential habitat on the scale of the planning area. Proposed management under Alternative III would tend to maintain static conditions with some localized and periodic heavy use that could leave vegetation communities vulnerable to noxious weed and invasive plant introduction and spread. While Reserve Common Allotments would not likely be located in slickspot peppergrass habitat, establishment in other locations could result in impacts to other special status plants. Local impacts of allocations on special status plants and occupied or potential habitats would be dependent on grazing systems, including rotations, seasons of use, and stocking rates. These impacts to special status plants and their habitats would be analyzed in detail for specific implementation-level grazing actions.

The impacts of targeted grazing to special status plants are described under *Impacts from Upland Vegetation Actions.*

The impacts described above would be moderated by implementation of management proposed for special status species common to all alternatives and for this alternative specifically (see *Impacts from Special Status Species Actions*).

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Under Alternative IV-A, 1,320,000 acres (90%) of the planning area would be available for livestock grazing and 145,000 acres (10%) of the planning area would be unavailable; under Alternative IV-B (the Preferred Alternative), 1,352,000 acres (92%) of the planning area would be available for livestock grazing and 113,000 acres (8%) of the planning area would be unavailable. Under Alternative IV-A, populations of 18 special status plants would be located in areas unavailable for grazing; populations of 17 special status plants would be located in areas unavailable for grazing under Alternative IV-B (Table 4-113). Livestock exclusion would include areas in the Inside Desert ACEC identified for restoration of non-native perennial communities to native shrubland to support slickspot peppergrass. With the exception of Alternative V, the long-term effects of livestock exclusion would occur over larger and more contiguous areas, particularly for slickspot peppergrass populations and habitat within the Inside Desert ACEC. The opportunity for determining landscape-level grazing effects to special status plants and their habitats would be the same as for Alternative I.

The effects of allocations, estimated utilization levels, Reserve Common Allotments, TNR, and actions to manage sage-grouse and big game habitat to vegetation communities are described in the *Upland Vegetation* section*.* Proposed management under Alternative IV would tend to increase species and structural diversity of plant communities, as well as cover and species composition of biological soil crusts. These actions would be expected to maintain or increase numbers of special status plants or populations and acres of occupied or potential habitat on the scale of the planning area. The local impacts of allocations on special status plants and occupied or potential habitats would be dependent on grazing systems, including rotations, seasons of use, and stocking rates. These impacts to special status plants and their habitats would be analyzed in detail for specific implementation-level grazing actions.

The impacts of targeted grazing to special status plants are described under *Impacts from Upland Vegetation Actions.*

It is expected that the number and density of all types of range infrastructure developments under Alternative IV would decrease compared to the No Action Alternative due to decreased allocations. This would decrease potential for direct or indirect affects to special status plants via trampling or consumption or competition with noxious and invasive weeds (see the *Upland Vegetation* section). Locations of existing facilities could be modified to meet resource objectives. The effects of construction, installation, maintenance and use of developments would be similar to those described for the No Action Alternative. The effects of fence removal or relocation would be similar to those described for Alternative I.

Direction to locate supplements, new troughs, new reservoirs, and new holding facilities more than 300 feet from playas would reduce the potential for concentrated use in areas supporting Davis peppergrass. Prohibitions against new pipelines in WSAs; eligible, suitable, and designated WSRs; and ACECs would reduce potential for increased noxious weed and invasive plant introduction and spread in special status plant habitats.

The impacts described above would be moderated by implementation of management proposed for special status species common to all alternatives and for this alternative specifically (see *Impacts from Special Status Species Actions*).

Impacts from Management Specific to Alternative V

Under Alternative V, 1,156,000 acres (79%) of the planning area would be available for livestock grazing and 309,000 acres (21%) of the planning area would be unavailable. Populations of 18 special status plants would be located in areas unavailable for grazing (Table 4- 113). This would include areas in the Lower Bruneau Canyon and Middle Snake ACECs identified for restoration of annual and non-native perennial communities to native shrubland and non-native understory. The long-term effects of livestock exclusion would occur over the largest and most contiguous areas of all the alternatives. The opportunity for determining landscape-level grazing effects to special status plants and their habitats would increase under Alternative V due to the creation of large, pasture-size reference areas.

The effects of allocations, estimated utilization levels, and actions to manage sage-grouse and big game habitat to vegetation communities are described in the *Upland Vegetation* section*.* There would be no TNR, Reserve Common Allotments, or targeted grazing under Alternative V. Proposed management under Alternative V would increase species and structural diversity of plant communities, as well as cover and species composition of biological soil crusts. These actions would be expected to maintain or increase the number of special status plants or populations and acres of occupied or potential habitat throughout the planning area. Local impacts of allocations on special status plants and occupied or potential habitats would be dependent on grazing systems, including rotations, seasons of use, and stocking rates. These impacts to special status plants and their habitats would be analyzed in detail for specific implementation-level grazing actions.

It is expected that the number and density of all types of range infrastructure developments under Alternative V would decrease compared to the No Action Alternative to due to decreased allocations, especially in the Sagebrush Sea ACEC. This would decrease the potential for direct or indirect affects to special status plants via trampling or consumption or competition with noxious and invasive weeds (see the *Upland Vegetation* section). Locations of existing facilities could be modified to meet resource objectives. Effects of construction, installation, maintenance and use of developments would be similar to those described for the No Action Alternative. The effects of fence removal or relocation would be similar to those described for Alternative I.

Direction to locate supplements, new troughs, new reservoirs, and new holding facilities more than 300 feet from playas would reduce the potential for concentrated use in areas supporting Davis peppergrass. Prohibitions against new pipelines would reduce potential for increased noxious weed and invasive plant introduction and spread in special status plant habitats throughout the planning area.

The impacts described above would be moderated by implementation of management proposed for special status species common to all alternatives and for this alternative specifically (see *Impacts from Special Status Species Actions*).

Impacts from Transportation and Travel Actions

Cross-country motorized vehicle use, use and maintenance of routes, and route density can influence human-related disturbance, including introduction and spread of noxious weeds and invasive plants (Gelbard & Belnap, 2003; Gelbard & Harrison, 2003) and human-caused fire (Svejcar, 2003). Changes in travel designation (open to cross-country motorized vehicle use, limited to designated routes or ways, and closed to motorized vehicle use) and seasonal restrictions can influence vegetation continuity and condition. The effects to special status plants can be direct (removal or crushing of plants; physical disruption of soils containing rooted plants or seed banks), or indirect (e.g., soil compaction or erosion, modification of soil nutrients or plant community composition or structure).

Impacts from Management Specific to the No Action Alternative

Under the No Action Alternative, 77% of the planning area would be open to cross-country motorized vehicle use, 16% would be limited to designated routes, 5% would be limited to inventoried ways, and 2%

would be closed to motorized vehicle use. The majority of the closed area is in the WSA, where canyonland topography restricts travel. It is expected that cross-country motorized vehicle use would increase and that additional unplanned routes would be created by repeated use. This would result in a long-term increase in route density within the planning area.

Impacts to vegetation communities due to cross-country motorized use are described under *Impacts from Transportation and Travel Actions* in the *Upland Vegetation* section. Impacts to special status plants could occur due to damage or destruction of plants or disturbance to occupied or potential habitat resulting in increased potential for introduction and spread of noxious weeds and invasive plants.

Impacts from Management Common to All Action Alternatives

Management actions common to all action alternatives provide guidance and protective mechanisms that would reduce direct and indirect impacts to special status plants and their habitats due to route or travel designations.

Impacts from Management Specific to Alternative I

Under Alternative I, less than 1% of the planning area would be open to cross-country motorized vehicle use, 93% would be limited to designated routes, 5% would be limited to designated ways, and 4% would be closed to motorized vehicle use. About 3,600 acres of the Deadman/Yahoo SRMA, contained within the Deadman/Yahoo TMA, would be designated open to cross-country motorized vehicle use. This relatively small area currently has a high density of motorized use, which would be expected to continue under the open designation. This would likely result in direct and indirect impacts to calcareous buckwheat, Greeley's wavewing, Janish penstemon, and Snake River milkvetch. Plants could be damaged or destroyed by vehicles. Habitat could be modified as described in the *Upland Vegetation* section.

Route density is expected to decrease over about 48% of the planning area. This decrease would be focused in the Canyonlands, Jarbidge Foothills, and Snake River TMAs. Decreased route density is expected to reduce indirect effects to special status plants and their habitats, primarily due to the lower potential for noxious weed and invasive plant introduction and spread.

About 49% of the planning area would retain the current level of route density and would occur primarily in the Devil Creek TMA. Since the focus of this TMA would be to balance livestock grazing management needs with restoration activities, it is anticipated that route locations would continue to access existing livestock facilities and could be modified on establishment of new facilities. Increased route density is expected to increase indirect effects to special status plants and their habitats, primarily due to higher potential for noxious weed and invasive plant introduction and spread.

Actions that allow game retrieval within 300 feet of a designated route and access to camp sites within 25 feet of a designated route would result in an expansion of potential risks to special status plants and their habitats beyond the designated route corridor. It is expected that these actions would result in low density disturbances adjacent to designated routes, and could cause localized degradation of plant communities, especially if repeated use occurred. Cross-country motorized vehicle use could also damage or destroy special status plants occurring in the area. Exemptions to motorized vehicle restrictions that allow cross-country travel would have effects similar to those described for the No Action Alternative.

Areas closed to motorized vehicle use would be free of impacts associated with cross-country motorized vehicle use and roads described for the No Action Alternative and could serve as refugia for native plants, including special status plants (Gelbard & Harrison, 2003). These areas are small and isolated. Therefore, there would be limited potential for special status plant dispersal beyond the immediate area.

Seasonal closures or restrictions on primitive roads, trails, and areas open to cross-country motorized vehicle use would reduce the potential for human-caused wildland fire, and thus the potential for loss or modification of special status plant occupied and potential habitats. Implementation of BMPs to control noxious weeds and invasive plants in roadside areas would reduce impacts to upland vegetation in areas that would be open and limited to designated routes.

Impacts from Management Specific to Alternative II

Under Alternative II, none of the planning area would be open to cross-country motorized vehicle use, 93% would be limited to designated routes, 5% would be limited to designated ways, and 2% would be closed to motorized vehicle use. The lack of the open designation would eliminate impacts to special status plants and their habitats associated with that designation described for Alternative I.

Route density would be expected to increase in about 85% of the planning area, primarily within the Bruneau Desert TMA to facilitate access for commercial uses. Impacts of increased route density within the Bruneau Desert TMA would be similar to impacts described for the No Action Alternative. Route density would be expected to remain the same in about 15% of the planning area, primarily within the Canyonlands TMA to facilitate livestock grazing with mitigation for impacts to resources. Impacts within the Canyonlands TMA would be similar to those described for the Devil Creek TMA in Alternative I. Unlimited motorized access off designated routes for game retrieval and within 100 feet of a designated route for camp site access in areas not closed to motorized use would result in impacts similar to those described in Alternative I, but would apply to most of the planning area. Exemptions to motorized vehicle restrictions that allow cross-country travel would have effects similar to those described for the No Action Alternative.

The Bruneau and Jarbidge Canyons, which are physically restrictive to motorized transportation, would be closed to motorized vehicle use under Alternative II, providing negligible protection to special status plants and their habitats.

The effects of implementation of BMPs would be similar to those described for Alternative I.

Impacts from Management Specific to Alternative III

Under Alternative III, less than 1% of the planning area would be open to cross-country motorized vehicle use, 93% would be limited to designated routes, 5% would be limited to designated ways, and 2% would be closed to motorized vehicle use. The effects of designated open areas in the Deadman/Yahoo SRMA, which coincides with the Deadman/Yahoo TMA, to special status plants and their habitats would be similar to those described for Alternative I.

Route density would be expected to increase in about 2% of the planning area, primarily within the Deadman/Yahoo TMA to facilitate motorized recreational opportunities. The impacts of increased route density within the Deadman/Yahoo TMA would be similar to impacts described for Alternative I.

Route density would be expected to remain the same in about 98% of the planning area, primarily within the Devil Creek, Jarbidge Foothills, Snake River, and West Side TMAs. These TMAs would be managed to improve access and facilitate wildland fire prevention and suppression. Therefore, management might not increase route density, but could improve surface condition. Improvement of road condition could result in wider disturbance areas adjacent to roads due to increased maintenance, including mowing of roadside areas, and increased cover of noxious weeds and invasive plants due to increased use (Gelbard & Belnap, 2003). This would increase potential indirect impacts to special status plants and direct impacts to occupied and potential habitats occurring adjacent to improved routes.

The lack of motorized access off designated routes for game retrieval and limiting motorized access to camp sites to within 25 feet of a designated route would reduce off-road disturbance relative to the No Action Alternative and Alternatives I and II. Exemptions to motorized vehicle restrictions that allow cross-country travel would have effects similar to those described for the No Action Alternative.

The Salmon Falls Creek ACEC and the Bruneau and Jarbidge Canyons, which are physically restrictive to motorized transportation, would be closed to motorized vehicle use in Alternative III, providing negligible protection to special status plants and their habitats.

The effects of seasonal closures for wildland fire prevention and BMPs would be similar to those described for Alternative I.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Under Alternative IV, less than 1% of the planning area would be open to cross-country motorized vehicle use, 89% would be limited to designated routes, 5% would be limited to designated ways, and 5% would be closed to motorized vehicle use. The effects of designated open areas in the Deadman/Yahoo SRMA, which coincides with the Deadman/Yahoo TMA, would be similar to those described for Alternative I.

Route density would be expected to increase in about 2% of the planning area, primarily within the Deadman/Yahoo TMA to facilitate motorized recreational opportunities. The impacts of increased route density within the Deadman/Yahoo TMA would be similar to impacts described for Alternative I.

Route density would be expected to decrease in about 98% of the planning area, primarily within the Canyonlands, Devil Creek, Jarbidge Foothills, and Snake River TMAs. Decreased route density is expected to reduce indirect effects to special status plants and their habitats, primarily due to lower potential for noxious weed and invasive plant introduction and spread.

The lack of motorized access off designated routes for game retrieval and limiting motorized access to campsites to within 25 feet of a designated route would reduce off-road disturbance relative to the No Action Alternative and Alternatives I and II. Exemptions to motorized vehicle restrictions that allow cross-country travel would have effects similar to those described for the No Action Alternative.

The Bruneau-Jarbidge Canyon and non-WSA lands managed for their wilderness characteristics would be closed to motorized vehicle use in Alternative III. Closed areas would be free of impacts associated with off-road vehicle use and roads described for the No Action Alternative, and could serve as refugia for native plants, including special status plants (Gelbard & Harrison, 2003).

The effects of seasonal closures for wildland fire prevention and BMPs would be similar to those described for Alternative I.

Impacts from Management Specific to Alternative V

Under Alternative V, less than 1% of the planning area would be open to cross-country motorized vehicle use, 89% would be limited to designated routes, none would be limited to designated ways, and 11% would be closed to motorized vehicle use. The effects of designated open areas in the Yahoo SRMA, which coincides with the Yahoo TMA, would be similar to those described for Alternative I but would be spatially reduced by about 80%.

Route density would be expected to increase in less than 1% of the planning area, primarily within the Yahoo TMA to facilitate motorized recreational opportunities. The impacts of increased route density within the Yahoo TMA would be similar to impacts described for Alternative I, but would apply to less than 1% of the spatial area of Alternative I. This would affect populations of calcareous buckwheat, Greeley’s wavewing, and Snake River milkvetch.

Route density would be expected to decrease in about 99% of the planning area, primarily within the Devil Creek, Jarbidge Foothills, Snake River, and West Side TMAs. Decreased route density is expected to reduce indirect effects to special status plants and their habitats, primarily due to lower potential for noxious weed and invasive plant introduction and spread.

Since the density of routes within the planning area would be reduced, lack of motorized access off designated routes for game retrieval and limiting motorized access to campsites to within 25 feet of a designated route would reduce off-road disturbance to the greatest degree of all the alternatives. The application of motorized vehicle restrictions to lessees, BLM permit holders, and ROW holders would reduce the potential for cross-country motorized vehicle use to the greatest degree of all the alternatives and would eliminate most impacts to special status plants and their habitats associated as described in the No Action Alternative.

WSAs, including inventoried ways, and non-WSA lands managed for their wilderness characteristics would be closed to motorized vehicle use in Alternative V. The effects on special status plants and their habitats would be similar to Alternative I, but would cover a geographic area 3.5 times greater in size.

The effects of seasonal closures for wildland fire prevention and BMPs would be similar to those described for Alternative I.

Impacts from Areas of Critical Environmental Concern Actions

Special status plants and their habitats are identified as relevant and important values in the Bruneau-Jarbidge River, Inside Desert, Jarbidge Foothills, Lower Bruneau Canyon, Middle Snake, Sagebrush Sea, and Salmon Falls Creek ACECs. Table 4- 114 identifies special status plants with known populations in nominated ACEC by alternative. Special status plants can also be directly or indirectly affected by actions that manage for other important and relevant values.

Table 4- 114. Special Status Plants with Known Populations in ACECs by Alternative

Species	Alternatives						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
Annual/Biennial Forbs							
Alkali cleomella [A]							
Desert pincushion [A]							
Least phacelia							X[H]
Rigid threadbush [A]		X[D]			X[D]	X[D]	X[D]
Slickspot peppergrass					X[F]	X[F]	X[H]
Spreading gilia [A]		X[D]			X[D]	X[D]	X[D]
White eatonella [A]							
White-margin waxplant [A]		X[D]			X[D, G]	X[D, G]	X[D, H]
Perennial Forbs							
American wood sage							
Broadleaf fleabane					X[G]		X[H]
Bruneau River phlox	X[B]	X[B,D]		X[B]	X[B,D]	X[B,D]	X[H]
Calcareous buckwheat		X[E]					X[E]
Chatterbox orchid		X[D]			X[D]	X[D]	X[D]
Cusick's primrose	X[B]	X[B]			X[B]	X[B]	X[H]
Davis peppergrass	X[B]	X[B]		X[B]	X[B]	X[B]	X[H]
Four-wing milkvetch					X[G]	X[G]	X[H]
Greeley's wavewing		X[E]					X[E]
Janish penstemon		X[E]					X[E]
Lewis buckwheat					X[G]		X[H]
Matted cowpie buckwheat		X[E]					X[E]
Newberry's milkvetch					X[G]	X[G]	X[H]
Owyhee milkvetch							
Packard's cowpie buckwheat		X[D]			X[D]	X[D]	X[D]
Spine-node milkvetch		X[D]			X[D]	X[D]	X[D]
Two-headed onion					X[G]	X[G]	X[H]
Non-Vascular Plants							
Earth lichen					X[F]		X[H]
Woven-spore lichen							

[A] Desert Annual Guild
[B] Bruneau-Jarbidge River
[C] Salmon Falls Creek
[D] Lower Bruneau Canyon
[E] Middle Snake
[F] Inside Desert
[G] Jarbidge Foothills
[H] Sagebrush Sea
Source: Idaho Department of Fish and Game, Idaho Natural Heritage Program (INHP), and BLM field inventory.

Impacts from Management Specific to the No Action Alternative

Actions prescribed under the No Action Alternative for the Bruneau-Jarbidge ACEC would provide for specific and general protection for special status plants and their habitats (Table 4- 114). Protection of special status plants would be given priority over livestock and recreation use. Actions that would prohibit mineral and utility development and limit motorized vehicle use would also reduce potential habitat degradation for special status plants associated with noxious weed and invasive plant introduction and spread as described in the *Noxious Weeds and Invasive Plants* section.

Impacts from Management Specific to Alternative I

Actions prescribed under Alternative I for the Bruneau-Jarbidge ACEC would provide general protection for special status plants and their habitats in the Bruneau and Jarbidge Canyons and along the rims (Table 4- 114). Actions would tend to maintain native plant communities at the current acreage and condition. Required use of weed-free forage and straw, designating camp areas outside the ACEC, limiting motorized use to designated routes, prohibitions on mineral development, limits on new ROWs, and integrated treatment of noxious weeds and invasive plants would all reduce potential for introduction and spread of noxious weeds and invasive plants in occupied and potential habitat. Prioritization of the ACEC for critical suppression would reduce the potential for fire-related impacts to special status plants and their habitats as described under *Impacts from Wildland Fire Ecology and Management Actions.* Placement of livestock facilities (e.g., fencing, water, salt) to draw livestock away from bighorn sheep habitat would protect special status plants and their habitats within the ACEC from concentrated use. This would also shift patterns of livestock use outside the ACEC and impact other special status plant populations.

Actions prescribed under Alternative I for the Lower Bruneau Canyon ACEC would provide specific and general management for special status plants (Table 4- 114). Alternative I promotes restoration of annual and non-native plant communities to native shrubland within the ACEC. The short- and long-term effects of vegetation treatments are described under *Impacts from Upland Vegetation Actions.* This would improve existing and expand potential habitat for special status plants. Integrated treatment of noxious weeds and invasive plants and prioritization of the ACEC for critical suppression would reduce the potential for modification or loss of existing and restored habitats. Livestock grazing and new infrastructure would be allowed if compatible with desired success of restoration treatments and life-history needs for special status plants including support of pollinators and seed production. This would provide potential for special status plants to expand into restored habitats. Closure of the area to mineral leasing and salable mineral development would reduce potential degradation of habitat by introduction of noxious weeds and invasive plants (see the *Noxious Weeds and Invasive Plants* section).

Actions prescribed under Alternative I for the Middle Snake ACEC would provide specific and general management for special status plants (Table 4- 114). Actions prescribed under Alternative I would promote habitat restoration and transplant or seeding of special status plants. This would expand existing special status plant populations and their habitats. Integrated treatment of noxious weeds and invasive plants with special conditions applied for special status plants would reduce competition and habitat degradation and the potential for treatment impacts to special status plants. Prioritization of the ACEC for critical suppression would reduce the potential for modification or loss of existing or restored habitats. The effects of livestock grazing exclusion on upland vegetation communities are described under *Impacts from Livestock Grazing Actions*. Closure of the ACEC to mineral leasing and new salable mineral development would reduce potential for degradation of habitat introduction of noxious weeds and invasive plants (see the *Noxious Weeds and Invasive Plants* section).

Impacts from Management Specific to Alternative II

No ACECs would be designated under Alternative II; therefore, protections afforded to areas with relevant and important values for special status plants and their habitats would not occur.

Impacts from Management Specific to Alternative III

The effects of actions prescribed under Alternative III for the Bruneau-Jarbidge ACEC would be similar to those described for Alternative I, but would apply to about 67% of the area of Alternative I. Road improvement of some designated routes would decrease potential for physical disturbance to potential special status plant habitat due to road braiding. Increased potential for noxious weed or invasive plant introduction and spread due to road improvement (see *Impacts from Travel and Transportation Actions*) would be offset by integrated weed management within the ACEC.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Actions prescribed under Alternative IV for the Bruneau-Jarbidge ACEC provide specific direction to restore and protect Davis peppergrass habitat and populations. Actions would tend to maintain special status plant populations and their habitats by limiting human and livestock disturbance. Required use of weed-free forage and straw, designating camp areas outside the ACEC, limiting motorized use to designated routes, and integrated treatment of noxious weeds and invasive plants would all reduce risk of habitat degradation due to introduction and spread of noxious weeds and invasive plants. Prioritization of the ACEC for critical suppression would reduce the potential for fire-related impacts to status plants and their habitats as described under *Impacts from Wildland Fire Ecology and Management Actions*. Placement of livestock facilities (e.g., fencing, water, salt) to draw livestock away from bighorn sheep habitat would protect special status plants and their habitats within the ACEC from concentrated use. This would also shift patterns of livestock use outside the ACEC and impact other special status plant populations.

Actions prescribed under Alternative IV for the Inside Desert ACEC would provide specific management to protect slickspot peppergrass populations and restore habitat. Alternative IV-B (the Preferred Alternative) would protect 56% of the area of Alternative IV-A. Integrated treatment of noxious weeds and invasive plants and prioritization of the ACEC for critical suppression would reduce the potential for fire-related impacts to slickspot peppergrass populations and habitat as described under *Impacts from Wildland Fire Ecology and Management Actions*. Elimination of camping and staging areas for fire suppression and rehabilitation in the ACEC would reduce the potential for human disturbance that would result in small-scale fragmentation of plant communities and increased potential for introduction and spread of noxious weeds and invasive plants. The effects of livestock grazing exclusion, motorized vehicle closure, and closure to mineral leasing and development would improve potential for success of habitat restoration treatments by reducing on-going disturbance and related introduction and spread of noxious weeds and invasive plants. Specific effects of exclusion from livestock grazing and access closures are described under *Impacts from Livestock Grazing Actions* and *Impacts from Transportation and Travel Actions.*

Actions prescribed under Alternative IV for the Jarbidge Foothills ACEC would indirectly protect special status plants and their habitats (Table 4- 114) by limiting human and livestock disturbance. Alternative IV-B would protect 48% of the area of Alternative IV-A. Required use of weed-free forage and straw, designating camp areas within the ACEC, limiting motorized use to designated routes, and integrated treatment of noxious weeds and invasive plants would all reduce risk of fragmentation of special status plant habitats due to introduction and spread of noxious weeds and invasive plants. Prioritization of the ACEC for critical suppression would reduce the potential for fire-related impacts to status plants and their habitats as described under *Impacts from Wildland Fire and Ecology Management Actions*. Management actions that specifically reduce disturbance of sage-grouse during breeding and nesting periods and for protection of habitat would likewise protect special status plants and their habitats during active growth periods for plants.

Impacts of actions prescribed under Alternative IV for the Lower Bruneau Canyon ACEC would be identical to those described for Alternative I.

Impacts from Management Specific to Alternative V

Impacts of actions prescribed under Alternative IV for the Lower Bruneau Canyon ACEC would be identical to those described for Alternative I.

Effects of actions prescribed under Alternative V for the Middle Snake ACEC would be similar to those described for Alternative I, except that livestock grazing would be not allowed in the Asquena pasture.

This would increase potential for special status plant habitat restoration and increased populations due to transplant and seeding for the entire ACEC.

Actions prescribed under Alternative V for the Sagebrush Sea ACEC would provide protection for special status plant populations and existing and restored habitats over about 70% of the planning area in VMAs B, C, and D (Table 4- 114). Specific direction to restore Davis peppergrass habitat would increase potential for long-term maintenance and increase of populations. Stipulations requiring use of only native species in vegetation treatments would reduce potential for competition from non-native perennial plants special status plants. Additional stipulations for treatment buffers and exclusion of aerial spraying for slickspot and Davis peppergrass would reduce potential for damage or death of plants due to herbicide application.

Reduction of utilization levels to 10% to 20% and corresponding livestock infrastructure would promote the success of restoration treatments by minimizing post-treatment effects associated with livestock trampling and grazing (Stevens, 2004) (see the *Upland Vegetation* section). Required use of weed-free forage and straw, designating camp areas within the ACEC, limiting motorized use to designated routes, and integrating treatment of noxious weeds and invasive plants would all reduce risk degradation of occupied and potential special status plant habitats due to introduction and spread of noxious weeds and invasive plants. Prioritization of the ACEC for critical suppression would reduce the potential for fire-related impacts to status plants and their habitats as described under *Impacts from Wildland Fire Ecology and Management Actions*.

Summary of Direct and Indirect Impacts

Table 4- 115 contains a summary of the impacts of proposed management by alternative.

Impacts from the No Action Alternative

The No Action Alternative ranked sixth for management of special status plants and their habitats. While the No Action Alternative would do little to restore potential habitat, it contains low levels of management for protection of existing populations. This includes indirect impacts from special management for bighorn sheep in the Bruneau-Jarbidge ACEC.

Overall, the No Action Alternative would result in minor adverse impacts to BLM Sensitive plants. Threatened and Endangered plants would continue to be protected through current conservation and recovery plans.

Impacts from Alternative I

Alternative I ranked fourth for management of special status plants. This is due primarily to intermediate levels of habitat restoration and management that would reduce fire-related impacts to special status plants and their habitats and prevent direct and indirect impacts due to cross-country motorized use and route densities. ACEC designations under Alternative I would provide intermediate levels of management. Protections for special status plants and their habitats would only occur along the Bruneau, Jarbidge, Middle Snake, and Salmon Falls Creek drainages; populations and habitats in the interior of the planning area would not have elevated levels of management.

Overall, Alternative I would result in minor beneficial impacts to BLM Sensitive plants. Threatened and Endangered plants would continue to be protected through current conservation and recovery plans.

Impacts from Alternative II

Alternative II would do the least to manage for special status plants and their habitats. This is due to low levels of habitat restoration combined with the highest amount and intensity of livestock use and impacts due to route densities. Critical fire suppression priorities would do little to protect special status plants and their habitats. Under Alternative II there would be no ACEC designations and, therefore, no special management for special status plants and their habitats.

Overall, Alternative II would result in moderate adverse impacts to BLM Sensitive plants. Threatened and Endangered plants would continue to be protected through current conservation and recovery plans.

Table 4- 115. Summary of Impacts to Special Status Plants

<table>
<tr><th rowspan="3"></th><th colspan="7">Alternatives</th></tr>
<tr><th rowspan="2">No Action</th><th rowspan="2">I</th><th rowspan="2">II</th><th rowspan="2">III</th><th colspan="2">IV</th><th rowspan="2">V</th></tr>
<tr><th>IV-A</th><th>IV-B</th></tr>
<tr><td colspan="8">Special Status Species</td></tr>
<tr><td>Maintain or Increase Existing Populations (1=highest, 6=lowest)</td><td>4</td><td>3</td><td>6</td><td>5</td><td colspan="2">1</td><td>2</td></tr>
<tr><td>Maintain or Increase Occupied or Potential Habitat (1=highest, 6=lowest)</td><td>5</td><td>2</td><td>6</td><td>4</td><td colspan="2">1</td><td>3</td></tr>
<tr><td>Maintain or Increase Existing Populations by Supporting Pollinators (1=highest, 6=lowest)</td><td>2</td><td>1</td><td>2</td><td>2</td><td colspan="2">1</td><td>1</td></tr>
<tr><td colspan="8">Upland Vegetation Communities</td></tr>
<tr><td>Maintain or Increase Habitat (1=highest; 7=lowest)</td><td>6</td><td>3</td><td>5</td><td>4</td><td colspan="2">1</td><td>2</td></tr>
<tr><td colspan="8">Noxious Weeds and Invasive Plants</td></tr>
<tr><td>Maintain or Increase Occupied or Potential Habitat (1=highest, 6=lowest)</td><td>6</td><td>3</td><td>4</td><td>5</td><td colspan="2">1</td><td>2</td></tr>
<tr><td colspan="8">Wildland Fire Ecology and Management</td></tr>
<tr><td>Maintain Existing Populations and Occupied or Potential Habitat (1=highest; 7=lowest)</td><td>7</td><td>4</td><td>6</td><td>5</td><td>2</td><td>3</td><td>1</td></tr>
<tr><td colspan="8">Livestock Grazing</td></tr>
<tr><td>Maintain Existing Populations and Occupied or Potential Habitat (1=highest; 7=lowest)</td><td>5</td><td>4</td><td>7</td><td>6</td><td>2</td><td>3</td><td>1</td></tr>
<tr><td colspan="8">Travel and Transportation Management</td></tr>
<tr><td>Maintain Existing Populations and Occupied or Potential Habitat (1=highest; 6=lowest)</td><td>6</td><td>3</td><td>5</td><td>4</td><td colspan="2">2</td><td>1</td></tr>
<tr><td colspan="8">ACECs</td></tr>
<tr><td>Maintain or Increase Existing Populations and Occupied or Potential Habitat (1=highest; 7=lowest)</td><td>5</td><td>4</td><td>7</td><td>6</td><td>2</td><td>3</td><td>1</td></tr>
<tr><td colspan="8">Note: Rankings on each line are intended to convey how well each alternative maintains special status plant populations and habitats. A ranking of 1 indicates that the alternative result in high potential to maintain or increase existing populations and occupied or potential habitats; a rating of 7 would indicate lower potential. Rankings are for comparison purposes within a row only and are not meant to be additive by alternative.</td></tr>
</table>

Impacts from Alternative III

Alternative III ranked fifth for management of special status plants and their habitats. This is due primarily to relatively high levels of habitat fragmentation due to management actions intended to reduce large, landscape-level wildland fires. Establishment of vegetated and unvegetated fuel breaks, combined with increased fire suppression infrastructure, would break up contiguous blocks of special status plant habitats and create opportunities for introduction and spread of noxious weeds and invasive plants. Alternative III also contains reduced levels of noxious weed controls compared to the other action alternatives and focuses on fuels reduction. Improvement of routes to facilitate fire suppression would also increase the potential for introduction and spread of noxious weeds and invasive plants. Critical fire suppression priorities extend protections to non-native perennial communities and do not fully protect occupied and potential habitats for special status plants. ACEC designations under Alternative III would only manage special status plants and habitats along the Bruneau and Jarbidge Rivers and in an area two-thirds the size of that protected under Alternative I. Therefore populations and habitats for special status plants throughout most of the planning area would not have elevated levels of management.

Overall, Alternative III would result in minor adverse impacts to BLM Sensitive plants. Threatened and Endangered plants would continue to be protected through current conservation and recovery plans.

Impacts from Alternative IV (the Preferred Alternative)

Alternative IV-A ranked first in maintaining existing special status plant populations and maintaining or increasing occupied and potential habitats. This is due primarily to actions that actively restore habitats, including diversification of plant community composition to support pollinator species. While short-term impacts exist, Alternative IV as a whole would do the most to improve the quality of existing and potential habitats and prevent habitat degradation due to introduction and spread of noxious weeds and invasive plants. Management is included in Alternative IV-A to reduce fire-related impacts to special status plants and their habitats and to prevent direct and indirect impacts due to cross-country motorized vehicle use and route densities. ACEC designations under Alternative IV-A would provide direct and indirect management for special status plants and their habitats throughout the planning area. Alternative IV-A was rated first for its ability to maintain or increase special status plant populations and their habitats. Alternative IV-B (the Preferred Alternative) was rated third due to reduced acreages for special management associated with ACECs.

Overall, Alternative IV would result in moderate beneficial impacts to BLM Sensitive plants. Threatened and Endangered plants would continue to be protected through current conservation and recovery plans.

Impacts from Alternative V

Alternative V ranked second for management of special status plants. This is due primarily to the passive nature of restoration actions and noxious and invasive weed treatments, which would reduce acreage and increase length of time required for potential habitat restoration. Alternative V provided the greatest amount of active management to reduce fire-related impacts to special status plants and their habitats, and to prevent direct and indirect impacts due to cross-country motorized vehicle use and route densities. ACEC designations under Alternative V would provide direct and indirect management for special status plants and their habitats on the most acreage of all the alternatives, and, thus, for the most special status plant species and populations. However, management under Alternative V would allow for more uses, which could result in indirect impacts to special status plants and their habitats.

Overall, Alternative V would result in minor beneficial impacts to BLM Sensitive plants. Threatened and Endangered plants would continue to be protected through current conservation and recovery plans.

Cumulative Impacts

Past, Present, and Reasonably Foreseeable Actions

Cumulative impacts for special status plants consist of incremental effects of the alternatives when added to other past, present, and reasonably foreseeable future actions. These effects can occur over a long period of time, resulting in the gradual changes to special status plants.

Because of similarities in geology, soils, and vegetation, the planning area and the following areas form the geographic boundary for the analysis of cumulative effects on special status plants: adjacent portions of BLM's Burley, Bruneau, Shoshone, and Wells FOs, and Snake River Birds of Prey National NCA; the South Hills Unit of the Sawtooth National Forest; and the Jarbidge Ranger District of the Humboldt-Toiyabe National Forest. The area includes Federal, State, and private lands. The temporal scope of the analysis is approximately 20 years or the life of the plan.

Past, present, and reasonably foreseeable actions for the following resource and resource uses cumulatively affect special status plants:

- Military Use
- Wildland Fire Ecology and Management
- Livestock Grazing
- Transportation and Travel

These actions are described in detail in the *Introduction* to this chapter.

Summary of Cumulative Impacts

Cumulative Impacts from the No Action Alternative

Since live ordnance is no longer used at the military ranges, the current and future impacts to special status plants and their habitats are related to use of routes within the planning area for transport of vehicles, equipment, and personnel to and from the ranges. BLM also provides the military with fire suppression assistance for wildland fires within the ranges under cooperative agreement. In the event of multiple ignitions, fire suppression priorities within the planning area could be modified to provide suppression assistance. Although BLM has no control over these impacts, BLM actions that affect transportation and travel and wildland fire management, when added to the effects of military use, result in cumulative impacts to special status plants and their habitats. The USAF performs monitoring on slickspot peppergrass populations to determine impacts from grazing, fire, and rehabilitation treatments (CH2MHILL, 2008). This ongoing monitoring is complementary to techniques for monitoring slickspot peppergrass range wide and therefore provides additional information regarding effects of management activities.

Past livestock grazing and wildland fires resulted in vegetation removal and, in some areas, replacement with annual or non-native perennial communities. This conversion has been extensive throughout the cumulative analysis area, particularly in areas where the elevation is less than 5,000 feet. Wildland fires and associated impacts to plant communities are expected to continue within the planning area as well as adjacent Federal, State, and private lands. Under the No Action Alternative, the frequency and scale of wildland fire is expected to occur at current or increased levels. High suppression priorities for ignitions on military ranges could shift suppression efforts away from BLM-managed lands within the planning area or adjacent Federal, State, or private lands in the event of multiple incidents. This could result in local or large-scale decreases in remaining vegetation and special status plant habitats. Removal of livestock from burned public lands and shifting use elsewhere could result in potential for direct and indirect impacts to special status plants, primarily populations or habitats on State or private lands.

Because most of the planning area would remain open to cross-country motorized vehicle use, users from surrounding areas with more restrictions (e.g., National Forests and the Snake River Birds of Prey NCA) would increasingly utilize the planning area, increasing potential damage or destruction of special status plants and their habitats in previously unused areas.

Cumulative Impacts from Alternative I

Cumulative impacts related to military lands would be the same as described for the No Action Alternative.

Under Alternative I, cumulative impacts related to wildland fire would be due to upland vegetation treatments and wildland fire management actions that would increase vegetation resilience and reduce fire size. This would potentially reduce impacts of wildland fire and associated potential for fire-related impacts to special status plants on adjacent Federal, State, and private lands.

Alternative I would increase the number of acres limited to designated routes and closed to motorized vehicle use within the cumulative analysis area. Restrictions in the planning area may result in increased impacts to special status plants and their habitats on adjacent Federal and State lands where cross-country motorized vehicle use is less restricted. Increased impacts to adjacent BLM lands would be short-term since the Bruneau, Burley, and Shoshone FOs are scheduled to prepare RMPs for their respective planning areas in the near future. Likewise, the Humboldt-Toiyabe National Forest has initiated their travel management planning process. According to current policy, transportation and travel allocations would substantially decrease the amount of areas open to cross-country motorized vehicle use.

Cumulative Impacts from Alternative II

Cumulative impacts related to military lands would be the same as described for the No Action Alternative.

Cumulative impacts regarding potential impacts to special status plants and their habitats under Alternative II are expected to be similar to the No Action Alternative. Alternative II prioritizes the least acreage of all action alternatives for critical suppression and creates a landscape dominated by non-native perennial communities. While these plant communities are relatively resilient in the event of fire, fire management priorities would increase potential for fire spread to adjacent Federal, State, and private lands. This would increase potential in those areas for fire-related impacts to special status plants and their habitats.

Although no areas would be open to cross-country motorized vehicle use, the impacts to special status plants would be larger in scale due to the expected increase in route density associated with commercial operations. As with Alternative I, the lack of cross-country motorized vehicle opportunities would likely shift current use to adjacent Federal or State lands with fewer restrictions.

Cumulative Impacts from Alternative III

Cumulative impacts related to military lands would be the same as described for the No Action Alternative.

Under Alternative III, cumulative effects of wildland fire management on special status plants and their habitats are expected to be slightly greater than Alternative I. Increases in fire suppression infrastructure could reduce potential for fire to spread to adjacent Federal, State, and private lands. However, the potential for degradation of existing habitats due to introduction and spread of noxious weeds and invasive plants would be greater. Cumulative impacts related to travel and transportation actions would be similar to Alternative I.

Cumulative Impacts from Alternative IV (the Preferred Alternative)

Cumulative impacts related to military lands would be the same as described for the No Action Alternative.

Under Alternative IV, cumulative impacts regarding wildland fire effects on special status plants and their habitats are expected to be slightly less than for Alternative I. This is due to greater acreage prioritized for critical suppression and reduced potential for fire spread to adjacent Federal, State, and private lands. The cumulative effects of transportation and travel actions would be similar to Alternative I.

Cumulative Impacts from Alternative V

Cumulative impacts related to military lands would be the same as described for the No Action Alternative.

Under Alternative V, cumulative impacts due to wildland fire effects on special status plants and their habitats would be lowest of all alternatives. Critical suppression priorities could reduce potential for impacts to special status plant populations on adjacent Federal, State, and private lands. Alternative V contains the most restrictive travel management allocations of all the alternatives. Therefore lack of cross-country motorized vehicle opportunities would likely shift current use to adjacent Federal or State lands with fewer restrictions.

4.3.7.2. Special Status Fish and Aquatic Invertebrates

Analysis Methods

Indicators

The following indicators were used for the analysis of impacts to special status fish and aquatic invertebrates:

- **Water quality and quantity in 303(d)-listed streams and riparian condition in streams with Proper Functioning Condition (PFC) data**– Water quality and quantity and riparian condition were used as indicators to assess the effects of management actions on ESA-listed (Threatened and Endangered) Snake River aquatic snails. Streams with these data are summarized in the *Water*

Resources section (Table 4- 38) and the *Riparian Areas and Wetlands* section (Table 4- 82). These indicators were used because management actions that pose a risk to water quality or riparian condition for the Snake River would also pose a risk to Snake River snails or their habitat. The variables used to determine water quality (i.e., sediment, water temperature, nutrients, streamflow) are the primary risk variables for Snake River snails; these are the same variables used to identify impaired water quality that results in the 303(d) listing of streams by DEQ and approved by the EPA.

- **Habitat condition for special status fish species in streams with Habitat Condition (HC) rating data** – HC ratings were generated from BLM's 2005 and 2006 fisheries habitat data and were used as an indicator for the analysis of direct and indirect impacts to special status fish species. HC ratings encompass streambank stability, streambank cover, stream substrate condition (including spawning fine sediments), water temperature (maximums for juvenile fish rearing), pool volume, pool quality, migration barriers, width-to-depth ratio, habitat complexity, and relative fish abundance. All of these instream habitat variables were evaluated and summarized into one HC rating for individual stream reaches (Appendix D). These instream habitat features were selected because they have the greatest influence on the reproduction and survival of Interior Columbia River redband trout (redband trout) and Columbia River Basin bull trout (bull trout) populations. Both of these species are broadly distributed throughout the planning area and are designated as special status species. Bull trout are Federally listed under ESA as Threatened, and redband trout are Type 2 BLM Sensitive. Results from the evaluation were used to identify stream reaches containing bull trout and/or redband trout in need of restoration (Restoration Reaches) and those needing to be protected as-is (Conservation Reaches). The BLM management policy is to improve and maintain the habitats used by these species for their long-term survival and recovery (BLM Manual 6840). For streams that do not have HC data, PFC data were used as a surrogate for habitat condition for special status fish (Table 4-118).

Methods and Assumptions

Impacts to special status fish and aquatic invertebrates from management in the following sections of Chapter 2 were analyzed in detail: *Special Status Species*, *Water Resources*, *Riparian Areas and Wetlands*, *Noxious Weeds and Invasive Plants*, *Wildland Fire Ecology and Management*, *Livestock Grazing*, *Recreation*, *Transportation and Travel*, *Land Use Authorizations*, *Minerals*, and *Areas of Critical Environmental Concern*. Management from the remaining sections was not analyzed in detail because the management did not vary measurably between alternatives or impact the indicator for special status species and aquatic invertebrates. **Impacts from management for special status fish and aquatic invertebrates** can be found under *Impacts from Special Status Species* in the *Tribal Rights and Interests*, *Water Resources*, *Riparian Areas and Wetlands*, *Fish*, *Livestock Grazing*, *Transportation and Travel*, *Land Use Authorizations*, and *Leasable Minerals* sections.

The process of defining HC rating categories appropriate for the planning area included building a matrix that compared literature-supported habitat requirements for redband trout and bull trout to the BLM habitat data collected during a planning area-wide survey in 2006. Descriptions of bull trout and redband trout habitat condition indicators and thresholds, defining a range of habitat conditions, are included in Appendix D (referred to as "the ARMS" throughout this section). These matrices allowed the identification of stream reaches that were functioning appropriately for fish, functioning with some level of risk to fish, or functioning at an unacceptable level for fish (Appendix D). The functional conditions for individual instream habitat variables were used to develop HC ratings. The BLM 2005 and 2006 stream survey data were used to identify habitats with the greatest relative fish abundance as a reference for good habitat condition and the habitats with the lowest relative fish abundance as a reference for poor habitat condition. The process of prioritizing stream reaches as Conservation or Restoration Reaches is described in Appendix D; Restoration Reaches were assigned a further priority of high, moderate, or low. These stream reaches are identified in Appendix D. In general, 34% of the stream reaches were identified as Conservation Reaches, 18% were identified as High Priority Restoration Reaches, 16% for were identified as a Moderate Priority Restoration Reaches, and 30% were identified as Low Priority Restoration Reaches (Table 4- 116; Appendix D).

Table 4- 116. Instream Functional HC Ratings for Bull Trout and Redband Trout Streams

Instream Functional Condition Class	HC Rating	Miles of Stream	Percent of Streams
Functioning Properly or Functioning at Risk	Conservation	18	34
Functioning at Risk	Restoration – High Priority	10	18
Functioning at Risk	Restoration – Moderate Priority	9	16
Functioning in an Unacceptable Condition [A]	Restoration – Low Priority	16	30
	Total	**53**	**100%**

[A] Includes stream miles in a degraded condition due to factors beyond BLM discretion (i.e., dewatered).

The priorities for Restoration Reaches (i.e., high, moderate, low) were compared to the riparian PFC ratings (Priority 1: FAR-NA and FAR-DN; Priority 2: FAR-UP and NF; and Priority 3: PFC) to identify stream reaches for improvement. The areas where the HC and PFC ratings overlap are identified as stream reaches with a clear need for restoration or conservation. Information on the riparian PFC designations and analysis process are in the *Riparian Areas and Wetlands* section.

The management objective for special status fish under all action alternatives is to maintain or improve the quality and quantity[7] of special status species habitat by managing public land activities to sustain or benefit those species. For special status fish, this means to maintain Conservation Reaches that are properly functioning for fish and improve Restoration Reaches where fish survival or reproduction are limited.

The effects analysis compares the relevant management actions under each alternative to the objective of maintaining the Conservation Reaches and improving the Restoration Reaches for special status aquatic species. Either the action contributes to attaining the objective, has a neutral effect, or reduces the likelihood the objective will be achieved. Perennial stream miles were provided to establish a context for the miles of streams that have the potential to be affected a specific land use allocation compared to the miles of streams with HC or PFC data that have the potential to be affected. The analysis was based on GIS-generated miles, which do not take into account topography or stream channel sinuosity (meander). The GIS miles can vary from the miles of stream measured during field surveys. Stream miles were rounded to the nearest mile.

Management actions that have the potential to affect the geothermal hot springs where the Bruneau hot springsnail occurs were considered in the analysis. The primary reasons for the decline of the Bruneau hot springsnail includes a reduction or loss of geothermal spring habitats resulting from the depletion of the regional geothermal aquifer underlying the Bruneau Valley Area (FWS, 2002), which is due to actions on private lands that are beyond BLM discretion. Many of the actions that would benefit Bruneau hot springsnail or their habitats on BLM-managed land, such as installing livestock grazing exclosure fences, have already been implemented to protect this species.

Assumptions for Special Status Fish and Aquatic Invertebrates

- Management actions and guidance in the ARMS would improve instream habitat conditions across the planning area in the long-term. It is recognized that restoration activities could lead to localized negative impacts to stream habitats in the short-term that would lead to benefits to the habitat in the long term.
- Management actions to improve special status fish species and their habitats would also improve habitats for non-special status fish species (i.e., native non-game fish) in streams where these species coexist.
- The guidance in the ARMS would provide sufficient protection for streams where native non-game fish do not coexist with special status fish (see the *Fish* section).
- For special status fish streams without HC data but with PFC data, management actions to improve PFC ratings would also improve instream condition and HC ratings.

[7] Quantity is not identified as an objective in Alternatives II and III.

- The Bruneau River and portions of Salmon Falls Creek have special designations that maintain these habitats in a high quality habitat condition that equates to management as a Conservation Reach.
- Any stream in an impaired condition would be identified for restoration or improvement within the limits of BLM discretion.
- Relative fish abundance was estimated using the unit of effort method and assumes that fish are distributed evenly through the reach.
- Fish habitat attributes may vary spatially, but the analysis integrates the habitat attributes over the entire stream reach.
- In bull trout habitat, field surveys did not include the entire stream reach. Habitat condition in the surveyed reaches is assumed to approximate habitat condition for the entire reach.
- Management actions that pose a risk to water quality or PFC ratings for the Snake River would also pose a risk to Snake River snails and their habitat. Implementing the ARMS, which includes priorities for improving HC and PFC ratings along the Snake River and its tributaries, would maintain or improve habitats occupied by Snake River snails. Implementing the ARMS would also minimize the risk for land uses to threaten the continued survival and reproduction of Snake River white sturgeon (white sturgeon) and Shoshone sculpin adjacent to the planning area.
- Management actions that pose a risk to geothermal springs would pose a risk to Bruneau hot springsnails and their habitat. Management actions implemented as a result of ESA consultation on the public land have reduced the potential for adverse affects to Bruneau hot springsnail. Implementing the ARMS, which includes priorities for improving HC and PFC ratings along the Bruneau River and its tributaries, would maintain or improve habitats occupied by Bruneau hot springsnail (USFS, et al., 2004).

Direct and Indirect Impacts

Impacts from Special Status Species Actions

Managing streams to maintain and promote the biological needs of special status aquatic species directly influences HC and PFC ratings. Special status aquatic species require stable streams that are well vegetated with low instream fine sediments and cool water temperatures for survival and reproduction (Appendix D). Shaded stream areas are preferred habitats of juvenile salmonids (Platts, 1991). PFC is a minimal requirement for special status aquatic species. HC goes beyond PFC by addressing sediment, water temperature, fish abundance, and instream characteristics related to hydrological function (i.e., pool depth, maximum width, length, area, number/mile, and dominant substrate).

Any actions related to restoring, conserving, moving toward or achieving a satisfactory HC rating for special status species habitat would improve PFC ratings for riparian areas. A total of 40 miles of streams have both PFC and HC data, including 20 miles (50%) of the Priority 1 riparian reaches. High Priority Restoration Reaches that are PFC Priority 1 would be a top priority for restoration activities. The HC and PFC ratings for streams with both types of data and their priorities for restoration are summarized in Table 4- 117.

Restoration priorities for streams containing special status species habitat that do not have HC data but have PFC data are summarized in Table 4- 118.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative includes management guidance to protect the aquatic habitat of Sensitive and Candidate species in the Snake River below lower Salmon Falls Dam that would provide some protection for aquatic species in that a portion of the Snake River, but would not protect bull trout and their habitats in the Jarbidge River Watershed or redband trout in the Jarbidge River Watershed, Bruneau River Watershed, or Salmon Falls Creek Watershed. The current management direction does not include guidance for improving the existing habitat condition in the Snake River or any other fish-bearing streams in the planning area. A portion of the Snake River snail habitat would be protected but not improved under this management direction. The 500-feet year round occupancy restrictions for oil and gas exploration and development would protect redband trout, white sturgeon, and Shoshone sculpin habitat, but would not protect bull trout habitat in the Jarbidge River Watershed. Some protection for occupied bull trout habitat would occur under the management for eligible WSR segments.

Table 4- 117. Riparian Priority Ratings for Conservation and Restoration Reaches (Miles)

HC Rating	Riparian Priority Rating	Miles
Conservation	Priority 1 (FAR-NA, FAR-DN)	9
	Priority 2 (FAR-UP, NF)	3
	Priority 3 (PFC)	1
Restoration – High Priority	Priority 1 (FAR-NA, FAR-DN)	2
	Priority 2 (FAR-UP, NF)	<1
	Priority 3 (PFC)	6
Restoration – Moderate Priority	Priority 1 (FAR-NA, FAR-DN)	3
	Priority 2 (FAR-UP, NF)	2
	Priority 3 (PFC)	3
Restoration – Low Priority	Priority 1 (FAR-NA, FAR-DN)	6
	Priority 2 (FAR-UP, NF)	2
	Priority 3 (PFC)	3
	Total	**40**

Table 4- 118. Riparian Priority Ratings for Stream Reaches Containing Special Status Species Habitat without HC Data

Riparian Priority Ratings	Perennial Stream Miles without HC Data
Priority 1 (FAR-NA, FAR-DN)	52
Priority 2 (FAR-UP, NF)	55
Priority 3 (PFC)	65
Unknown	20
Total Miles	**192**

The management direction in the No Action Alternative resulted in the instream habitat conditions for redband trout and bull trout that are summarized in Table 4- 116. The table is based on the 2005 and 2006 BLM fisheries data, which were collected during surveys of 53 miles of fish-bearing streams. The ARMS contains a detailed summary of PFC ratings, limiting factors, and Conservation and Restoration Reaches based on the 2005 and 2006 stream survey data. The guidance in the ARMS does not apply to the No Action Alternative; however, compliance with ESA consultations would minimize the potential for adverse affects to ESA-listed species and their habitats. BLM Sensitive species habitats would not have the same requirements as the ESA-listed species habitats.

The No Action Alternative does not provide specific guidance for the following land use actions that have the potential to affect special status aquatic species: livestock grazing, wildland fire management, recreation, transportation and travel, land use authorizations, or salable and locatable mineral exploration or development. Although there is guidance for activities to be evaluated on a case-by-case basis, it is unclear how or when changes in management would be implemented. This alternative does not identify how past impacts to special status aquatic species habitat would be restored or provide clear direction for avoiding impacts from new authorizations.

Impacts from Management Common to the No Action and All Action Alternatives

The No Action Alternative and all action alternatives include guidance to follow current conservation measures in biological opinions and letters of concurrence, which can be updated, revised, or replaced through future consultation with the FWS. This guidance would maintain or improve habitat conditions for aquatic species for which ESA consultation has been completed, such as bull trout, Snake River snails (i.e., Bliss Rapids snail, Utah valvata, Snake River physa), and Bruneau hot springsnail.

Impacts from Management Common to All Action Alternatives

All action alternatives include management direction to maintain or improve special status fish and aquatic species habitats as outlined in the ARMS. The ARMS provides guidance for maintaining or improving habitat conditions for special status aquatic species and identifies conservation and restoration priorities for managing their habitats. Current BLM policy is to incorporate the *Interior Columbia Basin Strategy and Aquatic Framework* (USFS, et al., 2004) and the *Guidance for Developing Aquatic Conservation Strategies for BLM Resource Management Plans in the Interior Columbia Basin* (USDI, 2008) into RMP revisions. Implementation of the ARMS would improve aquatic indicators for HC and PFC ratings over the life of the plan.

All action alternatives include specific management guidance for ESA-listed or BLM Sensitive aquatic species (Table 3- 24 and Table 3- 26), including completing ESA consultation with FWS prior to authorizing any action that may affect ESA-listed species or their habitat. Actions that could adversely affect any special status species would not be implemented without mitigation to reduce the potential for adverse effects. Management for all special status aquatic species would be conducted according to current conservation plans, ESA consultation documents, and other strategies for special status aquatic species (Appendix G). All action alternatives would use monitoring and adaptive management to reduce impacts to special status aquatic species and their habitats in the planning area.

All action alternatives would include the use of BMPs to maintain and improve habitat for special status aquatic species (Appendix E); direction for implementing habitat improvement projects to reduce fragmentation in redband trout habitat and promote the recovery of bull trout; and direction to work cooperatively with Federal and State agencies, private landowners, and companies to identify and mitigate threats to Snake River snails, white sturgeon, Shoshone sculpin, and Bruneau hot springsnail from BLM-managed lands. All of these actions comply with the ARMS and are expected to improve the HC and PFC ratings over the life of the plan.

Impacts from Management Specific to Alternative I

The guidance in the ARMS would be used to improve 37 miles of Restoration Reaches and maintain 13 miles of Conservation Reaches (Table 4- 117).This further facilitates achieving the riparian objectives for 145 miles to achieve or move toward PFC in the life the plan. This rate of riparian improvement is slower than in Alternatives III, IV, and V, but faster than under Alternative II. Compliance with ESA and other consultation requirements would minimize the potential for adverse effects to ESA-listed species and their habitats from management actions implemented under Alternative I. The ARMS, Appendix E, and Appendix H would all be used to improve or maintain HC and PFC ratings to meet the habitat needs of special status aquatic species over the life of the plan.

Impacts from Management Specific to Alternative II

The guidance in the ARMS would be used to improve 37 miles of Restoration Reaches and maintain 13 miles of Conservation Reaches (Table 4- 117).The guidance in the ARMS would be used to maintain 85 miles of stream at PFC and 140 miles of stream to be moving toward PFC over the life of the plan. This rate of riparian improvement is slower than all of the other action alternatives and would result in more miles of stream being in a condition that is lower than PFC, reducing the rate of improvement in HC ratings over the life of the plan. Compliance with ESA consultation requirements would minimize the potential for adverse affects to ESA-listed species and their habitats. Uses and activities in other BLM Sensitive species habitats would not have the same requirements as those in ESA-listed species habitats. The ARMS, Appendix E, and Appendix H would be used to improve or maintain HC and PFC ratings to meet the habitat needs of special status aquatic species over the life of the plan.

Impacts from Management Specific to Alternative III

The guidance in the ARMS would be used to improve 37 miles of Restoration Reaches and maintain 13 miles of Conservation Reaches (Table 4- 117).The guidance in the ARMS is for 183 miles of stream to be at PFC and 42 miles of stream to be moving toward PFC over the life of the plan. This rate of riparian improvement is similar to what would occur under Alternatives IV and V and faster than under Alternatives I and II. Some fire-related actions, such as fuels treatments in the RCA, could locally reduce

HC and PFC ratings, but compliance with ESA consultation requirements would minimize the potential for adverse effects to ESA-listed species and their habitats. Uses and activities in other BLM Sensitive species habitats would not have the same requirements as those in ESA-listed species habitats. Guidance in the ARMS, Appendix E, and Appendix H would be used to minimize the potential for adverse effects to BLM Sensitive species habitats from wildland fire suppression, fuels treatments, and fire rehabilitation activities in the RCA.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Under Alternative IV, stream reaches containing special status species or their habitat would be a high priority for active restoration. The guidance in the ARMS would be used to improve 37 miles of Restoration Reaches and maintain 13 miles of Conservation Reaches (Table 4- 117). The guidance in the ARMS is for 183 miles of stream to be at PFC and 42 miles of stream to be moving toward PFC over the life of the plan. This rate of riparian improvement is similar to what would occur under Alternatives III and V and is faster than under Alternatives I and II. The result of this guidance is that more miles of stream would be at PFC over the life of the plan than under Alternatives I and II. Active restoration activities in the RCA could have more short-term adverse effects to HC and PFC ratings, but there is likely to be more improvement to these indicators in the long-term and at a faster rate than would be expected from passive restoration. Appendix E and Appendix H also include guidance for restoration activities in the RCA that would reduce the potential for a reduction in HC and PFC ratings in stream containing special status aquatic species.

Impacts from Management Specific to Alternative V

Under Alternative V, stream reaches containing special status species would be a high priority for restoration. Active restoration for streams with HC data would be limited to FAR-DN and NF reaches. The guidance in the ARMS would be used to improve 37 miles of Restoration Reaches and maintain 13 miles of Conservation Reaches (Table 4- 117). The guidance in the ARMS is for 183 miles of stream to be at PFC and 42 miles of stream to be moving toward PFC over the life of the plan. This rate of riparian improvement is similar to what would occur under Alternatives III and IV and faster than under Alternatives I and II. The passive restoration activities under this alternative would have fewer short-term adverse effects and longer habitat recovery timeframes from restoration activities than under Alternative IV. In some cases, recovery may not be achieved if specific actions are needed to restore a habitat component that is no longer present (i.e., appropriate riparian vegetation) or to remove an impact to the stream channel (i.e., remove a culvert that is impairing streamflow). Passive restoration combined with fewer resource uses would improve HC and PFC ratings in the long-term.

Impacts from Water Resources Actions

The Clean Water Act of 1972 requires restoration and maintenance of the chemical, physical, and biological integrity of the nation’s surface waters. The water quality standards for the State of Idaho and State of Nevada are the benchmark standards that DEQ and NDEP use to protect, maintain, or improve surface water resources in Idaho. These standards are designed to protect the beneficial uses of water including cold water fishes, recreation, and agriculture. The indicators used to identify streams with impaired water quality (i.e., sediment, water temperature, streamflow alteration and nutrients) are also factors in determining HC ratings.

Water temperature is a limiting factor for the distribution and abundance of aquatic organisms. Many aquatic species can only inhabit and reproduce successfully in a specific range of water temperature. Elevated water temperatures can be harmful or lethal, isolate aquatic species by creating a thermal migration barrier, and decrease the amount of DO in the water. High water temperatures can create large algal blooms in popular recreation areas such as along the Snake River and Salmon Falls Reservoir. The increase of water temperature may be attributed to lack of streamside vegetation, decreased streamflows, or other human-caused factors (Bjornn & Reiser, 1991).

Reduced streamflow can be directly detrimental to both spawning and rearing habitats and fish populations by impeding or blocking both downstream fish movements and upstream adult migrations (Clark & Gibbons, 1991). Diversions can substantially alter streamflow regimes. Fish and other aquatic species may also be displaced into irrigation diversions and canals where the environment is not suitable for long-term survival (Bjornn & Reiser, 1991).

The development of hydroelectric power has changed the Snake River from a primarily free-flowing, cold-water system to a slower-moving, warmer water river system (FWS, 1995). In general, the habitat requirements for Snake River snails include cold, clean, well-oxygenated, flowing water with low turbidity. Despite some similarities, each of these species has slightly different habitat preference. For example, the Snake River physa are only found in the free-flowing reaches of the Snake River, while the Bliss Rapids snail and Utah valvata occur in both cold-water springs and Snake River habitats.

Flow alteration is also the primary threat to Bruneau hot springsnail, which are only found in warm water springs and seeps along a 5.5 mile reach of the lower Bruneau River near Hot Creek. Development of the geothermal springs on which this species depends has reduced the amount of habitat available for this species (FWS, 2002).

Table 4- 119 identifies the miles of 303(d)-listed streams that have both HC and PFC data.

Table 4- 119. 303(d)-Listed Streams with HC and PFC Data (Miles)

HC Rating	Riparian Priority Rating	Miles of 303(d)-Listed Stream
Conservation	Priority 1 (FAR-NA, FAR-DN)	2
	Priority 2 (FAR-UP, NF)	3
	Priority 3 (PFC)	2
Restoration – High Priority	Priority 1 (FAR-NA, FAR-DN)	1
	Priority 3 (PFC)	3
Restoration – Moderate Priority	Priority 1 (FAR-NA, FAR-DN)	2
	Priority 2 (FAR-UP, NF)	2
	Priority 3 (PFC)	2
Restoration – Low Priority	Priority 1 (FAR-NA, FAR-DN)	3
	Priority 3 (PFC)	2
	Total	**22**

Impacts from Management Specific to the No Action Alternative

The No Action Alternative includes direction to improve water quality in accordance with Federal and State standards and to design and construct land treatments to maintain or improve water quality and quantity. The No Action Alternative does not provide specific direction for improving water quality or quantity in special status aquatic species habitat. The current management direction is likely to maintain but not improve water quality conditions.

The planning area contains 316 miles of perennial stream, of which 117 miles of stream in Idaho (12 stream segments) and 34 miles of stream in Nevada (three stream segments) are 303(d) listed for impaired water quality. Currently, 22 miles of 303(d)-listed stream have both HC and PFC data; of these, 15 miles are Restoration Reaches and 13 miles are Priority 1 or 2 for restoration (Table 4- 119). Except for Cougar Creek, all of these water quality impaired streams are occupied by special status aquatic species. Streams with impaired water quality are discussed in the *Water Resources* section of Chapter 3.

Impacts from Management Common to the No Action and All Action Alternatives

The No Action Alternative and all action alternatives include management guidance to maintain or improve water quality in accordance with Federal and State standards. This indirectly provides direction for managing water resources for special status aquatic species or their habitats. Full compliance with the Federal and State water quality guidance would meet the water quality needs of special status aquatic species.

Impacts from Management Common to All Action Alternatives

All action alternatives include management direction to maintain or improve water quality in streams containing special status aquatic species, fish-bearing streams, and 303(d)-listed streams. Management direction is also provided to implement the ARMS and Appendix E to promote the achievement of water resource objectives. Direction is provided to modify or suspend BLM management activities that are a factor in not meeting water quality standards. This guidance would contribute to the attainment of water quality standards at the watershed level.

The management direction to implement the ARMS to restore water quality conditions in impaired streams would be beneficial to special status aquatic species. The guidance in the ARMS is designed to achieve the desired instream and riparian conditions and promotes actions to maintain good and restore impaired water quality conditions over the life of the plan. Maintaining water quality in streams currently not listed as having impaired water quality would also support moving Restoration Reaches to Conservation status for reaches with special status aquatic species in the long-term.

Riparian guidance would result in 145 miles of stream at PFC over the life of the plan, which supports the direction in the ARMS to maintain or improve special status aquatic species habitat. Water quality is expected to improve as HC and PFC ratings improve from restoration of hydrological and riparian function. Impacts to the remaining 104 miles of 303(d)-listed stream without HC and PFC data are analyzed in the *Water Resources* section.

Impacts from Riparian Areas and Wetlands Actions

Riparian vegetation provides shade, stabilizes streambanks, reduces erosion, influences channel morphology (i.e., pools and riffles), provides habitat for insects, provides cover for fish, and can provide up to 50% of the stream’s nutrient energy supply in the form of organic matter (Platts, 1991). The extent to which these characteristics are affected is determined by the diversity, density, and vigor of the riparian vegetation (Platts, 1991).

Water temperature is directly influenced by streamside vegetation. Riparian vegetation reduces the intensity of incoming solar radiation and reduces radiative cooling during cold months, thereby buffering stream temperatures and creating the preferred habitats of juvenile salmonids (Platts, 1991).

Grasses and grass-like plants, especially the sod-forming types, stabilize streambanks and reduce erosion. As well-sodded banks gradually erode, they create undercuts that are important as hiding places for salmonids (Platts, 1991) and aquatic insects (Platts, 1991). Woody streamside vegetation provides habitat for terrestrial insects, which are important food for salmonids and other fish species. Research suggests that in rangeland streams of the western United States, terrestrial invertebrates are important prey resources for trout (Saunders & Fausch, 2007). Removal of streamside vegetation can affect the diet of fish by reducing production of terrestrial and aquatic insects (Platts, 1991). Vegetation also provides organic matter to the stream. Leaf litter and other organic material from terrestrial plants is a principal source of food for aquatic invertebrates that eventually become food for fish. The presence of sod-forming plant types and woody vegetation promotes the development of pools and the formation of gravel bars, which balances erosion and deposition in the stream channel and promotes the development of quality fish habitat. These conditions are a component of HC ratings and are conducive to good fish habitat. In Conservation Reaches, fish habitat is functioning properly, and the aquatic objectives would be met.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative includes direction to maintain or improve riparian habitat condition and identifies fish and riparian values as high priorities. In general, the management guidance to avoid uses within the riparian buffer zone does not provide direction for improving or restoring riparian condition or special status aquatic species habitat over the life of the plan. The current riparian conditions are summarized in the *Riparian Areas and Wetlands* section (Table 4- 82).

Impacts from Management Common to All Action Alternatives

All action alternatives would implement the ARMS to achieve riparian management objectives. The ARMS provides site-specific objectives and management guidelines for riparian areas and wetlands through the implementation of conservation and restoration activities. The ARMS outlines priorities for restoration based on the HC and PFC ratings. Compliance with the ARMS would provide a major benefit to special status aquatic species and their habitats by maintaining Conservation Reaches in good condition and prioritizing the most important habitats for restoration and recovery. Implementing management direction in the ARMS would improve HC and PFC ratings over the life of the plan.

The ARMS also provides direction to use adaptive management to reduce impacts on riparian areas and wetlands from BLM authorized uses and activities. Adaptive management is a continual process of planning, implementation, monitoring, and evaluation to adjust management strategies to meet clearly defined goals and objectives (Williams, et al., 2007). This approach improves resource conditions by learning from management outcomes. By continually adjusting management strategies as needed, supported by monitoring or additional information, adaptive management would result in attainment of short- and long-term trends toward meeting HC and PFC objectives. Adaptive management provides the capability to respond quickly to monitoring data with consideration given to past season monitoring or preseason conditions. It also allows changes needed to meet long-term objectives of the RMP, including direction from the ESA, Clean Water Act, and S&Gs. Compliance with the guidance in the ARMS to use adaptive management would promote the long-term improvement in riparian condition for streams occupied by special status aquatic species throughout the planning area and over the life of the plan.

All action alternatives include management actions to consider authorizing activities or facilities where long-term benefits outweigh short-term impacts to riparian vegetation and fish habitat and to remove nonessential human-made structures and objects that adversely impact floodplain function. Although short-term localized adverse effects to aquatic habitat could occur, these activities would have to comply with the ARMS to assure they would support and promote improvements in special status aquatic species habitats and riparian condition in the long-term.

Impacts from Management Specific to Alternative I

Under Alternative I, the management actions identify stream reaches with game fish or habitat suitable for game fish as a high priority for restoration according to the priorities identified in the ARMS. The result would be that the 85 miles of Priority 3 reaches would be maintained at PFC, 60 miles of Priority 1 reaches and 63 miles of Priority 2 reaches achieve PFC over the life of the plan (see the *Riparian Areas and Wetlands* section). The ARMS includes a summary table of stream reaches by priority rating.

Riparian restoration activities can either have negligible short-term impacts with long-term benefits (i.e., fencing, riparian planting) or moderate to major short-term impacts with long-term benefits (i.e., culvert replacements, modification or removal of water developments, instream work). Road closures could have a variety of effects depending upon site-specific conditions and whether restoration includes a full reclamation component with substantial ground disturbance. Overall, the potential short-term effects would be out-weighed by the long-term benefits to riparian conditions, ultimately providing benefits to special status aquatic species and their habitats. All of these improvements would comply with the direction in the ARMS and would result in an improvement in the HC and PFC ratings for special status aquatic species habitat.

Impacts from Management Specific to Alternative II

Under Alternative II, the management actions identify fish-bearing stream reaches as a high priority for restoration, according to the priorities identified in the ARMS. This management direction is focused on all fish that are native to the planning area. The emphasis areas for restoration projects would generally occur in the Jarbidge River Watershed and tributary streams in the Jarbidge Foothills. The result would be that 85 miles of Priority 3 reaches would be maintained at PFC and all Priority 1 and 2 reaches would be moving toward PFC over the life of the plan.

The potential for short-term adverse impacts and long-term benefits from restoration actions such as culvert replacements, and possible road closures in the RCA, would be the same as those described for Alternative I. This alternative differs from Alternative I in that water developments that are impairing riparian condition would be modified but not removed, livestock grazing pastures would not be closed even if grazing could not be conducted in an manner that improves riparian condition, and the reintroduction of beaver could not be used to restore floodplain function in stream reaches where the water table has dropped. This could affect special status aquatic species by limiting options to improve habitat condition, but would not preclude using other restoration methods to improve riparian conditions.

The effect could be that improvements in the riparian condition related to livestock grazing water developments and floodplain issues that could be alleviated by beaver would be slower to recover than if these techniques could be used according to site-specific conditions.

Impacts from Management Specific to Alternative III

Under Alternative III, the management actions identify stream reaches with the potential to serve as fire breaks as a high priority for restoration according to the priorities identified in the ARMS. The result would be that the 85 miles of Priority 3 reaches would be maintained at PFC, 77 miles of Priority 1 reaches and 21 miles of Priority 2 reaches would achieve PFC, and an additional 42 miles of Priority 2 reaches would be moving toward PFC over the life of the plan.

The potential for short-term adverse impacts and long-term benefits from restoration actions would be the same as described for Alternative I. This alternative differs from Alternative I in that water developments would not be removed and road closures would not be used to reduce impacts to riparian areas. This could affect special status aquatic species by limiting options to improve habitat condition, but would not preclude using other restoration methods to improve riparian conditions for special status aquatic species habitats. The effect could be that improvements in the riparian condition related to water developments and road closures would be slower to occur than if these techniques could be used where site-specific conditions warrant. Similar to Alternatives I and II, the short–term, potentially adverse impacts from restoration actions would be out-weighted by the long-term improvement and riparian recovery.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Under Alternative IV, stream reaches containing special status species or their habitat would be a high priority for active restoration in the priorities identified in the ARMS. Active restoration would be limited to PFC Priority 1 and Priority 2 restoration reaches. The guidance in the ARMS would be used to meet the riparian objective of 85 miles of Priority 3 reaches to be maintained at PFC, 77 miles of Priority 1 reaches and 21 miles of Priority 2 reaches to achieve PFC and 42 miles of Priority 2 reaches to be moving toward PFC over the life of the plan. Since improvements in PFC ratings correlate with improvements in HC ratings, similar improvements in HC ratings can be expected. This rate of riparian improvement is similar to what would occur under Alternatives III and V and is faster than under Alternatives I and II. The result of this guidance is that more miles of instream and riparian improvement would occur over the life of the plan than under Alternatives I or II.

Active restoration activities in the RCA could have more short-term effects, but there is likely to be more improvements to the habitat in the long-term and at a faster rate than would be expected from passive restoration. Appendix E also includes guidance for restoration activities in the RCA that would reduce the potential for effects to riparian areas and wetlands.

Impacts from Management Specific to Alternative V

Under Alternative V, stream reaches containing special status species or their habitat would be a high priority for restoration in the priorities identified in the ARMS. Active restoration would be limited to FAR-DN and NF reaches or as identified in the ARMS. Similar to Alternative IV, Alternative V would have approximately 140 miles of Priority 1 and 2 reaches improved over the life of the plan, but only 30 miles of the FAR-DN would be improved through active restoration. Any other improvements would occur through passive restoration or as a result of habitat recovery through fewer uses on the public land. Limiting the priorities for restoration to FAR-DN and NF reaches or limiting the type of restoration tools that could be used to restore riparian habitats could preclude restoration techniques or emphasis areas that would have more improvement in HC and PFC ratings for RCAs containing special status aquatic species. This alternative would have the slowest recovery timeframes of any of the other action alternatives.

Impacts from Noxious Weeds and Invasive Plants Actions

Noxious weeds and invasive plants are often the first colonizers of disturbed areas. These species lack deep root systems, which stabilize streambanks and maintain narrow stream channels. Noxious weeds and invasive plants can replace native vegetation (e.g., juniper encroachment prevents aspen and willow regeneration). Noxious weeds and invasive plants can alter soil stability, promote erosion, and affect the accumulation of leaf litter or other soil resources. Noxious weed infestations in upland and riparian areas can result in a buildup in hazardous fuels, which can increase fire frequency, severity, and duration and could ultimately impact aquatic species. All of these factors result in a reduction in HC ratings.

In aquatic systems, noxious weeds and invasive plants can clog slow-moving water bodies and create an overabundance of organic material. Dense concentrations of invasive aquatic plants also reduce light and DO levels, eliminating habitat and decreasing growth of or killing special status fish and other aquatic species.

A variety of chemicals can be used reduce the spread of noxious weeds and invasive plants on public lands that could be detrimental to the survival, growth, reproduction, or behavior of fish or aquatic species (Norris, et al., 1991). Biological treatments, such as the use of targeted grazing, can be used to reduce or control the spread on invasive plants. Although livestock can be used to control vegetation, they can also potentially have additional effects on riparian areas and wetlands and aquatic organisms (see *Impacts from Livestock Grazing Actions*). Where noxious weeds invade riparian areas and wetlands, HC and PFC ratings decline, and the maintenance or attainment of quality fish habitat is less likely to occur.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative includes direction to treat noxious weeds and invasive plants according to the guidelines in biological opinions, Candidate Conservation Agreements, and management plans for ACECs and other special designations. Noxious weeds and invasive plants continue to persist in RCAs across the planning area, although treatments have likely reduced some weed populations locally. The No Action Alternatives does not provide guidance to treat weeds in riparian areas containing BLM Sensitive species that do not have a Candidate Conservation Agreement, such as white sturgeon, Shoshone sculpin or redband trout. Compliance with the terms and conditions in biological opinions issued by FWS would minimize the potential for adverse effects to special status aquatic species and their habitats. Negligible localized effects to the species or their habitats would occur from treatments in RCAs occupied by ESA-listed species. There is no management emphasis to prevent the increase of noxious weeds in RCAs, so weed populations would likely increase under the No Action Alternative. There also is no management guidance for the treatment of invasive aquatic plants, such as *Hydrilla,* or other invasive plant species known to occur in the planning area (Table 3- 13).

Impacts from Management Common to All Action Alternatives

All action alternatives include management direction to follow applicable laws, policies, label instructions for the application of herbicides, and the current vegetation treatment EIS, currently the *Final Programmatic Environmental Impact Statement for Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States* (BLM, 2007b). The methods of control in or near special status species habitat would be adjusted on a site- and species-specific basis to minimize impacts and comply with current ESA consultation. BMPs for noxious weed and invasive plants would be incorporated into BLM management activities and authorized uses as appropriate (Appendix E). Additional management direction for the treatment of noxious weeds and invasive plants is included in the ARMS. This guidance would reduce the potential for noxious weed treatments to adversely affect special status aquatic species.

Treatments under the requirements of ARMS, the current vegetation treatment EIS, and local ESA consultations, where applicable, would mitigate the adverse effects and reduce the risks of herbicides on ESA-listed fish and aquatic snails. Noxious weed treatments in habitats occupied by other BLM Sensitive fish and aquatic invertebrates would not be conducted under the same ESA requirements. The current vegetation treatment EIS and Clean Water Act would provide guidance so chemicals that could harm aquatic species would not be used in a manner that would have short or long-term effects on sensitive fish-bearing habitats.

Treatment methods can generally be described as chemical, mechanical, manual, or biological. When these treatments are used in riparian areas, their potential to affect aquatic species and their habitats vary by the method used, the amount and type of vegetation treated, the amount of soil disturbed, the proximity of the treatment to water, and a variety of other factors (BLM, 2007b). Maintaining the native vegetation in RCAs is critical to maintaining properly functioning riparian condition and fish-bearing streams. Noxious weed and invasive plant treatments in the RCA would be desirable as long as mitigation is applied to reduce effects to the extent possible. The short-term, potentially adverse effects to special status species are less than by allowing noxious weeds and invasive plants to displace native riparian vegetation over the long-term.

Impacts from Management Specific to Alternative I

Under Alternative I, chemical, mechanical, and biological treatments and targeted grazing would be used to treat 250,000 acres of noxious weeds. The emphasis areas would include RCAs occupied by special status aquatic species, recreation access points, and special designations. Noxious weed and invasive plant treatments in habitat occupied by ESA-listed species would be conducted according to ESA consultation requirements, which would avoid the potential for adverse affects to these species and their habitats. The current vegetation treatment EIS and Clean Water Act would provide guidance so that chemicals that could harm aquatic species would not be used in a manner where they could have short-or long term effects on sensitive fish-bearing habitats.

The guidance in the ARMS includes direction to improve HC and PFC ratings by reducing threats to native vegetation from the invasion of noxious weeds. This guidance would reduce the potential for a decline in the condition of HC and PFC rated streams and riparian areas containing non-ESA listed aquatic species.

The use of targeted grazing could reduce HC and PFC ratings in habitats occupied by special status aquatic species. The level of reduction of these ratings would depend upon the grazing intensity, timing, and the current condition of the habitat occupied by ESA-listed species. Although the purpose of the treatment would be to reduce noxious weeds in the RCA, livestock would also browse native hydric species such as willows, carex, and sedges. This livestock use could result in a decrease in HC and PFC ratings prior to meeting the desired objectives for reducing noxious and invasive plants. Direct impacts to special status aquatic species from the trampling of their eggs could also occur if the targeted grazing treatment occurs during important spawning periods (Appendix H). Managing riparian areas at their potential would discourage the spread of invasive plants due to dense woody and herbaceous vegetation. Targeted grazing in upland areas to reduce noxious weed infestation would have minimal effects to special status species habitats as long as livestock do not enter riparian areas as part of the treatment.

Impacts from Management Specific to Alternative II

In Alternative II, chemical, mechanical, and biological methods, as well as targeted grazing and prescribed fire, would be used to treat 250,000 acres of noxious weeds and invasive plants. The emphasis areas for noxious weeds and invasive plant treatments would include RCAs occupied by special status aquatic species. The effects of noxious weed and invasive plant treatments on HC and PFC ratings in habitat occupied by ESA-listed species would be the same as described in Alternative I. The potential effects from using targeted grazing to reduce noxious weeds and invasive plants in RCAs would be the same as described for Alternative I.

Alternative II differs from Alternative I in that prescribed fire would be used to treat noxious weeds and invasive plants in RCAs. Prescribed fire has similar effects on the landscape as wildland fire, although the potential to reduce HC and PFC ratings would be less pronounced because prescribed fires are planned ignitions and are conducted with specific project objectives (e.g., intensity, acreages, weather conditions). The use of prescribed fire in riparian areas containing special status aquatic species could reduce HC and PFC ratings because the fire would also remove non-target vegetation. The general effect of fire on riparian areas and special status aquatic species and their habitats are described under *Impacts from Wildland Fire Ecology and Management Actions*. Compliance with the ARMS would minimize the potential for HC and PFC ratings to be reduced from using prescribed fire to control noxious weeds and invasive plants in RCAs; the use of prescribed fire is compatible with the objectives for riparian recovery.

Impacts from Management Specific to Alternative III

In Alternative III, chemical, mechanical, and biological methods, as well as targeted grazing and prescribed fire, would be used to treat 200,000 acres of noxious weeds and invasive plants. There would be fewer acres of noxious weeds treated under Alternative III than under the other alternatives, which could result in an incremental increase in noxious weeds and invasive plants over time. The emphasis areas for noxious weed and invasive plant treatments would include special designations, fuel breaks, roadsides, and special status species habitat. The effects of noxious weed and invasive plant treatments on HC and PFC ratings in RCAs occupied by ESA-listed species would be the same as described in Alternative I. The potential effects from using targeted grazing and prescribed fire to reduce fuels in RCA would be the same as those described under Alternatives I and II, respectively.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV would have 450,000 acres of noxious weed and invasive plant treatments, the largest number of acres treated of all alternatives. The emphasis for noxious weeds and invasive plants would include special designations, riparian areas, special status species habitat, and native plant communities. Chemical, mechanical, and biological methods, as well as targeted grazing and prescribed fire, would be used for treatments. The effects of these treatments on HC and PFC ratings in RCAs occupied by special status aquatic species would be the same as described for Alternatives I and II; however, effects would occur on more acres.

Impacts from Management Specific to Alternative V

In Alternative V, there would be 300,000 acres of noxious weed and invasive plant treatments. This alternative would have fewer acres of noxious weed and invasive plant treatments than Alternative IV, but more than the No Action Alternative and Alternatives I, II, and III. The emphasis areas and treatment methods would be the same as described for Alternative IV, except targeted grazing would not be used. The effects of these treatments on HC and PFC ratings in RCAs occupied by special status aquatic species would be the same as described for Alternatives I and II; however, there would be no impacts related to targeted grazing under this alternative.

Impacts from Wildland Fire Ecology and Management Actions

Wildland fires play an important role in renewing upland and riparian landscapes. The intensity of fires varies across the landscape, with a mix of low to moderate severity and lesser amounts of high burn severity (Gresswell, 1999). The potential effects of fire on salmonid habitat vary according to the location of the fire (e.g., headwaters, lower stream reaches), fuels, burn severity, and the amount of the watershed burned. A study on the Boise National Forest found the principal effect of fire was to embed the substrate with fine sediments. Where high severity wildland fire removed the overstory canopy or shade adjacent to streams, increased exposure to sunlight in the riparian area was observed (Burton, 2005). Post-fire floods can rejuvenate stream habitats by importing large amounts of gravel, cobble, woody debris, and nutrients to the stream. Subsequent spring floods scoured the substrates and transported most of the fine sands into the floodplain, resulting in higher fish productivities than before the fire (Burton, 2005).

Smaller, disconnected fish populations are at a higher risk of extirpation due to uncharacteristic wildland fire because of their isolation. Reducing the risks of uncharacteristic wildland fire can provide benefits to isolated fish populations until connectivity or habitat quality is restored. In some cases, habitats completely devoid of salmonid fish just after debris floods were later re-colonized with migrants returning from downstream or nearby tributary rearing habitats (Burton, 2005). Similar findings were reported by Rieman et al., who found, in the case of uncharacteristic wildland fires, local extirpation of fish is apparently short-term and patchy, recolonization is potentially rapid, and habitats disrupted immediately after the flood events are often rejuvenated in five to ten years (Rieman, et al., 1997). Habitat restoration, barrier removal, and other management actions to reduce wildland fire risks may have short-term risks associated with fine sediment production that may temporarily reduce fish survival and reproduction. These risks would be outweighed by long-term improvements in fish habitat and connectivity. Projects to reduce the risks of uncharacteristic wildland fire balance short-term risks against long-term benefits to fish (Burton, 2005). Larger, well-connected fish populations are at lower risk of extirpation due to uncharacteristic wildland fire (Rieman & Clayton, 1997).

Fire suppression activities can have both beneficial and detrimental effects on aquatic ecosystems (Gresswell, 1999; Rieman & Clayton, 1997). Detrimental impacts from these activities would include loss of riparian vegetation, soil disturbance in the riparian areas that results in sedimentation of streams, introduction of toxic substances (e.g., fire retardants, petroleum products) into water resources, and the loss of streamflows as a result of removing water from fish-bearing streams for suppression efforts. However, fire suppression activities can benefit fish habitats by preventing the burning of high quality fish habitats. Wildland fire, fire suppression, and fuels treatments can increase instream fine sediments, reduce streambank stability, remove riparian vegetation, and reduce fish population connectivity. All of these are variables directly influence HC ratings.

ES&BAR activities, such as drill seeding, hand or mechanical planting, installation of water bars, fire line rehabilitation, and other activities, could reduce sediment contributions to fish-bearing streams and expedite the recovery of vegetation in the burned areas and improve HC ratings.

Critical Suppression Areas represent the highest suppression priority to reduce fire size and acres burned and are prioritized by VMA when multiple ignitions occur (Table 4- 120). Alternatives that identify critical suppression for habitats used by special status aquatic species would minimize the potential for HC and PFC ratings to be reduced in these habitats. Conditional Suppression Areas, which represent areas of lower suppression priority based on the resource values and a desired fire role in the ecosystem, could result in unsuppressed wildland fire in RCAs with short- and long-term effects to special status aquatic species and their habitat. In Conditional Suppression Areas, Restoration Reaches not at PFC are more at risk for a prolonged reduction in rating condition from the impacts of wildland fire than those streams and riparian areas that are Conservation Reaches and at PFC. The effectiveness of including Restoration Reaches in Critical Suppression Areas is dependent on accessibility by fire personnel, but in general there is less risk to a further reduction in HC rating when streams are included in Critical Suppression Areas and guidelines in the ARMS are applied.

Table 4- 120. Perennial Streams in Critical and Conditional Suppression Areas by VMA by Alternative (Miles)

VMA	Alternative						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
Critical Suppression Areas							
VMA A	39	38	32	32	37	38	33
VMA B	121	98	27	66	93	93	114
VMA C	62	47	8	32	43	41	62
VMA D	94	56	21	50	89	79	94
Total	**316**	**239**	**88**	**180**	**262**	**251**	**303**
Conditional Suppression Areas							
VMA A	0	<2	7	7	2	<2	6
VMA B	0	22	94	54	28	28	7
VMA C	0	16	54	30	19	21	0
VMA D	0	38	73	44	5	15	0
Total	**0**	**77**	**228**	**135**	**54**	**66**	**13**

Table 4- 121 identifies the miles of Conservation and Restoration Reaches in Critical Suppression Areas in VMAs C and D by alternative. Bull trout and redband trout do not occur in VMAs A or B, so HC data were not collected in these VMAs. Prioritizing VMAs A or B for suppression would not benefit bull trout or redband trout. The miles of riparian priority reaches in Critical Suppression Areas are summarized in the *Riparian Areas and Wetlands* section (Table 4- 83).

All action alternatives include management guidance to use MIST to avoid retardant-related impacts to streams and other surface water resources. Site-specific mitigation, such as drafting water from streams in a manner that does not cause localized dewatering, using screens when drafting water from fish-bearing streams, and avoiding the placement of fueling, staging, and other fire support areas in RCAs, would minimize the potential for fire suppression activities to reduce HC and PFC ratings in habitat containing special status aquatic species. The use of these guidelines would comply with ESA consultation and the ARMS.

Table 4- 121. Conservation and Restoration Reaches in Critical Suppression Areas by VMA by Alternative (Miles)

VMA[A]	HC Rating	Alternative					
		I	II	III	IV		V
					IV-A	IV-B	
Critical Suppression Areas							
VMA C	Conservation	6	4	4	6	6	6
	Restoration	<1	<1	<1	2	2	2
	Total	**6**	**4**	**4**	**8**	**8**	**8**
VMA D	Conservation	11	5	10	12	12	12
	Restoration	12	6	11	17	13	17
	Total	**23**	**11**	**21**	**29**	**25**	**29**
	Grand Total	**29**	**15**	**25**	**37**	**33**	**37**

[A] There are no HC data for streams in VMAs A or B, and therefore, no Conservation or Restoration Reaches, as bull trout and redband trout do not occur in those VMAs.

Local water sources are used for fire suppression. Water developments for fire suppression include water storage tanks, draft sites, hydrants off pipelines, and enlarging stock water and surface water storage ponds. The general effects of diverting surface flows from fish-bearing streams would depend upon their proximity to the occupied habitat, the amount of water used, and the rate and time of year surface waters are diverted (see *Impacts from Water Resources Actions*). The use of free-flowing streams would pose an increased risk to special status aquatic species and their habitat due to reducing streamflows and removing riparian vegetation, which would locally reduce HC ratings. The development of new draft sites from fish-bearing streams could locally reduce HC and PFC ratings by affecting streamside vegetation, streambanks, streambed fine sediments, pool quality, and streamflow. The use of impounded waters for fire suppression would likely have a minor impact on special status aquatic species because these habitats are not occupied by special status aquatic species (see the *Special Status Wildlife* section for potential effects to Columbia spotted frog). Hydrants would result in a short-term reduction to streamflows in special status species habitats during the hot summer months when streamflows are already reduced or at base flows. The use or expansion of stock water and other water storage ponds could reduce HC and PFC ratings by reducing instream flows, creating a barrier to migration, introducing sediments, and concentrating livestock in the RCA. Stock water ponds in upland areas would have less potential to affect fish-bearing habitats in RCAs.

Special status aquatic species can be negatively impacted if surface flows are diverted during important spawning periods (Appendix H) or if proper containment or screening is not used to prevent juvenile fish from being drawn into pump intakes. Water quality can also be reduced where petroleum products are used to operate water pumps in the RCA.

Road improvements in the RCA can have both beneficial and adverse effects to stream habitats. The primary adverse effect of roads on streams is from sediment contributions that exceed the stream's ability to transport the additional fine sediments. This sediment can imbed in stream substrates and have a variety of detrimental effects to fish-bearing streams (see *Impacts from Transportation and Travel Actions*). Improved road surfacing, road realignment away from fish-bearing streams, improved road drainage, or replacing damaged or removed riparian vegetation could reduce sediment contributions to streams where roads are present in the RCA. These improvements would provide some benefit to fish-bearing streams and riparian habitat. Road improvements in upland areas to reduce response times for fire suppression would have minimal effects to fish-bearing streams as long as proper drainage is provided to discourage sediment from being transported into streams.

Improved stream crossings could have positive effects to streams if undersized culverts are replaced with culverts that can accommodate greater flood flows or if culverts that pose a barrier to fish passage are replaced with open bottom culverts or bridges. Road crossings could also be designed to allow for water withdrawals for fire suppression so additional channel disturbance is not created to obtain water.

Impacts from Management Specific to the No Action Alternative

Management in the No Action Alternative calls for full suppression and aggressive suppression of all new fires, but does not prioritize specific areas in the planning area. The current management does not provide direction for minimizing fire suppression-related impacts to special status aquatic species or their habitats. Limited management guidance is provided for fuels treatments and ES&BAR for protecting watershed and riparian conditions and guidance is not provided specific to special status aquatic species or their habitats. Management direction to avoid mechanical equipment in canyons and some riparian areas provides guidance for bull trout and redband trout habitat and a small portion of the Snake River at the Sand Point ACEC, but does not provide direction for all special status species habitats. The guidance in the ARMS would not be used to minimize the effects from wildland fire suppression on HC and PFC ratings or to improve HC and PFC ratings for streams containing special status aquatic species.

Impacts from Management Common to All Action Alternatives

All action alternatives include using the guidance in the ARMS for fire suppression in riparian areas and incorporating Appendix E into BLM management activities and authorized uses. The potential for short-term reductions in HC and PFC ratings for streams containing special status aquatic species would continue to occur as a result of the wildland fire. However, the management guidance in the ARMS would reduce the potential for HC and PFC ratings to be reduced due to fire suppression activities in special status aquatic species habitats.

Fuels treatments occurring in riparian areas would follow the guidelines in the ARMS. Fuels treatments in riparian areas would result in short-term reductions in HC and PFC ratings but potentially long-term improvements to these ratings. The guidance in the ARMS, Appendix E, and ESA consultation guidelines would reduce the potential for fuels treatments to reduce HC and PFC ratings in habitats containing special status aquatic species. Rest from uses such as livestock grazing, recreation, and travel would be an important component of RCA recovery after fuels treatments.

A variety of mechanical, chemical, and manual methods would be used to restore vegetation and stabilize soils in burned areas. The ARMS, Appendix E, and compliance with ESA consultations where required would reduce impacts to special status aquatic species and their habitats from ES&BAR projects. Some localized short-term effects could occur, but a reduction in HC and PFC ratings for streams containing special status aquatic species or their habitats are not expected from these treatments.

Compliance with ESA consultation would reduce the potential for impacts to ESA-listed species from obtaining water for suppression from occupied habitats. Compliance with the ARMS, fire suppression BMPs (Appendix E), and avoidance of important spawning periods (Appendix H) would minimize the potential to reduce redband trout spawning success, juvenile survival, and their habitat. The guidance in the ARMS, Appendix E, avoidance of important spawning periods (Appendix H), and ESA consultation guidelines for instream activities would reduce impacts to special status aquatic species from improving stream crossings for fire suppression.

Impacts from Management Specific to Alternative I

Alternative I identifies WUI; the Bruneau-Jarbidge, Lower Bruneau Canyon, Middle Snake, and Salmon Falls Creek ACECs; and key sage-grouse habitat as Critical Suppression Areas and all other areas as Conditional Suppression Areas. Of the 316 miles of perennial streams in the planning area, 239 miles would be in Critical Suppression Areas and and 77 would be in Conditional Suppression Areas (Table 4-120). There are 12 miles of Restoration Reaches and 17 miles of Conservation Reaches in Critical Suppression Areas (Table 4- 121).

The Bruneau-Jarbidge ACEC includes all occupied and suitable bull trout habitat, except for approximately eight miles of bull trout habitat in the Jarbidge River. Designating this ACEC as a Critical Suppression Area and using the guidance in the ARMS, BMPs, and ESA consultation during fire suppression activities would reduce the potential for HC and PFC ratings to be reduced in occupied or suitable bull trout and redband trout habitat in the ACEC. Some riparian areas may still burn, locally affecting bull trout or redband trout habitat and potentially resulting in short- or long-term reductions to HC and PFC ratings. Fires in these areas would likely introduce sediment to the stream and input large woody debris that could ultimately improve HC and PFC ratings. Fish populations in the ACEC are connected to other quality habitats, so the threat of species isolation due to wildland fire is less of a concern than for isolated fish populations. Portions of this ACEC are in each VMA.

The Lower Bruneau Canyon ACEC contains all of the geothermal springs in the planning area occupied by Bruneau hot springsnail. Critical fire suppression in this area, combined with using the guidance in the ARMS, ESA consultation, and other BMPs to minimize effects to occupied habitats, would reduce the potential for fire suppression efforts to adversely affect Bruneau hot springsnail. Habitats used by these snails could be adversely affected if a portion of the habitat was to burn, but the critical suppression emphasis should reduce the amount of habitat burned to the extent possible. This ACEC is in VMA A, which has the lowest priority for fire suppression during multiple ignitions in Alternative I.

The Middle Snake ACEC is adjacent to approximately 22 miles of the Snake River occupied by two BLM Sensitive fish (white sturgeon, Shoshone sculpin), three ESA-listed aquatic snails (Snake River physa, Bliss Rapids snail, Utah valvata) and three BLM Sensitive aquatic snails (California floater, Columbia pebblesnail, Short-face lanx). The identification of this area as a Critical Suppression Area, combined with using the ARMS guidance and other BMPs to minimize effects to occupied habitats, would reduce the potential for wildland fire or fire suppression activities to adversely affect these species or their habitats. Compliance with existing consultation would further reduce impacts to the ESA-listed species. This ACEC is in VMA A, which has the lowest priority for fire suppression during multiple ignitions in Alternative I.

Alternative I would include guidance for improving water availability. The development of new draft sites from fish-bearing streams could locally reduce HC and PFC ratings. Vehicle wash stations for fire suppression vehicles and equipment could reduce the potential for noxious weeds and invasive plants to be introduced into RCAs that would replace native vegetation and reduce HC and PFC ratings.

Alternative I would improve existing roads and stream crossings. Building new roads into RCAs would result in increased impacts to fish-bearing streams and locally reduce HC and PFC ratings. As these new roads and stream crossings are created, the potential for increased use by other public land users would have an additive effect to HC and PFC ratings in RCAs.

The building of new infrastructure for fire suppression in the RCA would result in long-term impacts to HC and PFC ratings due to the increase amount of ground disturbance in addition to the existing ground disturbance. This increased level of ground disturbance would be maintained over the life of the plan.

Using targeted grazing to treat fuels in RCAs would occur under Alternative I. Using livestock to treat noxious weeds in RCAs would increase the amount of browse on other hydric vegetation and could destabilize streambanks and result in reduced HC and PFC ratings in the treatment areas. Targeted grazing would be expected to increase impacts to RCAs, particularly in VMAs C and D, unless additional infrastructure is used to maintain HC and PFC ratings.

Impacts from Management Specific to Alternative II

Alternative II identifies WUI as a Critical Suppression Area and all other areas as Conditional Suppression Areas. Critical Suppression Areas would encompass 88 miles of perennial stream, and Conditional Suppression Areas would encompass 228 miles of perennial stream (Table 4- 120). There are 6 miles of Restoration Reaches and 9 miles of Conservation Reaches in Critical Suppression Areas (Table 4- 121). Alternative II has most miles of high-value habitat (10 miles of Conservation Reaches) in Conditional Suppression Areas of any action alternative.

Water developments, roads and stream crossings, and building new roads in areas with limited access, would have the same effects to special status aquatic species as described for Alternative I. These would improve the effectiveness of suppressing wildland fire in Critical Suppression Areas; however, Conservation Reaches rated at PFC can also be effective in slowing the progress of wildland fire.

Alternative II would have substantially fewer areas with special status aquatic species habitat (88 miles) in Critical Suppression Areas than in Alternative I (239 miles). The occupied bull trout and redband trout habitat in the Jarbidge River and its East Fork would be Critical Suppression Areas, reducing the potential for a reduction in HC and PFC ratings from wildland fire. There would be an increased potential for a reduction in HC and PFC ratings due to wildland fire in redband trout habitats in the Jarbidge Foothills streams and Salmon Falls Creek and in white sturgeon and Snake River snail habitats in the Snake River, as these areas are in Conditional Suppression Areas. The ARMS guidance and ESA consultation requirements would reduce the potential for adverse effects to special status aquatic species.

Alternative II would include the use of prescribed fire and targeted grazing to reduce fuels. The impacts from using targeted grazing for fuels treatments are similar to those described for Alternative I. The impacts from using prescribed fire to for fuels treatments are similar to those described under *Impacts from Noxious Weeds and Invasive Species Actions*.

Impacts from Management Specific to Alternative III

Alternative III identifies WUI; the Bruneau-Jarbidge and Salmon Falls Creek ACECs; and key sage-grouse habitat as Critical Suppression Areas and all other areas as Conditional Suppression Areas. Both of the ACECs contain habitat occupied by bull trout and redband trout. Critical Suppression Areas would encompass 180 miles of perennial stream, and Conditional Suppression Areas would encompass 135 miles of perennial stream (Table 4- 120). There are 11 miles of Restoration Reaches and 14 miles of Conservation Reaches in Critical Suppression Areas (Table 4- 121).

For Alternative III, the effects of Critical and Conditional Suppression Areas on HC ratings would be similar to those described under Alternative I, although fewer Conservation and Restoration Reaches would be in Critical Suppression Areas. Alternative III would have the most fire suppression related infrastructure of all alternatives. This could result in soil disturbance that could enter fish-bearing streams and reduce HC and PFC ratings. Locating guard stations, airstrips, helipads in upland areas where they do not pose a threat to HC and PFC ratings is expected to avoid impacts to special status aquatic species and their habitats.

The impacts from increased water developments would be the same as described for Alternative I. The development of new pipelines could have additional impacts to HC and PFC ratings in RCAs if they are developed from habitats occupied by special status aquatic species. These developments would have localized disturbance to streamside vegetation, streambeds, and streambank stability. There also would be a localized short-term reduction in streamflows as additional water is removed from the stream. Compliance with the guidance in the ARMS and Appendix E would reduce impacts to special status fish in streams where water is withdrawn for fire suppression.

Alternative III would have the greatest number of new and improved roads to facilitate fire suppression of any of the action alternatives. Some of these new roads or road-related improvements would be in RCAs occupied by special status aquatic species. New roads in uplands would likely have a minor impact on riparian habitats as long as BMPs are used to minimize off-site surface erosion to RCAs. Roads constructed in the RCA and any other road-related improvements would be constructed using the guidance in the ARMS to reduce adverse effects to special status aquatic habitats. Site-specific and short-term effects to HC and PFC ratings from fire-related road improvements would occur, but to comply with the ARMS, activities would ultimately have to improve instream habitats in the long term. It is possible that the new roads in uplands would improve the response time for fire suppression and would reduce the potential for riparian habitats to burn due to a large wildland fire. The impacts of improving existing roads would be similar to those described under Alternative I.

In Alternative III, fuels treatments would occur at the landscape scale and would include increased utilization and targeted grazing. These fuels treatments would have similar effects to HC and PFC ratings as described for Alternatives I and II. Fuels treatments would occur on approximately 492,000 acres, more acres than under Alternative II but fewer than under Alternatives I, III, IV, and V.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV includes WUI; the Bruneau-Jarbidge, Inside Desert, Jarbidge Foothills, and Lower Bruneau Canyon ACECs; and key sage-grouse habitat in Critical Suppression Areas and all other areas in Conditional Suppression Areas. The Critical Suppression Areas would encompass 262 miles and 251 miles of perennial stream in Alternatives IV-A and IV-B (the Preferred Alternative), respectively. Conditional Suppression Areas would encompass 54 miles and 66 miles of perennial stream in Alternatives IV-A and IV-B, respectively (Table 4- 120). This alternative would include fewer perennial stream miles in Conditional Suppression Areas than Alternative V, but more than the other action alternatives. Critical suppression emphasis for the Jarbidge Foothills ACEC would include more of the redband trout habitat in Alternative IV-A than in Alternative IV-B. There are 19 miles of Restoration Reaches in Critical Suppression Areas in Alternative IV-A and 15 miles in Alternative IV-B; in both subalternatives, there are 18 miles of Conservation Reaches in Critical Suppression Areas (Table 4- 121).

As in other action alternatives, there would be an increased emphasis on improving water sources, roads and stream crossings, and other infrastructure to enhance fire suppression, with similar effects. The impacts from constructing new guard stations would be the same as described for Alternative III. The effects of increasing the number and type of water developments, improving existing roads and stream crossing, and constructing new roads and crossings would be the same as described for Alternative I.

The effects of prescribed fire and targeted grazing for fuels reduction would be similar to those described under Alternatives I and II, although the effects would be more pronounced in Alternative IV because it would include more acres of fuels treatments (1,115,000 acres) than all other alternatives. Not all of these treatment acres would be in RCAs, but riparian areas and special status aquatic species habitats would be an emphasis for these treatments.

Impacts from Management Specific to Alternative V

Alternative V includes WUI; the Lower Bruneau Canyon, Middle Snake, and Sagebrush Sea ACECs; and key sage-grouse habitat in Critical Suppression Areas and all other areas in Conditional Suppression Areas. Critical Suppression Areas would encompass 303 miles of perennial stream, and Conditional Suppression Areas would encompass 13 miles of perennial stream (Table 4- 120). As in Alternative IV-A, there are 19 miles of Restoration Reaches and 18 miles of Conservation Reaches in Critical Suppression Areas (Table 4- 121). Alternative V would have less fire suppression infrastructure and less watershed disturbance than any of the other action alternatives.

Critical suppression for the Lower Bruneau Canyon and Middle Snake would have the same effects to HC and PFC ratings as described for Alternative I. Water developments would be maintained at their current levels, which would result in fewer disturbances to HC and PFC ratings and streamflows. The effects of road and stream crossing improvements would be the same as described for Alternative I. The effects of using prescribed fire for fuels treatments would be the same as described for Alternative II.

Critical suppression in the Sagebrush Sea ACEC would encompass 258 miles of the 316 perennial streams miles in the planning area. The ACEC would include all occupied and potential bull trout habitat and all 24 redband trout streams in the planning area. Fire suppression activities in bull trout habitat would be conducted according to existing ESA consultation. Although portions of bull trout habitat could be impacted by wildland fire, the suppression emphasis and tactics are expected to reduce the potential for wildland fire and fire suppression to reduce HC and PFC ratings to the extent practical. The ARMS guidance would be used to reduce impacts from fire suppression on redband trout and their habitat. These habitats could be impacted by wildland fire and fire suppression activities when there is an urgent need to protect structures and public safety. Maintaining water availability at current levels could reduce response time for suppression and result in more acres burned by wildland fire. Improvements in roads and stream crossings in the RCA could create areas to obtain water for fire suppression in areas already impacted by roads or stream crossings. The Sagebrush Sea ACEC is a large and continuous geographic area (958,000 acres) and likely contains areas with structures or resources that are of lower value than other areas in the planning area. Identifying such a large area for critical suppression could limit fire suppression options during intense fire activity when flexibility with suppression resources is needed to most effectively manage the fire.

Impacts from Livestock Grazing Actions

Livestock grazing can alter the riparian vegetation along the stream and can reduce HC and PFC ratings. In areas grazed by livestock, stream channels contain more fine sediment, streambanks are more unstable, and streambanks are less undercut than in ungrazed areas (Platts, 1991). These channel alterations decrease the depth and number of pools, reducing the physical space available for rearing fish, and can adversely affect all life stages of fish and other aquatic life (Furniss, et al., 1991). Streamside vegetation stabilizes the streambank and shades the stream, influencing water temperature. Shaded stream areas are preferred habitats of juvenile salmonids (Platts, 1991). Once the stream has been heated, riparian shading and insulation merely limits further heating.

Riparian vegetation also plays an important role in rebuilding streambanks by trapping fine sediments during flood events. As sediment-laden floodwaters rise up and then over the streambank, flexible streamside vegetation such as willows and grasses is flattened into mats that hug the streambank and adjacent ground (Platts, 1991). Livestock grazing, if allowed to deplete vegetation, can accelerate streambank erosion (Platts, 1991). When animals graze directly on streambanks, mass erosion from trampling, hoof slide, and streambank collapse causes soil movement directly into the stream (Platts, 1991). These instream and riparian processes are components of HC and PFC ratings.

Fencing streams to exclude livestock grazing is a widely used approach for restoring stream habitats (Platts, 1991). Properly constructed and maintained exclosure fences protect riparian vegetation and streambanks from livestock grazing and other resource uses (i.e., recreation, transportation and travel). Research shows that riparian areas quickly improve when they are fenced to exclude grazing, but stream morphology improves slowly, and fish populations may or may not be improved (Platts, 1991). In areas excluded from livestock grazing, changes in stream channels are associated with a decrease in the width-to-depth ratio, which is strongly associated with high quality habitat for fishes, particularly salmonids. Platts found that once grazing ceased, streambanks rebuilt rapidly, and stream width was significantly narrower inside a rested exclosure than in stream reaches outside the exclosure (Platts, 1991). Although there is limited research on the changes in fish populations resulting from exclosures, one study indicated a strong preference for exclosed stream reaches by salmonids less than one year old (Bayley & Li, 2008).

The creation of ungrazed riparian reference areas would be expected to improve HC and PFC ratings, benefiting special status aquatic species.

Trailing across streams can cause localized streambank alterations. If trailing occurs in the summer months, riparian banks are not saturated and are less prone to shearing by hoof impacts. Livestock trailing through the RCA and into the uplands can contribute some amount of fine sediment over time.

Table 4- 122 identifies the perennial stream miles available and unavailable for livestock grazing by alternative; the subset of stream miles unavailable for livestock grazing that would be within riparian reference areas is also displayed. Table 4- 123 identifies the Conservation and Restoration Reaches available for livestock grazing by alternative.

Table 4- 122. Perennial Streams in Areas Available and Unavailable for Livestock Grazing and within Riparian Reference Areas by Alternative (Miles)

Allocation	Alternative						
	No Action	I	II	III	IV[A]		V
					IV-A	IV-B	
Available for Livestock Grazing	138	95	121	120	103	104	63
Unavailable for Livestock Grazing	178	221	195	196	213	212	253
Riparian Reference Areas [B]	0	19	7	7	19		25

[A] The only difference between Alternative IV-A and IV-B is one mile of stream in Clover Creek.
[B] Miles within riparian reference areas are a subset of the areas unavailable for livestock grazing.

Table 4- 123. Conservation and Restoration Reaches in Areas Available for Livestock Grazing by Alternative (Miles)

HC Rating	Alternative					
	No Action	I	II	III	IV	V
Available for Livestock Grazing						
Conservation	14	5	5	5	5	1
Restoration	27	25	27	27	22	10
Total	**41**	**30**	**31**	**31**	**27**	**10**

The miles of riparian priority reaches available and unavailable to livestock grazing are summarized in the *Riparian Areas and Wetlands* section (Table 4- 84).

Impacts from Management Specific to the No Action Alternative

In the No Action Alternative, 138 miles of perennial stream are in areas available for livestock grazing, and 178 miles of perennial stream are in areas unavailable for livestock grazing (Table 4- 122). There are 27 miles of Restoration Reaches in areas available for grazing (Table 4- 123). The No Action Alternative has the most miles of Restoration Reaches available for livestock grazing of the alternatives, 79% of the miles of Restoration Reaches in the planning area. Livestock grazing in the No Action Alternative is expected to maintain or reduce HC and PFC ratings because the guidance in the ARMS would not be used to implement adaptive management for livestock grazing or prioritize areas to improve HC and PFC ratings.

Impacts from Management Common to All Action Alternatives

Livestock grazing on all allotments in the planning area would comply with the management guidance in the ARMS. This guidance would be used in grazing authorizations and yearly operating plans to adjust livestock grazing in areas where HC or PFC ratings are in a reduced condition and to maintain areas identified as Conservation Reaches and rated at PFC. This is expected to improve HC and PFC ratings in Restoration Reaches and maintain the ratings in Conservation Reaches. Special status aquatic species and their habitats are expected to improve as a result of implementing the direction in the ARMS.

Impacts from Management Specific to Alternative I

In Alternative I, the majority of the planning area would be available for livestock grazing (1,381,000 acres) including 95 miles of perennial streams (Table 4- 122). Livestock grazing would not be allowed on 84,000 acres, including 221 miles of perennial streams. There would be 25 miles of Restoration Reaches available for livestock grazing (Table 4- 123).

The ten riparian reference areas would encompass 19 miles of perennial stream (Table 4- 122) and create approximately 3,000 acres of grazing closure. There would be 2 miles of Restoration Reaches in reference areas under this alternative. The riparian reference areas are expected to result in an improvement in HC and PFC ratings and have a positive impact on special status fish species that occupy these reference areas.

Livestock grazing would not occur in RCAs in the Jarbidge River and its East Fork, but would occur in the tributaries to these bull trout occupied streams. Grazing in these areas could contribute fine sediments to the bull trout occupied reaches. Except for the 19 miles of redband trout habitat in riparian reference areas, livestock would have access to all redband trout streams in the Jarbidge Foothills. Livestock grazing in these areas would pose an increased threat to redband trout due to grazing-related impacts to HC and PFC ratings. Livestock would not have direct access to special status species habitats in the lower Bruneau River and the Snake River due to existing ESA consultation requirements. The guidance in the ARMS, Appendix E, and Appendix H would be applied to grazing allotments and would reduce the impacts of grazing on special status aquatic species and their habitats. Overall, livestock grazing impacts under this alternative would be more than under Alternative V, but less than under the other alternatives.

Any TNR issued in RCAs would be done according to the guidance in the ARMS, which would require HC and PFC ratings to be maintained or improved by actions authorized in the RCA. Livestock have an increased tendency to consume woody vegetation late in the grazing season after the herbaceous vegetation has cured. Issuing TNR late in the grazing season would pose an increased risk to woody vegetation along streams occupied by special status aquatic species. These habitats could also be affected by issuing TNR in upland areas, unless upland water sources are provided and temporary fencing is used to prevent livestock from accessing the occupied RCAs.

Impacts from Management Specific to Alternative II

In Alternative II, substantially more livestock grazing would occur than under any of the other alternatives including the No Action Alternative. The majority of the planning area would be available for livestock grazing (1,406,000 acres), including 121 miles of perennial stream (Table 4- 122). Livestock grazing would not be available on 59,000 acres, including 195 miles of perennial stream. This alternative would have more perennial stream miles in areas available for livestock grazing and a higher vegetation allocation for livestock than under Alternative I. There are 27 miles of Restoration Reaches in areas available for livestock grazing (Table 4- 123).

The ten riparian reference areas would encompass 7 miles of perennial stream (Table 4- 122) and create approximately 1,000 acres of grazing closure; 1 mile of Restoration Reaches would be included in reference areas. The effects from constructing fences to create reference areas and the long-term improvement in riparian conditions would be the same as described for Alternative I, except fewer miles of perennial stream and Restoration Reaches would be included in a riparian reference area (Table 4-122).

The effects of this alternative would be similar to those described for Alternative I, except more miles of special status aquatic species habitat would be available for grazing. The additional stream miles available for livestock grazing would be along Clover Creek and the Snake River. The guidance in the ARMS, Appendix E, and Appendix H would be applied to grazing allotments and would reduce the impacts of grazing on special status aquatic species. Overall, this alternative would have the greatest potential for livestock to reduce HC and PFC ratings in RCAs containing special status aquatic species than any of the other alternatives.

Reserve Common Allotments would be selected based on special management concerns, such as whether riparian areas contained special status aquatic species and whether the area can sustain grazing use without significant resource impacts. The guidance in the ARMS would be used to maintain or improve HC and PFC ratings in these allotments. The effects of issuing TNR in riparian areas occupied by special status aquatic species in Alternative II would be the same as described for Alternative I.

Impacts from Management Specific to Alternative III

Alternative III authorizes livestock grazing on slightly fewer acres than Alternative II, but both alternatives affect nearly the same number of stream miles and the same special status species habitats; 120 miles of perennial stream would be available and 196 miles would be unavailable for livestock grazing (Table 4-122).

Seven miles of perennial stream would be in ten riparian reference areas and unavailable for grazing (Table 4- 123). The location of reference areas and their effects to special status aquatic species would be the same as for Alternative II. The effects of issuing TNR in riparian areas occupied by special status aquatic species under this alternative would be the same as those described for Alternative I. The effects of creating Reserve Common Allotments under this alternative would be the same as described for Alternative II.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV authorizes livestock grazing along fewer stream miles, 103 miles, than Alternatives II and III and the No Action Alternative, but more than Alternatives I and V; 213 miles would be unavailable for livestock grazing (Table 4- 122). The only difference between Alternative IV-A and IV-B (the Preferred Alternative) is 1 mile of stream in Clover Creek being unavailable for livestock grazing in Alternative IV-A but available in Alternative IV-B. There are 22 miles of Restoration Reaches available for livestock grazing (Table 4- 123).

Reference area locations and their impacts to HC and PFC ratings and to special status aquatic species and their habitats would be the same as described for Alternative I. Nineteen miles of perennial stream, including 2 miles of Restoration Reaches, would be in ten riparian reference areas and unavailable for grazing (Table 4- 122).

The impacts from livestock grazing on HC and PFC ratings in Alternative IV would be more than in Alternative V but less than in the other alternatives. Alternative IV is expected to result in more miles with improvement in HC and PFC ratings than the No Action Alternative and Alternatives I, II, and III due to the active restoration emphasis and the guidance in the ARMS.

The effects of issuing TNR in riparian areas occupied by special status aquatic species under this alternative would be the same as described for Alternative I. The effects of creating Reserve Common Allotments under this alternative would be the same as described for Alternative II.

Impacts from Management Specific to Alternative V

In Alternative V, 63 miles of perennial stream would be available and 253 miles would be unavailable for livestock grazing (Table 4- 122). This alternative has the fewest miles of perennial stream containing special status aquatic species available to livestock grazing. There are 10 miles of Restoration Reaches in areas available for grazing (Table 4- 123).

The creation of six, pasture-sized riparian reference areas would encompass 25 miles of perennial stream, including 6 miles of Restoration Reaches, and create approximately 23,000 acres of grazing closure. Most of these stream miles are in occupied redband trout habitat. The effects from creating reference areas would be the same as described for Alternative I, except this alternative would have substantially more miles of stream in reference areas than any of the other action alternatives. Riparian reference areas in this alternative would result in the most improvement in HC ratings of all alternatives.

Areas unavailable for livestock grazing would include most of the occupied and suitable bull trout and redband trout habitat and all Bruneau hot springsnail habitat. The level of livestock use under this alternative would be substantially less than under the other alternatives. This alternative is expected to result in the most improvement in HC and PFC condition and would have the greatest benefit to special status species habitat of any of the alternatives.

Impacts from Recreation Actions

Recreation impacts to HC ratings are primarily related to the reduction or removal of riparian vegetation and the compaction of riparian soils. Streamside vegetation directly affects fish cover, food, and streambank stability and also provides shade, resulting in the cool waters favored by salmonids. Large woody debris in the stream is an important habitat component of a healthy stream. Woody debris removal by swimmers, boaters, anglers, and other recreators can be significant over time at recreation areas that receive substantial use. Some locations along the Snake River have seen a reduction in riparian vegetation as recreators remove woody vegetation for campfires. Similar effects have occurred along some redband trout streams. Recreators can also have localized direct effects to water quality by introducing chemicals, such as bathing and dish washing soaps, into fish-bearing streams (Meehan, 1991). Fecal coliform bacteria can be a source of water contamination, primarily at dispersed recreation sites, where human waste facilities are not provided (Clark & Gibbons, 1991).

Reservoirs and impounded waters, such as those found in Salmon Falls Creek and along the Snake River, are popular areas for motorized boating. Power boats can have numerous negative impacts on lake and reservoir environments, including shoreline erosion and suspension of fine sediments. Outboard engines can also introduce hydrocarbons emissions that are toxic to aquatic organisms into the aquatic environment. Power boats are also associated with the spread of the exotic Eurasian watermilfoil (*Myriophyllum spicatum*), which is easily transported between water bodies when plant matter becomes entangled on boat propellers or trailers.

The miles of perennial stream and Conservation and Restoration Reaches within each proposed SRMA are provided in Table 4- 124 and Table 4- 125, respectively. Table 4- 126 identifies special status species in each SRMA. The miles of riparian priority reaches in SRMAs are summarized in the *Riparian Areas and Wetlands* section (Table 4- 86).

Table 4- 124. Perennial Streams in SRMAs by Alternative (Miles)

SRMA	Alternative [A]				
	I	II	III	IV	V
Balanced Rock	1		1		
Bruneau-Jarbidge	68	68	68	68	68
Canyonlands	42			42	
Deadman/Yahoo	1		1	1	
Jarbidge Foothills	61				
Jarbidge Forks	7	7	7	7	7
Little Pilgrim	2	2	2		
Salmon Falls Reservoir	8	8	8	8	
Yahoo					1
Total	**190**	**85**	**87**	**126**	**76**

Note: Shaded cells indicate the SRMA would not be designated in that alternative
[A] The No Action Alternative did not identify boundaries for SRMAs.

Table 4- 125. Conservation and Restoration Reaches in SRMAs by Alternative (Miles)

HC Rating [A]	Alternative [B]				
	I	II	III	IV	V
Bruneau-Jarbidge					
Conservation	0	0	0	0	0
Restoration	3	3	3	3	3
Total	**3**	**3**	**3**	**3**	**3**
Canyonlands					
Conservation	7			7	
Restoration	9			9	
Total	**16**			**16**	
Jarbidge Foothills					
Conservation	5				
Restoration	21				
Total	**26**				
Jarbidge Forks					
Conservation	6	6	6	6	6
Restoration	1	1	1	1	1
Total	**7**	**7**	**7**	**7**	**7**
Grand Total	**52**	**10**	**10**	**26**	**10**

Note: Shaded cells indicate the SRMA would not be designated in that alternative
[A] HC data are not available for the Balanced Rock, Deadman/Yahoo, Little Pilgrim, or Salmon Falls Reservoir SRMAs.
[B] The No Action Alternative did not identify boundaries for SRMAs.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative provides limited guidance for special status species and their habitats in the Bruneau-Jarbidge, Jarbidge Forks, and Salmon Falls Creek Canyon SRMAs. The Salmon Falls Creek Canyon SRMA has limited access due to the steep canyon walls and infrequent human use. The Bruneau-Jarbidge SRMA is a popular whitewater rafting area that, due to the flow regimes, has a short floating season. The short floating season and relatively low number of visitors would continue to maintain the condition of these rivers, although some localized impacts to water quality and riparian vegetation at campsites would occur. The impacts would be relatively minor to occupied redband trout habitat in the Bruneau and Jarbidge Rivers and to the potential bull trout overwintering habitat in the Jarbidge River. The Jarbidge Forks SRMA receives limited recreation use, and impacts to HC and PFC ratings due to recreation would be localized and somewhat limited. The No Action Alternative does not include direction for improving riparian condition for special status aquatic species in these SRMAs.

Table 4- 126. Occurrence of Special Status Fish and Aquatic Species and Expected Change in Use in SRMAs

SRMA	Change in Use	Special Status Species Present in SRMA				
		Bruneau Hot Springsnail	Bull Trout	Redband Trout	Snake River Snails	White Sturgeon
Balanced Rock	Increase			X		
Bruneau-Jarbidge	No Change		X	X		
Canyonlands	No Change	X	X	X		
Deadman/Yahoo	No Change or Increase				X	X
Jarbidge Foothills	No Change			X		
Little Pilgrim	Increase				X	X
Salmon Falls Reservoir	Increase			X		

Impacts from Management Common to All Action Alternatives

Recreation activities in riparian areas in all action alternatives would follow the guidelines in the ARMS, which includes management direction to reduce recreation-related impacts to HC and PFC ratings in streams containing special status aquatic species and their habitat. The ARMS includes guidance for reducing impacts from existing recreation sites and avoiding the construction of new recreation sites in the RCA unless a site-specific analysis determines the riparian improvement objectives can be met. ESA consultation would be required for recreation site development in RCAs containing bull trout and Snake River snails.

Impacts from Management Specific to Alternative I

SRMAs in Alternative I would encompass 190 miles of perennial stream and 52 miles of Conservation and Restoration Reaches (Table 4- 124 and Table 4- 125). The Bruneau-Jarbidge, Canyonlands, and Jarbidge Forks SRMAs would include 117 miles of perennial stream and 26 miles of Conservation and Restoration Reaches, including all bull trout habitat and approximately half of the redband trout habitat in the planning area. These areas would be managed for their remote recreation experience and undeveloped characteristics. Current use levels are expected to remain the same in these SRMAs (Table 4- 126). Localized impacts to HC and PFC ratings would likely remain static under this alternative. Monitoring recreation use would ensure that impacts to bull trout and redband trout habitat would not increase to levels that reduce HC and PFC ratings. The SRMA management guidance would comply with the ARMS to maintain or improve habitat condition ratings for special status aquatic species. The proposed SRMA management would comply with the guidance in the ARMS and improvement of HC and PFC ratings over the life of the plan.

The Balanced Rock, Jarbidge Foothills, and Salmon Falls Reservoir SRMAs would include 70 miles of perennial stream and 26 miles of Conservation and Restoration Reaches, including approximately half of the redband trout habitat in the planning area (Table 4- 124 and Table 4- 125). Recreation use is expected to increase in the Balanced Rock and Salmon Falls Creek SRMAs (Table 4- 126). Localized reductions to HC and PFC ratings may occur, but are likely to be minimal as a result of increased management emphasis. In the Jarbidge Foothills SRMA, the potential for localized impacts to redband trout or their habitat is greater because redband trout exist in isolated populations. Managing these SRMAs according to the guidance in the ARMS would maintain or improve HC and PFC ratings in these areas.

The Little Pilgrim SRMA would provide management emphasis for recreation along the Snake River near the mouth of Little Pilgrim Gulch and include 2 miles of the Snake River occupied by white sturgeon and Snake River snails (Table 4- 124). This area is a popular area for white sturgeon fishing and receives moderate to heavy use throughout the summer months. Providing sanitation at the site and development of parking, camping, and improved vehicle access would reduce localized impacts to PFC ratings from human uses in the area. Recreation use is expected to increase in this SRMA (Table 4- 126). Impacts to riparian vegetation are expected to continue from recreators gathering riparian vegetation for firewood. Impacts to ESA-listed snails in the Snake River would locally be reduced from recreation-related improvements at this site, but the improvement would be limited in relation to the length of the Snake River adjacent to the SRMA.

The Deadman/Yahoo SRMA would provide management emphasis for Yahoo Creek (Table 4- 124). Yahoo Creek is a non fish-bearing stream in a popular motorized recreation area. This area contains highly erosive soils and is a source of sediment to the Snake River. Recreation use is expected to remain the same or increase in this SRMA (Table 4- 126). The increased management emphasis near Yahoo Creek would focus on allowing motorized recreation to continue on designated routes. Management for the SRMA would improve sanitation and parking for SRMA users. Recreation in the SRMA would continue to cause soil disturbance that could ultimately be introduced into the Snake River.

Impacts from Management Specific to Alternative II

Alternative II would include the Bruneau-Jarbidge, Jarbidge Forks, Little Pilgrim, and Salmon Falls Reservoir SRMAs. The Bruneau-Jarbidge and Jarbidge Forks SRMAs include 75 perennial stream miles and 4 miles of Restoration Reaches (Table 4- 124 and Table 4- 125). Fewer perennial stream miles would be in an SRMA in Alternative II than in Alternatives I, III, and IV, but more perennial stream miles than Alternative V. Alternative II would include 30 fewer miles of Restoration Reaches in SRMAs than Alternative I. The impacts from SRMA management guidance for the Bruneau-Jarbidge, Jarbidge Forks, Little Pilgrim, and Salmon Falls Reservoir would be the same as described for Alternative I. All of the proposed SRMAs under this alternative would comply with the ARMS and would improve HC and PFC ratings for special status aquatic species over the life of the plan.

Impacts from Management Specific to Alternative III

Alternative III would include the Balanced Rock, Bruneau-Jarbidge, Deadman/Yahoo, Little Pilgrim, Jarbidge Forks, and Salmon Falls Reservoir SRMAs (Table 4- 124). Alternative III would include fewer perennial stream miles in SRMAs than Alternatives I and IV, but more perennial stream miles than Alternatives II and V. The effects from management for the Balanced Rock, Bruneau-Jarbidge, Deadman/Yahoo, Jarbidge Forks, Little Pilgrim, and Salmon Falls Reservoir SRMAs would be the same as described for Alternative I. Alternative III has same miles of Restoration Reaches in SRMAs as Alternative II and V in an SRMA, which is less than Alternatives I and IV. The more miles of Restoration Reaches included in an SRMA, the greater likelihood for HC ratings to be improved.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV would include the Bruneau-Jarbidge, Canyonlands, Deadman/Yahoo, Jarbidge Forks, and Salmon Falls Reservoir SRMAs. Alternative IV would include 126 miles of perennial stream and 26 miles of Conservation and Restoration Reaches (Table 4- 124 and Table 4- 125). Alternative IV has fewer perennial stream miles in an SRMA than Alternative I, but more than Alternatives II, III, and V. Alternative IV would have fewer miles of Restoration Reaches in SRMAs than Alternative I and more miles than Alternatives II, III, and V. The more miles of Restoration Reaches included in an SRMA, the greater likelihood for HC ratings to be improved. Under this alternative, the impacts from management for the Bruneau-Jarbidge, Canyonlands, Deadman/Yahoo, Jarbidge Forks, and Salmon Falls Reservoir SRMAs would be the same as described for Alternative I.

Impacts from Management Specific to Alternative V

Alternative V would include the Bruneau-Jarbidge, Jarbidge Forks, and Yahoo SRMAs. Alternative V would have the fewest perennial stream miles in SRMAs and the same amount of Restoration Reaches as Alternatives II and III, but fewer than Alternatives I and IV (Table 4- 124 and Table 4- 125). The more miles of Restoration Reaches included in a SRMA the greater likelihood for HC ratings to be improved. The effects from management for the Bruneau-Jarbidge and Jarbidge Forks SRMAs would be the same as Alternative I. The Yahoo SRMA would have the same impacts to special status aquatic species in the Snake River as the Deadman/Yahoo SRMA in Alternative I.

Impacts from Transportation and Travel Actions

Transportation and travel systems can harm salmonids and their habitat because of the sediments they contribute to streams. Sediment generated by road construction, maintenance, and use can enter streams through surface erosion and mass movement of destabilized soil. Sediment in the stream can lead to physical alterations in channel morphology, such as increased channel braiding, increased width-to-depth ratios, and increased incidence and severity of streambank erosion. Excessive sediment delivery to streams can decrease the depth and number of pools, reducing the physical space available for rearing fish. These habitat changes can reduce HC ratings and reduce survival and reproduction for all types of aquatic life (Furniss, et al., 1991). Some road maintenance activities, such as improving road drainage and graveling road surfaces, can reduce the amount of fine sediments that enter a stream.

Improperly designed roads crossings can prevent or interfere with upstream and downstream migration of both adult and juvenile salmonids. Culverts pose the most common migration barriers associated with road networks, usually because of outfall drops that are too great, excessive water velocities through culverts, insufficient water depth in culverts, a lack of resting pools in or below the culvert, or a combination of these factors. In general, bridges are preferred because they usually cause less modification of the stream channel than culverts and are often the best way to assure fish passage (Furniss, et al., 1991).

Cross-country motorized vehicle use increases the risk of impacts to riparian vegetation, sediment introduction to streams, and localized impacts to water quality. Over time, the number of cross-country travel routes in areas available for this use would be expected to increase in density and distance. This could result in an increase in human-related impacts in the RCA. Travel restrictions in upland areas could have benefits to aquatic resources at the watershed scale if they result in less soil disturbance or surface erosion entering fish-bearing streams. Travel restrictions in RCAs would result in the most improvement in special status aquatic species habitats, particularly where HC and PFC ratings indicate there are degraded channel and riparian conditions.

Table 4- 127 identifies the miles of road in the RCAs by RCA category. Table 4- 128 identifies the perennial stream miles in each travel designation by alternative. Table 4- 129 identifies the miles of Conservation and Restoration Reaches by travel designation for each alternative. The miles of riparian priority reaches in each travel designation are summarized in the *Riparian Areas and Wetlands* section (Table 4- 87).

Table 4- 127. Roads in RCAs (Miles)

RCA Category	Miles of Roads
Category 1: Perennial Fish-Bearing Streams	32
Category 2: Perennial Non Fish-Bearing Streams	5
Category 3: Ponds, Lakes, Reservoirs, and Wetlands >1 acre	4
Category 4: Intermittent Streams, Wetlands <1 acre, and Landslide Prone Areas	175
Total	**216**

Table 4- 128. Perennial Streams within Travel Designations by Alternative (Miles)

Travel Designation	Alternative					
	No Action	I	II	III	IV	V
Open to Cross-Country Motorized Vehicle Use	114	0	0	0	0	0
Limited to Designated Routes	86[A]	180	211	200	180	180
Limited to Designated Ways	11[B]	9	29	9	29	0
Closed to Motorized Vehicle Use	105	126	76	107	107	136

[A] Limited seasonally or to designated routes
[B] Limited to inventoried ways

Table 4- 129. Conservation and Restoration Reaches within Travel Designations by Alternative (Miles)

HC Rating	Alternative					
	No Action	I	II	III	IV	V
Open to Cross-Country Motorized Vehicle Use						
Conservation	7	0	0	0	0	0
Restoration	16	0	0	0	0	0
Limited to Designated Routes or Ways						
Conservation	13	18	18	18	18	17
Restoration	17	26	31	31	26	25
Closed to Motorized Vehicle Use						
Conservation	0	1	0	0	1	1
Restoration	2	9	3	3	9	10

Impacts from Management Specific to the No Action Alternative

Under the No Action Alternative, 114 miles of perennial stream are included in areas open to cross-country motorized vehicle use, 86 miles of stream are in areas limited seasonally or to designated routes, 11 miles of stream are in areas limited to inventoried ways, and 105 miles of stream are in areas closed to motorized travel (Table 4- 128). Areas closed to motorized vehicle use include the Bruneau and Jarbidge Canyons and portions of the Salmon Falls Creek Canyon. There are 216 miles of road in RCAs (Table 4-127). These roads will continue to locally reduce HC and PFC ratings by contributing fine sediment to fish-bearing streams, removing riparian vegetation, and impacting water quality due to increased motorized use in the RCA.

Route density would continue to increase due to a substantial increase in use of ATVs, UTVs, and off-road motorcycles, which enables public land users to pioneer roads into areas previously not accessible. The overall impacts from roads and their use on special status aquatic species are an increase in the number of stream fords, increased sediment contributions to fish-bearing streams, increased recreational use in RCAs, an increase in noxious weeds in riparian areas, and an increased incidence of human-caused fires. All of these have contributed to a reduction in HC and PFC ratings in the planning area. The No Action Alternative does not include direction for reducing road the impacts of roads on special status aquatic species and their habitats.

Impacts from Management Common to All Action Alternatives

The ARMS contains guidance to reduce impacts from existing roads and for avoiding construction of new roads in RCAs unless a site-specific analysis indicates long-term adverse effects to special status aquatic species and RCAs can be avoided. ESA consultation with FWS would be required for road construction, reconstruction, or reclamation in RCAs containing bull trout, Snake River snails, or Bruneau hot springsnail. Compliance with the ARMS and ESA consultation would reduce the potential for adverse effects to special status aquatic species and their habitats. ARMS guidance would also reduce effects to aquatic Sensitive species habitats.

Developing a CTTMP would provide a site-specific analysis to identify road closures, travel restrictions, or other travel management adjustments to reduce impacts on RCAs and special status aquatic species. Short-term localized reductions with long-term improvements in HC and PFC ratings in special status species habitats would occur as a result of road improvement projects, culvert replacements, route closures, or road rehabilitation. Implementing actions that result in short-term effects for long-term improvement in HC and PFC ratings comply with the direction in the ARMS. The potential for impacts to special status aquatic species or their habitats from roads in the RCA would continue to occur until mitigation is applied or restoration actions are accomplished to reduce road-related impacts.

Impacts from Management Specific to Alternative I

Areas closed to motorized vehicle use in Alternative I would encompass 126 miles of perennial stream and 5 miles of Conservation and Restoration Reaches (Table 4- 128 and Table 4- 129). The closed areas are located in the Bruneau and Jarbidge Canyons, portions of the Jarbidge River, and in the Salmon Falls

Creek Canyon. Areas with travel limited to designated routes or ways would reduce travel-related impacts to HC and PFC ratings on 189 miles of perennial stream, including 14 miles of Restoration Reaches.

Travel limitations would reduce the potential for a decrease in HC and PFC ratings in habitats occupied by special status species and would comply with the direction in the ARMS. Where roads in RCAs are closed, their impacts to instream and riparian conditions would be reduced. However, reclamation of the road would be needed to completely reduce road-related impacts to HC and PFC ratings in the long-term.

Alternative I would create five TMAs; route designation within the TMAs is expected to reduce road-related impacts to RCAs containing special status aquatic species over the long term. Route density would be expected to increase on 41,000 acres (3%) of the planning area, remain the same on 667,000 acres (49%), and decrease on 666,000 acres (48%). Any changes in route density could affect HC and PFC ratings for RCAs containing special status aquatic species. Areas where route density increases could have impacts to RCAs in addition to those which have already occurred. In Alternative I, portions of the Deadman and Yahoo areas would be open to cross-country motorized vehicle use and would encompass fewer than 2 miles of perennial stream. These stream miles do not contain special status aquatic species, but Yahoo Creek can be a source of sediment to the Snake River, which is occupied by special status aquatic species. Designating routes within the Yahoo TMA, combined with the designation of this area as a SRMA, would reduce the potential for cross-country motorized vehicle use to impact special status aquatic species habitats in the Snake River.

Exceptions to motorized vehicle restrictions for lessees or permit holders could locally reduce HC and PFC ratings if travel occurs in RCAs. Similar impacts are expected from allowing game retrieval using motorized vehicles 300 feet off designated routes where this occurs in the RCA. There is a larger decrease in route density expected under this alternative than Alternatives II and III, but less of a decrease than expected under Alternatives IV and V. In general, any decrease in route density in riparian areas would reduce impacts to special status aquatic species and their habitat.

Impacts from Management Specific to Alternative II

Alternative II would not designate areas open to cross-country motorized vehicle use. Alternative II would have 76 miles of perennial stream in areas closed motorized vehicle use, the fewest miles of all alternatives. There would be 240 miles of perennial stream and 18 miles of Restoration Reaches in areas with travel limited to designated routes or ways, the most of all alternatives (Table 4- 128 and Table 4-129). Areas designated as closed to motorized vehicle use would reduce impacts to occupied redband trout and potential bull trout overwintering habitat in the Jarbidge River. The Jarbidge River, its East Fork, and the tributaries important for bull trout and redband trout would be included in areas limited to designated routes or ways. These bull trout and redband trout habitats would be at an increased risk for a reduction in HC and PFC ratings due to travel in the RCA. Portions of redband trout habitat in Salmon Falls Creek Canyon would be closed to motorized vehicle use. The redband trout streams in the Jarbidge Foothills would be in areas limited to designated routes or ways and would be at risk for reduction HC and PFC ratings due to travel, but at less risk than if these areas were open to cross-country motorized vehicle use. The Bruneau hot springsnail and special status aquatic species in the Snake River would also be at less risk for travel-related impacts with than if these areas were open to cross-country motorized vehicle use.

Authorizing cross-country motorized vehicle use for game retrieval or administrative purposes in areas designated as limited or closed to motorized vehicle use would have the same localized impacts to HC and PFC ratings as described for Alternative I.

Alternative II would create two TMAs. Route density would be expected to increase on 1,161,000 acres (85%) of TMAs and would remain the same on 213,000 acres (15%) of TMAs. This is a substantially larger area that where route density is expected to increase than in any of the action alternatives.

Impacts from Management Specific to Alternative III

Areas closed to motorized vehicle use would encompass 107 miles of perennial stream, while areas limited to designated routes or ways would encompass 209 miles of perennial stream; the miles of

Restoration Reaches in each travel designation would be the same as in Alternative II (Table 4- 128 and Table 4- 129). Alternative III would have the same effects to HC and PFC ratings in areas occupied by special status aquatic species as described for Alternative II; however, more perennial stream miles would be in areas closed to motorized vehicle use in Alternative II. Areas open to cross-country motorized vehicle use in Alternative III would have the same impacts as described for Alternative I. Authorizing cross-country motorized vehicle use in areas designated as limited or closed to motorized vehicle use would have the same localized impacts to HC and PFC ratings as described for Alternative I.

Alternative III would create five TMAs. The effects of creating these TMAs would be the same as under Alternative I. Route density would be expected to increase on 34,000 acres (2%) in the planning area and remain the same 1,339,000 acres (98%). There would be no reduction in route density because routes would be maintained for fire suppression efforts. The result would be a slower rate of recovery of HC and PFC ratings from road-related impacts to special status aquatic habitats than could occur under any of the other action alternatives, but a faster rate than in the No Action Alternative.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Areas open to cross-country motorized vehicle use in Alternative IV would be in the same locations and have the same impacts to special status aquatic species as in Alternative I. Alternative IV would have the same miles of perennial stream in areas limited to designated routes or ways and areas closed to motorized vehicle use as Alternative III, more perennial stream miles than Alternative II and the No Action Alternative, but fewer than in Alternative I and V. Alternative IV has the same miles of Restoration Reaches in areas limited to designated routes or ways and closed to motorized vehicle use as Alternative I. The location of the closed areas would be the same as Alternative I with the exception of additional closures in the China Creek area and in the upper reaches of Salmon Falls Creek. In general, Alternative IV would have more routes closed to motorized vehicle use than Alternatives I through III and approximately half of what would be closed under Alternative V.

Alternative IV would create the same TMAs described under Alternative I. Route density under Alternative IV would be expected to increase on 34,000 acres (2%) in the planning area and decrease on 1,339,286 acres (98%). A portion of the changes in route density are likely to occur in riparian areas containing special status aquatic species. A reduction in route density would improve HC and PFC ratings over the life of the plan.

Exceptions to motorized vehicle restrictions for lessees or permit holders could locally reduce HC and PFC ratings if travel or other related uses occur in RCAs.

Alternative IV emphasizes active restoration and increases the likelihood that more miles of road in the RCA would be modified to reduce impacts to HC and PFC ratings than in Alternatives I, II, and III. There would be short-term localized reductions in HC and PFC ratings from road improvement, relocation, or restoration activities, but these activities are expected to improve these ratings in the long term. This alternative would have the most short-term impacts and the fastest recovery of instream channel conditions and riparian areas than any of the other action alternatives.

Impacts from Management Specific to Alternative V

Alternative V would include 136 miles of perennial stream in areas closed to motorized vehicle use, the most of all alternatives (Table 4- 128). Alternative V would have travel limitations that could potentially reduce travel-related impacts to HC and PFC ratings on 180 miles of perennial stream. The miles of Conservation and Restoration Reaches in each travel designation in Alternative V are the same as in Alternatives I and IV. The impacts of travel designations would be the same described for Alternative I. The only riparian area open to cross-country motorized vehicle use would be in Yahoo Creek; this would have similar impacts to special status aquatic species as described in Alternative I. Travel would be limited to designated routes in the Deadman area and would have similar effects to special status species as described for Alternative II. The location of the closed areas would include portions of the China Creek area and the upper reaches of Salmon Falls Creek, which would reduce the potential for travel-related impacts to an additional 10 miles of redband trout habitat.

Alternative V would create the same TMAs described under Alternative III. Route density under Alternative V would be expected to decrease use on 1,370,000 acres (99%). This is likely to have a major long-term beneficial effect on special status species habitats as a primary source of sediment to streams channels is reduced. There would be short-term adverse effects from road improvements, relocations, or restoration activities, but the long-term effects from these activities are expected to out-weigh the short-term effects.

It is expected this alternative would implement more road restoration activities in RCAs than any of the other action alternatives. These restoration activities would likely cause localized adverse effects to fish-bearing streams during the restoration activities, but overall effects to RCAs containing special status aquatic species would be reduced. Alternative V would likely have fewer adverse effects than under Alternative IV because more passive techniques would be used for restoration. The passive restoration techniques could result in some areas not being fully restored because more aggressive techniques may not be used. The rate of recovery of some of the riparian areas with road closures could be slower than if active restoration was used to expedite the recovery process. However, this alternative would result in a significant reduction in route density over the life of the plan, which would be expected to have a major reduction in road-related impacts to special status aquatic species habitats.

Impacts from Land Use Authorizations Actions

The impacts from land use authorizations on special status aquatic species vary by the type of authorization, its location, season and duration of use, and proximity of use to streams containing special status species or their habitats. Some uses, such as upland powerlines, phone lines, and telecommunication sites, could have little or no potential to reduce HC and PFC ratings. Other land use authorizations, such as roads, water developments, ditches, energy projects, and other surface-disturbing uses, have potential to reduce HC and PFC ratings depending on their proximity to streams containing special status species. The impacts from these uses include increased sediment, reduced instream flows, and the removal of riparian vegetation, all of which reduce HC and PFC ratings.

Utility corridors can contain powerlines, support towers, roads, and other operational and maintenance structures. The primary effect of utility corridors on aquatic habitats occurs where roads enter the RCA. The impacts of roads on riparian areas and the sediment they introduce into fish-bearing habitats are described under *Impacts from Transportation and Travel Actions*. The construction of utility developments can impact water quality from the storage and use of hazardous chemicals (e.g., petroleum products, lubricants, drill fluids, and others; see *Impacts from Water Resources Actions*). Surface waters may be needed to facilitate road construction or reconstruction, for dust abatement on roads or equipment staging areas, or for mixing with concrete to construct tower foundations. All new utility developments would comply with the ARMS, Appendix E, and Appendix H to reduce impacts to special status species.

Wind energy projects are an increasing use on public lands, and the number of wind energy projects is expected to increase over the life of the plan. Most of the infrastructure for wind energy projects, such as towers, support facilities, and associated powerlines, are located in upland areas or ridge tops and would have limited impacts to RCAs or fish-bearing habitat. The road systems that support wind energy projects pose the greatest threat to aquatic resources from the use of existing roads and creation of new roads. Any location where roads enter RCAs could have impacts to stream channel conditions and riparian vegetation. Where roads cross fish-bearing streams, the use of culverts or bridges directly influences the long-term impacts to HC ratings. Wind energy projects can also have short-term impacts to instream flows if surface water is required for road construction or reconstruction, dust abatement on roads or equipment staging areas, or mixing with concrete to construct tower foundations. The impacts from removing surface water from fish-bearing streams vary by location, amount and rate of withdrawal, and season. The impacts of streamflow alteration are described under the *Impacts from Water Resources Actions*.

Table 4- 130 identifies the perennial stream miles in ROW exclusion or avoidance areas and in potential utility and wind development areas.

Table 4- 130. Perennial Streams in ROW Exclusion or Avoidance Areas or in Potential Utility and Wind Development Areas by Alternative (Miles)

	Alternative					
	No Action	I	II	III	IV	V
ROW Exclusion Areas	0	107	105	107	138	138
ROW Avoidance Areas	118	221	220	220	224	294
Potential Utility Development Areas	15	9	15	9	9	6
Potential Wind Development Areas	48	7	48	7	7	3

Table 4- 131 displays the Conservation and Restoration Reaches in ROW exclusion or avoidance areas and in potential wind development areas. No Conservation or Restoration Reaches are located within any potential utility development areas.

Table 4- 131. Conservation and Restoration Reaches in ROW Exclusion or Avoidance Areas or in Potential Wind Development Areas by Alternative (Miles)

HC Rating	Alternative					
	No Action	I	II	III	IV	V
ROW Exclusion Areas						
Conservation	N/A	<1	<1	<1	1	1
Restoration	N/A	3	3	3	9	9
Total		**4**	**4**	**4**	**10**	**10**
ROW Avoidance Areas						
Conservation	5	12	12	12	12	17
Restoration	7	8	8	8	5	25
Total	**11**	**20**	**20**	**20**	**17**	**42**
Potential Wind Development Areas						
Conservation	5	0	5	0	0	N/A
Restoration	12	<1	12	<1	<1	N/A
Total	**17**	**<1**	**17**	**<1**	**<1**	**N/A**

Notes:
Data are not available for ROW exclusion areas in the No Action Alternative.
No streams in the potential wind development areas for Alternative V have HC data; therefore, there are no Conservation or Restoration Reaches in potential wind development areas.

The miles of riparian priority reaches in ROW avoidance or exclusion areas and in potential wind development areas are summarized in the *Riparian Areas and Wetlands* section (Table 4- 88 and Table 4- 89, respectively).

Impacts from Management Specific to the No Action Alternative

The No Action Alternative would include 118 miles of perennial stream in utility avoidance areas, 15 miles in utility development areas, and 48 miles in potential wind development areas (Table 4- 130). The No Action Alternative would have utility avoidance or use restrictions for the redband trout habitat in the Bruneau River, Jarbidge River below the confluence with the East Fork, and a portion of the redband trout habitat in the Jarbidge River and its East Fork. The bull trout overwintering habitat in the lower portion of the Jarbidge River would be a utility avoidance area. A portion of the Bruneau hot springsnail habitat would be in a utility avoidance area. Redband trout habitats in the Salmon Falls Creek Canyon would be in a utility avoidance area, but none of the redband trout habitat in the tributaries in the Jarbidge Foothills, upper Salmon Falls Creek, or lower Salmon Falls Creek would be excluded from utility development. Other than in the Sand Point ACEC, none of the other areas adjacent to the Snake River with habitats used by white sturgeon, Snake River snails, or Shoshone sculpin would be excluded from utility development. Current management direction does not provide sufficient guidance for preventing utility development or associated infrastructure in habitats used by special status aquatic species. It also does not provide direction for improving special status species habitats in areas where utility corridors could occur.

Impacts from Management Common to the No Action and All Action Alternatives

The No Action Alternative and all action alternatives would adopt the programmatic policies and BMPs for the wind energy development program (Appendix N). The adoption of this guidance would reduce the potential for wind energy projects to impact special status aquatic species or their habitat.

Impacts from Management Common to All Action Alternatives

All existing and new ROWs on public land would follow the guidance in the ARMS, which includes management direction for restoring and improving fish-bearing streams and riparian habitats. These guidelines are expected to reduce impacts to HC and PFC ratings in habitats containing special status aquatic species from ROWs and potential wind energy development projects on public land.

Impacts from Management Specific to Alternative I

In Alternative I, ROW exclusion areas would encompass 107 miles of perennial stream and 3 miles of Restoration Reaches (Table 4- 130 and Table 4- 131). The ROW exclusion areas contain potential bull trout overwintering habitat in the Jarbidge River, redband trout habitat in a portion of Salmon Falls Creek, and a small section of the Snake River snail and white sturgeon habitat along the Sand Point ACEC. Since these areas would not be available for ROWs, HC and PFC ratings in areas occupied by special status aquatic species are likely to improve. Streams containing special status aquatic species outside ROW exclusion or avoidance areas are at the most risk for a reduction in HC and PFC ratings.

ROW avoidance areas would encompass 221 miles of perennial stream and 8 miles of Restoration Reaches (Table 4- 130 and Table 4- 131). ROW avoidance areas would include all occupied and potential bull trout habitat, all of the Bruneau hot springsnail habitat, and most of the free-flowing section of the Snake River occupied by white sturgeon and Snake River snails. Redband trout habitats in upper Salmon Falls Creek, Salmon Falls Creek Canyon, portions of Rocky Canyon Creek, Jarbidge River, Bruneau River, and lower Clover Creek would also be included in ROW avoidance areas. ROW avoidance areas in non-WSA lands managed for wilderness characteristics would reduce the potential for impacts to HC and PFC ratings in RCAs containing redband trout habitat. Streams occupied by special status aquatic species in ROW avoidance areas are at less risk for a reduction in HC and PFC ratings than riparian areas that are available for land use authorizations with fewer restrictions. Compliance with the guidance in the ARMS would reduce impacts from new ROWs in avoidance areas.

Potential utility development areas would include 9 miles of perennial stream; none of these are Conservation or Restoration Reaches. A majority of these areas are located in upland areas and would have limited impacts, if any, to HC and PFC rating for RCAs containing special status aquatic species. The portions of these areas that cross RCAs have the potential to affect HC and PFC ratings. The greatest impacts would occur where utilities are buried in the RCA or where new stream crossings are created to support utility corridors. New utility developments would comply with the ARMS, Appendix E, and Appendix H to reduce impacts to HC and PFC ratings in occupied special status species habitats.

Potential wind development areas would be along the Snake River from the Hagerman Fossil Beds National Monument to the town of Hammett and in upper Salmon Falls Creek in the China Creek and Cedar Creek Watersheds. There would be 7 miles of perennial stream in these areas, of which 2 miles contain special status species (Salmon Falls Creek, China Creek; Table 4- 130). The impacts from infrastructure development and roads in the RCA would have the most potential to reduce HC and PFC ratings in streams containing special status aquatic species. All new wind energy projects would comply with the direction in the ARMS.

Impacts from Management Specific to Alternative II

In Alternative II, ROW exclusion areas would be similar to those described for Alternative I, except the Sand Point ACEC would not be an exclusion area as the ACEC would no longer be designated. ROW exclusion areas would include 105 miles of perennial stream and 3 miles of Restoration Reaches (Table 4- 130 and Table 4- 131). The effects of ROW exclusion areas under this alternative would be the same as those described for Alternative I, except that 2 miles of the Snake River in the Sand Point ACEC would be at an increased risk from ROW uses. All new ROWs would comply with the ARMS, Appendix E, and Appendix H to reduce impacts to special status species and their habitats.

ROW avoidance areas would include 220 miles of perennial stream and contain the same miles of Restoration Reaches in the same areas described in Alternative I (Table 4- 130 and Table 4- 131). Occupied and potential bull trout habitat is outside ROW avoidance areas in this alternative. This alternative would have the same impacts on the Bruneau, Jarbidge, and Snake Rivers as described for Alternative I, except that more redband trout habitat in the Browns Bench area of the Jarbidge Foothills would be available for ROWs. Streams occupied by special status aquatic species in ROW avoidance areas are at less risk for a reduction in HC and PFC ratings than riparian areas available for land use authorizations with fewer restrictions. Compliance with the guidance in the ARMS would reduce the impacts from new ROW in avoidance areas on special status aquatic species. If ROWs were granted in these avoidance areas, the ARMS, Appendix E, and Appendix H would be used to reduce impacts to special status species habitats.

Potential utility development areas in Alternative II would be in the same areas as in Alternative I, with the exception of additional areas along Browns Bench in the upper Salmon Falls Creek and China Creek areas. Utility development areas would include 15 miles of perennial stream, 10 miles of which are occupied by special status aquatic species. This alternative would have the most utility corridor development on any of the action alternatives. Other than the increased potential for impacts to redband trout in the China Mountain corridor, the effects of utility development for Alternative II would be the same for Alternative I.

Potential wind development areas would occur in the same general areas as described in Alternative I, except a larger area in the Jarbidge Foothills and along the Snake River would be available for development. The potential wind development areas in Alternative II include 26 miles of the redband trout streams in the Jarbidge Foothills and 21 miles along the Snake River (Table 4- 130). These areas include 5 miles of Cedar Creek, which has the highest redband trout densities in the planning area. There are 12 miles of Restoration Reaches in the potential wind development areas (Table 4- 131). Portions of the occupied bull trout watersheds in the upper Jarbidge River and redband trout habitat in the Bruneau River would be in the potential wind development areas. The ARMS guidance and ESA consultation would be used to reduce impacts to bull trout and redband trout habitat in potential wind development areas.

Impacts from Management Specific to Alternative III

The ROW exclusion areas in Alternative III would be in the same locations and have the same impacts as described for Alternative I. The ROW avoidance areas in Alternative III would be the same as described in Alternative II, with the addition of the Bruneau-Jarbidge ACEC. This alternative would include 220 miles of perennial stream and 8 miles of Restoration Reaches and would have the same impacts as described for Alternative II. All of the bull trout habitat and portions of the redband trout habitat would be included in the ROW avoidance areas for WSRs. Redband trout habitat in the Jarbidge Foothills would not be included in ROW avoidance areas.

Potential utility development areas in Alternative III would be located in the same areas and would include the same perennial stream miles as Alternative I.

Potential wind development areas for Alternative III would include the same perennial streams as Alternative I. Guidance in the ARMS, Appendix E, and Appendix H would be used to reduce the potential to impact HC and PFC ratings in habitats occupied by special status aquatic species from ROWs and wind energy projects.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

ROW exclusion areas for Alternative IV would include 138 miles of perennial stream and 10 miles of Restoration Reaches (Table 4- 130 and Table 4- 131). The ROW exclusion areas for Alternative IV would be the same as described for Alternative I with the addition of non-WSA lands managed for their wilderness characteristics (i.e., portions of the East Fork Jarbidge River, upper Salmon Falls Creek and

Browns Bench). Alternative IV would have more miles of perennial stream in exclusion areas than Alternatives I, II, and III, but fewer than V. This alternative would have the same miles of Restoration Reaches in exclusion areas as Alternative V, which is more than Alternatives I, II, and III.

The ROW avoidance areas in Alternative IV would be in the same areas as described for Alternative II with the addition of the Bruneau-Jarbidge ACEC. ROW avoidance areas would include 224 miles perennial stream and 14 miles of Restoration Reaches (Table 4- 130 and Table 4- 131). Alternative IV would have more miles of Restoration Reaches in ROW avoidance areas than Alternatives I, II, and III, but fewer than Alternative V. The impacts would be the same as described for Alternative II, except more miles of special status species habitat would be included in ROW avoidance areas.

Potential utility development areas in Alternative IV would include the same perennial stream miles as Alternative I. Potential wind development areas for Alternative IV would impact the same perennial streams as Alternative I. The impacts to HC and PFC ratings from ROW avoidance, ROW exclusion, utility corridors would be the same as Alternative I.

Impacts from Management Specific to Alternative V

ROW exclusion areas for Alternative V would be in the same location and include the same number of perennial stream miles as Alternative IV, but would include 20 more miles of Restoration Reaches than Alternative IV (Table 4- 130 and Table 4- 131). The impacts of ROW exclusion areas on special status aquatic species would be the same as described for Alternative IV.

ROW avoidance areas in Alternative V would be the same as described for Alternative I, with the addition of the Sagebrush Sea ACEC. ROW avoidance areas would include 294 miles of perennial stream and 34 miles of Restoration Reaches (Table 4- 130 and Table 4- 131). This is the largest avoidance area of all alternatives. The impacts of ROW avoidance areas would be the same as described for Alternative I. Managing the Sagebrush Sea ACEC as a ROW avoidance area would reduce the likelihood for ROWs to be granted in bull trout habitat and all but a portion of redband trout habitat in lower Salmon Falls Creek. ROWs could be granted in this area if a site-specific analysis determines HC and PFC ratings would not be reduced. If ROWs were granted in these avoidance areas, the guidance in the ARMS, Appendix E, and Appendix H would be used to reduce impacts to special status species. ESA consultation would be required for actions affecting ESA listed species or their habitats.

Potential utility development areas in Alternative V include the same corridors described in Alternative I with the exception of a portion of the Saylor Creek Corridor that would not be identified as a corridor. This portion of the corridor contains 2 miles of perennial stream, which are not occupied by special status aquatic species. The impacts of energy corridor development under this alternative would be the same as in Alternative I.

The potential wind development areas in Alternative V would include the fewest perennial stream miles of all the alternatives. The potential wind development areas include 3 miles of perennial stream, but only 1 mile on the Snake River contains special status aquatic species (Table 4- 130). No streams in the potential wind development areas for Alternative V have HC data; therefore, there are no Conservation or Restoration Reaches in potential wind development areas. The impacts of Alternative V are the same as described for Alternative I for the Snake River.

Impacts from Minerals Actions

The impacts on HC and PFC ratings for any minerals development in the RCA would be primarily related to streambank and streambed alteration, removal of riparian vegetation, sediment introductions to streams from surface-disturbing activities such as road construction and maintenance, facilities development and operation, and general impacts to water quality and quantity. Restoration Reaches not at PFC are at more risk for further reduction in condition and less likely to improve when in areas open to mineral development than those in closed areas. Conservation Reaches at PFC are more resilient to impacts associated with mineral development. These areas are still at risk for a reduction in condition due to minerals exploration or development, but at less risk than would be expected if they were in a reduced condition prior to development.

Seasonal use restrictions for mineral development are expected to reduce the potential for impacts to special status aquatic species from surface-disturbing activities or occupancy in the RCA. Closing RCAs to mineral development during the spawning periods would protect special status fish spawning and reproduction, but activities in the RCA during other times of the year could reduce HC and PFC ratings in special status aquatic species habitats. Some aspects of oil and gas or geothermal development, such as blasting, consumptive and non-consumptive use of surface or groundwater, disposal of wastewater, and general surface disturbance in the RCA, could reduce HC and PFC ratings where these activities occur. Blasting activities may result in negative impacts to special status aquatic species, particularly during spawning, incubation, or other reproductive stages (Appendix H). The impacts to special status fish from directional drilling to access geothermal or oil and gas resources are unknown. Geothermal leasing near the Lower Bruneau Canyon ACEC could pose a threat to subsurface geothermal resources in the ACEC that support Bruneau hot springsnails. NSO restrictions would avoid direct impacts to RCAs containing special status aquatic species, but indirect impacts to HC and PFC ratings could occur where minerals exploration or development occurs in the RCA at any time of the year.

Locatable mineral exploration and development in the planning area usually occurs in RCAs and can result in disturbances to the streambed, streambank, streamflow, streamside vegetation, and other RCA components. Water quality can be reduced as a result of chemicals used in the mineral extraction process (Nelson, et al., 1991). The impacts from these projects can result in a long-term reduction in HC and PFC ratings in RCAs containing special status aquatic species and their habitats. The more miles of Restoration Reaches and riparian Priority 1 and 2 reaches in areas recommended for withdrawal, the fewer risk for reduction in these ratings from locatable mineral development. All locatable mineral development would comply with the guidance in the ARMS, Appendix E, and Appendix H to reduce the potential for impacts to the extent possible, but all impacts may not be fully mitigated.

Table 4- 132 through Table 4- 139 identify the miles of perennial stream and Conservation and Restoration Reaches within leasable, salable, and locatable mineral allocation areas.

The miles of riparian priority reaches in potential oil and gas areas, potential geothermal areas, available for salable mineral development, and recommended for withdrawal from locatable mineral development are summarized in the *Riparian Areas and Wetlands* sections (Table 4- 90, Table 4- 91, Table 4- 92, and Table 4- 93, respectively).

Table 4- 132. Leasable Mineral Allocations for Perennial Streams in Potential Oil and Gas Areas by Alternative (Miles)

Leasable Mineral Allocation	Alternative				
	I	II	III	IV	V
Open	3	9	9	4	7
Open - No Surface Occupancy	2	27	25	2	2
Open - Seasonal and Controlled Surface Use Restrictions	37	0	0	36	31
Open - Seasonal Restrictions	6	0	0	5	1
Open - Controlled Surface Use Restrictions	7	51	51	12	11
Closed	35	1	4	31	37

Table 4- 133. Leasable Mineral Allocations for Conservation and Restoration Reaches in Potential Oil and Gas Areas by Alternative (Miles)

HC Rating	Alternatives					
	I	II	III	IV		V
				IV-A	IV-B	
Open						
Conservation	0	0	0	0	0	0
Restoration	0	0	0	0	0	0
Open – No Surface Occupancy						
Conservation	0	0	0	0	0	0
Restoration	0	2	2	0	0	0
Open-Seasonal and/or Controlled Restrictions						
Conservation	5	5	5	5	5	5
Restoration	8	8	8	8	8	8
Closed						
Conservation	0	0	0	0	0	0
Restoration	2	0	0	2	0	2

Table 4- 134. Leasable Mineral Allocations for Perennial Streams with Geothermal Potential by Alternative (Miles)

Leasable Mineral Allocation	Alternative					
	I	II	III	IV		V
				IV-A	IV-B	
High Potential						
Open	1	1	1	1		1
Closed	6	6	6	6		6
Medium Potential						
Open	18	43	39	24		18
Closed	27	2	6	22		27
Low Potential						
Open	116	168	159	107	110	114
Closed	149	97	105	157	155	151
Note: There are no perennial streams in areas closed by statue or public land order (PLO).						

Table 4- 135. Leasable Mineral Allocations for Conservation and Restoration Reaches in Low Potential Geothermal Areas by Alternative (Miles)

HC Rating	Alternative				
	I	II	III	IV	V
Open					
Conservation	5	18	18	5	5
Restoration	23	31	31	20	23
Closed					
Conservation	13	1	1	13	13
Restoration	11	3	3	14	11
Note: There are no Conservation or Restoration Reaches in areas with high or medium potential for geothermal leasing.					

Table 4- 136. Salable Mineral Allocations for Perennial Streams by Alternative (Miles)

Salable Mineral Allocation	Alternative					
	I	II	III	IV		V
				IV-A	IV-B	
Open	138	211	142	130	132	130
Closed	178	105	173	186	184	186

Table 4- 137. Salable Mineral Allocations for Streams with HC Data by Alternative (Miles)

HC Rating	Alternative				
	I	II	III	IV	V
Open					
Conservation	5	31	5	5	5
Restoration	23	18	23	20	23
Closed					
Conservation	13	<1	13	13	13
Restoration	11	3	11	14	11

Table 4- 138. Locatable Mineral Allocations for Perennial Streams by Alternative (Miles)

Locatable Mineral Allocations	Alternative				
	I	II	III	IV	V
Available	135	155	154	136	149
Recommended Withdrawn	182	161	163	180	167

Table 4- 139. Conservation and Restoration Reaches in Areas Recommended for Withdrawal from Locatable Mineral Development by Alternative (Miles)

HC Rating	Alternative				
	I	II	III	IV	V
Conservation	13	13	13	13	13
Restoration	11	11	11	14	11

Impacts from Management Specific to the No Action Alternative

The HC and PFC ratings in areas open to minerals exploration and development are at the most risk for a decrease in these ratings because the guidance in the ARMS would not be applied to the No Action Alternative. ESA consultation requirements would reduce the potential for mineral exploration or development to impact habitats occupied by ESA-listed species. Habitats occupied by non ESA-listed species, such as redband trout, would be at the most risk for a reduction in condition due to minerals exploration and development because the ARMS would not be applied in the No Action Alternative. However, according to the RFDS for oil and gas development (Appendix U), approximately 90 acres of surface disturbance are expected to occur in the planning area as a result of oil and gas exploration and development over the life of the plan. This is less than 0.1% of the potential oil and gas areas that would be available for oil and gas leasing. Similarly, according to the RFDS for geothermal development (Appendix V), between 185 and 230 acres of surface disturbance are expected to occur in the planning area as a result of geothermal exploration and development over the life of the plan. This is less than 0.1% of the potential geothermal areas that would be available for geothermal leasing.

Salable and locatable mineral use restrictions in the No Action Alternative provide some guidance for occupied and potential bull trout habitats in the Jarbidge River and Bruneau River and the redband trout habitats in these rivers, the Salmon Falls Creek Canyon, and other tributaries, reducing potential impacts to special status species. Salable minerals developed in the No Action Alternative would not follow guidance in the ARMS, although development would have to comply with ESA consultation, which would minimize impacts to special status aquatic species. The acreage on which salable mineral development occurs is expected to increase from approximately 1,300 acres to approximately 2,300 acres over the life of the plan. No salable mineral sources are currently in special status aquatic species habitat. Salable mineral development is expected to occur on approximately 0.2% of the area available for salable mineral development.

The No Action Alternative recommends the Bruneau-Jarbidge and Sand Point ACECs; designated wilderness; and the Bruneau, Jarbidge, and Salmon Falls Creek Canyons be withdrawn from locatable mineral development. This would protect some redband and bull trout habitats. Demand for locatable minerals in the planning area is not expected to change from present levels.

Impacts from Management Common to All Action Alternatives

Minerals projects would comply with the ARMS, which would reduce the potential for impacts to HC and PFC ratings in habitats occupied by special status aquatic species. The ARMS provides guidance for conserving high quality habitats and restoring impaired habitats so that HC and PFC ratings are improved. Site-specific analysis would be required to assure actions encroaching on the RCA do not impair the attainment of ARMS objectives. All action alternatives would comply with ESA consultations where mineral exploration or development activities have the potential to impact habitats containing ESA listed species.

Impacts from Management Specific to Alternative I

Under Alternative I, 3 miles of perennial stream in potential oil and gas areas would be open to oil and gas leasing, 52 miles of stream would be open to leasing with restrictions, and 35 miles of stream would be closed to oil and gas leasing (Table 4- 132). There are 5 miles of Conservation Reaches and 8 miles of Restoration Reaches open to leasing with restrictions (Table 4- 133). Combined with implementation of guidance in the ARMS, Alternative I is expected to have fewer impacts to special status aquatic species and their habitat than the No Action Alternative. According to the RFDS for oil and gas development (Appendix U), approximately 90 acres of surface disturbance are expected to occur in the planning area as a result of oil and gas exploration and development over the life of the plan. This is less than 0.1% of the potential oil and gas areas that would be available for oil and gas leasing.

In Alternative I, 265 miles of perennial stream are in areas open and 182 miles of perennial stream are in areas closed to geothermal leasing (Table 4- 134). There are 23 miles of Restoration Reaches in areas open to geothermal leasing and 11 miles of Restoration Reaches in areas closed (Table 4- 135). In general, the geothermal management guidance and the direction in the ARMS are not expected to reduce HC and PFC ratings. Alternative I is expected to have fewer impacts to special status aquatic species and their habitat than the No Action Alternative. According to the RFDS for geothermal development (Appendix V), between 185 and 230 acres of surface disturbance are expected to occur in the planning area as a result of geothermal exploration and development over the life of the plan. This is less than 0.1% of the potential geothermal areas that would be available for geothermal leasing.

In Alternative I, 138 miles of perennial stream would be in areas open and 178 miles of perennial stream would be in areas closed to salable mineral development (Table 4- 136). There are 12 miles of Restoration Reaches in areas open and 6 miles in areas closed to salable mineral development (Table 4-137). The areas closed to salable mineral development coincide with the special status aquatic species habitats in the Bruneau River, Jarbidge River and its tributaries, most of the Snake River, and most of Salmon Falls Creek. Since these areas are closed to salable mineral development, there is no potential for special status aquatic species to be impacted. In areas with special status species habitat open to salable minerals development, there would be an increased risk for HC and PFC ratings to be reduced due to salable mineral development. However, all salable mineral developments would comply with the guidance in the ARMS, Appendix E, and Appendix H, which would substantially reduce the potential for impacts to HC and PFC ratings in RCAs occupied by special status aquatic species. The acreage on which salable mineral development occurs is expected to increase from approximately 1,300 acres to approximately 2,300 acres over the life of the plan. No salable mineral sources are currently in special status aquatic species habitat. Salable mineral development is expected to occur on approximately 0.2% of the area available for salable mineral development. Alternative I is expected to have fewer impacts to special status aquatic species and their habitat than the No Action Alternative.

In Alternative I, 135 miles of perennial stream in would be areas available for and 182 miles in areas recommended for withdrawal from locatable mineral development (Table 4- 138). This alternative has the fewest perennial stream miles in areas available to locatable minerals development of all alternatives. There are 11 miles of Restoration Reaches in areas recommended for withdrawal from locatable mineral development (Table 4- 139). The areas recommended for withdrawal would coincide with bull trout and redband trout habitats in the Bruneau-Jarbidge ACEC, the redband trout habitat in the Salmon Falls Creek ACEC and portions of upper Salmon Falls Creek and Rocky Canyon Creek, and the Snake River snail and white sturgeon habitats in the Snake River in the Middle Snake and Sand Point ACECs. The redband trout streams in the Jarbidge Foothills and the Bruneau hot springsnail habitat would be in area available for locatable minerals development. Demand for locatable minerals in the planning area is not expected to change from present levels. The recommended locatable mineral withdrawal, combined with the guidance in the ARMS, is expected to result in fewer impacts to special status aquatic species and their habitat than the No Action Alternative.

Impacts from Management Specific to Alternative II

In Alternative II, 87 miles of perennial stream in potential oil and gas areas would be open (with and without additional restrictions) to oil and gas development (Table 4- 132). There are 5 miles of Conservation Reaches and 10 miles of Restoration Reaches open with restrictions (Table 4- 133). Alternative II would have the greatest number of perennial stream miles in areas open to oil and gas development of all alternatives. The potential impacts of oil and gas development on redband trout and their habitat would be the same as for Alternative I, except 34 more miles of stream would be at risk for impacts from oil and gas development in Alternative II.

In Alternative II, 212 miles of perennial stream would be in areas open to geothermal leasing, and 105 miles of perennial stream would be in areas closed to geothermal leasing (Table 4- 134). This alternative has the most miles perennial stream in areas open to geothermal leasing of all alternatives. There are 31 miles of Restoration Reaches are in areas open to geothermal leasing and 3 miles of Restoration Reaches in areas that are closed to leasing (Table 4- 135). Combined with guidance in the ARMS, Alternative II would have more risk to special status aquatic species than Alternative I, but less than the No Action Alternative.

In Alternative II, 211 miles of perennial stream would be in areas open and 105 miles of perennial stream would be in areas closed to salable mineral development (Table 4- 136). This alternative would have the most perennial stream miles in areas open to salable mineral development of all alternatives. There are 19 miles of Restoration Reaches in areas open and no Restoration Reaches in areas closed to salable mineral development (Table 4- 137). The impacts of salable minerals development in Alternative II would be the same as for Alternative I, except there would be more miles Restoration Reaches in areas open to salable minerals development in Alternative II.

In Alternative II, 155 miles of perennial stream would be in areas available for and 161 miles in areas recommended for withdrawal from locatable minerals development (Table 4- 138). This alternative has the most perennial stream miles in areas available for locatable mineral development of all alternatives. The miles of Restoration Reaches recommended to be withdrawn from locatable mineral development are the same as for Alternative I (Table 4- 139). The areas available for and recommended for withdrawal from locatable mineral development would generally coincide with the areas identified in Alternative I, except the closures would be limited to eligible, suitable, and designated WSRs instead of ACEC boundaries. The general effects of locatable mineral development on special status aquatic species would be the same as described for Alternative I, except that more stream miles would be available for locatable mineral development.

Impacts from Management Specific to Alternative III

The areas open and closed to oil and gas leasing in potential oil and gas areas in Alternative III would impact the same stream miles as Alternative II, with the exception of an additional 3-mile section of Salmon Falls Creek closed to oil and gas leasing and 2 fewer miles open to oil and gas leasing with NSO restrictions. The impacts to HC and PFC ratings from this alternative would be the same as Alternative II.

In Alternative III, 199 miles of perennial stream would be in areas open to geothermal leasing, and 117 miles of perennial stream would be in areas closed to geothermal leasing (Table 4- 134). This alternative has more miles of perennial stream in areas open to geothermal leasing than Alternatives I, IV, and V, but fewer than Alternative II. The impacts of this alternative would be similar to Alternative II except there is less potential for Snake River snail and white sturgeon habitats in the Snake River and redband trout habitat in Salmon Falls Creek to be impacted by geothermal development. The miles of Restoration Reaches open to geothermal leasing are the same as in Alternative II (Table 4- 135). Combined with guidance in the ARMS, Alternative III would have less risk to special status aquatic species than Alternative II but more than the other alternatives.

In Alternative III, 142 miles of perennial stream would be in areas open and 173 miles would be in areas closed to salable mineral development (Table 4- 136). This alternative would have fewer perennial stream miles in areas open to salable minerals development than the other alternatives. There would be 12 miles of Restoration Reaches in areas open and 6 miles in areas closed to salable mineral development (Table 4- 137). Areas open to salable mineral development would have the same miles of Restoration Reaches as Alternatives I and V, fewer than Alternative II, and more than Alternative IV.

In Alternative III there would be 154 miles of perennial stream in areas available for and 163 miles of perennial stream in areas recommended for withdrawal from locatable mineral development (Table 4-138). This alternative has 1 less perennial stream mile open to locatable mineral development than Alternative II, which would have the most perennial stream miles open to locatable minerals development. The miles of Conservation and Restoration Reaches in areas recommended for withdrawal from locatable mineral development would be the same as Alternative II (Table 4- 139). The impacts of this alternative would be the same as Alternative II.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

In Alternative IV, 59 miles of perennial stream in potential oil and gas areas would be in areas open and 31 miles would be in areas closed to oil and gas leasing (Table 4- 132), more miles open to leasing than Alternative I and fewer miles open to leasing than Alternatives II and III. The miles of Restoration Reaches available for leasing and the impacts to special status aquatic species would be the same as in Alternative I (Table 4- 133).

In Alternative IV-A, 132 miles of perennial stream would be in areas open and 185 miles would be in areas closed to geothermal leasing; Alternative IV-B (the Preferred Alternative) varies from Alternative IV-A by 2 miles (Table 4- 134). There would be 20 miles of Restoration Reaches in areas open and 14 miles of Restoration Reaches in areas closed for geothermal leasing (Table 4- 135). Alternative IV would have the fewest miles of Restoration Reaches open for leasing and, combined with guidance in the ARMS, poses the least risk to special status aquatic species and their habitat of all alternatives.

In Alternatives IV-A, 130 perennial stream miles would be open to salable mineral development; an additional 2 miles of Clover Creek would be open in Alternative IV-B (Table 4- 136). There would be 9 miles of Restoration Reaches in areas open and 9 miles in areas closed to salable mineral development (Table 4- 137), the most miles of Restoration Reaches in areas closed to salable mineral development of all alternatives.

In Alternative IV, 136 miles of perennial stream would be in areas available for and 180 miles of perennial stream would be in areas recommended for withdrawal from locatable mineral development (Table 4-138). This alternative would have more perennial stream miles in areas available for locatable mineral development than Alternative V, but fewer than the other action alternatives. This alternative has 14 miles of Restoration Reaches in areas recommended for withdrawal from locatable development, the most of all alternatives (Table 4- 139). Alternative IV would have the least risk to HC and PFC ratings in RCAs containing special status aquatic species of all alternatives.

Impacts from Management Specific to Alternative V

In Alternative V, 52 miles of perennial stream in potential oil and gas areas would be in areas open and 37 miles would be in areas closed to oil and gas development (Table 4- 132). Eight miles of Restoration Reaches would be in areas open to oil and gas leasing, the same as for Alternatives I and IV (Table 4-133). Oil and gas development would have the least risk to HC and PFC rating for RCAs containing special status aquatic species of all alternatives.

In Alternative V, 133 miles of perennial stream would be in areas open and 184 miles would be in areas closed to geothermal leasing (Table 4- 134). The miles of perennial stream open to geothermal leasing in areas with high to moderate potential would be the same as in Alternatives I and IV. In areas with low potential for development, 23 miles of Restoration Reaches would be open to geothermal leasing, the same as in Alternative I (Table 4- 135). The impacts of geothermal development on HC and PFC rating for streams containing special status aquatic species would be the same as for Alternative I.

In Alternatives V, 130 miles of perennial stream would be in areas open and 186 miles would be in areas closed to salable mineral development (Table 4- 136). This alternative would have the fewest miles of perennial stream in areas open to salable mineral development of all alternatives. The miles of Restoration Reaches in areas open to salable mineral development would be the same as in Alternatives I and III; fewer than Alternative II, but more than Alternative IV.

In Alternative V, 149 miles of perennial stream would be in areas available for and 167 miles of perennial stream would be in areas recommended for withdrawal from locatable mineral development (Table 4-138). Alternative V would encompass more miles of perennial stream in areas available for locatable mineral development than Alternatives I and IV, but fewer than Alternatives II and III. The miles of Restoration Reaches in areas recommended for withdrawal from locatable mineral development would be the same as in Alternatives I, II and III.

Impacts from Areas of Critical Environmental Concern Actions

The management actions for each ACEC are designed to maintain or improve relevant and important values for special status aquatic species, where they exist, by modifying or eliminating activities that impact these species or impair their habitats. The proposed modifications in transportation and travel, infrastructure, fire suppression, mineral withdrawal, livestock grazing, and restoration treatments would support or maintain values for the ACECs overall, but not all actions would directly improve HC or PFC ratings for RCAs containing special status aquatic species. Restoration Reaches not at PFC in ACECs are at less risk for further reduction in condition and more likely to improve than areas not in ACECs because of the increased management emphasis on activities that could impair HC and PFC ratings. Conservation Reaches at PFC are more resilient to land use activities and are more likely to be maintained in their current condition through ACEC designation than if not included in an ACEC.

Of the 13 proposed ACECs, all but two, the Inside Desert and Sand Point ACECs, have at least one special status aquatic species as a relevant and important value (Table 4- 140). Table 4- 141 identifies the miles of perennial stream with relevant and important values for special status aquatic species in each ACEC by alternative. Table 4- 142 displays Conservation and Restoration Reaches within each ACEC by alternative. Management actions that reduce the amount of sediment entering fish-bearing streams, promote healthy riparian vegetation, and improve and maintain water quality would ultimately improve the HC and PFC ratings. The amount of improvement would vary by ACEC and the proposed management changes. In general, ACECs that include the Bruneau-Jarbidge Canyon would improve HC and PFC ratings for bull trout and redband trout, ACECs that include the Jarbidge Foothills and Salmon Falls Creek would improve HC and PFC ratings for redband trout, and the ACEC that includes the lower Bruneau River would improve PFC ratings for the Bruneau hot springsnail. ACECs that include the Snake River would support the overall recovery efforts for the Snake River, but improvement in habitat condition for Snake River snails, Snake River sturgeon, and Shoshone sculpin would be limited. The primary factors that contributed the special status designation for these species are related to flow alteration and water quality concerns due to the hydroelectric development of the Snake River (FWS, 1995).

Table 4- 140. ACECs with Relevant and Important Values for Special Status Fish and Aquatic Invertebrates

ACEC	Bruneau Hot Springsnail	Bull Trout	Redband Trout	Snake River Snails	White Sturgeon
Bruneau-Jarbidge		X	X[A]		
Jarbidge Foothills			X[B]		
Lower Bruneau Canyon	X				
Middle Snake				X	X
Sagebrush Sea		X	X		
Salmon Falls Creek			X		

[A] Redband trout are not included as a relevant and important value in the Bruneau-Jarbidge ACEC with the reduced boundary.
[B] Redband trout are not included as a relevant and important value in the Jarbidge Foothills ACEC with the reduced boundary.

Table 4- 141. Perennial Streams in ACECs Containing Relevant and Important Special Status Aquatic Species Values by Alternative (Miles)

<table>
<tr><th rowspan="3">ACEC</th><th colspan="7">Alternative</th></tr>
<tr><th rowspan="2">No Action</th><th rowspan="2">I</th><th rowspan="2">II</th><th rowspan="2">III</th><th colspan="2">IV</th><th rowspan="2">V</th></tr>
<tr><th>IV-A</th><th>IV-B</th></tr>
<tr><td>Bruneau-Jarbidge</td><td>107</td><td>107</td><td></td><td>51</td><td colspan="2">119</td><td></td></tr>
<tr><td>Jarbidge Foothills</td><td></td><td></td><td></td><td></td><td>70</td><td>38</td><td></td></tr>
<tr><td>Lower Bruneau Canyon</td><td></td><td>2</td><td></td><td></td><td colspan="2">2</td><td>2</td></tr>
<tr><td>Middle Snake</td><td></td><td>12</td><td></td><td></td><td colspan="2"></td><td>12</td></tr>
<tr><td>Sagebrush Sea</td><td></td><td></td><td></td><td></td><td colspan="2"></td><td>258</td></tr>
<tr><td>Salmon Falls Creek</td><td>31</td><td>31</td><td></td><td>31</td><td colspan="2"></td><td></td></tr>
<tr><td>Total</td><td>138</td><td>152</td><td>0</td><td>82</td><td>191</td><td>159</td><td>272</td></tr>
<tr><td colspan="8">Note: Shading indicates the ACEC would not be designated for the Alternative.</td></tr>
</table>

Table 4- 142. Conservation and Restoration Reaches in ACECs Containing Relevant and Important Special Status Aquatic Species Values by Alternative (Miles)

<table>
<tr><th rowspan="3">HC Rating [A]</th><th colspan="7">Alternative</th></tr>
<tr><th rowspan="2">No Action</th><th rowspan="2">I</th><th rowspan="2">II</th><th rowspan="2">III</th><th colspan="2">IV</th><th rowspan="2">V</th></tr>
<tr><th>IV-A</th><th>IV-B</th></tr>
<tr><td colspan="8">Bruneau-Jarbidge</td></tr>
<tr><td>Conservation</td><td>7</td><td>7</td><td></td><td><1</td><td colspan="2">13</td><td></td></tr>
<tr><td>Restoration</td><td>8</td><td>8</td><td></td><td>3</td><td colspan="2">12</td><td></td></tr>
<tr><td>Total</td><td>15</td><td>15</td><td>0</td><td>4</td><td colspan="2">25</td><td>0</td></tr>
<tr><td colspan="8">Jarbidge Foothills</td></tr>
<tr><td>Conservation</td><td></td><td></td><td></td><td></td><td>5</td><td>5</td><td></td></tr>
<tr><td>Restoration</td><td></td><td></td><td></td><td></td><td>21</td><td>4</td><td></td></tr>
<tr><td>Total</td><td>0</td><td>0</td><td>0</td><td>0</td><td>26</td><td>9</td><td>0</td></tr>
<tr><td colspan="8">Sagebrush Sea</td></tr>
<tr><td>Conservation</td><td></td><td></td><td></td><td></td><td colspan="2"></td><td>18</td></tr>
<tr><td>Restoration</td><td></td><td></td><td></td><td></td><td colspan="2"></td><td>35</td></tr>
<tr><td>Total</td><td>0</td><td>0</td><td>0</td><td>0</td><td colspan="2">0</td><td>53</td></tr>
<tr><td>Grand Total</td><td>15</td><td>15</td><td>0</td><td>4</td><td>51</td><td>34</td><td>53</td></tr>
<tr><td colspan="8">[A] There are no Conservation or Restoration Reaches in the Lower Bruneau Canyon, Middle Snake, Salmon Falls Creek, and Sand Point ACECs.
Note: Shading indicates the ACEC would not be designated for the Alternative.</td></tr>
</table>

The miles of riparian priority reaches in ACECs are summarized in the *Riparian Areas and Wetlands* section (Table 4- 94).

Impacts from Management Specific to the No Action Alternative

Management associated with the Bruneau-Jarbidge and Salmon Falls Creek ACECs would continue to reduce impacts to special status aquatic species habitats in approximately 138 miles of perennial stream (Table 4- 141). The Bruneau-Jarbidge ACEC includes 107 miles of perennial stream, of which 91 miles contain bull trout and/or redband trout (Table 4- 140). There are 7 miles of Conservation Reaches in the Bruneau-Jarbidge ACEC (Table 4- 142). The Salmon Falls Creek ACEC includes 31 miles of redband trout habitat in Salmon Falls Creek. ACEC management would result in riparian areas in relatively good condition.

Impacts from Management Specific to Alternative I

Alternative I would designate four ACECs with special status aquatic species as a relevant or important value (Appendix W): the Bruneau-Jarbidge, Lower Bruneau Canyon, Middle Snake, and Salmon Falls Creek ACECs. The ACECs designated under this alternative would include 152 miles of perennial stream (Table 4- 141) and 7 miles of Conservation Reaches (Table 4- 142).

The Bruneau-Jarbidge ACEC would include the occupied bull trout habitat in the East Fork of the Jarbidge River and in the lower portions of the Jarbidge River that are not protected under the WSA or WSR guidance. There are 7 miles of Conservation Reaches in the Bruneau-Jarbidge ACEC. The proposed management changes for this ACEC could directly or indirectly improve HC and PFC ratings on 107 miles of perennial stream occupied by bull trout and/or redband trout. Alternative I contains more management guidance for the Bruneau-Jarbidge ACEC than the No Action Alternative. All actions to maintain or improve relevant and important values for the ACEC would comply with the ARMS and ESA consultation, where required, which would minimize the potential to reduce HC and PFC ratings in habitats occupied by bull trout and redband trout.

The Lower Bruneau Canyon ACEC would encompass a 2-mile reach of the lower Bruneau River (Table 4- 141) and the associated geothermal hot springs. All actions implemented to maintain or improve relevant and important values for the ACEC would comply with the guidance in the ARMS and promote the maintenance and improvement of riparian condition in the ACEC. The maintenance or improvement of the geothermal hot springs and seeps as a relevant and important value for the ACEC would comply with the recovery plan requirements for the Bruneau hot springsnail and their habitat. Geothermal development is the primary threat to Bruneau hot springsnails (FWS, 2002). Closing the ACEC to mineral leasing would prevent the geothermal development on public lands in the ACEC. Geothermal development adjacent to the Lower Bruneau Canyon ACEC could pose a threat to subsurface geothermal resources in the ACEC that support Bruneau hot springsnails. Not recommending the ACEC be withdrawn from locatable mineral development could result in a reduction in riparian condition.

The Middle Snake ACEC would encompass a 12-mile reach of the Snake River (Table 4- 141). All actions implemented to maintain or improve relevant and important values for the ACEC would comply with the guidance in the ARMS and promote the maintenance and improvement of riparian condition in the ACEC. Many of the livestock grazing-related impacts to the Snake River have already been mitigated through ESA consultation requirements for Snake River snails. BLM Sensitive white sturgeon and Shoshone sculpin and their habitats in the Snake River are expected to continue to improve from this management guidance.

The Salmon Falls Creek ACEC would include approximately 31 miles of redband trout habitat in the Salmon Falls Creek Canyon (Table 4- 141). Identifying the ACEC as a high priority for the treatment of noxious weeds and invasive plants would reduce the potential for non-native vegetation to displace native vegetation. Identifying the ACEC as a Critical Suppression Area would reduce the potential for a reduction in HC and PFC ratings from wildland fire and fire suppression activities. The ACEC would remain closed to livestock grazing, ensuring new impacts from livestock would not occur in the ACEC. Closing the ACEC to mineral leasing and salable mineral development and recommending the ACEC for withdrawal from locatable mineral development would ensure that any actions related to these uses would not degrade HC and PFC ratings or result in impacts to water quality that would not be consistent with maintaining resource values in the ACEC.

Impacts from Management Specific to Alternative II

Alternative II would remove the ACEC designation from the existing Bruneau-Jarbidge and Salmon Falls Creek ACECs; 138 miles of perennial stream (Table 4- 141) and 7 miles of Restoration Reaches (Table 4- 142) would no longer benefit from ACEC management.

In some locations, riparian areas would continue to be protected by WSA designations (e.g., Jarbidge River, portions of the Bruneau River and Salmon Falls Creek) or WSR suitability (e.g., Jarbidge River, portions of the Bruneau River) or eligibility (e.g., Jarbidge River and its East Fork, portions of Salmon Falls Creek). Not re-designating the Bruneau-Jarbidge and Salmon Falls Creek ACECs increases the potential for impacts to HC and PFC ratings due to changes in vegetation due to weed introductions, human-caused wildland fire, and potential increases in recreation-related impacts to RCAs. Increases in infrastructure could also be expected as a result of increases in ROW, commercial activities, rangeland improvements related to livestock grazing or recreation developments. The development of mineral resources would not occur in areas with WSA or WSR designations, but could occur in other locations that would not be designated as an ACEC, such as the upper Bruneau River. Minerals exploration or development in this area could locally reduce HC and PFC ratings in RCAs containing special status aquatic species.

Impacts from Management Specific to Alternative III

Alternative III would designate two ACECs with special status aquatic species as a relevant or important value (Appendix W): the Bruneau-Jarbidge and Salmon Falls Creek ACECs (Table 4- 141). ACECs designated in this alternative would include 82 miles of perennial stream (Table 4- 141) and 3 miles of Restoration Reaches (Table 4- 142).

Under Alternative III, the boundary of the Bruneau-Jarbidge ACEC would be reduced compared to the No Action Alternative. The ACEC would include 51 miles of perennial stream, less than half of the perennial stream miles in the ACEC in the No Action Alternative (Table 4- 141). There are 3 miles of Restoration Reaches in the ACEC, 5 miles fewer than the ACEC in the No Action Alternative (Table 4- 142). The ACEC would not include portions of the occupied bull trout habitat in the Jarbidge River or its East Fork or redband trout habitat in the upper and lower Bruneau River or lower Clover Creek. The ACEC would include the potential bull trout overwintering habitat in the Jarbidge River (Table 4- 140). The river segments not included in the ACEC are suitable WSR segments and expected to be maintained in their current condition. All actions implemented to maintain or improve relevant and important values for the ACEC would comply with the guidance in the ARMS and promote the maintenance and improvement of riparian condition in the ACEC. Management actions to maintain or improve relevant and important values for this ACEC are the same as in Alternative I.

In Alternative III, the Salmon Falls Creek ACEC would have the same management actions to maintain or improve relevant and important values as Alternative I; therefore, the impacts to redband trout would be the same as in Alternative I.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV would designate three ACECs with special status aquatic species as a relevant or important value (Appendix W): the Bruneau-Jarbidge, Jarbidge Foothills, and the Lower Bruneau Canyon ACECs (Table 4- 140). ACECs designated in this alternative would include 191 miles of perennial stream with the in Alternative IV-A and 159 miles of perennial stream in Alternative IV-B (the Preferred Alternative; Table 4- 141). There are would be 23 miles or Restoration Reaches in ACECs in Alternative IV-A and 16 miles in Alternative IV-B (Table 4- 142). This alternative would have more perennial stream miles and more Restoration Reaches in ACECs than every alternative except Alternative V.

In Alternative IV, the boundary of the Bruneau-Jarbidge ACEC would be expanded compared to the No Action Alternative and would include 119 miles of perennial streams, 12 more miles than in the No Action Alternative (Table 4- 141). These additional miles include the occupied bull trout habitat in the Jarbidge River and its East Fork and the potential bull trout overwintering habitat in the Jarbidge River (Table 4-140). There are 12 miles of Restoration Reaches in the ACEC, 4 more miles than in the No Action Alternative (Table 4- 142). This expanded ACEC would provide more improvement in bull trout and redband trout habitat than the No Action Alternative and Alternatives I and III.

The Jarbidge Foothills ACEC include 70 miles of perennial stream and 21 miles of Restoration Reaches in Alternative IV-A and 38 miles of perennial stream and 4 miles of Restoration Reaches in Alternative IV-B (Table 4- 141 and Table 4- 140). The management emphasis for the ACEC in Alternative IV- A would be to restore redband trout habitat and reduce habitat fragmentation in redband trout occupied watersheds. The ARMS provides guidance for improving riparian conditions and HC ratings for fish-bearing streams that would improve redband trout habitat over time. Although restoration projects could have a localized short-term reduction in HC or PFC ratings, these impacts would be outweighed by the improved HC and PFC ratings for RCAs containing redband trout and reduced habitat fragmentation in the long-term. In Alternative IV-B, the ACEC contains approximately half of the redband trout habitat than in Alternative IV-A and does not identify redband trout as a relevant and important value for the ACEC. The redband trout habitats that are not included in the ACEC would be at an increased risk for a reduction in HC and PFC ratings from land uses that could occur if the area is not designated as an ACEC.

The Lower Bruneau Canyon ACEC would be managed the same as in Alternative I. The impacts to Bruneau hot springsnail would be the same as in Alternative I.

Impacts from Management Specific to Alternative V

Alternative V would designate three ACECs with special status aquatic species as a relevant or important value (Appendix W): the Lower Bruneau Canyon, Middle Snake, and Sagebrush Sea ACECs (Table 4-140). ACECs designated in this alternative would include 272 miles of perennial stream (Table 4- 141) and 35 miles of Restoration Reaches (Table 4- 142). This alternative would have the most perennial stream miles and Restoration Reaches included in an ACEC of all alternatives.

In Alternative V, the Sagebrush Sea ACEC would include 258 perennial stream miles and 35 miles of Restoration Reaches (Table 4- 141, Table 4- 142). Management guidance for the Sagebrush Sea ACEC would emphasize passive and active restoration actions to improve HC and PFC ratings and reduce habitat fragmentation in redband trout occupied streams. Active restoration actions could have short-term impacts to HC and PFC ratings that would be outweighed by long-term improvements to these ratings expected to occur. The substantial reduction in the amount of livestock grazing in the planning area would be expected to result in a substantial improvement in HC and PFC ratings throughout the ACEC. Removing the livestock infrastructure from RCAs could have short-term impacts to HC and PFC ratings that would be outweighed by the long-term improvements in instream and riparian conditions.

In Alternative V, the Lower Bruneau Canyon ACEC would be managed the same as in Alternative I, except that livestock grazing would not be allowed in the ACEC. This would contribute to an overall decrease in ground disturbance in the ACEC, but would likely have minimal effects on Bruneau hot springsnail because the impacts of livestock grazing have been mitigated through ESA consultation with the FWS. The impacts to Bruneau hot springsnail would be the same as described for Alternative I.

In Alternative V, the Middle Snake ACEC would be managed the same as in Alternative I, except livestock grazing would not be allowed in the Asquena pasture. Livestock trailing would be allowed through the ACEC with no overnight stay, resulting in less livestock-related ground disturbance than in the other alternatives. Otherwise, the impacts for the Middle Snake River ACEC would be the same as for Alternative I.

Summary of Direct and Indirect Impacts

The impact analysis for special status aquatic species focused on resource uses that posed the greatest risk to HC ratings. The impacts to Conservation and Restoration Reaches are summarized in Table 4-143. The impact to HC ratings were evaluated on whether the resource uses would improve or maintain the HC and PFC rating and would facilitate the movement toward or achievement of the riparian objectives in the *Riparian Areas and Wetlands* section. The more miles of Conservation and Restoration Reaches in areas open to resource uses the greater the risk for reduction in HC and PFC ratings. The summary of impacts discussed below focuses on the resource uses that have the greatest likelihood to impact HC ratings.

Impacts from the No Action Alternative

The ARMS would not be implemented under the No Action Alternative, resulting in the fewest miles of improvement in HC and PFC ratings of all alternatives. The No Action Alternative is expected to result in the fewest miles of improvement for Restoration Reaches and the fewest miles attaining PFC over the life of the plan of all alternatives. This alternative would have the most risk to special status aquatic species of all alternatives. The entire planning area would be managed for full suppression, which would not focus suppression activities on Restoration Reaches in the event of multiple fire ignitions. This alternative has the most miles of Restoration Reaches vulnerable to impacts from livestock grazing, cross-country motorized vehicle use, land use authorizations, and minerals development of all alternatives.

Overall, the No Action Alternative would have moderate adverse impacts to special status fish and aquatic invertebrates. Threatened and Endangered aquatic species would continue to be protected through current conservation and recovery plans.

Table 4- 143. Summary of Impacts to Special Status Aquatic Species by Alternative (Miles)

Impact	Alternative						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
Wildland Fire Ecology and Management							
Improve	28	12	6	11	19	15	18
Maintain	14	17	8	14	18	18	18
Decline	0	7	22	11	0	4	0
Livestock Grazing							
Improve	8	9	9	9	13		25
Maintain	4	13	13	13	13		18
Decline	41	30	31	30	27		11
Riparian Reference Areas							
Improve	N/A	2	1	1	2		6
Maintain	N/A	0	0	0	0		0
Recreation							
Improve	N/A	33	4	4	12		4
Maintain	N/A	18	6	6	13		6
Decline	N/A	12	16	16	12		13
Transportation and Travel							
Improve	2	10	3	3	10		11
Maintain	21	34	49	49	44		42
Decrease	23	0	0	0	0		0
Land Use Authorizations							
ROWs							
Improve	N/A	4	4	4	10		10
Maintain	11	24	24	24	27		42
Decline	N/A	24	24	24	15		0
Wind Energy Development							
Maintain	35	52	34	52	52		52
Decline	17	<1	18	<1	<1		0
Minerals							
Oil and Gas Leasing							
Improve	N/A	2	0	0	2		2
Decline		12	14	14	12		12
Geothermal Leasing							
Improve	N/A	24	4	4	27		24
Decline		28	49	49	25		28
Salable Mineral Development							
Improve	N/A	24	3	24	27		24
Decline	N/A	28	49	28	25		28
Locatable Mineral Development							
Improve	0	24	24	24	24		24
Decline	38	14	14	14	14		14
ACECs							
Improve	8	8	0	3	33	17	35
Maintain	7	7	0	<1	18	18	18
Decline	37	37	0	48	1	17	0
Note: N/A indicates data are not available or the action does not apply.							

Impacts from Alternative I

All actions in Alternative I would comply with the ARMS, which would result in more improvement in HC and PFC ratings than the No Action Alternative and Alternatives II and III, but less improvement than

Alternatives IV and V. The ARMS would be used to maintain 85 miles of stream at PFC, achieve PFC on 60 miles of stream, and move toward PFC on 80 miles of stream over the life of the plan. Since improvements in PFC ratings correlate with improvements in HC ratings, similar improvements in HC ratings can be expected. Alternative I would have more potential to meet or surpass the riparian management objectives in riparian reaches containing special status aquatic species than Alternatives II and III because Alternative I would have fewer authorized uses.

Alternative I would have more miles of Restoration Reaches vulnerable to impacts from wildland fire than the No Action Alternative and Alternatives IV and V, but fewer than Alternatives II and III. Overall, livestock grazing in Alternative I would pose a greater risk for a decline in special status aquatic species habitat than Alternatives IV and V, but less than in the other alternatives. Alternative I would have the same miles of Restoration Reaches vulnerable to impacts from travel as Alternatives IV and V, which is fewer than the No Action Alternative and Alternatives II and III. This alternative includes more miles of Restoration Reaches in SRMAs expected to improve or be maintained than the other action alternatives. Potential oil and gas areas would include the same miles of Restoration Reaches closed to leasing as Alternatives IV and V and more than Alternatives II and III. This alternative would have more miles of special status aquatic species habitat in an ACEC than Alternatives II and III, but fewer than Alternative IV and V.

Overall, Alternative I would result in minor adverse impacts to special status fish and aquatic invertebrates. Threatened and Endangered aquatic species would continue to be protected through current conservation and recovery plans.

Impacts from Alternative II

Alternative II would have more potential for an improvement in HC and PFC ratings than the No Action Alternatives but less than the other action alternatives. The management actions in this alternative would comply with the ARMS. The ARMS would be used to achieve PFC on 85 miles of stream and move toward PFC on 140 miles of stream over the life of the plan. Since improvements in PFC ratings correlate with improvements in HC ratings, similar improvements in HC ratings can be expected. Alternative II would have more authorized uses and fewer miles of special status aquatic species habitat achieving PFC of all action alternatives. The increase emphasis on commercial uses would inhibit the effectiveness of achieving the riparian management objectives more in Alternative II than in the other alternatives except for the No Action Alternative.

In Alternative II, the Critical Suppression Areas would include the fewest miles of Restoration Reaches of all action alternatives and would have the most potential for a further reduction in HC and PFC ratings from wildland fire. Substantially more livestock grazing would occur in Alternative II than under any other alternative and would pose the most potential for a decrease in HC and PFC ratings with the exception of the No Action Alternative. This alternative has the same miles of Restoration Reaches expected to decline due to transportation and travel and recreation impacts as Alternative III, more than the other alternatives. The potential wind development areas would have the most Restoration Reaches vulnerable to impacts from wind energy development of all alternatives. Alternative II would have the same miles of Restoration Reaches vulnerable to oil and gas and geothermal development as Alternative III, more than the other alternatives. No ACECs would be designated under this alternative, which would result in the most Restoration Reaches vulnerable to a decline in condition of all alternatives.

Overall, Alternative II would result in major adverse impacts to special status fish and aquatic invertebrates. Threatened and Endangered aquatic species would continue to be protected through current conservation and recovery plans.

Impacts from Alternative III

Alternative III is more likely to facilitate the attainment of riparian objectives in the life of the plan than the No Action Alternative and Alternative II, but less likely than Alternatives I, IV, and V. In Alternative III, the attainment of the riparian objectives is less likely to occur than in Alternative I because the amount of riparian improvement required to meet the objectives is greater in Alternative III while accommodating an increased level of authorized resource use and enhanced wildland fire suppression capabilities. The

ARMS would be used to maintain 85 miles of stream at PFC, achieve PFC on 98 miles, and move toward PFC on 42 miles of stream over the life of the plan. Since improvements in PFC ratings correlate with improvements in HC ratings, similar improvements in HC ratings can be expected. The ARMS would be applied to all actions in Alternative III and would reduce the potential for a decrease in HC and PFC ratings in riparian reaches containing special status aquatic species.

This alternative would have the most fire suppression related infrastructure, including road and stream crossings, of any alternative. Livestock grazing in Alternative III would pose a greater potential for a decline in HC and PFC ratings than Alternatives IV and V, but less than in the No Action Alternative and Alternative I. There would be no reduction in route density because routes would be maintained for fire suppression. This alternative includes the fewest miles of special status aquatic species habitat in SRMAs compared to the other action alternatives. Alternative III would impact the same miles of Restoration Reaches in areas open to mineral leasing as Alternative II, more than the other alternatives.

Overall, Alternative III would result in minor adverse impacts to special status fish and aquatic invertebrates. Threatened and Endangered aquatic species would continue to be protected through current conservation and recovery plans.

Impacts from Alternative IV (the Preferred Alternative)

Alternative IV has the greatest likelihood that a portion of the 42 miles of riparian areas with the objective of moving toward PFC would achieve PFC in the life of the plan. This alternative is the most likely to achieve the objective of 98 miles of riparian area currently not at PFC achieving PFC of all action alternatives and the most improvement of HC ratings. Active restoration is more likely to achieve restoration objectives and in a shorter timeframe than passive restoration. Overall, Alternative IV is more likely to facilitate the movement towards or the attainment of riparian objectives than all other alternatives within the life of the plan.

This alternative would have the same Restoration Reaches in Critical Suppression Areas as Alternative V, more than the other action alternatives. Alternative IV would have more miles of Restoration Reaches in areas vulnerable to livestock grazing than Alternative I and V, but fewer than the No Action Alternative and Alternatives II and III. Along with Alternative V, Alternative IV would have the fewest miles of Restoration Reaches vulnerable to transportation and travel management. Minerals exploration and development in Alternative IV would have fewer miles of Restoration Reaches vulnerable for a decline in condition than Alternatives I, II and III and the No Action Alternatives but more than Alternative V. Alternative IV-A encompasses the most redband trout habitat within an ACEC of all alternatives. Alternative IV-B (the Preferred Alternative) would have 17 miles of Restoration Reaches vulnerable to a decline in condition because they are not included in an ACEC.

Overall, Alternative IV would result in localized, moderate adverse impacts in the short-term from restoration activities leading to major beneficial impacts in the long term. Threatened and Endangered aquatic species would continue to be protected through current conservation and recovery plans.

Impacts from Alternative V

Alternative V is more likely to facilitate the movement towards attaining riparian objectives than the No Action Alternative and Alternatives I, II, and III. The rate of riparian improvement would be faster than the rate expected in the No Action Alternative and Alternatives I, II, and III, but slower than Alternative IV. Alternative V would result in the same improvements in HC and PFC ratings as Alternative IV, but at a slower rate due to the passive restoration techniques.

Alternative V would have the lowest levels of resource uses, which would result in the most improvement in Restoration Reaches containing special status aquatic species habitat of all alternatives. Critical Suppression Areas would include all special status aquatic species habitat in the planning area. This alternative would have the least amount of livestock grazing and the least potential for a decline in Restoration Reaches due to livestock grazing, transportation and travel, land use authorizations, and minerals exploration and development. Alternative V would have the fewest Restoration Reaches in

SRMAs of all alternatives. This alternative would have the most miles of Restoration Reaches that would improve due to ACEC designation.

Overall, Alternative V would result in major beneficial impacts to special status fish and aquatic invertebrates. Threatened and Endangered aquatic species would continue to be protected through current conservation and recovery plans.

Cumulative Impacts

Past, Present, and Reasonably Foreseeable Actions

This cumulative impacts assessment considers the effects of past, present, and reasonably foreseeable management actions on Federal, State and private lands in and adjacent to the planning area in addition to the management actions proposed to maintain or improve instream conditions (HC ratings) and riparian conditions (PFC ratings) for the alternatives. Management actions in the planning area could influence portions of the following three primary watersheds: Bruneau River, Salmon Falls Creek, and Snake River. These primary watersheds include lands administered by the BLM Bruneau, Burley, Shoshone, and Elko FOs; Humboldt-Toiyabe National Forest; Hagerman Fossil Beds National Monument; and State lands. These watersheds also include private inholdings and two military withdrawal areas. Management actions and activities in the identified watersheds that have influenced instream and riparian condition in the past and have the potential to influence instream and riparian condition in the future were considered in this cumulative impacts assessment.

Past, present, and reasonably foreseeable actions for the following resources and resource uses cumulatively affect special status fish and aquatic invertebrates:

- Water Resources
- Riparian Areas and Wetlands
- Noxious Weeds and Invasive Plants
- Wildland Fire Ecology and Management
- Livestock Grazing
- Recreation
- Transportation and Travel
- Land Use Authorizations
- Minerals

These actions are described in detail in the *Introduction* to this chapter.

Summary of Cumulative Impacts

Cumulative Impacts from the No Action Alternative

Management actions implemented under the No Action Alternative, combined with actions on Federal, State, and private lands, have contributed to the current instream and riparian conditions in the planning area. The No Action Alternative would not include the guidance in the ARMS for instream and riparian recovery, reducing the likelihood for 34 miles of Restoration Reaches and 140 miles of Priority 1 and 2 reaches for riparian restoration to improve over the life of the plan. Some of this impaired condition is due to dewatering of streams from Federal, State, and private lands for private and public land uses under legal water rights granted by the States of Idaho and Nevada.

The occurrence and frequency of large wildland fires and fire suppression activities has increased on Federal, State, and private land in and adjacent to the planning area, partially as a result of the increase in noxious weeds and invasive plants and areas open to cross-country motorized vehicle use. Trails, primitive roads, and infrastructure from commodity uses such as livestock grazing, energy development activities, or minerals exploration or development, are expected to result in a cumulative increase in impacts to HC and PFC rating for streams containing special status aquatic species. Actions implemented under the No Action Alternative in habitats occupied by ESA-listed species would comply with the ESA, which would ensure these species and their habitats are not jeopardized by any actions implemented on BLM-managed land. The No Action Alternative maintains the current instream and riparian conditions, but does not provide specific guidance for improving conditions for special status aquatic species.

Cumulative Impacts from Alternative I

All management actions implemented in Alternative I would use the guidance in the ARMS to maintain or improve special status aquatic species habitats, comply with the Clean Water Act, and comply with ESA requirements for riparian areas containing special status aquatic species. The cumulative impacts from implementing this management guidance are expected to improve instream and riparian condition for streams containing special status aquatic species.

The occurrence and frequency of large wildland fires and fire suppression activities has increased on Federal, State, and private land in and adjacent to the planning area, partially as a result of the increase in noxious weeds and invasive plants and areas open to cross-country motorized vehicle use. Trails, primitive roads, and infrastructure from commodity uses such as livestock grazing, ROWs for energy developments, or minerals exploration or development are expected to result in a cumulative increase in impacts to HC and PFC ratings for streams containing special status aquatic species. When combined with ongoing Federal, State, and private land activities in and adjacent to the planning area, the management actions proposed in Alternative I would rank fourth in cumulative risk for a potential decrease HC and PFC ratings. Alternative I would have less potential for cumulative impacts to special status aquatic species than the No Action Alternative and Alternatives II and III, but more risk than Alternatives IV and V.

Cumulative Impacts from Alternative II

All management actions implemented in Alternative II would use the guidance in the ARMS to maintain or improve special status aquatic species habitats, comply with the Clean Water Act, and comply with ESA requirements for riparian areas containing special status aquatic species. The cumulative impacts from implementing this management guidance expected to improve instream and riparian condition for streams containing special status aquatic species.

The occurrence and frequency of large wildland fires and fire suppression activities has increased on Federal, State, and private land in and adjacent to the planning area. Alternative II would include fuels treatments using prescribed fire and targeted grazing in addition to a substantial increase in permitted livestock grazing, concurrent with resource uses in planning area and on adjacent Federal, State, and private lands. These activities would result in an incremental increase in impacts to instream and riparian condition. Several small wind projects exist on private land in the northern portion of the field office and a large wind energy project (China Mountain) is proposed in the southern portion of the planning area. These actions may continue to increase on Federal, State, and private over the life of the plan and have additional impacts to riparian areas containing special status aquatic species on public lands.

Implementation of the ARMS would moderate impacts to instream and riparian condition from authorized public land uses, but the guidance would not moderate impacts from similar actions on Federal, State, or private land in or adjacent to the planning area. The cumulative impacts from implementing the restoration guidance in the ARMS in Alternative II are expected to result in less improvement in instream and riparian condition than the No Action Alternative and Alternative I because of the overall increased land uses in Alternative II. When combined with ongoing Federal, State, and private land activities in and adjacent to the planning area, the management actions proposed in Alternative II would rank second in cumulative risk for a potential decrease HC and PFC ratings. Alternative II would have less potential for cumulative impacts to special status aquatic species than the No Action Alternative, but more risk than Alternatives I, III, IV, and V.

Cumulative Impacts from Alternative III

All management actions implemented in Alternative III would use the guidance in the ARMS to maintain or improve special status aquatic species habitats, comply with the Clean Water Act, and comply with ESA requirements for riparian areas containing special status aquatic species. The cumulative impacts from implementing this management guidance expected to improve instream and riparian condition for streams containing special status aquatic species.

In Alternative III, management strategies most beneficial for enhancing wildland fire suppression capabilities, management of fuels and reducing wildland fire would be emphasized and would occur concurrently with commodity uses such as livestock grazing, recreation, transportation and travel, land use authorizations, energy development, and minerals exploration. The potential increase in AUMs for livestock grazing once upland vegetation objectives are achieved may impact a larger percentage of riparian areas in the planning area than all other alternatives except Alternative II. All other public land uses in Alternative III would be similar to Alternative II.

The construction of new roads would result in an a cumulative increase in roads in addition to existing roads currently used for other public land uses and the existing roads on Federal, State, and private land. Fire response time would be shortened as a result of these additional roads and fewer miles of riparian area would be impacted by wildland fire. These additional roads, particularly in the RCAs, are expected to increase uses by public land users and contribute to a cumulative increase in the spread of noxious weeds and invasive plants and human-caused fires over the long term. There would be fewer acres of noxious weeds treated in Alternative III than all other alternatives. Similar increases in route density on Federal, State, and private lands in and adjacent to the planning area are expected. New water developments created to enhance fire suppression would occur simultaneously with the private land irrigation and livestock watering developments and would increase water demand on existing surface and groundwater resources.

Implementation of the ARMS would moderate impacts to instream and riparian condition from authorized public land uses, but the guidance would not moderate impacts from similar actions on Federal, State, or private land in or adjacent to the planning area. The cumulative impacts from implementing the restoration guidance in the ARMS are expected to result in more improvement in instream and riparian condition than the No Action Alternative and Alternatives I and II, but less than Alternatives IV and V because of the overall increased fire infrastructure and land uses in Alternative III. When combined with ongoing Federal, State, and private land activities in and adjacent to the planning area, the management actions proposed in Alternative III would rank third in cumulative risk for a potential decrease HC and PFC ratings. Alternative III would have less potential for cumulative impacts to special status aquatic species than the No Action Alternative and Alternative II, but more risk than Alternatives I, IV, and V.

Cumulative Impacts from Alternative IV (the Preferred Alternative)

All management actions implemented in Alternative IV would use the guidance in the ARMS to maintain or improve special status aquatic species habitats, comply with the Clean Water Act, and comply with ESA requirements for riparian areas containing special status aquatic species. The cumulative impacts from implementing this management guidance expected to improve instream and riparian condition for streams containing special status aquatic species.

Alternative IV has fewer authorized public land uses and more active restoration of instream and riparian areas than the No Action Alternative and Alternatives I, II, and III. Larger Critical Suppression Areas would result in fewer cumulative impacts to instream and riparian condition for streams containing special status aquatic species from wildland fire and a reduced potential for wildland fire to spread onto adjacent Federal, State, and private lands. Fire suppression priorities would include the most special status aquatic species habitat. Alternative IV has the most weed treatments of all alternatives and would reduce the spread of noxious weeds and invasive plants between the Federal, State, and private land. Establishing the Jarbidge Foothills and Bruneau-Jarbidge ACEC would reduce the potential for cumulative impacts to half of the special status aquatic species habitat in the planning area.

Implementation of the ARMS would moderate impacts to instream and riparian condition from authorized public land uses, but the guidance would not moderate impacts from similar actions on Federal, State or private land in or adjacent to the planning area. The cumulative impacts from implementing the ARMS is expected to result in more improvement in instream and riparian condition than the No Action Alternative and Alternatives I, II, and III, but less than Alternative V. When combined with ongoing Federal, State, and private land activities in and adjacent to the planning area, the management actions proposed in Alternative IV would rank fifth in cumulative risk for a potential decrease HC and PFC ratings. Alternative IV would have less potential for cumulative impacts to special status aquatic species than the No Action Alternative and Alternative I, II, III, but more than Alternative V.

Cumulative Impacts from Alternative V

All management actions implemented in Alternative V would use the guidance in the ARMS to maintain or improve special status aquatic species habitats, comply with the Clean Water Act, and comply with ESA requirements for riparian areas containing special status aquatic species. The cumulative impacts from implementing this management guidance are expected to improve instream and riparian condition for streams containing special status aquatic species.

Alternative V relies on passive restoration improvements in instream and riparian conditions with limited active restoration. This alternative would have least amount of public land uses of all alternatives and the fewest cumulative effects to special status aquatic species habitats of all alternatives. Designating the Sagebrush Sea ACEC as a Critical Suppression Area would reduce the potential for impacts to instream and riparian condition. Alternative V includes no additional wildland fire related infrastructure and the least amount of authorized grazing of all alternatives. This is expected to result in fewer cumulative effects to special status aquatic species habitat from livestock grazing on the BLM-managed land than in any other alternative. Grazing impacts could substantially increase on the State and private land and result in cumulative effects to riparian condition on the BLM-managed land.

Implementation of the ARMS would moderate impacts to instream and riparian condition from authorized public land uses, but would not moderate impacts from similar actions on Federal, State, or private land in or adjacent to the planning area. The cumulative impacts from implementing the ARMS in Alternative V are expected to result in more improvement in instream and riparian condition. When combined with ongoing Federal, State, and private land activities in and adjacent to the planning area, the management actions proposed in Alternative V would have the least risk of a decrease in HC and PFC ratings in streams containing special status aquatic species of all alternatives.

4.3.7.3. Special Status Wildlife

Analysis Methods

Indicators

The same indicators to assess impacts to guild habitat in the *Wildlife* section were generally used for the analysis of impacts to special status wildlife habitat.

- **Acres of habitat for wildlife guilds** –This indicator was selected to help quantify relative changes to wildlife guild habitat based on vegetation treatments and management actions outlined by alternative.

- **Miles of riparian areas managed to achieve or exceed proper functioning condition (PFC)** –This indicator quantifies the relative condition of habitat specific to the riparian guild and qualifies recovery time.

- **Habitat fragmentation due to size of habitat patches for wildlife guilds and distance between patches** – This indicator assesses one component of habitat fragmentation: habitat connectivity. For example, as the amount of shrubland habitat increases and the distance between shrubland patches decreases, connectivity would improve for the sagebrush steppe guild wildlife. For some mammals, longer distance between patches of similar habitat decreases the likelihood of recolonization if the current population was extirpated (Hanser & Huntly, 2006). Fragmented California bighorn sheep (bighorn sheep) populations may result in genetic isolation, inbreeding, and suppressed reproductive rates (Singer, et al., 2001; Whittacker, et al., 2004). Male bighorn sheep made some long-distance movements (20.6 miles) in a study in the mountains of Montana (DeCesare & Pletscher, 2006), which helped retain genetic connectivity. Similar long movements likely occur across open plateaus between canyons in the planning area.

- **Habitat fragmentation due to infrastructure and human disturbance** – Human infrastructure can contribute to habitat fragmentation (Connelly, et al., 2004; Forman & Alexander, 1998; Ingelfinger & Anderson, 2004; Pitman, et al., 2005; Sawyer, et al., 2007), and mortality (Arnett, et al., 2007; Barclay, et al., 2007; Jantz & Goetz, 2008; Wolfe, et al., 2007). Powerpoles provide raptors and ravens additional perching and nesting sites (Steenhof, et al., 1993), and may alter habitat use by some wildlife (Pitman, et al., 2005). This indicator allows qualitative comparisons on the relative quantity and density of infrastructure among alternatives and comparisons of areas open or closed to infrastructure or development by alternative.

- **Acres with temporal and spatial restrictions that benefit special status wildlife** (e.g., road closure, minerals restrictions, recreation restrictions, or livestock grazing constraints) – This indicator is used to compare areas with minimal disturbance to special status wildlife among alternatives (e.g., amount of Greater sage-grouse [sage-grouse] where project construction or routine maintenance is scheduled to avoid the winter).

- **Relative amount of herbaceous cover and forage for wildlife**– This indicator is used to compare relative amount of herbaceous cover (height and density) available to wildlife for nesting, thermal, or security cover among alternatives. Vegetative cover has been linked to sage-grouse habitat use and nest success (Connelly, et al., 2004; Connelly, et al., 2000; Gregg, et al., 1994; Holloran, et al., 2005). Forbs are an important component of female sage-grouse diets prior to nesting (Gregg, et al., 2008) and of chick diets (Drut, et al., 1994; Huwar, et al., 2008) following hatching.

The following species-specific indicators are used where appropriate and are not necessarily used in each component of this analysis:

- **Number and distribution of active sage-grouse leks and number of birds at each lek** – This indicator is used to qualitatively compare impacts of actions on sage-grouse populations. Actions affecting the acreage of sagebrush steppe habitat, nesting success, or survival of sage-grouse were compared among alternatives where appropriate. For sage-grouse, numerous leks attended by large numbers of males distributed across a planning area is less vulnerable to extirpation than few leks attended by few males in small, widely separated portions of the planning area.

- **Number and distribution of active Columbian sharp-tailed grouse (sharp-tailed grouse) leks and number of birds at each lek** – This indicator is used to qualitatively compare impacts of actions on sharp-tailed grouse populations. Actions affecting the acreage of mountain mahogany/mountain shrub habitat, nesting success, or survival of sharp-tailed grouse were compared among alternatives as appropriate. Numerous sharp-tailed grouse leks attended by large numbers of males distributed across the planning area is less vulnerable to extirpation than few leks attended by few males in one or two small portions of the planning area.

- **Bighorn sheep population size and distribution** –Bighorn sheep populations with low numbers distributed in isolated pockets are vulnerable to localized extirpation.

- **Number of streams with suitable breeding habitat occupied by Columbia spotted frogs (spotted frogs)** – Spotted frogs occurring in moderate to high numbers in several streams are less vulnerable to extirpation than spotted frogs at low numbers in a single creek.

- **Acres of duneland habitat for Bruneau Dunes tiger beetle (tiger beetle)** – This indicator was used to compare impacts of actions among alternatives on distribution of this narrow endemic species. Actions that reduce the acres of habitat could further reduce the global distribution of this species.

Methods and Assumptions

Impacts to special status wildlife from management in the following sections of Chapter 2 were analyzed in detail: *Special Status Species*, *Water Resources*, *Vegetation Communities* (including *Upland Vegetation* and *Riparian Areas and Wetlands*), *Noxious Weeds and Invasive Plants*, *Wildland Fire Ecology and Management*, *Livestock Grazing*, *Recreation*, *Transportation and Travel*, *Land Use Authorizations*, *Minerals*, and *Areas of Critical Environmental Concern*. Management from the remaining sections was not analyzed in detail because the management did not vary measurably between alternatives or impact the indicator for land use authorizations. **Impacts from management for special status wildlife** can be found under *Impacts from Special Status Species* in the *Tribal Rights and Interests*, *Livestock Grazing*, *Recreation*, *Transportation and Travel*, and *Land Use Authorizations* sections.

GIS data layers were used to conduct analysis comparing the existing wildlife guild habitat to expected changes in acreage to wildlife guild habitats from various management actions by alternative. In some instances, the analyses were quantitative comparisons (e.g., acres of sagebrush steppe habitat in a particular ACEC). However, other comparisons (e.g., relative amount of restoration in a VMA) were qualitative because restoration areas are not spatially identified. Inherent in the analyses are minor inaccuracies that may be present in the GIS data. At the landscape scale, these errors should be negligible.

The following indicators were analyzed using GIS:

- **Acres of habitat for wildlife guilds** – GIS data were used to establish the current acres of guild habitats in the planning area, including acres of existing native shrubland (sagebrush steppe, mountain mahogany/mountain shrub), native grassland, and non-native grassland communities. Acres of aspen, mountain mahogany/mountain shrub, dunelands, and canyonlands were not expected to change appreciably between alternatives due to their limited presence and lack of community-specific management proposals. Canyonland habitat contains some sagebrush steppe, mountain mahogany/ mountain shrub, and grassland habitats that could be impacted by management. The miles and rate of change for riparian areas (maintained at PFC, improved to FAR, or improve) were compared among alternatives (see the *Riparian Areas and Wetlands* section). The analysis for uplands was based on projected changes in acres from one habitat type to another (e.g., grassland to sagebrush steppe).

- **Habitat fragmentation due to size of habitat patches for wildlife guilds and distance between patches**– Habitat fragmentation was analyzed by examining the size and distribution of plant communities throughout the planning area. GIS data were used to determine the baseline size and distance between native shrubland patches larger than 20 acres, which was the minimum mapping unit for the vegetation composition map (see the *Upland Vegetation* section). Shrubland communities of 20 acres could support the following number of nesting territories for special status wildlife: loggerhead shrike – one to three (Yosef, 1996), Brewer's sparrow – 10 to 18 (Rotenberry, et al., 1999), and sage sparrow – one to four (Martin & Carlson, 1998). Locally, aspen, mountain mahogany/mountain shrub, and dunelands naturally occur in relatively small patches. The soil surveys portrayed some of these habitat units in areas of less than 20 acres. The analysis focused primarily on changes in sagebrush steppe patch size and distance between sagebrush patches for sage-grouse and other sagebrush-obligate special status wildlife. To facilitate sagebrush steppe guild wildlife species dispersal, connectivity, and habitat suitability, larger patches of native shrubs are preferable to smaller patches, and patches that are in close proximity are more desirable than patches that are farther apart (Hanser & Huntly, 2006; Knick & Rotenberry, 1995). Small patches (islands) of habitat are functionally smaller than their physical size (Shepherd III, 2006). Islands have fewer resources available for necessary life requirements; whereas larger patches have more resources (Shepherd III, 2006). Also, there is some area associated with the edge of each patch that has different characteristics than the interior of the patch, such as microclimate, increased predation risk, presence of invasive plants or competitors, or other factors that can lead to reduced habitat quality for some species using the patch (Gutzwiller, 2002).

- **Habitat fragmentation due to infrastructure and human disturbance** – Habitat fragmentation for special status wildlife was assessed for changes in potential human disturbance and infrastructure by alternative. The baseline amount and density of infrastructure (e.g., ROWs, powerlines, canals, communication towers, meteorological towers, types of routes, fences, livestock watering areas) were determined using GIS data. A qualitative comparison was completed to assess relative expected changes in infrastructure between the alternatives.

The following assumptions were used in this analysis; most of these assumptions are also listed in the *Wildlife* section.

- For the purpose of analysis, sage-grouse are considered an umbrella or indicator species for other sagebrush-obligate special status wildlife including pygmy rabbit, Brewer's sparrow, sage-sparrow (Wisdom, et al., 2000), and loggerhead shrike.
- An increase in sagebrush patch size and a decrease in distance between sagebrush patches are beneficial for sage-grouse and sagebrush-obligate special status wildlife. Patches of sagebrush habitat surrounded by abrupt grass/forb communities are functionally smaller than their physical size (Shepherd III, 2006).
- Restored sagebrush steppe, mountain mahogany/mountain shrub, or aspen plant communities may take more than two decades to function similar to intact habitat of the same type (Baker, 2006; Connelly, et al., 2004; Crawford, et al., 2004; Wright, et al., 1979). It is also assumed dominant late-seral grasses in the planning area would typically recover to pre-burn density and production in less than five years (Wright, et al., 1979).
- Riparian areas can respond rapidly to restoration or changes in management. Depending on the type of riparian community and degree of past disturbance, riparian areas can begin recovery in four years or less (Clary, 1999; Dobkin, et al., 1998; Schulz & Leininger, 1991). However, it takes longer for some woody species to attain full size (Dobkin, et al., 1998; Schulz & Leininger, 1991). Riparian area function relates to vegetation composition and height, streambank stability, channel morphology within the land form, and water table depth. Beaver ponds, oxbows, and cut-off channels provide spotted frog habitat for reproduction, foraging, basking, and hibernation (Munger & Oelrich, 2006) and habitat for other special status amphibians. Willows, aspen, and other woody species provide the structure needed by willow flycatchers for nesting and foraging.
- For analyses purposes, all treatments would be implemented within five years; however, implementation is dependent on funding, labor, equipment and other factors, which would extend actual implementation beyond ten years. The impacts of treatments may appear a considerable amount of time after implementation. For example, the long-term impact of sagebrush habitat recovery occurs 10 to 15 years after seeding or planting as shrubs reach a size and density suitable for nesting by sage-grouse.
- Infrastructure such as powerlines, towers, poles, fences, corrals, and roads contribute to habitat fragmentation (Connelly, et al., 2004; Ingelfinger & Anderson, 2004; Kuvlesky Jr., et al., 2007), wildlife displacement (Doherty, et al., 2008; Ingelfinger & Anderson, 2004; Pitman, et al., 2005; Walker, Naugle, & Doherty, 2007), nest predation (Miller, et al., 1998), and wildlife mortality (Arnett, et al., 2007; Horn, et al., 2008; Jantz & Goetz, 2008; Kunz, et al., 2007; Lehman, et al., 2007; Steenhof, et al., 1993; Walker, Naugle, Doherty, et al., 2007; Wolfe, et al., 2007). As infrastructure associated with livestock grazing, recreation, transportation and travel, and land use authorizations are built, additional routes will be developed for construction and maintenance. The degree of fragmentation is influenced by the type of infrastructure and location of that infrastructure in the habitat. For example, a trail or fence would exhibit less impact on a large stand of aspen compared to the same trail or fence in a small patch of aspen. Project design and the level of use may also influence effects of fragmentation on wildlife.
- Wildland fire will continue to burn large areas of intact habitat as well as restored habitat over the life of the plan, hindering and complicating shrubland restoration and recovery efforts. The natural fire return interval should exceed 20 years in most of the sagebrush shrublands (Baker, 2006; Connelly, et al., 2004; Howard, 1999; Idaho Sage-grouse Advisory Committee, 2006; McMurry, 1986; Steinberg, 2002), 30 years in aspen (Howard, 1996), and 30 years in mountain mahogany (Gucker, 2006) and mountain shrub communities (Johnson, 2000).
- Human disturbance or occupancy can cause displacement and temporal or spatial habitat fragmentation (Bissonette & Steinkamp, 1996; Holloran, et al., 2005; Ingelfinger & Anderson, 2004; Ouren, et al., 2007; Walker, Naugle, & Doherty, 2007). For example, Brewer's sparrows and sage sparrows avoid nesting even near areas with low-use roads (fewer than 12 vehicles per day) (Ingelfinger & Anderson, 2004).
- All species in a guild will react in a similar manner to disturbances or habitat changes (Wisdom, et al., 2000); however, some individuals in a species may respond to the same disturbance differently than the majority of the individuals in that species.

- Current year and residual herbaceous vegetation (composition, height, and cover) influences wildlife habitat quality (Barnett & Crawford, 1994; Connelly, et al., 2004; Connelly, et al., 2000; DeLong, et al., 1995; Drut, et al., 1994; Gregg, et al., 2008; Gregg, et al., 1994; Huwar, et al., 2008).
- Changes in habitat affect wildlife distribution, species, and numbers; however, wildlife numbers may decline or increase for reasons not related to habitat such as population cycles (Best, 1996; Sera & Early, 2003), disease (Krausman & Bowyer, 2003; Marra, et al., 2004; Walker, Naugle, Doherty, et al., 2007), prey abundance (Dechant, et al., 1999; Steenhof, et al., 1999), or climatic factors such as drought (Connelly, et al., 2000; Flanders-Wanner, et al., 2004; Steenhof, et al., 1999), which are assumed to be consistent between alternatives and therefore are not addressed in the analysis.
- The effects of project-specific infrastructure influences an area substantially larger than the actual ground disturbance or project footprint (Arnett, et al., 2007; Doherty, et al., 2008; Holloran, et al., 2005; Ingelfinger & Anderson, 2004; Leu, et al., 2008; Pitman, et al., 2005; Walker, Naugle, & Doherty, 2007),
- Certain special status wildlife may require additional management actions above and beyond habitat restoration (e.g., transplants, seasonal limits on human disturbance, land use authorizations, grazing management adjustments) to maintain or enhance special status wildlife populations or distribution in the planning area.

Direct and Indirect Impacts

Impacts from Special Status Species Actions

Impacts from Management Specific to the No Action Alternative

Special status species would be given priority for habitat management in the No Action Alternative. Because special status wildlife are assigned to habitat guilds, actions that improve habitat in one guild are not expected to have significant adverse interactions with other guilds (i.e., increasing sagebrush steppe would not decrease mountain mahogany/mountain shrub), with the exception of grassland guild habitat. At this time, there are no BLM Sensitive species in the grassland guild. NSO restrictions for oil and gas would somewhat mitigate human disturbance from exploration and development in the prescribed distances for bighorn sheep, sage-grouse, sharp-tailed grouse, ferruginous hawk, and prairie falcon. However, they do not mitigate for displacement, loss of habitat, or reduction in habitat patch size that would result from oil and gas exploration and development.

Impacts from Management Common to the No Action and All Action Alternatives

The conservation measures would reduce or mitigate impacts of BLM actions on listed species and their habitats.

Impacts from Management Common to All Action Alternatives

The overall impact of the management actions common to all action alternatives is to maintain special status wildlife and their habitats.

Impacts from Management Specific to Alternative I

Special status species habitat would be one of the priorities for habitat management. Management actions that increase habitat patch size or reduce disturbance and habitat fragmentation of sagebrush steppe habitat are expected to enhance habitat for sage-grouse, pygmy rabbits, sage sparrow, Brewer's sparrow, loggerhead shrike, Piute ground squirrel, and ferruginous hawk. Some special status species, such as the sharp-tailed grouse, readily use sagebrush steppe habitat when it is in proximity to mountain mahogany/mountain shrub or other winter habitat. As a result, improved sagebrush steppe habitat may benefit species in other habitat guilds as well.

Temporal and spatial guidance is provided for several resource uses to minimize disturbance during important seasonal periods for sage-grouse, ferruginous hawk, prairie falcon, spotted frog, and bighorn sheep.

Impacts from Management Specific to Alternative II

In Alternative II, special status wildlife classified as Endangered, Threatened, Proposed, or Candidate (Type 1 BLM Sensitive species) would be the primary focus of habitat management. At present, this includes the spotted frog and yellow-billed cuckoo, which are Candidate species. *The Conservation Agreement and Strategy for Columbia Spotted Frog (Rana luteiventris)* has monitoring requirements and contains some provisions for habitat restoration (CSFTT, 2003). In Alternative II, habitat for sage-grouse, pygmy rabbit, and other Idaho BLM Sensitive wildlife species (Types 2 and 3) in the sagebrush steppe guild would also be a priorities for management, but to a lesser extent than the Type 1 BLM Sensitive species.

Some conservation actions or measures for Endangered, Threatened, Proposed, or Candidate species may improve habitat for other special status wildlife or non-special status wildlife. Actions that improve habitat, such as increasing sagebrush and forbs, would also improve habitat for sage-grouse, sage sparrow, pygmy rabbit, loggerhead shrike, and Brewer's sparrow. Improving riparian habitat for spotted frog (e.g., creating ponds or raising the water table) would also enhance habitat for western toad and other special status amphibians in the planning area.

Impacts from Management Specific to Alternative III

Impacts of implementing Alternative III are expected to be similar to No Action Alternative in that special status wildlife habitat is a high priority for management and restoration.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

The priority for habitat management would be similar to the No Action Alternative. Impacts to special status wildlife and habitat would be primarily influenced by actions in other sections, including *Wildland Fire Ecology and Management*. Although relocations of special status wildlife could occur, these relocations would not drive habitat restoration.

Impacts from Management Specific to Alternative V

The priority for habitat management would be similar to Alternative III with restoration of 9% more sagebrush steppe guild habitat than in Alternative III, increasing habitat patch size and reducing distances between patches for sage-grouse and other BLM Sensitive wildlife species in this guild in the long-term.

Summary

In Alternative II, priority for habitat management focuses primarily on special status species categorized as Endangered, Threatened, Proposed, or Candidate. All other alternatives are similar in that priority for management is given to all BLM Sensitive wildlife species through BLM Manual 6840, Special Status Species. This allows management to be more proactive and would potentially prevent the listing of species. Because special status species in the habitat guilds have limited overlap, the priority for habitat management for one guild is not expected result in a reduction in habitat for special status species in other guilds. If a grassland guild species becomes classified as Sensitive in the future, increases in habitat for the sagebrush steppe guild may conflict with maintaining habitat for special status species in the grassland guild.

Impacts from Water Resources Actions

Providing water of sufficient quantity maintains riparian and wetland vegetation and helps meet spotted frog and other special status amphibian habitat requirements.

The various alternatives are expected to differ in the amounts of water used for various resource uses (e.g., water for livestock grazing, fire suppression activities). For riparian-dependent special status species, water permanence, as well as volume and timing of water flows, is important for maintaining wetland and riparian habitat. Spring developments or other water diversions can substantially reduce or alter water flow, which can reduce or eliminate wetland and riparian habitat unless adequately mitigated.

Sage-grouse use springs, seeps, and meadows (Connelly, et al., 2004; Drut, et al., 1994), as late brood-rearing habitat. Diversion of water for other resource uses could reduce wetland habitat availability and therefore late brood-rearing habitat for sage-grouse. The effects of water removal are likely to intensify during drought periods.

Properly developed springs may be able to maintain wetland characteristics in years of average or above average precipitation; however, it is less likely the wetlands would be maintained with continued water diversion during a multi-year drought.

Water rights are administered by IDWR and NDWR under the principle of first in time, first in right. These are not BLM actions; therefore, the direct and indirect impacts of these actions are not analyzed.

Impacts from Management Specific to the No Action Alternative

Ongoing maintenance or reconstruction of some water sources would continue to reduce wetland and water flows. Existing water pipelines would continue to be extended and reconstructed with larger diameter pipe and new pipelines would continue to be constructed to supply more water for troughs, pipelines, and storage tanks. A few pipelines would remove water from springs and creeks. Water removed from creeks reduces or eliminates flows and riparian habitat used by special status species. Water removed from springs can reduce wetland vegetation associated with the spring. A reduction in wetland size could be accelerated during drought.

Impacts from Management Common to All Action Alternatives

While management actions in the *Water Resources* section are the same across all action alternatives, different levels of resource use in the alternatives would result in greater or lesser demand for water to meet those uses. The implementation of the ARMS would, at a minimum, maintain or improve riparian and wetland habitat. The ARMS allows some water to be diverted from springs or creeks to aid fire suppression, alter livestock distribution, or for other purposes. The diversion of water from springs or creeks can result in reduced flows, wetland size, and riparian area size and shifts in plant diversity and composition (e.g., change from Nebraska sedge to Baltic Rush, mortality to willows), reducing habitat in the long term for special status wildlife. Declines in wetland or riparian vegetation from water diversion would be further increased during drought periods. The effects of water diversions are considered to be moderate at the local level.

Summary

The No Action Alternative has little guidance for water resources. New water sources could be developed, and existing water sources maintained as long as the streambed is not dewatered. Specific provisions regarding protecting wetland integrity are lacking.

The ARMS would reduce or minimize impacts of construction of facilities in riparian areas and wetlands in all alternatives. Alternative II would require the most water to meet various resource use objectives including fire suppression water systems, livestock grazing, water needed during construction, and roads associated with some land use authorizations, followed by Alternatives III and I. These alternatives would result in additional water being removed for springs and creeks, reducing wetlands and riparian areas particularly during drought. Alternative V would require the least water to meet resource use objectives, leaving more water in springs and creeks to maintain or improve water flows and wetlands. Alternative IV-A would require less water than Alternative IV-B due to more conservative amounts of AUMs.

Impacts from Vegetation Communities Actions

Vegetation structure, cover, and composition affect special status species abundance and distribution within broad community types. Changes in vegetation communities from one guild habitat to another (e.g., native grassland to shrubland) alter the associated special status wildlife by changing the plant community structure and species composition (McAdoo, et al., 1989), habitat patch size, and distance between similar habitat patches (Knick & Rotenberry, 1995).

Impacts from Management Specific to the No Action Alternative

The limited amount of habitat restoration in the sagebrush steppe and mountain mahogany/mountain shrub guilds would be compatible with increasing habitat for special status wildlife that use those habitats.

In the long-term, populations of sage-grouse, sharp-tailed grouse, pygmy rabbit, Brewer's sparrows, sage sparrow, loggerhead shrike, and ferruginous hawk would decline because of wildland fire and the subsequent shift to grasslands. Although some habitat restoration would occur, the time it takes for usable structure to recover in most guilds would not keep pace with wildland fires. Piute ground squirrel populations would fluctuate more due to increasing grassland habitat, particularly during drought (Van Horne, et al., 1997). Management of bighorn sheep habitat toward late-seral plant communities would improve habitat for this species. Based on wildland fire and limited restoration, a trend toward increasing annual grassland would continue in bighorn sheep habitat. Restoration of occupied and potential bighorn sheep habitat in the canyons is limited by topography, rocky soils, and treatment technology. Some of the flat plateau bighorn sheep habitat adjacent to canyons outside the WSA boundary may be restored. Management direction for breeding and nesting habitat around prairie falcon and ferruginous hawk nests as well as sage-grouse leks would, at best, maintain habitat for these special status species during important times of the year. Because there are no special status wildlife in the grassland guild, changes from grassland to shrubland are not expected to reduce habitat for any special status wildlife.

Habitat management to move riparian areas to PFC would maintain or gradually improve habitat for spotted frog, northern leopard frog, western toad, and Woodhouse toad. Management to maintain or restore aspen, cottonwood, and willows in riparian areas are projected to specifically enhance habitat for willow flycatcher and yellow-billed cuckoo. Management for aspen would also maintain habitat for Lewis woodpecker and goshawks.

Impacts from Management Specific to Alternative I

VMA C would be a priority for restoration, improving habitat connectivity for the sagebrush steppe guild. Restoring sagebrush steppe guild habitat would increase the amount of suitable habitat for sage-grouse, pygmy rabbit, Brewer's sparrow, sage sparrow, loggerhead shrike, Piute ground squirrel, and ferruginous hawks in the long term. Active restoration in the uplands would result in an increased number and distribution of sage-grouse at leks in the southern part of the planning area over time due to increased quality of shrub steppe habitat. Similar increases in numbers are anticipated for pygmy rabbits, sage sparrows, and Brewer's sparrows. Restoration would also be used to create multiple "stepping stone" routes to reestablish connectivity between large blocks of habitat (Dramstad, et al., 1996), which would allow pygmy rabbits to recolonize unpopulated areas of suitable habitat. Sage-grouse numbers at leks and the number of leks should increase as the restored habitat becomes suitable. In the long term, planting and successful establishment of browse (e.g., bitterbrush, sagebrush, serviceberry, chokecherry) for wintering big game would increase mountain mahogany/mountain shrub habitat for wintering sharp-tailed grouse (Marks & Marks, 1988) and potentially mountain quail. Ferruginous hawk numbers would gradually increase over time as sagebrush steppe habitat restoration improves prey abundance (e.g., jackrabbits, ground squirrels, mountain cottontail) and nesting material availability. Research has indicated ground squirrel populations fluctuate less in sagebrush steppe habitats compared to grasslands (Van Horne, et al., 1997). Restoration of occupied bighorn sheep habitat would be limited in part because of the guidance associated with the IMP for the WSA. Topography and rocky soils also limit the amount of bighorn sheep habitat restoration that can be done. Because successful restoration of canyonland habitat would be minor given the current technology, bighorn sheep numbers should remain relatively static. The majority of active restoration on native grassland would occur in the southern third of the planning area (see the *Vegetation Communities* section in Chapter 2).

Vegetation treatments that reduce future non-native annual invasions would benefit tiger beetle; however, drill seeding dunes and dune interspaces to non-native perennial grass would reduce tiger beetle habitat.

Aspen treatments would generally be limited to reducing conifer (juniper) encroachment (e.g., selective cutting) and management to promote the establishment of aspen sprouts in existing aspen stands. In the long term, some aspen cutting or burning treatments may be implemented to encourage sprouting in over-mature aspen stands. Populations of aspen guild special status (e.g., Lewis woodpecker, goshawk, willow flycatcher) would be negligibly impacted by vegetation treatments because cutting or burning of entire aspen stands is expected to be limited. For goshawk or Lewis woodpeckers, nest trees would be avoided in specific projects.

Impacts from restoration on patch size and distance between similar patches are the same as described under *Impacts from Vegetation Communities Actions* in the *Wildlife* section.

Restoration of riparian habitat, including planting herbaceous or woody wetland vegetation to stabilize banks and provide cover, would benefit spotted frogs in areas where they are presently found. Planting willows, cottonwood, or aspen would increase habitat for willow flycatchers, mountain quail, and, in some areas, yellow-billed cuckoo.

Restoration could include transplanting beaver to specific drainages to create habitat components for spotted frogs or other riparian guild special status species, Beaver dams change stream hydrology, including increasing water storage (Naiman, et al., 1988). Dam building by transplanted beaver would help raise the water table in some creeks, increasing water permanence, and creating slow water for reproduction, open shallow water areas for basking, emergent vegetation for cover, and areas for hibernation (Munger & Oelrich, 2006; Watson, et al., 2003). Restoration of riparian areas, particularly Bear Creek tributaries and Shack Creek, would restore connectivity and allow for some expansion of spotted frogs. Elevated water tables and more permanent water in intermittent streams would also result in additional establishment of willows, sedges, and other vegetation improving habitat for riparian guild special status wildlife in the long term.

Impacts from Management Specific to Alternative II

Restoration would occur in slickspot peppergrass habitat, which would restore a small portion of habitat for several sagebrush steppe guild special status wildlife species, such as sage-grouse. Habitat suitability for ferruginous hawks would improve in areas where slickspot peppergrass habitat is restored due to the improved prey base and increased amount of woody nesting material. Because Alternative II proposes little restoration using native species and has limitations resulting from the IMP guidance, restoration of occupied bighorn sheep habitat would be a lower priority.

Because Alternative II includes actively maintaining non-native perennial grasslands (e.g., limiting shrub reestablishment), sagebrush steppe would continue to remain fragmented. By retaining large areas as non-native perennial grassland, ferruginous hawk nest numbers are expected to remain low or decline in the planning area because of less woody nest material, wide fluctuations in prey numbers particularly during drought (Van Horne, et al., 1997), and few nest trees.

Depending on the location of annual grassland areas targeted for conversion to non-native perennial grassland in VMA A, habitat for the tiger beetle may be treated using drill seedings of non-native perennial grasses. Tiger beetle habitat could become more limited due to the seeding of non-native grasses on dunes and in dune interspaces.

Sagebrush would be allowed to reestablish naturally in native grasslands in Alternative II. Because of large wildland fires, the sagebrush seed source has been eliminated over large portions of the planning area. Natural recovery of sagebrush steppe habitat adequate to provide suitable habitat for special status wildlife would take a few (Wambolt & Payne, 1986) to many (Baker, 2006) decades. Sage-grouse and sharp-tailed grouse leks and the numbers of grouse attending leks would decline due to limited sagebrush habitat, fragmentation, and the slow natural recovery time. Habitat loss and fragmentation effects would contribute to local extirpation of some sagebrush steppe special status species, such as pygmy rabbit, and inhibit re-colonization of the isolated sagebrush steppe islands (Hanser & Huntly, 2006).

Maintaining spotted frog habitat in the riparian area of Rocky Canyon and Shack Creek would be a priority. Spotted frogs would remain isolated in two drainages and be vulnerable to extirpation. Isolated populations of amphibians are more likely to be extirpated by events (e.g., drought) and, once eliminated, less likely to be recolonized (Semlitsch & Bodie, 1998). Maintaining even small wetlands are important to provide connectivity and a surplus of juveniles that function as a population source. Riparian habitat along the Snake River would also be priority for maintenance of yellow-billed cuckoo. In both cases, habitat improvement would occur primarily through natural recovery processes, because of limitations on planting riparian-dependent woody species. Natural recovery of the approximately 58 miles of riparian areas in the fenced reference areas would be more rapid than outside the exclosures, due to less bank alteration and utilization of riparian plants.

Impacts from Management Specific to Alternative III

Special status species habitat would be a priority for restoration in Alternative III, with emphasis in ACECs and VMAs A and D. Some vegetation treatments would reduce or contribute to fragmentation of some sagebrush steppe or mountain mahogany/mountain shrub guild habitat. Impacts from restoration on patch size and distance between similar patches are the same as in the *Wildlife* section. Restoration of habitat would increase the abundance and distribution of sage-grouse and sharp-tailed grouse leks in the long term. Pygmy rabbit habitat and connectivity would increase overall in the southern portion of the planning area, but in the northern portions of the planning area, sagebrush steppe habitat would remain fragmented due to its lower restoration priority. Occupied ferruginous hawk nesting territories would increase over time, particularly in the southern third of the planning area, because of sagebrush steppe restoration.

Few acres of occupied or potential bighorn sheep habitat would be treated because of management for the WSA and a reduction in the size of the Bruneau-Jarbidge ACEC. Bighorn sheep populations may remain similar to current levels. Impacts of future treatments in aspen would be the same as discussed for Alternative I. The abundance of special status wildlife using aspen habitats is expected to remain static.

Riparian habitats for spotted frog, northern leopard frog, western toad, willow flycatcher, and yellow-billed cuckoo would be priorities for improvement. VMA D is a priority for restoration in Alternative III, which would aid in reestablishing connectivity for some riparian habitats, particularly for spotted frog. Effects of managing 58 miles of riparian habitat as reference areas are the same as in Alternative II.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Impacts from restoration on sagebrush shrubland patch size and distance between similar patches are the same as discussed under *Impacts from Vegetation Communities Actions* in the *Wildlife* section. The distribution of sage-grouse leks and lek attendance would increase as restored sagebrush steppe guild habitat suitability improves over time. A similar effect is projected for sharp-tailed grouse using the mountain mahogany/mountain shrub habitat. The rate of recovery would be accelerated compared to the other alternatives because of an increase in active restoration. VMA D and C, where most of the remaining sagebrush steppe, aspen, and mountain mahogany/mountain shrub habitats are located, are high priorities for vegetation treatments. The effects on bighorn sheep, other canyonland guild species, and tiger beetles are similar to Alternative I.

More restoration would occur in riparian areas, and roughly 74 miles of riparian areas would be in reference areas. Priorities for riparian guild habitat restoration are all FAR and NF stream reaches. Because restoration of special status species habitat is a priority in Alternative IV, the abundance and distribution of spotted frogs and other riparian guild special status species should improve.

Impacts from Management Specific to Alternative V

The impacts of restoring sagebrush steppe and mountain mahogany/mountain shrub habitats on patch size and distance between patches are the same as described under *Impacts from Vegetation Communities Actions* in the *Wildlife* section. The number of sage-grouse leks and distribution of leks are projected to increase over time, more than in the No Action Alternative.

Alternative V has the most riparian and, potentially, special status riparian guild wildlife in exclosures. Natural recovery of the riparian areas in the exclosures may be somewhat faster compared to outside the exclosures due to more rest.

Summary

Alternatives I, III, IV, and V would shift vegetation communities from non-native annual grassland toward perennial grassland and sagebrush steppe over time, increasing habitat for sage-grouse, pygmy rabbit, and other sagebrush steppe special status wildlife. Alternatives I and IV contain the highest levels of active restoration to speed habitat recovery of habitat for these species. Habitat for the sagebrush steppe guild would increase more than mountain mahogany/mountain shrub habitat due to the larger area historically covered by sagebrush steppe. The impacts of this restoration would be negligible to special status wildlife in the short-term due to the time it takes woody vegetation to provide adequate structure. In the long term, restoration treatments are expected to increase sage-grouse and sharp-tailed grouse leks, lek distribution, and numbers of birds at leks as the shrubs mature, patch size increases, and distance between patches declines. Converting annual grassland to perennial habitats in all action alternatives would help control invasive plants adjacent to tiger beetle habitat. Restoration treatments in Alternative V differ from other alternatives in that only native plants would be used, which may result in maintaining arthropod and vertebrate prey base. Special status wildlife in the aspen guild would be negligibly affected because this vegetation community is expected to be minimally treated. Beaver, fire, and grazing will also provide some levels of disturbance to promote aspen sprouting.

Alternative III would have less annual grassland treated in bighorn sheep habitat, while no bighorn sheep habitat would be treated in Alternative II, in part because it is in the WSA. Treatments in bighorn sheep habitat would likely focus on the upland plateaus where soils are deeper and less rocky. Alternative V would allow the largest amount of native grassland to be restored as habitat for sage-grouse and other special status sagebrush obligates as well as sharp-tailed grouse. Non-native perennial grass treatment to restore sagebrush steppe habitat would be greatest in Alternative IV, followed by Alternative I. No treatments to restore non-native perennial grass to native shrubland would be conducted in the No Action Alternative or Alternatives II, III, or V.

Alternative V proposes the largest amount of riparian exclosures, followed closely by Alternatives I and IV. Active restoration of riparian habitat would be greatest in Alternative IV followed by Alternatives III, V, and I. The abundance and distribution of spotted frogs and other special status amphibians would increase most in Alternative IV, followed by Alternatives V, I, and III. Habitat for yellow-billed cuckoo would be most actively restored in Alternative IV; however, cuckoo habitat should improve under all alternatives in the long term. Existing spotted frog habitat would be maintained in Alternative II; however, because spotted frogs are an isolated population, they have the greatest potential to be extirpated in Alternative II. Other special status species in the riparian guild would be maintained in Alternative II.

Impacts from Noxious Weeds and Invasive Plants Actions

In uplands, invasive annual grasses promote increases in fire size and shorten the fire return interval (Brooks, et al., 2004; D'Antonio & Vitousek, 1992; Idaho Sage-grouse Advisory Committee, 2006; Pellant, 1990), thereby reducing habitat patch size and increasing distances between similar habitat patches. Invasive plants may reduce native plant diversity and abundance as well as influence the associated invertebrates (D'Antonio & Vitousek, 1992; Ehrenfeld, 2003), affecting special status wildlife diversity and abundance. Cheatgrass impedes mobility in some reptiles, which may decrease foraging and increase vulnerability to predation (Newbold, 2005).

Cheatgrass and other non-native annuals have invaded the interspaces between small dunes, reducing larval habitat for the tiger beetle (Baker & Munger, 2000). Several sites that were occupied in the early and mid 1990s (Baker, et al., 1994) have no evidence of larvae burrows being present during recent inventories between 2006 and 2008.

Canada thistle and bull thistle have been observed along portions of Shack and Rocky Canyon Creeks. As these species increase, the habitat for spotted frog would decline from the reduction of desirable riparian plants. Reed canary grass, an invasive wetland plant that rapidly forms monocultures, changes native plant species composition (Lesica, 1997) and may affect wetland hydrology (Pearl, et al., 2005). Tamarisk (Carman & Brotherson, 1982; Farley, et al., 1994) and Russian olive (Lesica & Miles, 2001) tend to dominate riparian areas and displace native plants. Purple loosestrife (Nagel & Griffin, 2001) and reed canary grass (Lesica, 1997) are known to replace native wetland vegetation including cattail and bulrush; these species also reduce plant and animal species diversity in riparian habitats, reducing or eliminating habitat for special status wildlife in riparian areas. Herbicides approved for use in wetlands or riparian areas should not result in mortality of spotted frogs at the specified application rate.

Invasive plants in riparian areas (e.g., purple loosestrife, reed canary grass, Russian olive, tamarisk) reduce native plant diversity (Maurer & Zedler, 2002), decreasing habitat quality for some riparian special status species. Effects of noxious weed and invasive treatment are analyzed in the *Wildlife* section under *Impacts from Noxious Weed and Invasive Plants Actions* and are not repeated.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative does not have a target for controlling noxious weeds. Invasive plants and noxious weeds would continue to increase in upland and riparian habitats. Continued expansion of cheatgrass into sagebrush steppe or canyonland special status species habitat would degrade habitat quality and increase the risk of wildland fire.

Cheatgrass, bur buttercup, and other invasive plants would continue to expand into sagebrush steppe and canyonland guild habitat from higher disturbance areas (e.g., roads) and fire, in the long term, this is expected to contribute to increased wildland fire size, reducing habitat patch size and increasing distance between similar habitat patches. The effects to special status wildlife and their habitat are considered minor in the short term and major in the long term at both the local and planning area scales.

Impacts from Management Specific to Alternative I

Alternative I has a target for reducing the acres of noxious weeds by 10%. Treatment or control of invasive annuals to improve habitat for the tiger beetle would include herbicide treatment to reduce or eliminate cheatgrass and other invasive annuals, then seeding to perennial vegetation. A reduction in invasive annuals by herbicide treatment has been shown improve larval habitat in the short term (Bouffard, et al., 2009) because reproductive habitat for tiger beetle is sparsely vegetated for egg laying and larvae development (Baker & Munger, 2000; Bauer, 1991). Driving motorized vehicles through tiger beetle reproductive habitat during weed treatments could result in the collapse of some tiger beetle larvae burrows. Short-term losses of tiger beetle larvae during treatment could be offset by increased production and survival due to increased habitat in subsequent years. Impacts of increasing invasive annuals and noxious weeds to tiger beetle habitat are considered moderate in the short term and major in the long term at the local and planning area scales.

In the short term, treatment of annual grasslands would reduce habitat for sagebrush steppe guild special status species if a sagebrush overstory is present and provides suitable nesting habitat. The majority of the annual grasslands have little or no sagebrush overstory. Treatment of annual areas would help reduce the expansion of cheatgrass and other invasive plants into adjacent habitat with little or no cheatgrass. Long-term treatment of annual grasslands would promote habitat for sagebrush steppe guild special status species by reestablishing shrubs and helping reduce the size and frequency of wildland fires.

Yellow-billed cuckoo have occasionally been observed on islands in the Snake River in the planning area. Habitat on the larger BLM-owned islands could be enhanced for yellow-billed cuckoo over time by treating Canada thistle, purple loosestrife, Russian olive, and tamarisk, promoting desirable shrubs and trees. Treatment of Canada thistle in spotted frog habitat is expected to maintain habitat for this species. Use of herbicides in riparian areas or wetlands is assessed in *Impacts from Management Specific to the No Action Alternative*.

Alternative I establishes a threshold of less than 5% cover of invasive plants in native habitats and less than 10% cover in non-native perennial grassland. It is not known if the threshold would result in an increase in invasive plants in the long term or maintain low levels of invasive plants. Continued increases in cheatgrass would promote wildland fire in native areas, reducing sagebrush habitat patch size in the long term. Without using prescribed fire to reduce accumulated litter, the effectiveness of treating invasive plants chemically or mechanically could be reduced in both the short and long term. This could result in decreased habitat patch size for sagebrush steppe and riparian habitats.

Alternative I includes riparian areas, native plant communities, and specials status species habitat as priorities in controlling or reducing noxious weeds and invasive plants. This is expected to control or slow the spread of noxious weeds and invasive plants primarily in riparian and sagebrush steppe habitats in the short term at the local scale and planning area scales. Effects would be minor at both the local and planning area scales.

Impacts from Management Specific to Alternative II

Alternative II has a target for reducing noxious weeds by 10% of the acreage. Alternative II establishes a threshold of less than 10% cover of invasive plants in native habitats and less than 15% in non-native perennial grassland. The 10% threshold in native habitat is more likely to result in an increase in invasive plants long term than Alternatives I, III, IV, and V. In the long-term, cheatgrass promotes wildland fire and results in reduced sagebrush steppe habitat patch size and an increase in distance between similar habitats.

Alternative II provides for treatment of noxious weeds and invasive plants in special status species habitat, but the highest invasive or noxious weed control priority would be for Type 1 species habitat. Spotted frog habitat would likely be maintained because spotted frogs are a Type 1 species and they have a native riparian community habitat. However, tiger beetle habitat would be a lower priority for treatment because the habitat is primarily non-native, riparian habitat is absent, and tiger beetles are a Type 2 species.

The effects of herbicide treatment on tiger beetle habitat are the same as described in Alternative I. Prescribed burning in tiger beetle habitat could potentially damage larval burrows or kill larvae if heat from the fire is transferred into the soil. Heat transfer would be greater in areas with the higher fuel loads or that burned slowly; however, grass fires usually have a relatively low fuel load and burn rapidly. Short-duration fires typically result in less heat transfer into the soil (Certini, 2005). Invertebrates in the soil are mobile and can burrow deeper to escape heating (Certini, 2005). Because tiger beetle larvae already have a burrow that extends several inches below the soil surface, they have a high potential to escape the heat of a fire. A few tiger beetle burrows would collapse if vehicles used for igniting the burn are driven over them (Bauer, 1991).

Prescribed burning in the spring could result in temporary disturbance of sage-grouse roosting near leks. Smoke and human disturbance associated with prescribed burning could also disturb sage-grouse, Brewer’s sparrow, and sage sparrows on nests near the area to be burned. These effects are avoided when burning is conducted in the fall.

The majority of shrubs in the prescribed burn area would be damaged by fire, reducing structure (shrub height and cover) in both the short and long term. At a landscape scale, effects are negligible in both the short and long term. Locally, effects of prescribed burning prior to treating annual grassland are considered minor in the short term and negligible in the long term.

The effects of increasing noxious weeds and invasive plants are minor in the short term at both the local and planning area scales. Long-term effects of increasing noxious weeds and invasive plants to special status wildlife and their habitats are moderate at the local and planning area scales.

Impacts from Management Specific to Alternative III

Alternative III has a noxious weed control target of no net increase in acres. Although special status species habitats would be a priority for treatment in Alternative III, riparian areas and native communities are not, allowing infestations in these areas to expand. Other priorities for treatment include fuel breaks, roads, diverting resources, and treatment of infestations in riparian and native plant communities. In the long term, patch size is expected to decrease, and the distance between patches would increase in sagebrush steppe and riparian habitats. The effects are expected to be minor in the short term, but moderate to major in the long term at both the local and planning area scales. Although the threshold level for allowable invasive plant cover in native plant communities is the same as Alternative I (less than 5%), native habitats are generally not a priority for treatment. In the long term, noxious weeds and invasive plants would increase in native habitats, increasing the likelihood of fire and reducing habitat for sagebrush steppe, mountain mahogany/mountain shrub, duneland, and canyonland habitats. The effects to special status species and their habitat are considered major at both the local and planning area scales.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Reducing noxious weeds and invasive plants on 50% of the planning area in Alternative IV would improve habitat for special status species more than the other alternatives. In the long term, control of noxious weeds and invasive plants could increase habitat patch size and reduce the distance between similar patches for special status species.

Thresholds for invasive plant cover are the same as in Alternative I, with the same effects. Priorities for treatment focus on riparian, native vegetation, and habitats used by special status species. Treatment of noxious weeds in special status species habitat is further elevated in priority where they overlap ACECs and other special designations.

The effects of noxious weed and invasive plant treatments are moderate at the local scale and minor at the planning area scale in the short term. In the long term, reducing noxious weeds and invasive plants on 50% of the area would be a moderate impact both at the local scale and planning area scales

Impacts from Management Specific to Alternative V

The noxious weed and invasive plant treatments in Alternative V would control noxious weeds and invasive plants species on less acreage than Alternative IV, but more than the other alternatives. Priorities for treating noxious weeds and invasive plants, as well as thresholds for cover, are the same as described in Alternative IV. The effects of prescribed burning to treat annual grassland would be the same in Alternative V as described for Alternative II.

The effects of noxious weed and invasive plant treatments would be moderate at the local scale and minor at the planning area scale in the short term. In the long term, reducing noxious weeds and invasive plants on 20% of the area would be a moderate impact both at the local scale and planning area scales

Summary

Noxious weeds and invasive plant species are expected to continue to increase under the No Action Alternative due to limited priority and treatments, reducing sagebrush steppe, duneland, and riparian habitats for special status species. Alternatives I and II have the same target for noxious weed control (10%), which should have similar impacts. Alternative II has the highest threshold for noxious weeds and invasive plants in both native and non-native plant communities, leading to increased fire size and frequency in the long term. This would reduce sagebrush steppe patch size for sage-grouse and increase distances between sagebrush steppe patches. Although Alternative III considers special status species a priority for noxious weed and invasive plants treatment, it also shifts the focus of treating noxious weeds and invasive plants away riparian areas and native plant communities to roads and fuel breaks. In the long term, this would result in larger fires in sagebrush steppe habitat, reducing habitat patch size and increasing distance between habitat patches. Alternative IV has the largest acreage where noxious weeds and invasive plants would be controlled and reduced. Additionally, native and riparian areas as well as special status species habitats are priorities for treatment. In the long term, Alternative IV should increase habitat patch sizes and decrease distance between patches of similar habitats, improving conditions for special status wildlife in all guilds. Alternative V has the same priorities for noxious weed and invasive plant treatment as Alternative IV; however, the acreage where noxious weeds and invasive plants are reduced is only 20% in Alternative V, compared to 50% in Alternative IV, The effects of treating that acreage primarily increase sagebrush steppe habitat in the long term, but not to the extent as Alternative IV.

Impacts from Wildland Fire Ecology and Management Actions

Wildland fire can rapidly alter habitat over vast areas. Woody species take substantial recovery time to provide habitat similar to pre-burn conditions. Until recovery has occurred, burned areas would be either unsuitable or marginally suitable for sage-grouse (Beck, et al., 2008) and other BLM Sensitive species. Fire suppression activities (e.g., back burns, dozer lines, retardant drops) can adversely impact special status species habitats for several years; however, these actions limit wildland fire size in many cases. Table 4- 144 displays acres of habitat guilds in Critical Suppression Areas.

Table 4- 144. Guild Habitat in Critical Suppression Areas by Alternative (Acres)

Guild Habitat	Alternative					
	I	II	III	IV		V
				IV-A	IV-B	
Aspen	3,000	400	3,000	3,000	3,000	3,000
Canyonland	36,000	8,000	27,000	39,000	39,000	43,000
Duneland	100	100	100	100	100	100
Grassland	135,000	79,000	133,000	197,000	174,000	573,000
Mountain Mahogany/Mountain Shrub	9,000	2,000	9,000	11,000	10,000	11,000
Riparian Habitat (mi)	200	<100	100	200	200	200
Sagebrush Steppe	294,000	79,000	293,000	340,000	326,000	432,000
[A] The No Action Alternative does not identify Critical Suppression Areas.						

Another type of fire suppression activity that can affect special status wildlife is retardant drops. The effects of retardant toxicity in developing spotted frog tadpoles are unknown. In a review of the scientific literature, the effects of organic chemicals on other frogs were not consistent between species and life stage (Beeson, et al., 1999). Pilliod et al. reported that amphibians may be less vulnerable to compounds in fire retardant than fish. Corrosion inhibitors in fire retardant are highly toxic to fish and amphibians at very dilute concentrations especially after exposure to sunlight (Pilliod, et al., 2003). Retardant entering water on most fires in the planning area is unlikely because most fires are limited to the uplands. Fire suppression tactics and FWS consultation requirements call for retardant drops to avoid riparian areas.

Fuels treatments would help restore more natural fire cycles and, in the case of fuel breaks, potentially hinder fire spread. More information regarding fuels and fire is contained under *Impacts from Wildland Fire Ecology and Management Actions* in the *Wildlife* section.

Impacts from Management Specific to the No Action Alternative

No Critical Suppression Areas are identified in the No Action Alternative, which prevents setting suppression priorities. Special status wildlife habitat is one of the values considered in fire suppression. Impacts to special status wildlife habitat include the following:

- Habitat for sage-grouse and other sagebrush-obligates would to continue to be fragmented by wildland fires in the future.
- Restoration to replace sagebrush steppe, mountain mahogany/mountain shrub, or canyonland guild habitat is not expected to keep pace with habitat loss and fragmentation.
- Numbers of leks and lek attendance for both sharp-tail and sage-grouse are expected to decline, in both the short term and long term, due to habitat alteration.
- Ferruginous hawk numbers are expected to continue to decline locally as native shrublands are altered to grassland, nest trees eliminated, nest material become limited, and the prey base changes.
- Numbers of other sagebrush steppe obligates, such as pygmy rabbit, Brewer's sparrow, sage sparrow, and loggerhead shrike, would continue to decline in the planning area due to sagebrush steppe being converted to grassland guild habitat.

Burned portions of watersheds containing spotted frog habitat would produce additional sediment for at least one year following the fire due to a reduction in plant cover and vegetative litter protecting the soil. Some of the sediment would be filtered out by riparian vegetation.

Yellow-billed cuckoo habitat in the Snake River is less likely to burn in the summer or fall because islands where cuckoo have been detected are over 100 feet from the nearest shore. Human use on some islands occurs in the late fall and winter during waterfowl hunting. Fire danger is low during this time. Although human-caused fires may potentially occur in the summer and fall on the Snake River islands, BLM has no records of suppressing fires on the islands.

Temporary fences installed following wildland fires as part of ES&BAR can be a source of mortality to sage-grouse. To reduce potential mortality to sage-grouse or other special status wildlife, temporary fences would be marked with vinyl strips to make them more visible to wildlife if they are in close proximity

(0.25 miles) to either a sage-grouse or sharp-tailed grouse lek. A let-down style fence could also be constructed to minimize the likelihood of special status wildlife collisions during important seasonal periods (e.g., winter, breeding as appropriate). Grazing would be scheduled to avoid having the fence up during the breeding season. Temporary fences would avoid being placed across or along wind-swept ridges and saddles in sage-grouse winter range to reduce collisions by sage-grouse (Connelly, et al., 2000). Temporary fences can also be used by birds as perches by ravens or raptors which may alter predation on sage-grouse, Piute ground squirrel, or pygmy rabbits locally. The effects of temporary fences to special status wildlife would be short-term.

Impacts from Management Common to All Action Alternatives

Direction for fire suppression contained in the ARMS would apply in all action alternatives. These BMPs are expected to minimize potential adverse impacts of fire suppression and ES&BAR activities in riparian areas and wetlands.

Impacts from Management Specific to Alternative I

In Alternative I, approximately 294,000 acres of sagebrush steppe habitat are in Critical Suppression Areas. The acres of other guild habitats for special status wildlife in Critical Suppression Areas are listed in Table 4- 144. Impacts of fuel breaks and new suppression infrastructure to wildlife guild habitats are addressed under *Impacts from Wildland Fire Ecology and Management Actions* in the *Wildlife* section. Depending on the location and nature of the fuel breaks, they may potentially form sites suitable for displaying grouse (Connelly, et al., 1981) by reducing shrub cover or creating openings, which may influence lek distribution. Due to past wildland fires and the transformation of large areas of shrub steppe to grassland, the effects of new disturbances on creating additional sage-grouse or sharp-tailed grouse lek habitat would be minimal. Fuels treatments to restore FRCC would increase habitat for sagebrush steppe and mountain mahogany/mountain shrub guilds. Restoration of the riparian guild would occur. Long-term changes in habitat are described under *Impacts from Vegetation Communities Actions* in the *Wildlife* section.

FRCC projects to establish shrubs to restore natural fire cycles would increase shrubland habitat for pygmy rabbit as well as nesting and winter habitat for sage-grouse and sharp-tailed grouse, increasing distribution and number of leks in the long term. Improvements in riparian habitats over time are expected to improve habitat for spotted frog and, potentially, yellow-billed cuckoo. Critical Suppression Areas in VMAs C and B have the highest suppression priority during multiple ignitions, which would increase fire protection for the majority of remaining sagebrush steppe habitat in the planning area.

Placement of fuel breaks or new roads in the majority of bighorn sheep habitat is not anticipated due to management for WSA and ACEC and topography. Improvement of habitat in bighorn sheep habitat is expected to be limited because of the IMP for WSAs and topography. Bighorn sheep numbers may increase gradually over time, in part due to bighorn sheep natural population growth and dispersal to adjoining unoccupied suitable habitat.

Fuel breaks or targeted grazing could potentially occur in tiger beetle habitat because of its proximity to WUI. With respect to targeted grazing, trampling of larval burrows by cattle resulted in decreased survival of the larvae (Bauer, 1991). The effects of concentrating sheep or goats for targeted grazing is expected to also result in tiger beetle burrow collapse increasing mortality on larvae. If tiger beetle habitat is avoided by targeted grazing, these effects would be avoided. Fuel break construction and maintenance may facilitate the expansion of invasive plants or noxious weeds into tiger beetle habitat.

Depending on the location of stream crossings, sediment from increased public use of new or improved stream crossings for access or recreation would result in an increase in sediment in spotted frog and other special status amphibian species habitat. Impacts of temporary fences for ES&BAR are the same as described in the No Action Alternative.

Impacts from Management Specific to Alternative II

Alternative II contains 79,000 acres of sage-grouse and other sagebrush-obligate special status species habitat in Critical Suppression Areas (Table 4- 144). The effects of fire suppression priorities on wildlife guild habitat are addressed under *Impacts from Wildland Fire Ecology and Management* in the *Wildlife* section. Critical Suppression Areas in VMAs A and B having highest priority during multiple ignitions gives suppression of fires in sagebrush steppe a lower priority than non-native perennial grassland. Long-term decreases in sagebrush steppe and mountain mahogany/mountain shrub habitats in VMAs C and D are expected because of their lower suppression priority. An accompanying decline in sage-grouse and sharp-tailed grouse leks and lek attendance would occur because of the continuing loss of habitat, decreasing patch size, and fragmentation. The lower suppression priority in VMA C would result in more ferruginous hawk nest trees being burned. The majority of the ferruginous hawk nests are located in isolated junipers in the southern half of the planning area. Opportunities to actively restore riparian guild habitat, including native tree and shrub plantings, are limited in Alternative II. The fewest acres of sagebrush steppe, mountain mahogany/mountain shrub, aspen, canyonland, and riparian guild habitat are in Critical Suppression Areas. Impacts of temporary fences for ES&BAR are the same as described in the No Action Alternative.

Impacts from Management Specific to Alternative III

Approximately 293,000 acres of sagebrush steppe habitat are identified as Critical Suppression Areas in Alternative III (Table 4- 144). The effects of wildland fire ecology and management actions on sagebrush steppe and mountain mahogany/mountain shrub guilds under Alternative III are addressed under *Impacts from Wildland Fire Ecology and Management Actions* in the *Wildlife* section. Critical Suppression Areas in VMAs B and A have highest suppression priority during multiple ignitions in Alternative III. Bighorn sheep habitat would not be restored in Alternative III under FRCC actions, in part due to the IMP. Bighorn sheep numbers are expected to remain static or decline over time due to increases in cheatgrass associated with wildland fire. Sage-grouse habitat in VMAs C and D are vulnerable to increasing habitat conversion due to the lower suppression priority for these areas.

Alternative III has the greatest amount of fire infrastructure. Improved roads or additional guard stations would reduce the response time to fires. Some of the 500-foot wide fuel breaks would be aligned to protect special status species habitat; however, fuel breaks, particularly unvegetated ones, would divide some large blocks of special status species habitat, contributing to a decrease in patch size and further fragmenting habitat. Effects of temporary ES&BAR fences are the same as described in the No Action Alternative.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV identifies over 325,000 acres of sage-grouse and other sagebrush obligate habitat as Critical Suppression Areas (Table 4- 144). The majority of the sagebrush steppe and all of the mountain mahogany/mountain shrub and aspen habitat are located in the southern third (VMAs C and D) of the planning area. These VMAs have high priority for fire suppression during multiple ignitions, which should help minimize fire size in the habitats with higher remaining concentrations of special status wildlife. The fire suppression priority and the amount of FRCC restoration in Alternative IV is more likely to maintain existing habitat and increase habitat in the long term for sage-grouse and sharp-tailed grouse compared to the No Action Alternative, increasing lek numbers and numbers of sage-grouse attending leks. Some FRCC restoration would occur to some extent in or adjacent to bighorn sheep habitat. Impacts of ES&BAR temporary fences are the same as in No Action Alternative, except temporary fences would not be allowed in native plant communities.

Impacts from Management Specific to Alternative V

Approximately 432,000 acres of sagebrush steppe habitat used by special status species are in Critical Suppression Areas. All of the aspen and nearly all of the mountain mahogany/mountain shrub habitat are also in the Critical Suppression Areas (Table 4- 144). The large size of these areas reduces the effectiveness of suppression prioritization. Effects of fire suppression priority, FRCC habitat restoration, less suppression infrastructure, and fuel breaks on special status species habitat are the same as in *Impacts from Wildland Fire Ecology and Management Actions* in the *Wildlife* section. Sage-grouse, sharp-tailed grouse, bighorn sheep, and spotted frog are expected to increase, in part, due to the suppression priorities for VMAs C and D and FRCC vegetation treatments to restore the natural fire frequency, which would increase habitat for sage-grouse and other sagebrush steppe special status species. Using only native plant species for restoration could slow restoration due to limited seed availability, reduced success in lower precipitation areas, and somewhat higher costs. Restoration success should improve as more drought-tolerant native plants are developed and released. Because temporary fences for ES&BAR would not be constructed, special status wildlife would not be impacted by temporary fences.

Summary

Infrastructure for fire suppression (e.g., roads, helipads, water sources) would be greatest in Alternative III. Alternative III is the only alternative that includes unvegetated fuel breaks. Alternatives I, II, and IV would have similar amounts and types of fire suppression infrastructure. Alternative V would have the least amount of infrastructure. In the No Action Alternative, all fires would be suppressed, with priority for suppression based on values. Wildland fire suppression priorities in Alternative IV and V would be similar in that the majority of sagebrush steppe guild habitat would be a high priority; however, Alternative V includes about 100,000 acres more sagebrush steppe habitat in Critical Suppression Areas. Alternative II has facilities and grassland areas as high priority for suppression; fires burning in sagebrush steppe, mountain mahogany/mountain shrub, and canyonlands would be lower priority. Alternative II identifies the fewest acres of sage-grouse habitat in Critical Suppression Areas of the action alternatives. As a result, these habitats would be further reduced by wildland fire, contributing to further declines in sage-grouse and sharp-tailed grouse leks; lek distribution and attendance; ferruginous hawk nest trees, and a subsequent decline in ferruginous hawks in the planning area; and potentially bighorn sheep numbers.

Impacts from Livestock Grazing Actions

In the planning area, bighorn sheep use the Bruneau and Jarbidge Canyons as well as upland plateau within a mile of the canyons. Livestock grazing management activities alter bighorn sheep use of habitat through displacement by cattle (Bissonette & Steinkamp, 1996) or horses (Osterman-Kelm, et al., 2008) and associated human disturbance (e.g., riders and dogs moving or herding livestock, livestock placing salt or supplements, otherwise monitoring livestock, or maintaining infrastructure). Domestic sheep or goats are potentially able to transmit disease to bighorn sheep contributing to population die-offs (Schommer & Woolever, 2008; WAFWA, 2007). Presently, cattle graze in and adjacent to bighorn sheep yearlong habitat during late fall, winter and spring. Cattle may alter bighorn sheep distribution (Bissonette & Steinkamp, 1996). Bighorn sheep diets include substantial amounts of forbs and grasses (Krausman & Bowyer, 2003). Depending on the time of year an area is grazed by livestock, grazing may enhance the nutritional value of regrown grasses (Vavra, 2005). In Oregon, spring grazing (grasses in the boot stage May to June) was found to increase the nutritional quality in regrowth of three species of grass that persisted into December (Ganskopp, et al., 2004). Although the nutritional quality improved, the amount of grass biomass was reduced by approximately 32% to 67% for the light and heavily grazed treatments, respectively (Ganskopp, et al., 2004). The authors cautioned of “negative effects of grazing cool season grasses during the boot stage” and wrote that spring grazing could be an option in grazing deferment or rotation systems (Ganskopp, et al., 2004). Similar results occurred with six species of grass (Ganskopp, et al., 2007).

The relationship between livestock grazing and impacts to sage-grouse and their habitat are complex and influenced by numerous factors including but not limited to time of year, distribution of livestock, utilization levels, grass species present, and plant growth as influenced by weather. One of the hypothesized links is the relationship between residual cover (vegetation height) available during nesting and early brood rearing (Connelly, et al., 2000). Research summarized by Connelly et al. indicates sage-grouse nesting success is usually higher in areas with taller residual herbaceous vegetation compared to shorter residual herbaceous vegetation (Connelly, et al., 2004). Connelly et al. recommended that residual herbaceous cover average 18 centimeters (about 7 inches) to provide adequate cover for sage-grouse nesting and early brood rearing (Connelly, et al., 2000). Hausleitner et al. reported that grass height increased 2 inches or more between nest initiation to hatch in Colorado due to grass growth (Hausleitner, et al., 2005). Sharp-tailed grouse appear to use areas with even taller (25 cm; 10 inches) residual cover (Giesen & Connelly, 1993) than sage-grouse.

At this time, there is no peer-reviewed scientific literature addressing livestock grazing seasons of use and impacts to sage-grouse displaying, breeding, or nesting. Cattle have been documented flushing sage-grouse from nests and, in one instance, damaging sage-grouse eggs in a nest (Coates, 2007). It is not known if sage-grouse flushed from nests by livestock have a greater chance of subsequent nest predation by ravens or other nest predators. The effects of livestock grazing on sage-grouse nest abandonment or changes in nest predation are poorly understood. Effects of mule deer, pronghorn, or elk grazing on sage-grouse nesting are also unknown.

Livestock grazing is not believed to substantively affect the ferruginous hawk prey base and promotes hunting efficiency of ferruginous hawks in the northern Great Plains by reducing cover (Dechant, et al., 2001). Ferruginous hawk prey (small mammals and birds) are sensitive to habitat changes brought on by grazing (Olendorff, 1993). The effects can be positive or negative depending on the prey species (Olendorff, 1993). However, livestock use ferruginous hawk nest trees for rubbing (White & Thurow, 1985) and shade, which can weaken roots or cause them to collapse over time (Olendorff, 1993). In the planning area, livestock rubbing nest platforms have broken the support pole, causing the platform to topple. White and Thurow noted that human disturbance that results in ferruginous hawks being flushed from nests can cause ferruginous hawks to have lower nesting success (White & Thurow, 1985);depending on the timing, human disturbance may cause ferruginous hawks to abandon nests. White and Thurow reported that livestock did not cause ferruginous hawks to abandon nests (White & Thurow, 1985). The impact of human disturbance associated with livestock management is expected to be minor and localized. Howard and Wolfe recommended that range manipulations be scheduled to avoid breeding, nesting, and fledging periods for ferruginous hawks to the extent possible (Howard & Wolfe, 1976).

Water troughs and stock ponds are usually sites of high disturbance where invasive plants can spread to adjoining uplands, altering habitat quality (Brooks & Berry, 2006). Various infrastructure contributes to habitat degradation, fragmentation (Connelly, et al., 2004; Ingelfinger & Anderson, 2004; Pitman, et al., 2005), and mortality (Connelly, et al., 2004; Wolfe, et al., 2007). Livestock grazing alters herbaceous cover important to sage-grouse nesting (Barnett & Crawford, 1994; Connelly, et al., 2004; Connelly, et al., 2000; DeLong, et al., 1995; Gregg, et al., 1994; Holloran, et al., 2005) and can influence plant species composition and abundance in riparian areas (Kauffman, et al., 1983) and uplands (Reynolds & Trost, 1980). Impacts to special status wildlife habitat are influenced by class of livestock, stocking rate, season of use, use levels, and other management practices.

Spotted frogs use areas with shallow water and emergent or aquatic vegetation for basking (Pearl, et al., 2005). Bull and Hayes reported livestock grazing had no significant effect on spotted frog reproduction in Oregon (Bull & Hayes, 2000). In Washington, Watson et al. reported moderate livestock grazing of ponds with reed canary grass improved spotted frog habitat by maintaining open water, but heavy grazing eliminated too much vegetation making habitat less suitable (Watson, et al., 2003). The effect of reed canary grass on riparian plant species diversity is addressed under *Impacts from Noxious Weeds and Invasive Plants Actions*.

The number of acres of each habitat guild in areas available and unavailable to livestock grazing is identified in Table 4- 101 in the *Wildlife* section.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative does not have specific utilization levels. Based on monitoring, these utilization levels vary between less than 20% to more than 50% in pastures. At 50% utilization, native grasses (e.g., Thurber needlegrass, Idaho fescue, Sandberg bluegrass, and bluebunch wheatgrass) in the sagebrush steppe and mountain mahogany/mountain shrub habitats lack adequate residual herbaceous height for nesting sage-grouse and sharp-tailed grouse, respectively. At 20% use, residual herbaceous heights of the same grasses are near or exceed the nesting cover requirements.

Grazing seasons of use can be changed to overlap sage-grouse display, breeding, and winter periods in sagebrush steppe and mountain mahogany/mountain shrub habitats winter, resulting in additional disturbance to breeding, nesting, or wintering sage-grouse. The effects to sage-grouse from increased energy expenditures due to being flushed during breeding or wintering is not known.

Domestic sheep and goats are believed to transmit diseases such as pneumonia to wild bighorn sheep (WAFWA, 2007). The No Action Alternative restricts converting cattle AUMs to domestic sheep AUMs in allotments with bighorn sheep habitat unless fencing or topography can satisfactorily maintain separation, to minimize the potential transmission of disease from domestic sheep to bighorn sheep.

Human disturbance (e.g., maintenance, hauling salt, herding or checks on livestock) associated with livestock grazing could result in ferruginous hawks having lower nest success or nests being abandoned for that year. The impact is expected to be minor in the planning area because the majority of ferruginous hawk nests are more than 0.25 miles from fences or water pipelines where human disturbance is more likely. The influence of livestock grazing on the ferruginous hawk prey base is unknown.

Livestock would continue trailing through tiger beetle egg-laying habitat, potentially collapsing burrows and increasing mortality on larvae in this area. If the area were fenced, livestock trampling of larvae burrows would be avoided. Effects of brown-headed cowbird predation using the fence as a hunting perches on adult tiger beetle populations are unknown.

Impacts from Management Specific to Alternative I

The effects of adopting the estimated utilization levels to achieve resource and use objectives on residual herbaceous height are addressed under *Impacts from Livestock Grazing Actions* in the *Wildlife* section. The increase in utilization levels would reduce herbaceous height used by sage-grouse (Connelly, et al., 2000; Thompson, et al., 2006; Vander Haegen, 2007), and sharp-tailed grouse (Giesen & Connelly, 1993) for nesting and brood rearing (Connelly, et al., 2000). Relatively shorter stature grasses such as Sandberg bluegrass, Thurber needlegrass, and Idaho fescue would not provide more than 6 inches of residual cover at the 30% to 40% utilization levels over the portion of the planning area where these species are dominant. Range infrastructure and supplements such as salt and molasses would further alter livestock distribution (Bailey & Welling, 1999; Bailey, et al., 2001; Martin & Ward, 1973). Additional fences would be constructed to protect reference areas. Improved livestock distribution as a result of new water developments and fences would reduce habitat patch size. Altered livestock distribution in pastures due to infrastructure would increase herbaceous height uniformity in the pasture. The increase in infrastructure and utilization levels proposed in Alternative I would likely decrease sage-grouse and sharp-tailed grouse populations over time as a result of less herbaceous height, reducing nest success and brood survival. Impacts of range infrastructure are addressed under *Impacts from Livestock Grazing Actions* in the *Wildlife* section and apply to both grouse species.

Alternative I contains guidance to provide for multi-aged aspen stands long term. Reducing livestock use on aspen sprouts would allow the trees to continue grow and mature providing suitable habitat for Lewis woodpecker and other special status wildlife in the aspen guild long-term. Grazing disturbance could help stimulate new aspen suckers.

Increases in range infrastructure or use of supplements would increase livestock use in bighorn sheep habitat on plateaus outside of the WSA. Improving livestock distribution near portions of the Bruneau and Jarbidge Canyons would increase the potential for displacement and possibly forage competition for bighorn sheep. Scheduling livestock grazing to avoid pastures with bighorn sheep habitat during the breeding and winter periods would help mitigate these impacts.

The ARMS would maintain a low level of use in spotted frog habitat. Fencing could be used to create riparian pastures to facilitate livestock management. Applying herbaceous use levels for livestock grazing in the uplands are expected to limit sediment transport into spotted frog habitat.

The effects of livestock grazing on ferruginous hawks and tiger beetles would be similar to those described for the No Action Alternative.

Impacts from Management Specific to Alternative II

Increases in infrastructure to facilitate livestock management would further fragment sage-grouse habitat. The lack of seasonal restrictions would not limit livestock use of breeding and nesting habitat for sage-grouse or sharp-tailed grouse. The current sage-grouse statewide plan calls for grazing management to maintain or enhance herbaceous understory cover, height, and plant species diversity during the nesting season (Idaho Sage-grouse Advisory Committee, 2006). Alternative II applies sage-grouse guidance to those allotments with greater than 50% native plant communities. The estimate of 50% use on native grasses (e.g., Idaho fescue, Thurber's needlegrass, Sandberg bluegrass and bluebunch wheatgrass) and 60% use on non-native perennial grasses to achieve resource and use objectives would reduce residual herbaceous height and would not provide suitable herbaceous height (7 inches) for sage-grouse nesting in the majority of the remaining sagebrush steppe habitat. The same utilization level on different grass species results in different residual heights. For example, 50% use of 22-inch tall bluebunch wheatgrass produces an average residual height of 4.5 inches, whereas 50% use of 22-inch Idaho fescue averages approximately 2.5 inches of residual height. Livestock grazing in the late summer through winter, when there is less likelihood of herbaceous plant growth, would contribute to shorter herbaceous plant height. Plant growth from April into June would somewhat offset reductions in residual cover. Both sage-grouse and sharp-tailed grouse numbers at leks, and possibly numbers of leks, are anticipated to decline because of reduced nest success.

Maintaining grassland habitat to support the utilization level for grazing is not expected to facilitate recovery of habitat for a more stable prey base for ferruginous hawks.

Alternative II lacks livestock grazing guidance for aspen stands. Repeated heavy browsing of aspen sprouts by livestock or wildlife reduces aspen recruitment (Bartos, et al., 1994; Kay & Bartos, 2000). In the long-term, the aspen stands would become decadent and could be eliminated, reducing or removing suitable habitat for Lewis woodpeckers and other aspen guild special status wildlife.

The combination of the issuance of TNR, estimated 40% to 50% utilization levels on native grass, and increases in range infrastructure and supplements are expected to increase competition for forage in plateau areas adjoining canyons occupied by bighorn sheep and contribute to habitat fragmentation. Human disturbance associated with infrastructure construction and maintenance would also increase. Livestock grazing would continue to be scheduled in and adjacent to bighorn sheep habitat during breeding and winter periods. Bighorn sheep would likely be displaced from a portion of currently occupied habitat in the Bruneau River from Black Rock north to Cedar Trail Lakes near Long Draw. The combination of displacement and reduced forage would result in a decline in bighorn sheep numbers over time. The Bruneau Canyon from Long Draw to Sheep Creek and the Jarbidge Canyon would continue to provide habitat bighorn sheep habitat similar to the current condition, primarily due to topography that limits livestock access.

Spotted frog habitat in Shack, Bear, and Rocky Canyon Creeks may be fenced. The estimated 40% to 50% use levels on Idaho fescue in the watersheds above these streams would result in an increase in sediment due to a reduction in herbaceous cover and litter. At 50% use, more grass basal leaves are consumed, leaving shorter leaves and less plant material to become litter, increasingly exposing soil to erosive forces. Sediment would be transferred from the uplands to ponds, making them shallower and becoming dominated by sedges, reducing open water habitat needed by spotted frogs for reproduction. To the extent soils become compacted and livestock trails on steeper slopes erode, the hydrology in spotted frog watersheds could change (Trimble & Mendel, 1995a).

Increasing utilization levels to an estimated 50% to 60% in pastures classified as non-native perennial may increase the amount of active dune habitat over time due to a decrease of native grasses and loss of soil around some seeded grasses from wind erosion. However, tiger beetle habitat would not necessarily have a corresponding increase due to continued trampling in larval habitat or changes in invasive annuals in larval habitat.

Impacts from Management Specific to Alternative III

The overall effects of estimated utilization levels at 30% to 40% to achieve fire and resource objectives in Alternative III would be similar to Alternative I. Additional fences would be constructed to create reference areas. To facilitate livestock management, additional infrastructure would be constructed, contributing to additional habitat fragmentation and a reduction in patch size. Sage-grouse and sharp-tailed grouse numbers are anticipated to decline over time due to a combination of decreases in herbaceous height reducing nesting cover, increases in infrastructure to enhance livestock distribution (e.g., fences, pipelines, water troughs), and increases in supplement locations to improve livestock distribution. The extent of decline cannot be quantified due to complex interactions and the unknown amounts and locations of infrastructure.

Impacts to bighorn sheep would be somewhat less than in Alternative II, but more than in Alternative I. Impacts would include displacement and increased competition for forage with livestock during the fall and winter. Increases in AUMs and competition for forage would be elevated in plateau areas next to bighorn sheep habitat outside the WSA including portions of the Bruneau Canyon from approximately the Long Draw confluence upstream to Hole in the Ground.

Impacts of livestock grazing to aspen habitat used by some special status species are the same as described for Alternative II.

Impacts to spotted frog habitat are expected to be similar to those in Alternative I due to similarity in estimated utilization levels.

Effects of livestock grazing on tiger beetles are expected to be similar to those described for the No Action Alternative.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Estimated utilization levels of 20% to 30% to achieve resource objectives would be less than in the No Action Alternative. As a result, adequate levels of residual current year's growth and residual herbaceous height would remain for sage-grouse and sharp-tailed grouse nesting and brood habitat over a larger area. New infrastructure could be constructed; additional fences would be constructed to create reference areas. New infrastructure would increase habitat fragmentation. Sage-grouse and sharp-tailed grouse numbers at leks are expected to increase due to additional nesting cover, which should reduce nest predation and predation on young chicks in the long term. Alternative IV contains guidance to provide aspen recruitment to maintain and create multi-aged aspen stands for Lewis woodpeckers and allowing young aspen mature to continue providing appropriate aspen habitat in the long term.

Lower utilization levels would reduce potential displacement and competition for forage between livestock and bighorn sheep. Livestock grazing would be scheduled to avoid pastures with bighorn sheep habitat during the breeding and winter period, minimizing displacement during this time. Placement of additional infrastructure and supplements may still influence bighorn sheep habitat use.

The estimated 20% to 30% utilization levels would leave more vegetation and litter in watersheds with spotted frogs. The increase in vegetation and litter would reduce sediment transport into spotted frog habitat compared to the No Action Alternative.

Livestock trailing may be somewhat reduced in tiger beetle habitat due to the lower utilization levels. Livestock trailing is expected to continue due to the proximity of the water trough to tiger beetle habitat. Livestock impacts could be eliminated if tiger beetle habitat was fenced or the trough moved at least 1 mile away.

Impacts from Management Specific to Alternative V

Alternative V would substantially decrease the amount of vegetation production allocated for livestock grazing, to less than half of current levels under the No Action Alternative. Residual cover for nesting sage-grouse and sharp-tailed grouse would be substantially greater in Alternative V than the in No Action Alternative due to estimated utilization levels of 10% to 20% in the Sagebrush Sea ACEC, which contains the majority of their habitat in the planning area, and the prohibition against issuing TNR. Taller residual cover would improve nesting success for both special status grouse species, contributing to an increase in populations as well as numbers and distribution of leks. Because reference areas are pasture sized, new infrastructure is expected to be minimal.

Ferruginous hawk numbers are expected to remain similar to those in the No Action Alternative. The lower use levels coupled with guidance for livestock grazing in aspen stands would result in multi-aged aspen stands long term.

The potential for displacement or competition for forage between livestock and bighorn sheep would be less than in the No Action Alternative due to lower utilization levels. Livestock grazing would be scheduled to avoid the breeding and winter periods in pastures containing bighorn sheep habitat, further minimizing displacement or competition.

Because spotted frog habitat lies in the Sagebrush Sea ACEC, livestock grazing utilization levels would be reduced to an estimated 10% to 20%, rather than the estimated 20% to 30% outside the ACEC, leaving more vegetation and vegetative litter in the uplands to reduce rain drop impact and overland flow, helping lessen sediment transport to spotted frog habitat.

Alternative V contains guidance to provide for multi-aged aspen recruitment to maintain aspen stands in the long term for Lewis woodpecker and other special status wildlife in the aspen guild. Additionally, maintaining aspen as a food and dam building material for beaver also maintains pond habitat for spotted frog.

Impacts to tiger beetles are expected to be similar to those in Alternative IV due to lower use levels.

Summary

Alternative II would leave the least herbaceous residual height for sage-grouse nesting and brood habitat due to the combination of utilization levels and expected new range infrastructure. Alternative IV would also provide more residual cover than the No Action Alternative and Alternatives II and III due to low utilization levels; however, new infrastructure including fences for reference areas would contribute to habitat fragmentation.

Alternative II is most likely to result in the highest displacement and forage competition between bighorn sheep and livestock due to higher use levels, more infrastructure, and less seasonal guidance, followed by Alternatives III, I, and the No Action Alternative. Alternative V most effectively reduces potential livestock/bighorn sheep conflicts, followed by Alternative IV. Alternatives I, IV, and V have provisions to schedule livestock grazing to avoid pastures with bighorn sheep habitat during the breeding and winter season. The effects of Alternative IV are not expected to be substantially different for bighorn sheep or sage-grouse.

Impacts to ferruginous hawks from livestock grazing are related to human disturbance, which does not vary appreciably by alternative.

Alternative V would leave the most vegetation and litter in watersheds occupied by spotted frogs, followed by Alternative IV, the No Action Alternative, and Alternative I. Alternative II would remove the most vegetation cover, which could result in an increase in sediment into spotted frog habitat.

Protecting tiger beetle habitat would be a priority in Alternatives I, III, IV, and V, but would a lower priority in Alternative II, unless it becomes a Type 1 Idaho BLM Sensitive species. All alternatives would allow for fencing and/or moving the water troughs from their present location to improve habitat.

Impacts from Recreation Actions

Human disturbance from recreation (e.g., hiking, noise, pets) can influence wildlife behavior or habitat use (Keller & Bender, 2007; Miller, et al., 1998, 2001). Some individuals in a species may be displaced while others may habituate to disturbance to some extent. Harassment from increased motorized vehicle use may displace even habituated wildlife from their home range (Ouren, et al., 2007). Recreators on foot, bicycles, or motorized vehicles can elicit strong flight responses in wildlife (Ouren, et al., 2007; Wisdom, et al., 2004). Motorized recreation, horses, and human foot traffic can also damage vegetation, compact soils, and increase the spread of noxious weeds or invasive plants, indirectly affecting habitat quality over the long term.

Dispersed recreation activities include wildlife photography and viewing, camping, mountain biking, sight-seeing, hiking, and rock climbing. It is expected that viewing and photographing of sage-grouse and sharp-tailed grouse on leks and ferruginous hawks on nests will continue. Human disturbance that results in flushing displaying grouse from leks may inhibit breeding on that day. Effects of photography or wildlife-viewing disturbance occurring at sage-grouse or sharp-tailed grouse leks multiple times during the breeding season are not known. Human disturbance from photography or wildlife viewing is generally considered negligible or minor at the present rates in the planning area. Connelly et al. recommend that only one to three leks be made known to the public for viewing and photography, and camping on leks should be prohibited during the breeding season (Connelly, et al., 2000).

Recreational trail use may displace some bird species from suitable nesting habitat (Miller, et al., 1998); however, a few species may be attracted to edge habitat created by trails, including brown-headed cowbirds, which are nest parasites and predators. Miller et al. reported that bird species exhibiting nesting displacement, nested from 150 to 300 feet from trails. Human disturbance and increased nest predation near trails appeared to contribute to lower nesting success (Miller, et al., 1998).

Human disturbance at ferruginous hawk nests may result in nest abandonment (White & Thurow, 1985). Depending on time of year, hiking or rocking climbing near nest sites can have more of an effect on nesting raptors, including ferruginous hawks and prairie falcons, than motorized vehicles (Richardson & Miller, 1997). Displacement of adults from the nest may lead to mortality of the eggs or young, depending on weather and nest predators (Richardson & Miller, 1997), or abandonment of the nest and territory for the year (Anderson, et al., 1990; Richardson & Miller, 1997; White & Thurow, 1985). Ferruginous hawks can be flushed by humans walking or in motorized vehicles (Holmes, et al., 1993; White & Thurow, 1985), resulting in nest abandonment.

Bighorn sheep may habituate to human activities to some extent (Keller & Bender, 2007; Leslie Jr. & Douglas, 1980; Papouchis, et al., 2001); however, habituated bighorn sheep can be displaced by increased human activities (Keller & Bender, 2007; Leslie Jr. & Douglas, 1980; Papouchis, et al., 2001). Bighorn sheep appear to flee sooner and at a farther distance from hikers than vehicles (Papouchis, et al., 2001).

SRPs can be issued for events where numerous recreators gathered for specific forms of recreation. Motorized and non-motorized races are one type of SRP activity. Depending on the type of SRP and time of year, some activities authorized in SRPs can displace wildlife or be a source of mortality. SRPs allowing motorized activities can result in habitat degradation and fragmentation by damaging vegetation and spreading invasive plants or noxious weeds. To the extent race events stay on existing routes, damage to vegetation and habitat would be minor. The starting line, check points, and finish line incur more habitat damage due to a greater concentration of participants, spectators, and vehicles in these areas. In addition to habitat damage, wildlife can be temporarily displaced during the event. Disturbance would be more important during winter, breeding, and nesting periods. SRPs held from late spring through summer could contribute to nest abandonment or direct wildlife mortality.

Acres of guild habitat by in SRMAs are presented in Table 4- 145.

Table 4- 145. Guild Habitat in SRMAs by Alternative (Acres)

Guild Habitat	Alternative [A]				
	I	II	III	IV	V
Aspen	3,000	0	0	<100	0
Canyonland	36,000	11,000	13,000	30,000	13,000
Duneland	0	0	0	0	0
Grassland	118,000	600	30,000	116,000	2,000
Mountain Mahogany/ Mountain Shrub	10,000	0	0	300	0
Riparian Area (Miles)	100	<100	<100	<100	<100
Sagebrush Steppe	154,000	8,000	12,000	58,000	4,000

[A] The No Action Alternative does not identify SRMA boundaries.

Impacts from Management Specific to the No Action Alternative

The Bruneau-Jarbidge SRMA would focus on primitive, primarily whitewater, recreation. Whitewater recreation is restricted by water flows to a short period annually in the spring. Human activity is essentially limited to the stream and riparian area. The No Action Alternative is expected to maintain human disturbance from recreation in bighorn sheep habitat at its current low level. Impacts to special status bat species present in this SRMA are expected to be minimal because these species are nocturnal.

Motorized recreation, particularly cross-country motorized vehicle use, has extended from the original Yahoo (Owsley Bridge) SRMA and would continue to expand with various trails splitting primarily grassland guild habitat, but also reducing sagebrush habitat used by sage sparrow, Brewer's sparrow, and loggerhead shrikes. This also reduces habitat patch size for these special status species.

Fishing and camping would continue in Jarbidge Forks SRMA resulting in negligible disturbance to some riparian guild special status wildlife (e.g., Calliope hummingbird, willow flycatcher). Western toad, Woodhouse toad, northern leopard frog, and spotted frog are not known to be present in this SRMA, and water flows make habitat for these species unsuitable. Because bats are nocturnal, effects of main types of recreation (e.g., camping, fishing) occurring in the SRMA should have negligible impacts on special status bats.

The Oregon Trail SRMA should result in little effect to special status wildlife. Management related to the Oregon NHT generally calls for maintaining the natural characteristics of the trail corridor and ruts, which should minimize habitat changes. Limited sagebrush steppe is present in the northern portion of the planning area where the Oregon NHT is located. The Oregon NHT also runs near some riparian areas along the Snake River. Reenactment recreation specific to following Oregon NHT ruts on horseback or in covered wagons is minimal. Recreators following the Oregon NHT may infrequently flush Brewer's sparrow, sage sparrow, or loggerhead shrikes if they pass through suitable habitat in the late spring or early summer. Displacement would be temporary and have a negligible effect on these species at the planning area or local scales. Sage-grouse, ferruginous hawk, prairie falcon, and pygmy rabbit were historically present, but wildland fire has reduced suitable habitat. Bald eagles are seen in low numbers (less than 20) along the Snake River in the winter.

Salmon Falls Creek SRMA was not mapped nor was there specific management guidance regarding the function of the SRMA, therefore, the impacts can only be addressed in qualitative terms. A few recreators float Salmon Falls Creek from 3 miles south of Jackpot, NV, to the reservoir backwaters in Idaho. During the floating period, recreation in the canyon is associated with the riparian corridor. Prairie falcon nesting in the canyon is minimally impacted by recreation due to few people floating in the spring and the relatively short time recreators are in individual nesting territories. Recreation in the canyon is not expected to impact sage-grouse in the uplands because the canyon depth provides a visual barrier. Recreation in the canyon is not expected to affect any of the special status bat species, because they are active primarily at night and day time human disturbance is negligible from the cliffs where bats roost.

The majority of the planning area is an ERMA in the No Action Alternative. With regard to special status species, ERMAs provide little guidance to mitigate recreational impacts to special status wildlife or their habitat. Increased recreation use, particularly in the Jarbidge Foothills is expected. Increased use would include cross-country motorized vehicle use as well as camping, hiking, and fishing. Using motorized vehicle for cross-country travel would create new routes, contributing to increased habitat fragmentation in the sagebrush steppe and mountain mahogany/mountain shrub special status species habitats. Additional routes near canyon rims may also displace some special status wildlife from habitat.

Impacts from Management Specific to Alternative I

Managing the Canyonlands SRMA with a focus on primitive recreation would maintain low levels of human disturbance in bighorn sheep habitat by limiting SRPs. The low level of human disturbance should also minimize effects to sage-grouse and its habitat during breeding and nesting periods as compared to the No Action Alternative.

The focus on primitive recreation in the Jarbidge Foothills SRMA would assist in reducing or minimizing recreation impacts to sage-grouse and sharp-tailed grouse habitat by applying seasonal, time of day, or other mitigation measures to recreation and SRPs.

Although the Salmon Falls Reservoir SRMA would have some primitive developments (e.g., campfire rings, delineated parking areas, barriers, and improved roads), these developments would reduce damage to sage-grouse habitat from indiscriminate parking, turning vehicles around, and camping. Improving selected roads commonly used to access Salmon Falls Reservoir from the west side would prevent or reduce route braiding and damage to adjoining special status species habitat caused by motorized vehicles driven cross country to avoid ruts, large rocks, or big potholes.

Prairie falcon, spotted bat, and Townsend's big-eared bat are present in the Balanced Rock SRMA. Increases in hikers or fishermen in the riparian area are not expected to affect these species because they usually occupy canyon walls, whereas recreators congregate along the stream. The BLM Sensitive bats are active at night so they are less exposed to human activity.

Deadman/Yahoo SRMA would limit recreational motorized vehicle use to specific trails with few open areas available for motorized vehicle cross-country use. The majority of the SRMA (approximately 31,000 acres) is vegetated by grassland guild habitat with a little over 5,000 acres of sagebrush steppe. Sage sparrow, Brewer's sparrow, and loggerhead shrike nest in some to the larger sagebrush steppe patches in the SRMA. Ferruginous hawks have been observed near Rosevear Gulch, but no nests are known to be present in this area. The small areas open to motorized cross country travel are primarily in grassland habitats which are already being used. Continued cross-country motorized vehicle travel could further reduce some small patches of sagebrush steppe locally, but at the planning area scale, impacts are considered minor in both the short and long term.

Sagebrush steppe habitat in the Little Pilgrim SRMA is present on steep slopes below the upland plateau. At this time, recreation occurring in the SRMA includes fishing year round, with some camping in the summer, and upland game bird and waterfowl hunting in the fall and early winter. Sage sparrow, Brewer's sparrow, and loggerhead shrike have not been observed in this SRMA. The nearest active sage-grouse lek is more than 20 miles away. Steep slopes make the majority of the sagebrush steppe habitat in the SRMA unsuitable for sage-grouse nesting. White pelicans have been observed flying along the Snake River in adjacent to the SRMA from spring into the fall. A few bald eagles have also been observed in the vicinity of the Little Pilgrim SRMA in the winter. Rocky habitat in Pilgrim Gulch appears suitable for black-collared lizards, but this species was not confirmed in recent inventories. Management related to the SRMA (e.g., parking areas, road maintenance) would reduce recreation effects to sagebrush steppe habitat in the SRMA.

Effects of ongoing recreation management in the Bruneau-Jarbidge and Jarbidge Forks SRMAs would be the same as the No Action Alternative.

SRPs would be issued after environmental analysis and include stipulations to minimize impacts to special status species or their habitat. For motorized events requiring an SRP, the route layout would avoid the Native Shrubland VSG to the extent practical to minimize impacts to sagebrush steppe, aspen, mountain mahogany/mountain shrub, canyonland, and riparian habitats. Tiger beetle habitat would not be open for SRPs. Depending on the type of SRP and location, events could be precluded during particular seasons (i.e., winter, breeding, or nesting) or have time of day stipulations to avoid, reduce, or mitigate disturbance to special status species. During raptor nesting and sage-grouse breeding and nesting, SRPs would avoid known raptor nest sites or grouse leks with an adequate buffer zone.

Impacts from Management Specific to Alternative II

Impacts from the Little Pilgrim and Salmon Falls Reservoir SRMAs would be the same as those described for Alternative I. The effects of continued recreation management in the Jarbidge Forks and Bruneau-Jarbidge SRMAs would be the same as the No Action Alternative.

The Canyonlands and Jarbidge Foothills areas would not be managed as SRMAs. The impacts of not having these SRMAs would be the same as those in the No Action Alternative.

SRPs would be issued after the appropriate analysis with stipulations to reduce adverse impacts to special status species habitat, but temporal or spatial guidance would be minimal. The limited temporal or spatial guidance is not expected to eliminate potential SRP impacts to sage-grouse during breeding, nesting, or wintering.

Impacts from Management Specific to Alternative III

Impacts from the Salmon Falls Reservoir SRMA would be similar to those described for Alternative I. The effects of recreation in the Bruneau-Jarbidge and Jarbidge Forks SRMAs would be the same as described for the No Action Alternative. Although the Deadman/Yahoo SRMA is about 1,500 acres smaller in Alternative III than in Alternative I, effects should be similar.

SRPs would be issued, with similar impacts as described for Alternative I. SRPs would not be authorized during fire season, which would eliminate the risk of a wildland fire caused by SRP participants or spectators.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Effects of implementing recreation management in Bruneau-Jarbidge and Jarbidge Forks SRMAs would be the same as described for the No Action Alternative. Impacts from implementing recreation management in the Canyonlands and Salmon Falls Reservoir SRMAs would be the same as in Alternative I. Even though Deadman/Yahoo SRMA is about 1,500 acres smaller in Alternative IV compared to Alternative I, implementing recreation management in this SRMA is expected to be similar to Alternative I. Overall potential impacts of recreation on bighorn sheep, sage-grouse, sage sparrow, Brewer's sparrow, pygmy rabbit, and ferruginous hawks would be reduced compared to the No Action Alternative.

SRPs would be issued, with similar impacts as described for Alternative I.

Impacts from Management Specific to Alternative V

Because Alternative V contains only three SRMAs (Bruneau-Jarbidge, Jarbidge Forks and Yahoo), Alternative V is expected to have fewer impacts to special status wildlife from recreation management of SRMAs. Recreation in the Balanced Rock, Little Pilgrim, and Salmon Falls Reservoir areas would continue to be managed as ERMA, lowering the priority for addressing recreation-related resource issues. The small size of the Yahoo SRMA would tend to concentrate motorized vehicle use in this area, locally increasing effects to riparian and sagebrush steppe habitat but reducing effects from this use elsewhere.

SRPs would be issued, with similar impacts as described for Alternative I.

Summary

The No Action Alternative does not address the increased recreation use over most of the planning area. Alternative I would designate and specify management for the most SRMAs covering the largest acreage and most sagebrush steppe special status species habitat (Table 4- 145). Management of the majority of the SRMAs focuses on maintaining recreation for low levels of human disturbance and reducing effects of recreation on habitat. Maintaining low level recreation use would reduce or minimize potential effects to bighorn sheep, sage-grouse, sharp-tailed grouse, pygmy rabbit, and ferruginous hawk and their habitats. Alternatives I and IV include the Canyonlands SRMA, which would maintain low levels of recreation disturbance in and adjacent to bighorn sheep habitat. The location of motorized recreation SRMAs would have little effect on special status species because they primarily occur in grassland-dominated habitats. If a grassland guild species becomes a special status wildlife, the Deadman/Yahoo SRMA could have impacts to its habitat. At the planning area scale the Deadman/Yahoo SRMA would encompass a little more than 2% of the acreage of grassland guild. Sagebrush steppe occupies about 5,000 acres of the SRMA. Alternative II does not designate any motorized recreation SRMAs, whereas No Action and Alternative V have a small (about 3,000 acres) motorized recreation SRMA. Neither the Yahoo nor Deadman/Yahoo motorized SRMAs include habitat of the tiger beetle; therefore, no impacts from SRMA designation would occur to tiger beetle or their habitat.

Impacts from Transportation and Travel Actions

Routes and route density divide habitat, influence wildlife habitat use, and can be a source of wildlife mortality (Connelly, et al., 2004; Lyon & Anderson, 2003; Ouren, et al., 2007; Walker, Naugle, & Doherty, 2007; Wolfe, et al., 2007). Research has shown that sage-grouse are affected by low levels of use on roads (1 to 12 vehicles per day) (Lyon & Anderson, 2003). Vehicles are also sources of mortality to sage-grouse (Connelly, et al., 2004). Brewer's and sage sparrows are displaced by roads and typically nest less frequently near roads than away from roads (Ingelfinger & Anderson, 2004). Even bighorn sheep habituated to road disturbances can be displaced from habitat by increases human activity (Keller & Bender, 2007).

In a GIS analysis of human-caused fires, Connelly et al. reported human-caused fires are more frequent near roads (Connelly, et al., 2004) and less frequent away from roads. Roads are high disturbance corridors that promote invasion and expansion of invasive annuals (Brooks & Berry, 2006; Brooks, et al., 2004; Gelbard & Belnap, 2003; Ouren, et al., 2007).

At this time, cross-country motorized vehicle use and creation of new routes are degrading habitat for sage-grouse and other BLM Sensitive sagebrush steppe, mountain mahogany/mountain shrub, aspen, and duneland guild species, as well as bighorn sheep.

New roads, whether created for fire suppression, administrative purposes, land use authorizations or other land uses, affect a larger area than the physically disturbed site. Roads divide habitat, reducing habitat patch size. Brewer's sparrow and sage sparrow nesting are substantially reduced for at least 330 feet on either side of the road (Ingelfinger & Anderson, 2004). Roads also delay sage-grouse nesting and reduce use of suitable habitat (Lyon & Anderson, 2003). Holloran concluded that leks within 1.8 miles (3 km) of roads were negatively influenced by roads (Holloran, 2005).

New or improved access roads leading to bighorn sheep habitat could result in increased human activity. Although some bighorn sheep habituate to some human activities (Keller & Bender, 2007; Leslie Jr. & Douglas, 1980; Papouchis, et al., 2001), even habituated bighorn sheep can be displaced by increased human activities (Keller & Bender, 2007; Papouchis, et al., 2001). Improved roads would facilitate access during times of the year currently receiving little human use.

The vast majority of ferruginous hawk nests in the planning area are not in close proximity (0.1 miles) to roads; therefore, they are not likely to be affected by route designation. Ferruginous hawks are less disturbed by vehicles passing by on a road, compared to vehicles or humans that approach the nest (White & Thurow, 1985).

Impacts from Management Specific to the No Action Alternative

Under the No Action Alternative, an increase of routes would result from continued cross-country motorized vehicle use on the approximately 1,062,000 acres allocated as open. New roads would be constructed or upgraded in conjunction with some land use authorizations and minerals. Routes have been created into some bighorn sheep habitat. Route creation near the Bruneau and Jarbidge Canyons would continue in the No Action Alternative, potentially reducing bighorn sheep distribution (Papouchis, et al., 2001).

Presently, there are no routes within 0.25 miles of currently occupied spotted frog habitat. Land use authorizations would include authorizations for access roads. Increases of routes in watersheds with spotted frogs could increase sediment into spotted frog habitat, reducing habitat for this species. Continuing motorized vehicle use in tiger beetle habitat, both on dunes and in larval habitat, would continue to contribute to the spread of invasive plants species in larval habitat and increased mortality of larvae.

Impacts on habitat fragmentation from routes are addressed under *Impacts from Transportation and Travel Actions* in the *Wildlife* section.

Impacts from Management Specific to Alternative I

Alternative I proposes two TMAs with a focus to increase core wildlife habitat size on roughly 350,000 acres. Improvement of primitive roads or the creation of new roads to improve fire suppression and for other administrative purposes may result in additional human access and disturbance in sage-grouse and sharp-tailed grouse habitat at important times of the year. Improvements of routes leading to or in occupied bighorn sheep habitat could facilitate more human access and disturbance. Depending on the amount and type of disturbance, increased human activity could displace bighorn sheep from some areas, reducing overall habitat availability (Papouchis, et al., 2001) and quality. Displacement could reduce bighorn sheep numbers in close proximity to the routes or fragment habitat.

Seasonal closures, particularly winter through spring, would reduce displacement impacts on sage-grouse (Lyon & Anderson, 2003) and bighorn sheep during important seasonal periods. Route improvements in or adjacent to habitat bighorn sheep habitat could facilitate more human access at sensitive times of year. Depending on the amount and type of disturbance, areas with increased human use may effectively displace bighorn sheep from some areas; reducing overall habitat availability (Papouchis, et al., 2001).

Allowing exceptions to motorized vehicle restrictions for lease, ROW, or permit holders could continue motorized use on numerous undesignated routes. New routes would be created associated with new infrastructure, contributing to habitat fragmentation and a reduction in patch size. Continued use of many primitive roads and trails, as well as cross-country motorized vehicle use by permit holders, would minimize actual changes in route density, maintaining habitat fragmentation.

Impacts from Management Specific to Alternative II

Alternative II would likely designate the most miles of existing routes and create the most new routes to facilitate access for commercial development, permitted authorizations, fire suppression, and other administrative purposes. Because of additional infrastructure for land use authorizations, minerals, and livestock grazing, Alternative II could increase route density compared to the No Action Alternative, resulting in habitat loss, reduced habitat patch size, and increased habitat fragmentation.

None of the TMAs in Alternative II include an objective of increasing core habitat for wildlife or special status species. Increased roads for commercial activities would further reduce habitat patch size for sage-grouse, sharp-tailed grouse, and potentially result in displacement of bighorn sheep.

Route density would increase in watersheds occupied by spotted frogs. The increase in roads is expected to contribute additional sediment to spotted frog habitat, primarily in drainages with culverts increasing water flow from road ditches, making ponds shallower and smaller over time. More detailed analysis regarding roads and sediment is presented under *Impacts from Transportation and Travel Actions* in the *Riparian Areas and Wetlands* and *Special Status Fish and Aquatic Invertebrates* sections.

As in Alternative I, lease, permit, and ROW holders could get authorizations allowing exceptions to motorized vehicle restrictions; the effects would be similar to those described for Alternative I.

Impacts from Management Specific to Alternative III

Alternative III would be similar to Alternative I in overall route density due, in part, to improved roads for fire suppression and other administrative purposes. None of the TMAs have an objective to increase core habitat size for special status species.

Closures of some designated routes to the public during periods of excessive fire danger reduces the chance of human-caused fires burning special status species habitat that could reduce habitat patch size and increase habitat fragmentation.

As in Alternative I, lease, permit, and ROW holders could get authorizations allowing exceptions to motorized vehicle restrictions; the effects would be similar to those described for Alternative I.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV is expected to result in fewer designated routes due to the management of three TMAs to increase core habitat size. Route density would be reduced on roughly 1,017,000 acres of the planning area. Route designation will reduce the number of trails and primitive roads and route density in sage-grouse, pygmy rabbit, and sharp-tailed grouse habitat.

As in Alternative I, lease, permit, and ROW holders could get authorizations allowing exceptions to motorized vehicle restrictions; the effects would be similar to those described for Alternative I.

Impacts from Management Specific to Alternative V

There would be fewer impacts to sage-grouse habitat from roads in Alternative V than in the No Action Alternative. Three TMAs, encompassing over 1,027,000 acres, would have an objective to increase core habitat size, helping reduce route density. No new roads would be constructed for fire suppression or other administrative purposes, but some existing primitive roads would be improved to facilitate fire access. New roads associated with land use authorizations or mineral development could be constructed.

Because cross-country motorized vehicle use by lease, permit, or ROW holders would not be authorized, fewer new routes would be created and non-designated trails and primitive roads would recover over time. Long-term recovery would reduce route density, habitat fragmentation, and distance between habitat patches, resulting in increased habitat patch size for special status species.

Summary

Overall route density would continue to increase in the No Action Alternative. Alternatives I, IV, and V have TMAs where an objective is to increase core habitat size. These TMAs may reduce some of the habitat fragmentation from designated routes for sage-grouse and bighorn sheep. Alternative II would likely result in the highest route density of the action alternatives as a result of mineral exploration and development, land use authorizations, range infrastructure development, and improved fire suppression access. Neither Alternative II nor III have an objective of increasing core habitat size. To the extent seasonal limitations are used, they may mitigate some of the impacts from continued use of designated routes.

Alternatives I, II, III, and IV allow exceptions to motorized vehicle restrictions for various permit, lease, and ROW holders. The exceptions would result in continued use of existing primitive roads and trails and creation new routes.

Routes that are not designated are expected to recover over time, improving habitat and reducing human disturbance and habitat fragmentation for bighorn sheep, sage-grouse, pygmy rabbit, and sharp-tailed grouse. All action alternatives would minimize impacts of travel on tiger beetle habitat because cross-country motorized vehicle use would no longer be allowed in the area.

Impacts from Land Use Authorization Actions

Land use authorizations that result in increasing route density and infrastructure (e.g., roads, towers, powerlines, wind turbines, buildings) contribute to direct habitat loss, habitat degradation, fragmentation, disturbance, and mortality for special status wildlife species (Arnett, et al., 2008; Arnett, et al., 2007; Connelly, et al., 2004; Kuvlesky Jr., et al., 2007; Ouren, et al., 2007; Pitman, et al., 2005; Walker, Naugle, & Doherty, 2007; Wolfe, et al., 2007).

Various land use authorizations are expected to be issued in the planning area in the future including, but not limited to, ROWs for communication sites, powerlines, and telephone lines. Buried fiber optic cable would have less long-term effect on sage-grouse or sharp-tailed grouse and their habitat than authorizations with above ground structures (e.g., towers, transmission lines) due to potential displacement (Pitman, et al., 2005) or mortality from collisions (Connelly, et al., 2004). Effects to habitat would be minimized if buried cables were placed within existing disturbance corridors (e.g., along roads).

Table 4- 146 lists the acres of special status wildlife guild habitat present in potential utility development areas in each alternative. Table 4- 147 lists the acres of special status wildlife guild habitat present in potential wind development areas in each alternative.

Table 4- 146. Guild Habitat in Potential Utility Development Areas by Alternative (Acres)

Guild Habitat	Alternative					
	No Action	I	II	III	IV	V
Aspen	0	0	0	0	0	0
Canyonland	700	900	1,000	900	600	600
Duneland	0	0	0	0	00	0
Grassland	55,000	55,000	56,000	55,000	55,000	46,000
Mountain Mahogany/ Mountain Shrub	<100	<100	<100	<100	0	0
Sagebrush Steppe	18,000	13,000	18,000	13,000	13,000	13,000

Table 4- 147. Guild Habitat in Potential Wind Development Areas by Alternative (Acres)

Guild Habitat	Alternative					
	No Action	I	II	III	IV	V
Aspen	3,000	0	3,000	0	0	0
Canyonland	4,000	400	4,000	400	400	0
Duneland	0	0	0	0	0	0
Grassland	56,000	36,000	59,000	36,000	36,000	30,000
Mountain Mahogany/ Mountain Shrub	8,000	0	8,000	0	0	0
Sagebrush Steppe	75,000	22,000	75,000	22,000	21,000	11,000

Impacts from Management Specific to the No Action Alternative

Approximately 76,000 acres of the planning area would be included in potential utility development areas. Three utility corridors run through the northern portion of the planning area and one corridor crosses the planning area diagonally from the northeast to the southwest. No aspen habitat is present in any of the corridors. Sagebrush steppe guild habitat is present on approximately 18,000 acres of the potential utility development areas (Table 4- 146).

The No Action Alternative provides no guidance for ROWs to be placed in existing disturbed areas, which contributes to decreasing habitat patch size and increasing habitat fragmentation. The No Action Alternative identifies a 2-mile radius from leks as nesting/brood-rearing habitat and provides seasonal or occupancy restrictions that could be applied to activities other than oil and gas on a case-by-case basis. This guidance could help reduce human disturbance during sage-grouse and sharp-tailed grouse breeding or nesting. The 0.75 mile buffer from ferruginous hawk nests would reduce human disturbance during nesting, increasing the survival of young ferruginous hawks (White & Thurow, 1985) at the local level.

Wind energy developments and other land use authorizations are expected to increase access to some areas that presently receive low levels of human use. Potential wind development areas include approximately 156,000 acres in the No Action Alternative. Habitat for sage-grouse and other sagebrush obligates is present on roughly 77,000 acres.

Impacts from Management Specific to Alternative I

Alternative I includes the Balanced Rock, Jarbidge, Pilgrim Gulch, Saylor Creek, and Shoestring ROW Corridors, totaling about 71,000 acres in potential utility development areas. Approximately 18% of the potential utility development areas is sagebrush steppe habitat; whereas, nearly 78% is vegetated by grassland (Table 4- 146).The Jarbidge Corridor has the majority of the sagebrush steppe habitat in the utility corridors. Ferruginous hawks, other raptors, and ravens would continue to use powerpoles along the Jarbidge Corridor as hunting perches, increasing predation on Piute ground squirrels, pygmy rabbit, and sage-grouse within or adjacent to the corridor. Ravens would continue to use some of the powerpoles in this corridor as nest sites, increasing nest predation on sage-grouse nests in areas where the habitat was not conducive for raven nesting historically. Prairie chickens, which occur in open grassland habitats, are displaced from otherwise suitable habitat by tall structures (Pitman, et al., 2005); it is not known if sage-grouse respond similarly. The influence of transmission lines and roads on sage-grouse habitat was modeled at approximately 0.3 miles (0.5 km) (Connelly, et al., 2004). In Wyoming, increased traffic on roads within 1.8 miles (3 km) leks was one factor that negatively influenced lek attendance (Holloran, et al., 2005). Overall, impacts of additional transmission lines and associated roads in Jarbidge Corridor on sagebrush-obligate special status species and their habitat are considered moderate at the local scale and minor at the planning area scale.

Impacts of the Jarbidge Corridor on bighorn sheep are negligible at the local and planning area scale. Minimal bighorn sheep habitat is present in the Jarbidge Corridor.

The Saylor Creek Corridor would include about 2% of the tiger beetle habitat. The amount of direct impact depends on the location of the towers, access roads, and staging areas. If towers or roads were placed the dune interspaces, the habitat could become unsuitable. Avian predation on adult tiger beetles may increase as a result of birds perching on lines or structures. The Saylor Creek Corridor also crosses habitat occupied by western toad. Impacts to this species are not expected because towers and access roads would avoid wetland habitat. Additional transmission lines would further fragment habitat and provide raptors with additional hunting perches, but effects are expected to be localized and minor. At the planning area scale, effects to Piute ground squirrel populations are negligible.

The Balanced Rock Corridor crosses Salmon Falls Creek Canyon north of Balanced Rock Park. At the canyon crossing, the land is in private ownership and farmed. In this portion of the canyon, spotted bat, Townsend big-eared bat, and prairie falcons are known to be present. Impacts of this corridor are expected to negligible for these species because towers or access roads would not be placed in the canyon. The negligible impact is due collision with lines, guy wires, or towers when these BLM Sensitive species forage in the uplands adjacent to the canyon. The nearest active sage-grouse lek is approximately 7 miles away. The vast majority of habitat between the lek and the Balanced Rock corridor is not suitable for sage-grouse nesting; the corridor would not impact sage-grouse or their habitat. Piute ground squirrels are present within the utility corridor. Additional transmission lines would further fragment habitat and provide raptors with additional hunting perches, but effects are expected to be localized and minor. At the planning area scale, effects to Piute ground squirrel populations are negligible.

The dominant habitat in the Shoestring Corridor is grassland. The Shoestring Corridor is over 20 miles from the nearest sage-grouse lek and little nesting habitat is present between the lek and the Shoestring Corridor; therefore, sage-grouse should not be impacted by this utility corridor. Piute ground squirrels are known to be present and are hunted by raptors perching on the towers or lines. Additional transmission lines would further fragment habitat and provide raptors and ravens with additional hunting perches, but effects to Piute ground squirrels are expected to be localized and minor. At the planning area scale, effects to Piute ground squirrel populations are negligible. Remaining small islands of sagebrush steppe habitat are used by nesting Brewer's sparrows; however, impacts to this BLM Sensitive species should be local and negligible at the planning area scale.

The Pilgrim Gulch Corridor crosses primarily grassland habitat. Brewer's sparrow and sage sparrow are known to nest in the few small areas of remaining sagebrush steppe habitat, but any impacts to these species would be local and negligible at the planning area scale. Piute ground squirrels are present in the majority of this utility corridor.

No utility corridors would be present in occupied sharp-tailed grouse habitat or watersheds used by spotted frogs; therefore, these species should not be impacted.

Alternative I provides over 175,000 acres available to wind energy development, 60,000 acres of which are expected to be developed. The area with the highest potential for commercial development is in the southeastern part of the planning area. Roughly 22,000 acres of sage-grouse habitat is present in the potential wind development area. Approximately, 18,000 acres of sagebrush steppe in the potential wind development area is within 3 miles of active sage-grouse leks, indicating that most of the area is used by sage-grouse for breeding, nesting, and wintering.

The vast majority of acres of sagebrush steppe, aspen, mountain mahogany/mountain shrub, and canyonland guild habitats was classified as having a marginal wind resource. Roads and other infrastructure related to wind developments in areas with better wind resources would cross some of the marginal and poor wind resource sagebrush steppe habitat. Sage-grouse and other sagebrush-obligate special status species use in the area is expected to decline as roads, infrastructure, and human disturbance fragment habitat (Lyon & Anderson, 2003). The area is also used by wintering and nesting sharp-tailed grouse, which could be displaced. Access roads and roads associated with turbines, powerlines, and other infrastructure are expected to occur in watersheds upstream of spotted frog habitat. Because of the volcanic soils, steeper topography, and higher precipitation (more than 20 inches per year), run-off water from roads and ditches could increase sediment into occupied spotted frog habitat. Run-off water concentrated by ditches would increase water flow and velocity through culverts contributing to down cutting in drainages. No ferruginous hawks are known to be present in the potential wind development areas for Alternative I.

Other land use authorizations would contribute to overall habitat loss at the local scale and contribute to habitat fragmentation at mid scale. Impacts would vary between special status species habitats and specific locations. Alternative I attempts to keep new land use authorizations in existing disturbance corridors to minimize habitat fragmentation, maintain habitat patch size, and minimize displacement of species such as sage-grouse. Land use authorizations would include mitigation to minimize impacts to special status species or habitat. Alternative I identified about 99,000 acres as ROW exclusion areas. The majority of the exclusion area is WSA near the Bruneau and Jarbidge Canyons. The ROW exclusion protects the majority of bighorn sheep habitat and some upland sage-grouse habitat. Tall structures authorized by ROWs would not be located within 1 mile of active sage-grouse leks; however, they could be located 1 to 3 miles from sage-grouse leks if the structure would not conflict with the lek.

Impacts from Management Specific to Alternative II

Alternative II has approximately 77,000 acres of potential utility development areas, including the China Mountain and Shoestring Corridors. The majority of guild habitat present is grassland, followed by sagebrush steppe (Table 4- 147). The majority of the China Mountain Corridor is in sage-grouse nesting, early brood-rearing, and winter habitat. Approximately 64,000 acres of sagebrush steppe habitat is within 3 miles of the corridor and active sage-grouse leks. These areas are used by sage-grouse during breeding, nesting, and winter. Transmission lines could result increased predation (Steenhof, et al., 1993) on sage-grouse or make the habitat unsuitable. The southeastern portion of the corridor, including Browns Bench, has the highest density of active sage-grouse leks in the planning area, 13 total. At least five of these active leks are within 2 miles of this corridor. Development of the China Mountain Corridor may reduce the number of sage-grouse leks and number of sage-grouse displaying at leks in the area.

Alternative II has a 1 mile avoidance area from grouse leks. New maintenance routes and transmission lines are expected to reduce habitat patch size. Transmission line towers provide raptors and ravens perches and nest sites (Steenhof, et al., 1993), which may increase predation on sage-grouse and predation of grouse nests.

Impacts of the Balanced Rock, Big Pilgrim, Jarbidge, Saylor Creek and Shoestring Corridors are the same as described for Alternative I. Over 78,000 acres of sage-grouse habitat occurs in potential wind development areas for Alternative II (Table 4- 147). Ferruginous hawks are not known to nest in these areas. Potential wind development areas include the southwestern portion of the planning area; wind energy development in this area may result in bighorn sheep displacement in and near the Bruneau Canyon. Alternative II would allow wind energy in watersheds occupied by spotted frogs. Runoff from roads and concentrated in ditches as a result of wind energy development, may contribute sediment into spotted frog habitat similar to that in Alternative I. Wind energy development in the northern portion of the planning area would avoid sage-grouse habitat.

Constraints minimizing new land use authorizations to existing disturbance areas would not apply in Alternative II. Authorizations would decrease habitat patch size of sagebrush steppe, mountain mahogany/mountain shrub, and possible aspen habitats that are presently undisturbed. Depending on the specific location and type of authorization, sage-grouse or sharp-tailed grouse could possibly be displaced and predation and nest predation rates could increase locally due to increased presence of perches and nests for avian predators such as raptors or ravens. Numbers of sage-grouse leks or numbers of sage-grouse attending leks may decline in close proximity to tall structures (e.g., powerlines, communications sites). Zones of influence of specific tall structures on sage-grouse are uncertain; however, Connelly et al. recommended that tall structures that provide perches for raptors should be not be placed within 2 miles (3.2 km) of important seasonal sage-grouse habitat (Connelly, et al., 2000). Mitigation measures would be recommended but not required; however, some impacts could be reduced by project specific stipulations in special status species habitat.

The ROW exclusion area is approximately the same size as in Alternative I. Similar amounts of sage-grouse habitat would be protected by the exclusion areas. The areas in which tall structures would not be located would be limited to areas 1 mile of active leks, helping to maintain habitat patch size for sage-grouse and their habitat within this distance, but potentially affecting sage-grouse outside this radius.

Impacts from Management Specific to Alternative III

Because the potential utility development areas and potential wind development areas for Alternative III are nearly the same as Alternative I, the effects are expected to be the same as described for Alternative I. Other land use authorizations are the same as Alternative I and the ROW exclusion area is the same; however, the area in which tall structures would not be located includes areas within 3 miles of sage-grouse leks, further reducing fragmentation in sage-grouse habitat. Land use authorizations within the 3-mile zone may include seasonal or occupancy stipulations. Both measures should reduce impacts to special status species habitat such as a decrease in patch size or increase in distance between patches.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Because the potential utility development areas and potential wind development areas for Alternative IV are approximately 1,000 acres smaller than in Alternative I and are in the same approximate locations, impacts are expected to be similar to those described for Alternative I (Table 4- 146 and Table 4- 147). Approximately 4%, 3,000 acres, of sagebrush steppe is present in the potential wind development area. The ROW exclusion area in Alternative IV is approximately 148,000 acres, which protects an additional 49,000 acres of bighorn sheep and sage-grouse habitat. Alternative IV proposes to increase the area in which tall structures would not be located to areas within 5 miles of active sage-grouse leks, consistent with recommendations in the 2006 *Conservation Plan for the Greater Sage-grouse in Idaho*, reducing impacts to sage-grouse habitat within the 5 mile area.

Impacts from Management Specific to Alternative V

Potential utility development areas for Alternative V include 59,000 acres, 21% of which are habitat for sagebrush-obligate special status species (Table 4- 146). The Saylor Creek Corridor would not be allowed, eliminating potential impacts to tiger beetle and its habitat.

Wind development would not be allowed on BLM-managed land in the southeastern portion of the planning area, but could be developed in the northern portion of the planning area. Approximately 27% (11,000 acres) of the potential wind development area for Alternative V is habitat for sage-grouse. Wind energy could potentially be developed on private land in the southeastern portion of the planning area, requiring a ROW for a transmission line from the private land to the main transmission east of Salmon Falls Creek. Potential impacts to sage-grouse, sharp-tailed grouse, and spotted frog are expected to be reduced due to less infrastructure on BLM-managed land. The ROW exclusion area is the same as in Alternative IV.

Summary

Alternatives I, III, and IV are similar in the location of utility corridors and acreage of potential wind development areas; however, Alternative IV has more area (about 49,000 acres) closed to ROW than Alternative III and I, reducing habitat fragmentation impacts on this acreage. Alternative II has the smallest zone around sage-grouse leks in which tall structures would not be located and the most habitat for sage-grouse and other sagebrush obligates in utility corridors and potential wind development areas. This would result in decreased habitat patch size and more habitat fragmentation of sage-grouse habitat. Alternatives IV and V have a 5-mile avoidance zone for tall structures around sage-grouse leks, which is expected to minimize potential adverse impacts of ROW that include tall structures.

Impacts from Minerals Actions

Disturbance and infrastructure associated with mineral development results in a net loss of habitat, reduces habitat patch size, and alters habitat use (Connelly, et al., 2004; Doherty, et al., 2008; Holloran, et al., 2005; Ingelfinger & Anderson, 2004; Walker, Naugle, & Doherty, 2007).

<u>Leasable Minerals</u>
Appendix U describes the typical activities associated with oil and gas exploration and development, as well as anticipated levels of surface disturbance from these activities. Leasable mineral exploration using seismic reflection with drill rigs and blasting or truck-mounted vibrating equipment would result in the formation of new routes from driving heavy motorized vehicles cross country along the same routes, decreasing habitat patch size. Direct impacts to habitat would be more pronounced at drill and test sites due to the use of equipment. Noise from blasting and drilling, as well as human disturbance and equipment operation, would displace sage-grouse, Brewer's sparrow, sage sparrow, and other BLM Sensitive species from sagebrush steppe habitat at the test area while the disturbance was on-going. In Wyoming, Holloran reported male sage-grouse attending leks did not appear to be impacted if the drilling occurred more than 3.8 miles (6.2 km) from leks(Holloran, 2005).

Approximately five acres of habitat would be directly lost for each mile of new or upgraded (40 feet wide, ditch to ditch) road (Appendix U). New roads would decrease habitat patch size. Indirect habitat impacts for sage sparrow and Brewer's sparrow nesting include reducing nesting density, 39% to 60%, within 330 feet of the road (Ingelfinger & Anderson, 2004). For sage-grouse, vehicle traffic associated with roads reduces sage-grouse numbers at leks within 1.8 miles (3 km) (Holloran, 2005) and delays nesting (Lyon & Anderson, 2003). Even lightly used roads, 1 to 12 vehicles per day, appear to reduce sage-grouse nesting and result in female sage-grouse moving further to nest (Holloran, 2005). Because female sage-grouse have strong nest site fidelity (Holloran & Anderson, 2005), impacts to sage-grouse population nesting areas would not be realized for five to nine years after field development (Holloran, 2005). The influence traffic from main haul roads on sage-grouse leks ended at a distance of 3.75 miles (6.1 km) (Holloran, 2005). As road traffic increased in association with other gas field activities, sage-grouse attending leks within 1.8 miles (3 km) declined (Holloran, 2005). Similar information on impacts of oil and gas is lacking for special status wildlife in other guild habitats.

The influence of gas-producing wells on sage-grouse leks extended to about 2.9 miles (4.7 km) (Holloran, 2005). Wells could be authorized at densities of 1 per 40 acres, a density that could exclude nesting by female sage-grouse (Holloran, 2005). Well densities of less than 1 per 640 acres within 1.9 miles (3 km) of leks (Holloran, 2005) would reduce adverse impacts to sage-grouse. Ravens appeared to be attracted to gas fields, resulting in an increase in sage-grouse nests destroyed by avian predation (Holloran, 2005).

Effects of mortality caused by vehicle colliding or running over BLM Sensitive species wildlife would be in addition habitat loss, reductions in habitat patch size, and displacement.

One by-product of gas or oil extraction can be water. Saline water or water contaminated with petroleum would either be re-injected (preferred disposal method) or placed in a lined evaporation ponds. Spotted frogs use a variety of artificial ponds for breeding (Bull & Hayes, 2000) and could be attracted to these ponds, where they would likely die. Road and culvert placement could increase the amount of sediment transported into spotted frog habitat during run off, reducing the size and depth of ponds used by spotted frog.

Several special status bat species are known to drink from man-made water sources. Oil reserve or sludge pits associated with well drilling can be mistaken for ponds, causing mortality to bats trying to drink from them (O'Shea, et al., 2001). Toxins can accumulate in bats eating insects contaminated by waste water stored in ponds (Luce & Keinhath, 2007). Effects of increased bat mortality are believed to be minor for bat species that occur in high densities. However, the loss of adult bats that occur in low densities, such as spotted bat, has a greater impact local populations (Luce & Keinhath, 2007).

Seasonal, NSO, and controlled surface use restrictions could initially reduce effects of leasable mineral exploration to sage-grouse, ferruginous hawk, prairie falcon, and other special status wildlife in all guild habitats. However, research in Wyoming found sage-grouse attending leks situated in or near the gas field development boundaries declined and disappeared within three to five years (Holloran, 2005).

The effects of geothermal exploration and development would be similar to those described for oil and gas exploration and development. Appendix V describes the typical activities associated with geothermal exploration and development, as well as anticipated levels of surface disturbance from these activities.

Salable Minerals

Salable mineral development in the planning area includes gravel pits and decorative rock permits. Decorative rock permits are issued infrequently, resulting in some occasional localized disturbance. Routes will continue to be created, damaging habitat, encouraging the spread of invasive plants, reducing habitat patch size, and contributing to habitat fragmentation. The type of decorative rock available is presently in low demand. An additional community pit may open in a different area in the future as the rock in the existing community pit is removed and the amount declines. Like new gravel sources, disturbance associated with exploration for new decorative rock sites are expected to be minimal because rock outcrops or seams are used. No blasting occurs because the rock is on the surface.

Locatable Minerals

Future mining in or adjacent to bighorn sheep habitat in the Bruneau or Jarbidge Canyons could displace bighorn sheep because present human disturbance is low. Depending on the location, an active mine may reduce important lambing areas or fragment habitat, reducing genetic exchange between bighorn sheep in different portions of the canyon. In Arizona, desert bighorn sheep habituated to a large active mine (Jansen, et al., 2006). In arid climates, reclamation may be less successful as in areas with more precipitation (Jansen, et al., 2006). Unsuccessful reclamation would result in long-term habitat degradation or loss.

If a mine was located in close proximity to a sage-grouse lek, sage-grouse are likely to be displaced or the lek abandoned while a mine is active (Connelly, et al., 2000) due to human disturbance. After mining activity ceases, sage-grouse are expected to return to the general area, but they may or may not reach the same population level (Connelly, et al., 2000). The mined area may provide suitable sage-grouse habitat in the long-term following successful reclamation (Connelly, et al., 2000). If any high walls or steep slopes are left as part of the reclamation plan, they may provide suitable nesting habitat or perches for ravens or raptors increasing predation locally on sage-grouse or sage-grouse nests.

At leks, female sharp-tailed grouse appear to be more sensitive to disturbance than male grouse (Baydack & Hein, 1987) and do not return to a lek following disturbance on that day. Multiple disturbances during the breeding season at a lek over two to three years may suppress reproduction and nesting for the lek, resulting in a decline in local sharp-tailed grouse numbers and eventual lek abandonment. Because sharp-tailed grouse populations are low in the planning area, the loss of a single lek would be a major impact at the local scale. Repeated disturbance in winter habitat could displace grouse from the area.

If a mine were located in the watershed above occupied spotted frog habitat, it would be expected to contribute sediment into the watershed from roads and other disturbed areas. Depending on the location, type, and size of the mine and associated infrastructure (e.g., access roads, leach ponds), sediment may increase in spotted frog habitat, reducing pond depth and size. Depending on the type of ore and processing, other processing contaminants (e.g., heavy metals, sulfides, cyanide) could be present in water used in processing and enter the water. Depending on the concentration and type of contaminant, this could increase mortality or inhibit reproduction (Porter & Hakanson, 1976) of spotted frogs. Removal of water from Rocky Canyon to process ore would likely reduce or eliminate flows depending on the amount of water used. If all the water in Rocky Canyon were removed, the spotted frog population in the area would be extirpated.

Bats may drink contaminated water directly out of ponds or forage on contaminated insects (Luce & Keinhath, 2007; O'Shea, et al., 2001). Over time, metals and other toxins can accumulate in bats (O'Shea, et al., 2001). Although individual bats may die, it is not believed this would impact bat populations with high densities (O'Shea, et al., 2001). However, spotted bats are vulnerable to local extirpation from contaminated water or prey due to low population densities, low reproductive rates, and specialized prey (Luce & Keinhath, 2007). Properly installed netting or other techniques over such ponds can minimize direct mortality.

Mining in tiger beetle habitat would likely eliminate habitat in the planning area, but the majority of this species' habitat lies in Bruneau Dunes State Park outside the planning area. The likelihood of mine for locatable minerals being situated in tiger beetle habitat is low.

Impacts from Management Specific to the No Action Alternative

<u>Leasable Minerals</u>
Approximately 104,000 acres would be closed to mineral leasing, eliminating direct impacts of leasable mineral exploration and development to BLM Sensitive species and their habitat in the closed area. NSO, seasonal, and avoidance restrictions are identified specifically for oil and gas exploration and development and include sage-grouse winter range, breeding grounds, and nesting/brood rearing and ferruginous hawk and prairie falcon nest sites. According to the RFDS for oil and gas development (Appendix U), approximately 90 acres of surface disturbance are expected to occur in the planning area as a result of oil and gas exploration and development over the life of the plan. This is less than 0.1% of the potential oil and gas areas that would be available for oil and gas leasing. Similarly, according to the RFDS for geothermal development (Appendix V), between 185 and 230 acres of surface disturbance are expected to occur in the planning area as a result of geothermal exploration and development over the life of the plan. This is less than 0.1% of the potential geothermal areas that would be available for geothermal leasing.

<u>Salable Minerals</u>
In the No Action Alternative, the acreage on which salable mineral development occurs is expected to increase from approximately 1,300 acres to approximately 2,300 acres over the life of the plan. This is approximately 0.2% of the area available for salable mineral development. Three active gravel pits are in sage-grouse habitat. Seasonal restrictions for blasting and crushing operations are expected to reduce disturbance during the sage-grouse winter and breeding periods. In areas where sagebrush habitat exists, some disturbance to sage-grouse is likely to occur from blasting or crushing operations outside the breeding and winter periods. Raptors and ravens perch on stockpiled top soil or large piles of crushed gravel. The effects of raptor or ravens perching on gravel piles on sage-grouse mortality or nesting are unknown, but is likely similar to the effects of raptors or ravens perched on powerlines. These impacts are minor at the local scale and negligible at the planning area scale due to the few gravel pits in sage-grouse habitat. Depending on the number and placement, future gravel pits in sagebrush steppe habitat could result in increased local effects. Use of heavy equipment (e.g., loaders, dump trucks) and associated human activity and dust could temporarily disrupt nesting sage-grouse, Brewer's sparrows, and other special status wildlife during the spring, April through June, contributing to

nest failure locally. At the planning area scale, effects are considered negligible in both the short and long term.

Tiger beetle habitat was not identified as closed to salable minerals in any of the alternatives. Development of a sand or gravel source in this area is more likely than locatable mineral development due to the geology and proximity to gravel roads. A sand or gravel pit in tiger beetle habitat could reduce or eliminate larval habitat and habitat for adults. There are other sites in the general area where sand or gravel pits could be developed without affecting tiger beetle habitat.

All sharp-tailed grouse habitat is open to salable mineral development and effects would be the same as described for locatable minerals. Human disturbance associated with the removal of gravel and gravel crushing at gravel pits is typically infrequent, primarily occurring during road maintenance in the spring. No sharp-tailed grouse leks are located in close proximity to existing gravel pits; therefore, there would be no impacts.

<u>Locatable Minerals</u>
The vast majority of sage-grouse habitat in the planning area is open to locatable mineral exploration and development. All sharp-tailed grouse habitat is open to locatable mineral exploration and development in the No Action Alternative. The watershed and Rocky Canyon Creek are open to locatable mineral development in the No Action Alternative. Bruneau Dunes tiger beetle habitat is not included in areas recommended for locatable minerals withdrawal.

Based on past activity, the planning area is not expected to contain much potential for locatable minerals. The No Action Alternative recommends approximately 126,000 acres be withdrawn from locatable minerals mining claims. If withdrawn, the area would not be directly impacted by activities associated with the exploration or development of locatable minerals. A locatable mineral withdrawal would eliminate potential impacts associated with mining in bighorn sheep habitat in the Bruneau and Jarbidge Canyons.

Impacts from Management Common to the No Action and All Action Alternatives

<u>Leasable Minerals</u>
Exceptions, waivers, or modifications to stipulations as a result of ESA consultation with the FWS would not be authorized, protecting habitat of listed species.

<u>Locatable Minerals</u>
All alternatives include 92,000 acres closed to locatable mineral development by statute or PLO. In the closed area, 77,000 acres are grassland habitat and 14,000 acres are sagebrush steppe habitat. Habitat patch size in the closed area would not decrease from roads to extract locatable minerals or mines. A number of bats readily use artificial water sources. Metals (e.g., mercury, arsenic, cadmium) released into water by cyanide heap leaching can be toxic to bats resulting in mortality and reducing local populations. Mines and associated access would result in loss of habitat and reduce habitat patch size. Additional displacement of bighorn sheep, sage-grouse, or other BLM Sensitive species may occur. Diversion of water from streams for ore processing could reduce habitat for riparian special status species. In spotted frog habitat, this may result in the population being extirpated.

Impacts from Management Specific to Alternative I

<u>Leasable Minerals</u>
Approximately 278,000 acres would be closed to mineral leasing in Alternative I; therefore, special status wildlife habitat in these areas should not be affected by this activity. While approximately 288,000 acres would be available for oil and gas leasing, 183,000 acres open to leasing have potential for oil and gas leasing (Table 4- 148): one area in the southeastern portion of the planning area and a second area south of the Snake River. According to the RFDS for oil and gas development (Appendix U), approximately 90 acres of surface disturbance are expected to occur in the planning area as a result of oil and gas exploration and development over the life

of the plan. This is less than 0.1% of the potential oil and gas areas that would be available for oil and gas leasing.

Table 4- 148. Guild Habitat in Areas Available for Mineral Leasing in Potential Oil and Gas Areas in Alternative I (Acres)

Guild Habitat	Available throughout the Planning Area	Available in Potential Oil and Gas Areas
Aspen	2,000	<100
Canyonland	2,000	300
Duneland	600	600
Grassland	172,000	146,000
Mountain Mahogany/Mountain Shrub	7,000	400
Sagebrush Steppe	106,000	35,000
Total	**289,600**	**182,300**

The southeastern portion of the planning area contains habitat for sage-grouse, sharp-tailed grouse, prairie falcon, ferruginous hawk, Piute ground squirrel, pygmy rabbit, special status bats, and special status species associated with aspen. Approximately 2,000 acres would be closed in Rocky Canyon in Alternative I, providing some protection for spotted frog habitat. Spotted bat and Townsend big-eared bat are present in Salmon Falls Creek Canyon. Exploration (drilling and blasting) may disturb these species if conducted near the canyon, resulting in potential abandonment of habitat or young. Effects to local spotted bat populations could be minor to moderate depending on the proximity of oil fields to roosting habitat. Prairie falcons also nest in cliffs along Salmon Falls Creek. Nesting prairie falcons could adjust to some level of blasting and heavy equipment operation (Holthuijsen, et al., 1990). The effects to prairie falcons are expected to be negligible to minor locally and negligible at the planning area scale. Piute ground squirrels are present, and roads, pads, and other infrastructure would reduce habitat and result in some direct mortality. Ground squirrel mortality is expected to increase due to mortality from vehicles and increased predation by raptors which may suppress local populations a minor effect.

The majority of the area available for oil and gas development contains seasonal, controlled surface use, or NSO stipulations for aspen (97%), canyonland (84%), mountain mahogany/mountain shrub (94%) and sagebrush steppe (67%) guild special status wildlife species habitat. Based on research in Wyoming (Holloran, 2005), the constraints in the southeastern portion of the planning area are not likely to be effective in the long term at reducing displacement and population declines for sage-grouse within 2 to 3 miles of developed natural gas fields. Depending on location and distance between wells, a five-well development, as described in Appendix V, could have a moderate impact at the local scale and a minor impact at the planning area scale in the long term.

Fewer special status wildlife species are in the area south of the Snake River, as it is mostly grassland habitat. Special status species in this area primarily occur in the Snake River Canyon, which is closed to oil and gas leasing; therefore, the potential for oil and gas exploration or development disturbance impacts to bald eagle, white pelican, and yellow-billed cuckoo are considered negligible.

Over 97% of the area classified as having high potential for geothermal resources is in the grassland guild habitat. A little less than 2% of the high potential area contains sagebrush steppe guild habitat (Table 4- 149). Although sagebrush steppe habitat occurs on just under 33% of the areas with geothermal potential, nearly 343,000 acres (88%) are in areas with low geothermal resource potential (Table 4- 149). According to the RFDS for geothermal development (Appendix V), between 185 and 230 acres of surface disturbance are expected to occur in the planning area as a result of geothermal exploration and development over the life of the plan. This is less than 0.1% of the potential geothermal areas that would be available for geothermal leasing. Sagebrush steppe habitat in this category is not likely to be altered. Canyonland habitat at the north end of the Bruneau Canyon is not occupied by bighorn sheep; therefore, this species should not be impacted. Mojave black-collared lizards, spotted bat, ferruginous hawk, and prairie falcon are all known to be present in this portion of the Bruneau Canyon. Increases in human disturbance and noise from operation of the facility may displace some of these species. Effects of roads, infrastructure, and powerlines are expected to be similar to that described under *Impacts from Land Use Authorizations Actions*. Aspen and mountain mahogany/mountain shrub guild habitats occur in areas categorized as having low potential for geothermal resources and, therefore, should not be impacted. Mitigation associated with specific projects may reduce some of the impacts to special status wildlife. Spotted frog habitat in Rocky Canyon lies in an area with low potential for geothermal resources; therefore, spotted frog habitat is not expected to be affected.

Table 4- 149. Guild Habitat in Areas Available for Mineral Leasing by Geothermal Resource Potential in Alternative I (Acres)

Guild Habitat	Geothermal Resource Potential			Total
	High	Medium	Low	
Aspen	0	0	200	200
Canyonland	<100	0	10,000	10,000
Duneland	0	600	0	600
Grassland	5,000	294,000	494,000	794,000
Mountain Mahogany/Mountain Shrub	0	0	11,000	11,000
Sagebrush Steppe	100	48,000	343,000	391,000
Total	**5,100**	**342,600**	**858,200**	**1,206,800**

<u>Salable Minerals</u>

The acreage on which salable mineral development occurs is expected to increase from approximately 1,300 acres to approximately 2,300 acres over the life of the plan. This is approximately 0.2% of the area available for salable mineral development. One or more gravel pits may be developed in the Jarbidge Foothills, Diamond A, and other areas to provide gravel to create new or improved roads for fires suppression and other administrative purposes, accommodate leasable mineral exploration and development, and wind energy developments. Gravel pits and access roads in sagebrush steppe or mountain mahogany/mountain shrub habitats would result in a reduction of habitat and contribute to habitat fragmentation for special status wildlife associated with those habitats. Seasonal and temporal restrictions would be used to further minimize impacts. Rocky Canyon is closed to salable minerals in Alternative I, which minimizes potential impacts to spotted frog or its habitat. The effects of a salable minerals site in the watershed above Rocky Canyon are expected to be similar to impacts described for leasable minerals. Overall, salable mineral developments for sand or gravel are expected to have a negligible impact at the landscape scale.

<u>Locatable Minerals</u>

Alternative I would recommend about 20% more acreage than the No Action Alternative for locatable mineral withdrawal. The recommended withdrawal would protect the sage-grouse habitat on the plateaus in the Bruneau-Jarbidge ACEC. Any road improvement associated with mine access could increase human disturbance, resulting in displacement of special status species. Mitigation may reduce some adverse impacts long term. Demand for locatable minerals in the planning area is not expected to change from present levels; thus, the potential for impacts to occur in the life of the plan is low.

Impacts from Management Specific to Alternative II

<u>Leasable Minerals</u>

Approximately 212,000 acres of the planning area would be closed to mineral leasing, minimizing impacts to special status wildlife in the closed area. The number of acres of guild habitat open to mineral leasing is identified in Table 4- 150. Special status wildlife habitat in closed areas should not be directly impacted by exploration and development of oil or gas. According to the RFDS for oil and gas development (Appendix U), approximately 90 acres of surface disturbance are expected to occur in the planning area as a result of oil and gas exploration and development over the life of the plan. This is less than 0.1% of the potential oil and gas areas that would be available for oil and gas leasing.

Table 4- 150. Guild Habitat in Areas Available for Mineral Leasing in Potential Oil and Gas Areas in Alternative II (Acres)

Guild Habitat	Available throughout the Planning Area	Available in Potential Oil and Gas Areas
Aspen	2,000	1,000
Canyonland	4,000	4,000
Duneland	600	600
Grassland	177,000	168,000
Mountain Mahogany/Mountain Shrub	7,000	6,000
Sagebrush Steppe	111,000	103,000
Total	**301,600**	**282,600**

Alternative II lacks moderate special status wildlife constraints for leasable minerals activities. Exploration and development of mineral resources without following wildlife constraints is expected to increase human disturbance during important seasonal periods for special status species. Development activity would not be limited in winter or during breeding season, which could displace bighorn sheep, sage-grouse or sharp-tailed grouse. Although spotted frog habitat in Rocky Canyon would have an NSO restriction, roads in the upper portion of the watershed could increase sediment into spotted frog habitat reducing pond depth and size. Impacts of disposing water from oil and gas development in drains in the watershed could increase the amount of salt or petroleum contaminants in Rocky Canyon Creek.

The areas categorized as medium or high for geothermal resources are nearly the same as in Alternative I. Although the amount of canyonland habitat classified as having medium and high geothermal potential increases more than 500%, overall effects should be similar to Alternative I due to the relatively small number of acres involved (Table 4- 151).

Table 4- 151. Guild Habitat in Areas Available for Mineral Leasing by Geothermal Resource Potential in Alternative II (Acres)

Guild Habitat	Geothermal Resource Potential			Total
	High	Medium	Low	
Aspen	0	0	2,000	2,000
Canyonland	<100	200	21,000	21,200
Duneland	0	600	0	600
Grassland	5,000	299,000	514,000	818,000
Mountain Mahogany/Mountain Shrub	0	100	11,000	11,100
Sagebrush Steppe	500	52,000	366,000	418,500
Total	**5,500**	**351,900**	**914,000**	**1,271,400**

<u>Salable Minerals</u>
The acreage on which salable mineral development occurs is expected to increase from approximately 1,300 acres to approximately 3,300 acres over the life of the plan. This is approximately 0.2% of the area available for salable mineral development. The majority of bighorn sheep habitat would not open to salable mineral development in Alternative II. Salable minerals development could occur near bighorn sheep habitat near portions of the East Fork of the Jarbidge River and the area between the Bruneau and Jarbidge Rivers to supply gravel for road improvements for wind energy, leasable mineral exploration and development, and fire suppression. Salable mineral pits could also be developed in or near sage-grouse and sharp-tailed grouse habitat in the Jarbidge Foothills. Gravel pits would likely be placed in other sites throughout the planning area to support road improvement for fire suppression and other administrative purposes. New gravel pits and associated roads would contribute to net habitat

loss. Depending on the amount and time of use, sage-grouse could be displaced from otherwise suitable habitat. Roads would contribute to habitat fragmentation and contribute to a reduction in patch size for sage-grouse and other special status species.

Locatable Minerals
Alternative II recommends 24% fewer acres for withdrawal than the No Action Alternative. Occupied bighorn sheep habitat on the Bruneau River upstream of the Jarbidge confluence would not be recommended for withdrawal. Areas on the upland plateau used by bighorn sheep would not be included in the withdrawal, nor would sage-grouse habitat due to the narrow configuration of the recommended withdrawal. Development of a locatable mineral mine in the area would result in direct loss of some habitat due to the mine and access roads. Access roads would also contribute to a reduction in patch size. Indirect impacts from displacement or a reduction in density of special status wildlife, such as sage-grouse, Brewer's sparrow, and sage sparrow would also occur. Fewer than 2 miles of Rocky Canyon is recommended for withdrawal, but much of the upland watershed is open, which could result in impacts to spotted frogs. However, demand for locatable minerals in the planning area is not expected to change from present levels; thus, the potential for impacts to occur in the life of the plan is low.

Impacts from Management Specific to Alternative III

Leasable Minerals
A little over 213,000 acres of the planning area is closed to mineral leasing. Constraints on exploration and development of leasable minerals are lacking in key sage-grouse habitat; the impacts are similar to Alternative II.

Of the 380,000 acres identified as having potential for oil and gas development, about 1,000 acres of this acreage would be closed. The percent of the acres of special status guild habitat allocated as open with no restrictions is the same as in Alternative II (Table 4- 150); therefore, impacts are expected to be the similar to Alternative II.

Alternative III has a similar acreage of sagebrush steppe, mountain mahogany/mountain shrub, and duneland habitats available for exploration and development of geothermal resources as Alternative II (Table 4- 152). Therefore, effects should be the similar.

Table 4- 152. Guild Habitat in Areas Available for Mineral Leasing by Geothermal Resource Potential in Alternative III (Acres)

Guild Habitat	Geothermal Resource Potential			Total
	High	Medium	Low	
Aspen	0	0	2,000	2,000
Canyonland	<100	<100	21,000	21,000
Duneland	0	600	0	600
Grassland	5,000	298,000	514,000	818,000
Mountain Mahogany/Mountain Shrub	0	100	11,000	11,000
Sagebrush Steppe	500	52,000	366,000	419,000
Total	**5,500**	**350,700**	**914,000**	**1,271,600**

Salable Minerals
The area disturbed by salable mineral development is projected to be the same as in Alternative II, with comparable impacts.

Locatable Minerals
Alternative III includes roughly 4% more acres recommended for mineral withdrawal than the No Action Alternative. More upland plateau used by bighorn sheep between the southwestern planning area boundary and Long Draw along the Bruneau River would not be in the recommended withdrawal area. Most of the sage-grouse habitat in the uplands along the Jarbidge Canyon included in the recommended withdrawal burned in the Murphy Complex Fires

in 2006, minimizing the benefits of withdrawal in the short term. If sage-grouse habitat recovers in the long term, the withdrawal would reduce habitat fragmentation and disturbance resulting from locatable mineral development. Potential impacts to spotted frog, sharp-tailed grouse, and tiger beetle habitat are the similar to in the No Action Alternative.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Leasable Minerals

In Alternative IV-A, approximately 360,000 acres of the planning area would be closed to mineral leasing; approximately 327,000 acres would be closed in Alternative IV-B (the Preferred Alternative). As in Alternative I, seasonal restrictions would be applied in key sage-grouse habitat, helping reduce effects of displacement to this species during the winter and breeding periods.

In Alternative IV, the majority of the available oil and gas development area would be subject to seasonal, controlled surface use, or NSO restrictions. Seasonal restrictions are expected to mitigate some of the impacts if the area was developed; however, displacement of sage sparrow, Brewers sparrow, and sage-grouse grouse is likely to occur in the long-term (Holloran, 2005; Lyon & Anderson, 2003). Sharp-tailed grouse could be similarly impacted. Development would also result in habitat loss and a reduction in patch size from roads, increasing habitat fragmentation. The number of acres of guild habitat available for mineral leasing is identified in Table 4- 153. According to the RFDS for oil and gas development (Appendix U), approximately 90 acres of surface disturbance are expected to occur in the planning area as a result of oil and gas exploration and development over the life of the plan. This is less than 0.1% of the potential oil and gas areas that would be available for oil and gas leasing.

Table 4- 153. Guild Habitat in Areas Available for Mineral Leasing in Potential Oil and Gas Areas in Alternative IV (the Preferred Alternative; Acres)

Guild Habitat	Available throughout the Planning Area	Available in Potential Oil and Gas Areas
Aspen	2,000	<100
Canyonland	2,000	0
Duneland	600	600
Grassland	172,000	148,000
Mountain Mahogany/Mountain Shrub	5,000	300
Sagebrush Steppe	97,000	38,000
Total	**278,600**	**187,000**

More of the potential geothermal development area is subject to seasonal restrictions for sage-grouse and other wildlife than Alternative III. The seasonal restrictions are expected to reduce potential displacement of bighorn sheep and sage-grouse. In Alternative IV-A, sagebrush steppe is present on less than 15% (Table 4- 154) and 9% of the areas categorized as having a medium or high geothermal resource potential, respectively. Areas with medium or high potential for geothermal resources occur on less than 1% of aspen, canyonland, or mountain mahogany/mountain special status species habitat. Alternative IV-B has the same acreage for the same special status species as Alternative IV-A for aspen, canyonland mountain mahogany/mountain shrub, and sagebrush steppe habitats classified as high or medium. According to the RFDS for geothermal development (Appendix V), between 185 and 230 acres of surface disturbance are expected to occur in the planning area as a result of geothermal exploration and development over the life of the plan. This is less than 0.1% of the potential geothermal areas that would be available for geothermal leasing.

Table 4- 154. Guild Habitat in Areas Available for Mineral Leasing by Geothermal Resource Potential in Alternative IV (the Preferred Alternative; Acres)

Guild Habitat	Geothermal Resource Potential			Total
	High	Medium	Low	
Alternative IV-A				
Aspen	0	0	3,000	3,000
Canyonland	<100	<100	7,000	7,000
Duneland	0	600	0	600
Grassland	5,000	297,000	450,000	752,000
Mountain Mahogany/Mountain Shrub	0	100	10,000	10,000
Sagebrush Steppe	500	52,000	303,000	355,000
Total	**5,500**	**349,700**	**773,000**	**1,127,600**
Alternative IV-B				
Aspen	0	0	3,000	3,000
Canyonland	<100	<100	7,000	7,000
Duneland	0	600	0	600
Grassland	5,000	297,000	471,000	773,000
Mountain Mahogany/Mountain Shrub	0	100	10,000	10,000
Sagebrush Steppe	500	52,000	314,000	366,000
Total	**5,500**	**349,700**	**805,000**	**1,159,600**

Salable Minerals

The acreage on which salable mineral development occurs is expected to increase from approximately 1,300 acres to approximately 2,300 acres over the life of the plan. This is approximately 0.2% of the area available for salable mineral development. Portions of the southeastern part of the planning area would be closed to the development of salable minerals in Alternative IV, including sage-grouse breeding, nesting, and winter habitat, eliminating direct habitat impacts in the closed area. More area in the Inside Desert would be open to salable mineral development in Alternative IV-B (the Preferred Alternative) compared to Alternative IV-A. The vast majority of the Inside Desert has burned, reducing sage-grouse habitat. In the short term, there is no difference between Alternative IV-A and IV-B with regard to impacts on sage-grouse, Brewer's sparrow, or sage sparrow. Long term, the larger closed area Alternative IV-A would avoid fragmenting 30,000 thousand acres of recovered sage-grouse habitat.

Locatable Minerals

Alternative IV recommends 290,000 acres be withdrawn from locatable mineral entry, a 33% increase over the No Action Alternative. The recommended locatable mineral withdrawal areas covers all habitat used by bighorn sheep in the planning area and more sage-grouse habitat than the No Action Alternative. In areas available for locatable mineral entry, potential impacts to spotted frog, sharp-tailed grouse, sage-grouse, and tiger beetle habitat are expected to be similar to those described in Alternative I.

Impacts from Management Specific to Alternative V

Leasable Minerals

Approximately 25% of the planning area would be closed to mineral leasing. Over half of the potential oil and gas areas would be open for leasing. Seasonal restrictions would be implemented to help reduce disturbance impacts associated with exploration, construction, and some maintenance to sage-grouse, sharp-tailed grouse, pygmy rabbit, or special status species aspen guild species. The number of acres of guild habitat available for mineral leasing in potential oil and gas areas is identified in Table 4- 155. According to the RFDS for oil and gas development (Appendix U), approximately 90 acres of surface disturbance are expected to occur in the planning area as a result of oil and gas exploration and development over the life of the plan. This is less than 0.1% of the potential oil and gas areas that would be available for oil and gas leasing.

Table 4- 155. Guild Habitat in Areas Available for Mineral Leasing in Potential Oil and Gas Areas in Alternative V (Acres)

Guild Habitat	Available throughout the Planning Area	Available in Potential Oil and Gas Areas
Aspen	2,000	100
Canyonland	2,000	2,000
Duneland	600	600
Grassland	170,000	159,000
Mountain Mahogany/Mountain Shrub	6,000	800
Sagebrush Steppe	93,000	44,000
Total	**273,600**	**206,500**

More of the potential geothermal development area is subject to seasonal restrictions for sage-grouse and other wildlife than Alternative III but less than Alternative IV. The seasonal restrictions are expected to reduce potential displacement of bighorn sheep and sage-grouse. In Alternative V, sagebrush steppe is present on 9% (Table 4- 156) and less than 1% of the areas categorized as having a medium or high geothermal resource potential, respectively. Areas with medium or high potential for geothermal resources occur on less than 1% of aspen, canyonland, or mountain mahogany/mountain special status species habitat. According to the RFDS for geothermal development (Appendix V), between 185 and 230 acres of surface disturbance are expected to occur in the planning area as a result of geothermal exploration and development over the life of the plan. This is less than 0.1% of the potential geothermal areas that would be available for geothermal leasing.

Table 4- 156. Guild Habitat in Areas Available for Mineral Leasing by Geothermal Resource Potential in Alternative V (Acres)

Guild Habitat	Geothermal Resource Potential			Total
	High	Medium	Low	
Aspen	0	0	3,000	3,000
Canyonland	<100	0	9,000	9,000
Duneland	0	600	0	600
Grassland	5,000	294,000	499,000	798,000
Mountain Mahogany/Mountain Shrub	0	0	10,000	10,000
Sagebrush Steppe	<100	48,000	335,000	383,000
Total	**5,534**	**342,600**	**856,000**	**1,203,600**

<u>Salable Minerals</u>
The area disturbed by gravel pits is expected to be the same as Alternative I. Although portions of the southeast part of the planning area would be closed to salable mineral development, the area closed to salable mineral development is approximately 7,000 acres smaller in Alternative V than Alternative I.

<u>Locatable Minerals</u>
About 20% fewer acres would be included in a recommended withdrawal for locatable minerals in Alternative V compared to the No Action Alternative. Effects of including less canyonland and sagebrush steppe habitat in the recommended withdrawal area for bighorn sheep, spotted bat, and sage-grouse are similar to Alternative II.

Summary

<u>Leasable Minerals</u>
Alternatives II and III propose the largest open area for oil and gas oil leasing, with no seasonal restrictions, of any of the alternatives, which would not mitigate disturbance impacts during important seasonal periods for special status wildlife. A portion of Rocky Canyon and an area along Salmon Falls Creek are closed to leasing in Alternative I, providing some protection of habitat for spotted frog as well as prairie falcon and special status bats. The vast majority of the

potential oil and gas areas is available with seasonal restrictions, with a much smaller area allocated as open subject to standard lease terms. The No Action Alternative is similar to Alternative I. Alternative IV contains the smallest area open for oil and gas leasing, followed by Alternative I; however, Alternative I would allow more development in the potential oil and gas areas with seasonal restrictions than Alternative IV. Alternative IV and V have similar amounts of areas closed to leasing, but Alternative V has substantially more area open without seasonal restrictions than Alternative IV. However, due to the oil and gas potential of the planning area, surface disturbance is only expected to occur on approximately 90 acres under any alternative (Appendix U).

The areas where the potential for geothermal resources are classified as medium or high are the same for all alternatives. Seasonal restrictions in key sage-grouse habitat would be applied in Alternatives I, IV, and V, reducing disturbance impacts during exploration and construction. The No Action Alternative and Alternatives II and III lack seasonal restrictions that would reduce disturbance impacts of exploration and construction for geothermal energy during winter or breeding/nesting time periods. However, due to the geothermal potential of the planning area, surface disturbance is only expected to occur on approximately 185 to 230 acres under any alternative (Appendix V).

<u>Salable Minerals</u>
Alternative IV-A has largest acreage closed to salable mineral development, followed by Alternative IV-B. Alternative IV protects more habitat used by sage-grouse, Brewer’s sparrow, sage sparrow, loggerhead shrike, pygmy rabbit, and other special status wildlife. Alternatives I and V have similarly sized areas closed to salable mineral development. However, Alternative V contains more closed acreage in the southeastern portion of the planning area and leaves a portion along the Bruneau River open. The closed area in Alternative V would protect some sage-grouse and sharp-tailed grouse habitat. Alternative I would close the vast majority of the Bruneau River to salable mineral development, protecting bighorn sheep, prairie falcon, spotted bat canyonland guild habitat, but leaves the majority of sage-grouse and sharp-tailed grouse habitat the southeast portion of the planning area open. Tiger beetle habitat is not protected by a closure in any alternatives. However, salable mineral development is only expected to occur on approximately 0.2% of the planning area under any alternative.

<u>Locatable Minerals</u>
Alternatives II and V are similar in the acreage recommended for locatable mineral development withdrawal. The recommended withdrawals in these alternatives would protect most of bighorn sheep habitat in the Bruneau and Jarbidge Canyons, but little of the habitat used by bighorn sheep on the adjoining upland plateaus. Sage-grouse habitat in the upland plateaus could be affected by locatable mineral exploration and development in those areas. Although a portion of Salmon Falls Creek is recommended for withdrawal, it is not managed as bighorn sheep habitat in the planning area and the withdrawal would not protect any sage-grouse habitat. However, the withdrawal would limit impacts of locatable mineral exploration and development on prairie falcon, spotted bat, Townsend’s big-eared bat and other special status bat species in the withdrawn portion of Salmon Falls Creek. Alternatives I, III, and IV withdraw more upland plateaus; protecting more bighorn sheep and sage-grouse habitat from potential alteration due to locatable mineral exploration and development than Alternative II and Alternative V. Tiger beetle habitat is not proposed for withdrawal in any of the alternatives. However, demand for locatable minerals in the planning area is not expected to change from present levels; thus, the potential for impacts to occur in any alternative is low.

Impacts from Areas of Critical Environmental Concern Actions

Special management identified for ACECs with relevant and important values for special status wildlife species are can help reduce human disturbance, reduce route density, and seasonally restrict land use authorizations. These actions influence wildlife habitat, habitat use, and populations (Connelly, et al., 2004; Ingelfinger & Anderson, 2004; Keller & Bender, 2007). Table 4- 157 identifies the number of acres of guild habitat in ACECs.

Table 4- 157. Guild Habitat in ACECs by Alternative (Acres)

Guild Habitat	Alternative						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
Aspen	0	0	0	0	3,000	1,000	3,000
Canyonland	30,000	30,000	0	19,000	37,000	37,000	42,000
Duneland	0	0	0	0	0	0	0
Grassland	23,000	26,000	0	19,000	104,000	69,000	517,000
Mountain Mahogany/ Mountain Shrub	500	600	0	500	10,000	5,000	11,000
Not Identified	100	300		100	700	300	2,000
Sagebrush Steppe	35,000	40,000	0	22,000	180,000	121,000	392,000
Total Acres	**88,600**	**96,900**	**0**	**60,600**	**334,700**	**233,300**	**967,000**
Riparian (miles)	91	102	0	50	154	120	215

Impacts from Management Specific to the No Action Alternative

Bruneau-Jarbidge ACEC

The effects of continued management of the Bruneau-Jarbidge ACEC should help maintain the relatively low levels of human disturbance in the area. Roads would not be upgraded in order to help keep human disturbance low, resulting in little displacement of bighorn sheep from the area. Vegetation in the ACEC would be managed for a late-seral condition to maintain habitat quality for bighorn sheep and other special status wildlife. Additional livestock infrastructure including new water sources would continue to be restricted limiting addition fragmentation of bighorn sheep habitat on the plateaus adjacent to the canyons.

Salmon Falls Creek ACEC.

The ACEC would continue to be managed to retain its scenic and other values, limiting human-caused change and habitat alteration in the canyon for prairie falcon and special status bats. Salmon Falls Creek Canyon contains habitat for at least two special status bat species, spotted and Townsend big-eared bats, and several prairie falcon nests. Under current management, treatment of invasive plant species is not a high priority, which over time could result in reed, reed canary grass, and Russian olive dominating the riparian area. These vegetative changes could degrade habitat that supports the insect prey base used by special status bats. Because of the overall length of the canyon (in excess of 30 miles), this could be a major impact locally and a moderate impact at the planning area scale for spotted bats.

Sand Point ACEC

The Sand Point ACEC is not used substantially by terrestrial special status wildlife. The riparian areas may be used occasionally during migration by yellow-billed cuckoo and during the winter by bald eagles. Control of invasive plants is not a priority, which over time will further degrade about 1 mile of riparian habitat used by bald eagle during the winter for roosting and foraging.

Impacts from Management Specific to Alternative I

Bruneau-Jarbidge ACEC

Bighorn sheep habitat would be a priority for management and restoration in Alternative I. With the present technology, limited habitat restoration is expected to occur in the canyons. However, several adjacent upland plateau areas with a strong cheatgrass component could be treated. Treating the uplands and restoring a variety of shrubs, forbs, and native grasses is expected to improve habitat for nesting and wintering sage-grouse over time. As sagebrush increases in size and density, habitat for other sagebrush-obligate special status wildlife species including sage sparrow, Brewer’s sparrow, loggerhead shrike, and pygmy rabbit is expected to increase.

Increasing forbs in the area may benefit special status bat species by maintaining a diverse arthropod prey base (e.g., moths, beetles, bees, spiders, butterflies). Restoration of upland areas is expected to help stabilize the prey base used by special status raptors including ferruginous hawk and prairie falcon. Following evaluation, some infrastructure could be removed, increasing habitat patch size in the long term.

The combination of the ACEC being a high priority for restoration and fire suppression and a decrease in route density in the ACEC are expected to result in an increase in habitat patch size for sagebrush steppe habitat in the long term. As habitat increases, sage-grouse, and perhaps bighorn sheep, numbers could increase.

Lower Bruneau Canyon ACEC

A few special status wildlife are known to occur in the Lower Bruneau Canyon ACEC, including ferruginous hawk, the Great Basin collared lizard, and spotted bat. Restoration of habitat for the special status plants is expected to enhance habitat quality for the spotted bat by increasing the arthropod prey base. Restoration could reduce cheatgrass as well as increase and improve habitats for the collared-lizard and prey of ferruginous hawks.

Middle Snake ACEC

This ACEC has little habitat occupied by special status wildlife; however, western toads are known to breed in three areas. Reducing invasive plants and livestock trampling are expected to improve habitat for this species, and numbers could increase.

Salmon Falls Creek ACEC

Little restoration in the ACEC is expected at this time; however, the ACEC would be a priority for treating invasive plants such as reed canary grass and the noxious weeds Canada and bull thistle. The ACEC would be a Critical Suppression Area. A reduction in invasive plants and noxious weeds may enhance habitat for special status bats by increasing native plants in the riparian area.

Sand Point ACEC

Compared to the No Action Alternative 100 more acres of grassland habitat and an additional 1 mile of riparian habitat would be included in the Sand Point ACEC. Treatment of Russian olive, tamarisk, purple loosestrife, and other invasive plants and noxious weeds in the long term may improve riparian habitat quality for yellow-billed cuckoo and wintering bald eagles.

Impacts from Management Specific to Alternative II

Existing ACEC designations would be removed, and no new ACECs would be designated in Alternative II. Because special management for ACECs would not occur, increased infrastructure (i.e., roads, fences, communication sites, etc.) and associated human activity would decrease habitat patch size and reduce habitats for special status species. Special status species habitat in aspen, mountain shrub/mountain mahogany, riparian, and sagebrush steppe would be particularly impacted. A reduced emphasis for fire suppression would make these areas more vulnerable to wildland fires, decreasing in habitat patch size and increasing the distance between habitat patches. A reduced priority for restoration would hinder recovery of sagebrush steppe, mountain mahogany/mountain shrub, and riparian habitats. A lowered priority for noxious weed and invasive plants treatment over time would allow tamarisk, Russian olive, reed, reed canary grass, Russian knapweed, and Canada thistle to replace native willows, sedges, and rushes in portions of Salmon Falls and other creeks and along portions of the Snake, Bruneau, and Jarbidge Rivers. Changes in vegetation would result in reduction in prey base diversity and abundance. Decreases nocturnal moths from changes in vegetation (Luce & Keinhath, 2007) could reduce spotted bat numbers. A reduced prey base is also expected to result in lower reproductive rates for prairie falcons (Steenhof, et al., 1999) and ferruginous hawks (Smith, et al., 1981).

Impacts from Management Specific to Alternative III

Bruneau-Jarbidge ACEC

The Bruneau-Jarbidge ACEC would be approximately 33% smaller in Alternative III than in the No Action Alternative. Approximately 37% and 39% less sagebrush steppe and canyonland habitats, respectively, would be in the ACEC as compared to the No Action Alternative. Restoration and fire suppression would still be priorities, helping to limit reduction of habitat patch size due to wildland fire. Much less upland area would be included in the ACEC, reducing the amount of habitat restoration for sage-grouse. An increase in infrastructure in the area that would no longer be within the ACEC boundary is expected to increase human disturbance and may contribute to a decline in bighorn sheep numbers. For noxious weeds and invasive plants, effects are expected to be similar to Alternative I.

Salmon Falls Creek ACEC

The effects of designating the Salmon Falls Creek ACEC are the same as described for Alternative I.

Sand Point ACEC

The effects of expanding the Sand Point ACEC are the same as described for Alternative I.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Bruneau-Jarbidge ACEC

Although more of the uplands with sage-grouse habitat would be included in the ACEC, roughly the same areas would be a priority for restoration. Impacts to special status wildlife species and their habitat are expected to be similar to those described for Alternative I.

Inside Desert ACEC

The Inside Desert ACEC is nearly 44% larger in Alternative IV-A than Alternative IV-B (the Preferred Alternative). In Alternative IV-A, more habitat for sage-grouse, pygmy rabbit, sage sparrow, Brewer’s sparrow, and Piute ground squirrel would be a priority for restoration than in Alternative IV-B. Over time, restoration is expected to increase sage-grouse numbers and potentially increase the numbers of leks. Alternative IV-A contains some riparian and canyonland habitat, whereas Alternative IV-B does not. The majority of the canyonland habitat is mapped as mountain mahogany/mountain shrub and grassland, rather than canyonland. Restoration of the riparian and canyonland habitat could improve habitat patch size for willow flycatcher and foraging habitat for special status bats and prairie falcons.

Jarbidge Foothills ACEC

In Alternative IV-B (the Preferred Alternative), the Jarbidge Foothills ACEC encompasses fewer than 50% of the area as it does in Alternative IV-A and includes less habitat used by special status wildlife including sage-grouse, loggerhead shrike, Brewer’s sparrow, sharp-tailed grouse, Lewis woodpecker, and willow flycatcher. The elevated fire suppression priority is expected to help minimize further decreases in patch size for the sage-grouse, Brewer’s sparrow, sage-sparrow, and loggerhead shrike. The enhanced restoration priority of the ACEC would facilitate the increase in sagebrush steppe and mountain mahogany/mountain shrub habitat over time. Treatment and control of invasive plants, including Canadian thistle, will help maintain riparian habitat for willow flycatcher. All habitat used by spotted frog in the past 15 years would be included in the ACEC. Because of the restoration priority of ACECs, projects to improve historic spotted frog habitat would result increasing overall habitat and may increase spotted frogs in those creeks.

Lower Bruneau Canyon ACEC

The effects of designating the Lower Bruneau Canyon ACEC are the same as described for Alternative I.

Sand Point ACEC

The effects of expanding the Sand Point ACEC are the same as described for Alternative I.

Impacts from Management Specific to Alternative V

Lower Bruneau Canyon ACEC

The effects of designating the Lower Bruneau Canyon ACEC are the same as described for Alternative I. Even though the ACEC would be unavailable for livestock grazing, the limited habitat used by terrestrial special status wildlife in the ACEC indicates the overall impacts would be minor locally and negligible at the planning area scale.

Middle Snake ACEC

The effects of designating the Middle Snake ACEC are similar to those described in Alternative I. Even though the Asquena area would be unavailable for livestock grazing, the limited habitat used by terrestrial special status wildlife in that portion of the ACEC indicates that overall impacts would be minor locally and negligible at the planning area scale.

Sagebrush Sea ACEC

The vast majority of the existing Bruneau-Jarbidge ACEC, all of the Salmon Falls Creek ACEC, and all of the nominated Inside Desert and Jarbidge Foothills ACECs would be contained within the Sagebrush Sea ACEC boundary.

The ACEC is an avoidance area for communication sites, wind energy development, and other land use authorizations that reduce habitat and decrease habitat patch size; however, some land use authorizations could occur. Mineral exploration and development are not prohibited. These activities could require an increase in roads, partially offsetting routes closed through the CTTMP. Although overall route density may decrease, the change may not be substantial. The size of the Sagebrush Sea ACEC decreases the likelihood that prioritization for noxious weed and invasive plant treatments and fire suppression would be effective, contributing to long-term decreases in sage-grouse habitat patch size and increased distances between similar habitat patches. Other sagebrush steppe, mountain mahogany/ mountain shrub, and canyonland special status species would be similarly affected.

Summary

Management of the Lower Bruneau Canyon and Middle Snake ACECs would have a some benefit to canyonland and riparian special status species due to restoration, fire suppression, and noxious weed and invasive plant treatment in these areas in Alternative I. Special management associated with ACECs is eliminated in Alternative II, allowing a variety of infrastructure to be constructed or expanded in some of the area. Alternative III would contain a smaller Bruneau-Jarbidge ACEC than is currently designated. Areas not in this ACEC in Alternative III, could have new infrastructure constructed, decreasing habitat patch size in sagebrush steppe and near canyonland guild habitat. In the long term, bighorn sheep could be more restricted due to displacement associated with increased human activity (e.g., construction and maintenance of new infrastructure and access). New infrastructure (e.g., roads, powerlines, communications site, wind farms) would reduce the amount of habitat and habitat patch size. Alternative IV has substantial acreages as ACECs; however, unlike in Alternative V, the locations for these ACECs are more focused on areas containing relevant and important values. The priority for fire suppression could keep fire size small, reducing habitat conversion from sagebrush steppe or mountain mahogany/mountain to grassland. In the long-term, this should reduce decreases in habitat patch size. Active restoration in Alternative IV would increase habitat patch size, decrease the distance between habitat patches, and increase acreage of sagebrush steppe and mountain mahogany/mountain shrub habitats. Although Alternative V includes the greatest acreage as ACECs, special management for the Sagebrush Sea ACEC is limited. The size of the Sagebrush Sea ACEC reduces the value in setting priorities for fire suppression, restoration, and noxious weed and invasive plant treatments.

Summary of Direct and Indirect Impacts

Table 4- 158 ranks the effects of overall management actions across alternatives. The rankings are not necessarily comparable between rows. For example, a ranking of 3 for *Land Use Authorizations* does not necessarily reflect the same level of impact as a 3 for *Wildland Fire Ecology and Management*. In addition, rankings are not additive by alternative.

Table 4- 158. Rank of the Impacts on Special Status Wildlife and their Habitats by Alternative

Section (and drivers)	Alternatives [A]						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
Special Status Species	4	3	5	3	1	1	2
Water Resources	4	3	5	3	2	2	1
Vegetation Communities (amount of sagebrush steppe restoration)	5	4	6	3	1	2	3
Vegetation Communities (amount of annual and treatment objective)	6	4	2	3	1	1	5
Wildland Fire Ecology and Management (suppression priority, infrastructure, and FRCC goals)	7	5	6	4	1	2	3
Noxious Weeds and Invasive Plants (treatment acres and priorities)	5	3	3	4	1	1	2
Livestock Grazing (use levels, AUMs, and infrastructure)	5	4	7	6	2	3	1
Transportation and Travel (TMA purpose, exemptions, habitat fragmentation)	6	3	5	4	2	2	1
Recreation (Types of SRMAs)	6	1	5	4	2	2	3
Land Use Authorizations (areas and locations open)	3	3	4	3	2	2	1
Minerals	7	4	6	5	1	2	3
ACECs (management direction, purpose, restoration)	3	2	6	5	1	1	4

[A] Alternatives with the same ranking within a row would be affected similarly by that management. For ranking within a row, a ranking of 1 represents the alternative that would do most to enhance special status wildlife or their habitat whereas the highest rank represents the alternative that would do least to enhance special status wildlife habitat.

Because there are no special status wildlife species in the grassland guild, it is not specifically addressed. In the event a grassland species becomes a special status species, impacts would be similar to those outlined in the *Wildlife* section.

Impacts from the No Action Alternative

Sagebrush steppe and mountain mahogany/mountain shrub habitats would continue to be reduced in size, with a concurrent increase in distance between similar patches due to a combination of factors including wildland fires, land use authorizations that reduce or divide blocks of habitats, user-created routes, and range infrastructure. These changes are expected to reduce not only habitat, but also numbers of sage-grouse leks and numbers of sage-grouse attending leks. Sage sparrow, Brewer’s sparrow, loggerhead shrike, and pygmy rabbit would similarly decline. Sharp-tailed grouse may not be impacted to the same degree due to habitat differences. Riparian areas are expected to remain in the same condition; some may gradually improve due to changes in management or fencing, which would maintain or improve habitat for special status species using riparian areas and wetlands. It is anticipated that there will be an increase in salable mineral development to improve some of the existing roads and surface new roads. Continued management of the Bruneau-Jarbidge ACEC is expected to maintain the current low levels of human disturbance, minimizing displacement of bighorn sheep from quality habitat. Large areas open to cross-country motorized vehicle use would continue to reduce habitat patch size for sage-grouse, sage sparrow, and other BLM Sensitive species as well as promote the expansion of invasive plants such as cheatgrass. Increases in cheatgrass would contribute to larger and more frequent fires, reducing habitat for sage-grouse, pygmy rabbit, bighorn sheep, and a variety of other special status wildlife. Impacts are long term and considered major at the local and planning area scales.

Overall, continuing management in the No Action Alternative is expected to result in minor beneficial impacts to riparian guild habitat, and major adverse impacts to the sagebrush steppe and mountain mahogany/mountain shrub guild habitats. Habitat for the duneland, canyonland, and aspen guilds would continue to experience minor adverse impacts.

Impacts from Alternative I

Impacts of implementing Alternative I would result initially in a reduction in habitat patch size and an increase in distance between similar habitat patches for sage-grouse and other sagebrush steppe guild special status species due to increases in roads and infrastructure associated with land use authorizations including communication sites, powerlines, ROWs, and wind energy; exploration and development of minerals; and livestock grazing. The number of sage-grouse leks, lek distribution, and numbers of sage-grouse attending leks attendance would continue to decline.

Over the long term, habitat restoration to meet vegetation and FRCC objectives would help increase habitat patch size and reduce some of the distance between habitat patches for sage-grouse and other sagebrush steppe special status species. Habitat patch size would increase and distance between similar patches of mountain mahogany/mountain shrub habitat used by sharp-tailed grouse would decrease primarily due to restoration.

An increase in vegetation production allocated for livestock grazing would result in less herbaceous cover for sage-grouse during nesting and early brood rearing. The estimated 30% to 40% utilization of native grasses to achieve resource and use objectives would provide some residual herbaceous cover for nesting sage-grouse. New range infrastructure would be constructed to improve livestock distribution contributing to additional habitat fragmentation. Additional livestock, pipelines, troughs, and storage ponds would require more water, resulting in some diversion of water from springs or creeks. New roads and other infrastructure to facilitate fire suppression and administrative access would also contribute to a decrease in habitat patch size and increase in fragmentation. Because some infrastructure would be placed in existing disturbance corridors, fragmentation effects could be reduced.

In conjunction with the recreation management goals, the Canyonlands and Jarbidge Foothills TMAs would help reduce primitive road and trail densities and increase core habitat size for special status species in the sagebrush steppe, mountain mahogany/mountain shrub, and aspen guilds. Reducing user-created routes in the Canyonlands SRMA would help maintain low levels of human disturbance to bighorn sheep and other canyonland guild special status species. The effects of reducing route density would be offset by exceptions to motorized vehicle restrictions that may be granted to permit, lease, and ROW holders.

One utility corridor is in or in close proximity to tiger beetle habitat. Access roads through tiger beetle habitat could reduce or eliminate reproductive habitat for this species. No new utility corridors would be developed in remaining sage-grouse habitat.

Habitat used for wintering, nesting, and brood rearing by sage-grouse and sharp-tailed grouse is present in the potential wind development area for Alternative I. Roads for construction and maintenance of wind development infrastructure would reduce and divide habitat and increase collision mortality and could displace these species. Transmission lines would provide raptors additional hunting perches and would likely increase avian predation on adult sage-grouse and sage-grouse leks. Seasonal constraints during wintering, breeding, or nesting periods of special status species would mitigate some impacts during construction and maintenance. Disturbance during operation of the facilities and displacement or mortality (e.g., colliding with infrastructure or vehicles) are not mitigated by seasonal constraints.

ACECs would have an elevated priority for fire suppression, noxious weed and invasive plant treatments, and restoration of upland and riparian habitat. In the long term, habitat would be improved for canyonland, sagebrush steppe, and riparian special status species in the treated areas. Patch size of sagebrush steppe habitat would increase and distance between patches would decrease. Sage-grouse, Brewer's sparrow, and sage sparrow numbers would increase as the shrub height and density becomes suitable. No oil and gas leasing is expected to occur within 15 miles of bighorn sheep habitat.

The vast majority of bighorn sheep habitat is closed to geothermal leasing in Alternative I. Geothermal development would potentially occur in close proximity (within 0.5 to 1.0 mile) of potential bighorn sheep habitat, but seasonal restrictions would help mitigate adverse impacts during construction. The vast majority of bighorn sheep habitat would not be available for leasable and salable mineral exploration and development, minimizing impacts of these activities on bighorn sheep and their habitat.

Overall, management in Alternative I would result in major beneficial impacts to sagebrush steppe and mountain mahogany/mountain shrub guild habitat in the long term. Moderate impacts should occur in riparian guild habitat in the long term. Minor beneficial impacts would occur in aspen and canyonland guild habitat in the long term. Minor impacts would continue to occur in the duneland guild habitat in the long term.

Impacts from Alternative II

VMAs A and B would have the highest fire suppression priorities during multiple ignitions, potentially facilitating larger fires in sagebrush steppe and other special status species habitat in VMAs C and D. VMA A has the least habitat for sage-grouse and other special status species. As a result, sagebrush steppe and mountain mahogany/ mountain shrub habitats in VMAs C and D could be reduced and habitat patch sizes would become smaller. Fuel breaks would reduce habitat patch size and maintain a degree of fragmentation in the short and long term. Estimated utilization levels to meet resource and use objectives would result in less variation of residual cover for special status species and generally would not provide adequate residual nesting cover for sage-grouse or sharp-tailed grouse over most of the planning area. Shrub control in non-native perennial seedings would prevent sagebrush re-establishing, thereby minimizing recovery of sage-grouse habitat in the short and long term at both the local and planning area scales. Sage-grouse and sharp-tailed grouse would be expected to decline in the long term due to increased route densities associated with various infrastructure developments, habitat loss and fragmentation, and limited habitat restoration.

The majority of tiger beetle habitat has a substantial cheatgrass component and would likely be planted to non-native perennial grass in Alternative II, which would reduce or eliminate tiger beetle reproductive habitat in the dune interspaces and stabilize the dunes used by adults.

TMAs in Alternative II would allow the most routes to facilitate access for land uses, fire suppression, and other administrative purposes, maintaining or increasing route density. There would be a net loss of habitat, and habitat patch size would decrease due to roads and infrastructure associated with communication sites, ROWs, powerlines, wind farms, leasable mineral exploration and development, fire suppression, and livestock grazing. Alternative II would allow new roads and utility infrastructure to be constructed throughout the majority of the planning area rather than following existing disturbance corridors where practical, further decreasing habitat patch size. Alternative II would also require the most salable mineral development to gravel some existing and new roads for increased resource uses, fire suppression, and other administrative purposes. Authorizing exceptions to motorized vehicle restrictions for permit, lease, and ROW holders would result in continued use of undesignated routes, negating some of the beneficial impacts to special status wildlife from closing routes. Seasonal restrictions to mitigate effects of land uses on special status wildlife during important seasonal periods would be lacking. As a result, bighorn sheep, sage-grouse, and other special status wildlife could be disturbed during winter, breeding, or nesting periods.

Special management providing some protection to special status species or their habitat in ACECs would be removed. As a consequence, human activity adjacent to some bighorn sheep habitat would increase, contributing to displacement of bighorn sheep from otherwise suitable habitat, effectively reducing habitat size.

Under Alternative II, major adverse impacts to sagebrush steppe and mountain mahogany/mountain shrub guild habitat would occur. Overall impacts to aspen guild habitat would be moderate and adverse.

Impacts to riparian guild habitat would be minor and beneficial; whereas, canyonland guild habitat would incur minor adverse impacts. Duneland habitat is expected to experience moderate adverse impacts.

Impacts from Alternative III

In Alternative III, the creation of new fuel breaks, as well as unvegetated fuel breaks, would decrease the amount of habitat and habitat patch size in the short term. Alternative III provides for some restoration of special status species sagebrush steppe and mountain mahogany/mountain shrub habitats as part of restoring the HFR. In the long term, restoration could increase the amount of habitat and habitat patch size and reduce distance between similar habitat patches. However, a substantial degree of fragmentation would be retained because of the maintenance of the fuel breaks. Fuel breaks aligned to protect special status species habitat may limit fire in those areas.

Increases in habitat and patch size resulting from active restoration would be partially countered by additional fences, water pipelines, roads, and other infrastructure associated with reference areas and authorized uses such as land use authorizations and livestock grazing. Associated infrastructure would help reduce patch size for special status wildlife.

New roads would facilitate the spread of noxious weeds and invasive plants. Although roads are a priority for noxious weed and invasive plant treatment, noxious weeds and invasive plants are expected to increase in the long term. The roads would also contribute to long-term decreases in habitat and habitat patch size used by special status species. Like Alternative II, Alternative III allows new infrastructure, including roads, to be placed without regard to existing disturbance corridors, further decreasing habitat patch size for special status species.

The Deadman/Yahoo TMA, focusing on motorized recreation, is in an area dominated by grassland communities and should have a negligible impact on special status species in the sagebrush steppe guild. Mountain mahogany/mountain shrub, canyonland, and aspen habitats are not present in this TMA; therefore, special status species associated with these habitats would not be impacted in the short or long term at the local or planning area scale. Authorizing exceptions to motorized vehicle restrictions for permit, ROW, or lease holders would negate some of the beneficial effects of closing routes in other TMAs. Because one of the focuses of travel management in Alternative III is improving access for fire suppression and other administrative purposes, some new routes would be created or upgraded resulting in more human disturbance near bighorn sheep and sage-grouse habitat at important seasonal periods.

Overall, management in Alternative III would result in moderate beneficial impacts to sagebrush steppe, mountain mahogany/mountain shrub, and riparian guild habitats in the long term. Minor beneficial impacts would occur in aspen and canyonland guild habitat in the long term. Duneland habitat is expected to experience minor adverse impacts.

Impacts from Alternative IV (the Preferred Alternative)

The largest amount of active habitat restoration would occur in Alternative IV, focusing on sagebrush steppe, mountain mahogany/mountain shrub, and riparian guild habitats. In the long term, habitat and habitat patch size would be increased for special status species in these guilds due to restoration. Increases in habitat patch size from restoring special status species habitat are somewhat offset by additional fences, fuel breaks, roads, and other infrastructure, which will maintain a degree of fragmentation. Like Alternative I, new infrastructure would be located in existing disturbance corridors, helping reduce some impacts to special status species habitats.

Alternative IV-A has the second largest area closed to livestock grazing, reducing impacts of grazing to special status species and their habitats in closed areas, Estimated utilization levels to achieve resource objectives would leave more residual herbaceous heights to provide nesting cover for sage-grouse and sharp-tailed grouse compared to Alternatives I, II, and III. Taller residual herbaceous heights could increase sage-grouse and sharp-tailed grouse nesting success.

The TMAs would focus on increasing core habitat size on about 1,016,000 acres, primarily in the southern half of the planning area, which contains the majority of the remaining habitat for sage-grouse, sharp-tailed grouse. Authorizing exceptions to motorized vehicle restrictions for permit, lease, or ROW holders would maintain overall route density and offset some of the increase in patch size due to restoration in the sagebrush steppe.

ACECs in Alternative IV-A include more canyonland, sagebrush steppe, aspen, riparian, and mountain mahogany/mountain shrub habitat for special status species compared to Alternative IV-B (the Preferred Alternative). Because ACECs are priorities for fire suppression and noxious weed and invasive plant treatments, long-term habitat patch size would be expected to increase at the planning area scale. More sagebrush steppe habitat would be restored, increasing patch size and reducing the distance between similar habitat patches in Alternative IV-A compared to Alternative IV-B, improving conditions in the long term for sage-grouse and other sagebrush obligates at both the local and planning area scales.

Overall, management in Alternative IV would result in major beneficial impacts to the sagebrush steppe, mountain mahogany/mountain shrub, and riparian guild habitats in the long term. Minor beneficial impacts would occur in aspen and canyonland guild habitats in the long term. Duneland habitat is expected to experience minor adverse impacts.

Impacts from Alternative V

Alternative V proposes the largest area closed to livestock grazing. Estimated utilization levels to achieve resource objectives are projected to leave the greatest amount of residual cover for sage-grouse and sharp-tailed grouse nesting. Changes to livestock grazing season of use would reduce livestock and related human disturbance in sage-grouse wintering areas and bighorn sheep habitat. New range infrastructure would be minimal due to the pasture-sized reference areas, helping limit additional decreases in habitat patch size due to infrastructure. Other infrastructure would be limited to existing disturbance corridors, reducing or eliminating additional decreases in habitat patch size for sage-grouse and other sagebrush steppe special status wildlife from activities such as ROWs.

Impacts of the priority for fire suppression would be the same as in Alternative I. Fewer fuel breaks and no construction of new roads would minimize additional habitat loss and decreases in patch size compared to all the other alternatives. Vegetation treatments would be a mix of active restoration and natural recovery. Active restoration would increase shrubs in native grassland and convert annual grassland to sagebrush steppe, increasing overall habitat and habitat patch size for sage-grouse and other sagebrush-dependent special status species. Passive restoration would tend to slow recovery in most habitats compared to Alternative IV.

Route density is expected to be reduced due to the combination of the closing of routes and not granting exceptions to motorized vehicle restrictions for permit, ROW, or lease holders. Coupled with restoration, habitat patch size would increase and distance between patches of similar habitats would decrease, improving special status species habitat in all guilds at both the local and planning area scales.

Although Alternative V contains the largest amount of ACECs, special management of the Sagebrush Sea ACEC is limited, minimizing benefits of having this ACEC for sage-grouse and the majority of other special status wildlife.

Overall, management in Alternative V would result in moderate beneficial impacts to sagebrush steppe, mountain mahogany/mountain shrub, and riparian guild habitats in the long term. Minor beneficial impacts would occur in aspen and canyonland guild habitat in the long term. Duneland habitat is expected to experience minor adverse impacts.

Cumulative Impacts

Past, Present, and Reasonably Foreseeable Actions

The cumulative impact analysis boundary includes the planning area and adjacent portions of BLM's Bruneau, Burley, Shoshone, and Wells FOs and the Humboldt-Toiyabe National Forest. There is a substantial amount of private land and State lands in the cumulative impacts analysis area.

Past, present, and reasonably foreseeable actions for the following resources and resource uses cumulatively affect special status wildlife:

- Upland Vegetation
- Wildlife
- Noxious Weeds and Invasive Plants
- Wildland Fire Ecology and Management
- Livestock Grazing
- Transportation and Travel
- Land Use Authorizations
- Minerals

These actions are described in detail in the *Introduction* to this chapter.

Summary of Cumulative Impacts

Cumulative Impacts from the No Action Alternative

Cumulative impacts from the No Action Alternative would result in continued habitat fragmentation for the sagebrush steppe and mountain mahogany/mountain shrub guild habitats from continued large wildland fires. This would reduce sage-grouse and other sagebrush steppe special status species populations. User-created trails, primitive roads, and various infrastructures would contribute to decreasing patch size and increasing degradation and fragmentation of sagebrush steppe special status species habitat. User-created routes and invasive plants following wildland fire could continue to reduce bighorn sheep habitat quality. The Wells FO, south of the Jarbidge FO, is open to cross-country motorized vehicle use. Several pioneered routes have formed between the two areas. The combination of routes and fire is expected to promote invasive plants species and human-caused wildland fire. More information on habitat impacts is discussed in the under the *Summary of Cumulative Impacts* in the *Wildlife* section.

Cumulative Impacts from Alternative I

Wildland fires would burn both in the planning area and in adjacent FOs. Improving existing and constructing new roads, stream crossings, and guard stations would reduce the response time to fire and help reduce fire size. Fuel breaks may also help reduce fire size; however, fuel breaks and roads would also contribute to fragmenting habitat for sage-grouse and other sagebrush steppe special status species. Disturbance corridors as a result of infrastructure development would promote the spread of invasive annuals and noxious weeds and facilitate human access, which could contribute to more human-caused wildland fires. Increased infrastructure for fire would be in addition to infrastructure for land use authorizations, minerals, and livestock grazing. Infrastructure on Federal, State, and private lands will increase, increasing impacts to sage-grouse, and sharp-tailed grouse. Habitat connectivity of sagebrush steppe, particularly in the southern part of the planning areas is projected to increase over time due to restoration and some natural recovery. Wind and oil and gas development in the southeastern portion of the planning area would increase the number of routes and may result in a decrease in sharp-tailed and sage-grouse numbers and possibly displace them from winter habitat due to increased human activity associated with the developments. Sage-grouse movements from adjacent Federal lands are projected to decline due to development and loss of habitat. Roads associated with energy development are projected to increase sediment into spotted frog habitat. An increase in sediment would result in shallower ponds and increase sedges that may result in a decrease in reproduction. Overall, impacts are projected to result in a decrease in numbers of sage-grouse and other sagebrush steppe special status species.

Cumulative Impacts from Alternative II

In Alternative II, habitat fragmentation would be substantially increased because of a reduced emphasis on sagebrush steppe habitat restoration and more infrastructure development for land use authorizations, minerals, livestock grazing, and wildland fire. Although increased livestock grazing and utilization levels would reduce fine fuels for fire, grazing would also reduce the amount of herbaceous cover for nesting sage and sharp-tailed grouse. Additional fences and pipelines would be constructed to improve livestock distribution, subsequently decreasing the patch size and contributing to fragmentation. Increased grazing may also contribute to an increase in invasive annual plants from damage to biological soil crusts (Memmot, et al., 1998; Warren & Eldridge, 2001), and result in changes in plant species composition.

Wind energy and oil and gas development would increase roads, tall structures, and human disturbance. Displacement of special status species makes the impact area substantially larger than the disturbed areas. In Wyoming, development of gas and oil has resulted in declines in sage-grouse (Holloran, 2005).

Areas of geothermal development overlap habitat used by bighorn sheep. The same geothermal resources are also likely to in the Bruneau FO due to similar geology. Development of geothermal resources on both sides of the Bruneau and Jarbidge Rivers would result in increased human disturbance and reduced bighorn sheep numbers. Infrastructure development and increased human disturbance in the planning area would contribute to less connectivity for sage-grouse adjacent Federal lands.

The utility corridor in the northwestern portion of the planning area is anticipated to cross tiger beetle habitat. Conversion of annual grassland to non-native perennial grassland may not enhance habitat for tiger beetle. A few small wind developments and utility corridors in the northern portion of the planning area are already present and more or large facilities are proposed for construction.

Establishment of sagebrush would to be minimal over the next 20 years due to a lack of a seed source for large areas and brush control in non-native perennial grassland. The highest priorities for fire suppression are for VMAs A and B, which would result in shifting suppression resources away for special status species habitat in VMAs C and D. Infrastructure related to fire suppression would also increase including new roads and stream crossings, fuel breaks, and water pipelines. This infrastructure would contribute to a decrease in patch size and an increase in fragmentation. Some of the areas with potential for wind and oil and development overlap important habitat for sage-grouse and sharp-tailed grouse.

Because no ACECs would be designated in Alternative II, existing livestock infrastructure near bighorn sheep habitat would increase, which would increase human activity and contribute to more competition for forage between livestock and bighorn sheep. Livestock grazing would occur in bighorn sheep habitat during the breeding and winter seasons. If bighorn sheep are competitively or socially displaced, numbers of bighorn sheep and their distribution would decrease. Fences, roads, agricultural fields, and buildings contribute to a highly fragmented habitat in the area, which are not projected to decrease in the near or long term under Alternative II.

Cumulative Impacts from Alternative III

Cumulative impacts in Alternative III would be similar but somewhat less than Alternative II due in part to less infrastructure to support livestock grazing. Livestock grazing is expected to reduce herbaceous cover for nesting sage-grouse and sharp-tailed grouse. As a result of the reduced Bruneau-Jarbidge ACEC, infrastructure like roads, fences, and pipelines would extend into areas where they are currently absent, impairing some bighorn sheep habitat on the plateaus. Livestock grazing would occur in pastures with bighorn sheep habitat during the breeding and winter season. Some fuel breaks would be aligned to protect some special status species habitats; however, fuel breaks would also contribute to decreasing patch size and habitat fragmentation. Other fire-related infrastructure such as improved or new roads, stream crossings, and guard stations would shorten the response time to fire, thereby helping keep fires smaller. New water sources would make suppression somewhat more efficient. The fire suppression priorities in Alternative III is VMAs B and A, which could divert suppression resources from special status species habitat in VMAs C and D.

Cumulative Impacts from Alternative IV (the Preferred Alternative)

The combination of less infrastructure development and greater amounts of restoration in the Bruneau-Jarbidge, Inside Desert, and Jarbidge Foothills ACECs would increase sage-grouse and sharp-tailed grouse numbers and leks over time. Increases in sage-grouse habitat, particularly across the southern portion of the planning area, are projected to enhance connectivity of this species between adjoining Federal lands. Fewer land use authorizations, mineral development, and other developments would likely occur in close proximity to bighorn sheep habitat. Any authorized developments would include restrictions to help minimize disturbance. Livestock grazing would be scheduled to avoid pastures with bighorn sheep habitat during breeding and winter seasons. SRMAs and TMAs that help reduce route density and human disturbance in conjunction with more active restoration would increase habitat core size for special status species including sage-grouse. Fire suppression priorities would help protect remaining special status species habitat and restored areas. Additional fire infrastructure (e.g., roads, guard stations, helipads) would reduce fire response time and facilitate suppression. The greater amount of active riparian restoration coupled with transplanting beaver would increase suitable habitat for spotted frog. Guidance for aspen management as well as planting willows and cottonwood trees is expected to enhance habitat for yellow-billed cuckoo and willow flycatcher over time.

Cumulative Impacts from Alternative V

The amount of livestock grazing in Alternative V is expected to leave the highest amount of cover for wildlife. Fire size and frequency are expected to be similar to the present situation. There would be more fine fuels to carry wildland fire, but improvement of existing roads and stream crossings would help reduce response time. The priority for fire suppression by VMA, as well as ACECs, would protect the majority of the special status species habitat. Although some areas would be actively restored, a large part of the area would have natural recovery, which would extend the time for sage-grouse population recovery. The interaction between fire and less active restoration would prolong the time sage-grouse and sharp-tailed grouse habitat is fragmented, but increase connectivity to adjoining Federal lands in the long term. Alternative V would have the least amount of infrastructure for land use authorizations and livestock grazing, but may include some infrastructure for geothermal or oil and natural gas development.

4.3.8. Noxious Weeds and Invasive Plants

Analysis Methods

Indicators

The following indicators were used for the analysis of impacts to noxious weeds and invasive plants:

- **Potential for introduction and spread of noxious weeds and invasive plants** – No current inventory for acres occupied by noxious weeds exists. Additionally, only acres dominated by invasive annual vegetation have been quantified for the planning area. Acres where invasive plants are present, but not dominant, have not been quantified. Therefore, management actions are assessed for potential to decrease or increase acres occupied by noxious weeds and invasive plants.

- **Potential for control, containment, or eradication of noxious weeds and invasive plants** – In some cases, management actions might lead to control, containment, or eradication.

- **Potential for conversion of perennial communities to annual communities dominated by invasive plants** – Management actions affecting acres dominated by invasive annual grasses and resulting in conversion from the Annual VSG to other VSGs are discussed in the *Upland Vegetation* section.

Methods and Assumptions

Impacts to noxious weeds and invasive plants from management in the following sections of Chapter 2 were analyzed in detail: *Noxious Weeds and Invasive Plants*, *Upland Vegetation*, *Wildland Fire Ecology and Management*, *Livestock Grazing*, *Transportation and Travel*, *Land Use Authorizations*, *Minerals*, and *Areas of Critical Environmental Concern*. Management in the *Soil Resources* section proposed in all alternatives focus on minimizing or mitigating impacts to soils from various uses. These actions would generally reduce the potential for invasion and spread of noxious weeds and invasive plants, but are not expected to result in measureable changes at the planning area scale. Management from the remaining sections was not analyzed in detail because the management did not vary measurably between alternatives or impact the indicator for noxious weeds and invasive plants. **Impacts from management for noxious weeds and invasive plants** can be found under *Impacts from Noxious Weeds and Invasive Plants Actions* in the *Air Quality*, *Upland Vegetation*, *Riparian Areas and Wetlands*, *Fish*, *Wildlife*, *Special Status Plants*, *Special Status Fish and Aquatic Invertebrates*, *Special Status Wildlife*, and *National Historic Trails* sections.

Introduction and spread of noxious weeds and invasive plants into vegetation communities causes negative impacts to native plant community composition. Noxious weeds and invasive plants are known to displace native plants and disrupt the structure and function of local ecosystems (Vitousek, 1990). As noxious weed and invasive plant populations increase in size and frequency, they tend to reduce the diversity of surrounding native plant communities, altering the composition and community structure, the habitat quality in the infested area, recreational opportunities, and the visual aesthetic quality of the landscape (USDA, 1998; Usher, 1988; Weiss & Murphy, 1998). These changes to native plant communities can alter ecosystem processes, including productivity, decomposition, hydrology, nutrient cycling, and disturbance patterns such as frequency and intensity of wildland fires (Quigley & Arbelbide, 1997).

A number of integrated land use planning steps are important for the management and control of noxious weeds (USDA, 1998). These include a systematic and on-going inventory, application of specific BMPs to reduce opportunities for new introductions and spread of noxious weeds and invasive plants, strategic planning of prioritized integrated treatments for management and control, post-treatment monitoring and adaptive management strategies, and collaboration on cooperative agreements with surrounding land management entities.

Due to the lack of quantitative or qualitative inventory data for noxious weeds and invasive plants, management actions were assessed primarily for their ability to reduce potential for noxious weed and invasive plant introduction and spread.

The following assumptions were used when analyzing effects of management actions on noxious weeds and invasive plants:

- Noxious weeds and invasive plants would continue to be introduced and spread as a result of ongoing vehicle traffic in and out of the planning area, recreational activities, wildlife and livestock grazing and movements, and surface-disturbing activities. It is assumed that the greater the opportunity for these activities to occur, the greater the risk of introducing or spreading noxious weeds and invasive plants.
- Conversely, reductions in acreage with potential for surface-disturbing activities would result in reduction in potential for introduction and spread of noxious weeds and invasive plants.
- Management actions that designate areas as open or available for cross-country motorized vehicle use, activities authorized for land uses, or mineral extraction have greater potential for soil-surface disturbance than management actions that designate areas as closed or unavailable. This is due to potential for increased infrastructure and access routes. However, the actual disturbance area might not be proportional to the size of areas identified for potential designation or development.
- Treatments would result in attainment of the stated objectives. Failed or partially-failed treatments would be identified through monitoring and re-treated utilizing adaptive management methods until the objectives are met.

Direct and Indirect Impacts

Impacts from Noxious Weeds and Invasive Species Actions

Impacts from Management Specific to the No Action Alternative

Management actions specific to the No Action Alternative provide no objectives or clear prioritization for inventory or control of noxious weeds. Invasive plants are not addressed under the No Action Alternative. It is unlikely that the No Action Alternative would reduce the potential for introduction or spread of noxious weeds and invasive plants. Occupied acreages and diversity of noxious weeds would likely continue to increase within the planning area.

Impacts from Management Common to All Action Alternatives

Management actions common to all action alternatives provide for a proactive inventory, collaborative control, and incorporation of BMPs and stipulations into BLM management activities, authorized uses, permits and leases to limit introduction and spread of noxious weeds and invasive plants. The inventory would have the overall impact of quantifying existing conditions and providing a baseline for evaluation of risk for new introductions and spread of existing populations. An up-to-date inventory would also provide a basis for treatment prioritization. Appropriate prioritization, cooperative treatment, and incorporation of BMPs and stipulations would reduce risk of introduction and spread and increase potential for control or eradication of noxious weeds and invasive plants.

Impacts from Management Specific to Alternative I

Alternative I would treat about 200,000 acres (15%) of the planning area to prevent spread and an additional 50,000 acres (3%) to meet objectives for noxious weeds and invasive plants. Management actions prescribed in Alternative I would reduce the risk of noxious weed and invasive plant introduction and spread by focusing treatments in high-disturbance areas (e.g., motorized and recreational access points, roadsides) and using proactive management activities, including eradication of new or small populations in special designation areas and important habitats. The achievement of objectives to reduce cover of invasive plants would decrease the potential for conversion of perennial communities to annual, particularly in native communities.

Impacts from Management Specific to Alternative II

Alternative II would treat about 200,000 acres (15%) of the planning area to prevent spread and an additional 50,000 acres (3%) to meet objectives for noxious weeds and invasive plants. Management actions prescribed in Alternative II would reduce the risk of noxious weed and invasive plant introduction and spread, but do not prioritize treatments in areas where potential for introduction is high. Therefore, the introduction and spread of noxious weeds and invasive plants could occur in the vicinity of roads, recreation sites, stock driveways, or other high-use areas. Since thresholds described by the Alternative II objectives to reduce cover of invasive plants are higher than for the other alternatives, the risk of spread in both native and non-native communities would be greater. This would increase the potential for conversion of perennial communities to annual.

Impacts from Management Specific to Alternative III

Alternative III would treat about 200,000 acres (15%) of the planning area to prevent spread of noxious weeds and invasive plants. Alternative III would make the least progress of all the alternatives towards decreasing the introduction and spread of noxious weeds, as it prescribes the lowest level of treatment and focuses primarily on fuels reduction and, therefore, invasive plants. Management actions prescribed in Alternative III would reduce the risk of noxious weed and invasive plant spread by prioritizing treatments in areas with high potential for introductions to occur (e.g., fuel breaks, areas with high wildland fire occurrence, roadsides). The lack of treatment priority for small or new introductions could result in spread in other areas, such as native communities not contained within a special designation area or identified as special status species habitat. The achievement of objectives to reduce cover of invasive plants would decrease the potential for conversion of perennial communities to annual.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV would treat about 200,000 acres (15%) of the planning area to prevent spread and an additional 250,000 acres (18%) to meet objectives for noxious weeds and invasive plants. Based on stated objectives and projected treatment acres, Alternative IV would make the greatest progress of all the alternatives towards reducing the introduction and spread of noxious weeds and invasive plants and increasing the potential for control or eradication. Management actions prescribed in Alternative IV do not prioritize treatments in areas where potential for introduction is high. Therefore, the introduction and spread of noxious weeds and invasive plants could occur in the vicinity of roads, recreation sites, stock driveways, or other high-use areas. The treatment of small or new introductions, special designation areas, and important habitats would reduce potential for spread and maintain or improve vegetation community or habitat quality in these areas. The achievement of objectives to reduce cover of invasive plants would decrease the potential for conversion of perennial communities to annual, particularly in native communities.

Impacts from Management Specific to Alternative V

Alternative V would treat about 200,000 acres (15%) of the planning area to prevent spread and an additional 100,000 acres (7%) to meet objectives for noxious weeds and invasive plants. Management actions prescribed in Alternative V would reduce the risk of noxious weed and invasive plant introduction and spread, but do not prioritize treatments in areas where potential for introduction is high. Therefore, the introduction and spread of noxious weeds and invasive plants could occur in the vicinity of roads, recreation sites, stock driveways, or other high-use areas. Based on stated objectives, Alternative V would make intermediate progress towards the eradication of noxious weeds. The treatment of small or new introductions in special designation areas and important habitats would reduce the potential for spread and maintain or improve vegetation community or habitat quality in these areas. The achievement of objectives to reduce the cover of invasive plants would decrease the potential for conversion of perennial communities to annual, particularly in native communities.

Impacts from Upland Vegetation Actions

Management actions for upland vegetation communities that result in changes between VSGs or seral stages within native VSGs could influence the potential for the introduction and spread of noxious weeds and invasive plants into upland vegetation communities. Vegetation treatments can include activities (e.g., burning and mechanical treatments such as drill-seeding) that result in short-term soil surface disruption or create conditions that are conducive to the introduction and spread of noxious weeds and invasive plants. Management actions that maintain or improve the cover of diverse perennial vegetation would generally increase competition and resistance of plant communities to the introduction and spread of noxious weeds and invasive plants (DiTomaso, 2000) and could result in long-term control, containment, or eradication.

Management actions that increase the cover of biolgoical soil crusts would tend to decrease the potential for the introduction and spread of noxious weeds and invasive plants. Research has indicated biolgoical soil crusts form a physical or chemical barrier to some species and reduce the potential for the establishment of some noxious weeds and invasive plants (Gelbard & Belnap, 2003; Kaltenecker, et al., 1999).

Management actions related to areas dominated by invasive annual grasses could convert acreages from the Annual VSG to a Native or Non-Native Perennial VSG. Where invasive plants are dominant, management actions that would result in this type of conversion are analyzed in the *Upland Vegetation* section.

The effects of ungrazed reference areas are discussed under *Impacts from Livestock Grazing Actions*.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative would increase the acreage of non-native perennial communities through the conversion of annual communities and removal of shrubs in non-native understory communities (see the *Upland Vegetation* section). Treatments to convert annual communities to perennial resulting in complete removal of existing vegetation would occur on <1% of the planning area (Table 4- 14). This would be accomplished following wildland or prescribed fire and in conjunction with chemical treatment and/or seeding perennial vegetation. Prescribed fire or mechanical treatments would remove shrub overstory from non-native understory and native shrubland communities on about 6% of the planning area.

Treatments that would convert annual to perennial communities would increase the potential for the introduction and spread of noxious weeds and invasive plants not controlled by chemical treatments in the short term. Treatments to accomplish this conversion would temporarily remove vegetative cover and result in some soil surface disturbance from seeding methods. The subsequent establishment of perennial plant communities would result in decreased potential for introduction and spread of noxious weeds and invasive plants in the long term. Use of competitive non-native perennial vegetation might not completely curtail the introduction and spread of some noxious weeds and invasive plants and complementary treatments would need to occur to enhance success (Carpinelli, et al., 2004).

The removal of shrub overstories for conversion to grassland communities using prescribed fire or mechanical treatments would result in the short-term disruption of the plant community and some level of soil surface disturbance. This would increase the short-term potential for introduction and spread of noxious weeds and invasive plants in treatment areas. The removal of sagebrush can reduce competition and could also result in increased potential for introduction and spread of noxious weeds and invasive plants, particularly perennial, tap-rooted species, in the long term (Svejcar, 2003).

Impacts from Management Common to All Action Alternatives

Management actions common to all action alternatives provide guidance for the protection of existing vegetation and newly treated areas. This guidance is intended to reduce or eliminate improper uses or over-allocation, particularly during vulnerable periods such as growing seasons, drought periods, or seeding establishment. These actions would reduce the short- and long-term potential for the introduction and spread of noxious weeds and invasive plants in treatment areas.

Impacts from Management Specific to Alternative I

Alternative I would increase the acreage of native shrubland through conversion of annual, non-native perennial, non-native understory, and native grassland communities (see the *Upland Vegetation* section). This would be accomplished through use of multiple tools including chemical, mechanical, and biological treatments; seeding and planting, including interseeding existing perennial grassland or shrubland communities; and targeted grazing.

Treatments to convert annual communities to perennial grassland or shrubland communities would occur on about 3% of the planning area (Table 4- 14). The effects of burning, chemical, and mechanical treatments, including seeding and planting, would be similar to those described for the No Action Alternative. Biological treatments, such as the use of insect or fungal pests to control noxious weeds or invasive plants, would expand opportunities for control, containment, or eradication of noxious weeds and invasive plants without broad-scale removal of vegetation or soil surface disturbance.

Targeted grazing would result in localized removal of vegetation to reduce fine fuels as well as populations of noxious weeds and invasive plants. This could result in short- or long-term control, depending on the biology of the target plants. The effectiveness of targeted grazing for invasive annuals would be temporary and localized (Launchbaugh, et al., 2008; Vallentine & Stevens, 1994). Targeted grazing in areas dominated by invasive annuals would need to be combined with other treatments (e.g., chemical, seeding with perennial plants) for long-term effect (Hempy-Mayer & Pyke, 2008).

Native shrubland would be restored on 24% of the planning area. Over the long-term, the establishment of shrubs would diversify above- and below-ground structure and would increase the resistance of plant communities to the introduction and spread of noxious weeds and invasive plants (DiTomaso, 2000).

Rehabilitating areas disturbed by project construction, maintenance, or removal with a diverse mix of vegetation would reduce potential for introduction and spread of noxious weeds and invasive plants by establishing competitive vegetation in disturbed areas (DiTomaso, 2000). Since the use of competitive non-native perennial vegetation might not completely curtail the introduction and spread of some noxious weeds and invasive plants, complementary treatments would need to occur to enhance success (Carpinelli, et al., 2004).

Management to maintain or improve the cover and composition of biological soil crusts in native grassland and shrubland communities would reduce the potential for the introduction and spread of noxious weeds and invasive plants in those communities.

Impacts from Management Specific to Alternative II

Alternative II would increase the acreage of non-native perennial communities through conversion of annual communities and removal of shrubs in non-native understory communities (see the *Upland Vegetation* section). This would be accomplished through use of multiple tools including prescribed fire; chemical, mechanical, and biological treatments; seeding and planting, including interseeding existing perennial grassland or shrubland communities; and targeted grazing. Treatments to convert annual to perennial communities would occur on about 5% of the planning area (Table 4- 14). The effects of burning, chemical, mechanical (including seeding and planting), biological, and targeted grazing treatments would be similar to those described for the No Action Alternative and Alternative I.

Shrubs would be removed on about 2% of the planning area in the Non-Native Understory VSG. The effects of specific treatments would be similar to those described for the No Action Alternative and Alternative I, except herbicides could be used to kill shrubs in non-native understory communities. The lack of soil surface disturbance would not increase the potential for the introduction and spread of noxious weeds and invasive plants. The long-term impacts of shrub removal would be the same as those described for the No Action Alternative.

Rehabilitating areas disturbed by project construction, maintenance, or removal with grasses would reduce the potential for the introduction and spread of noxious weeds and invasive plants by establishing competitive vegetation in disturbed areas. The effects would be similar to those described for Alternative I; however, the diversity of resultant vegetation would be lower. This could result in a lower potential for resistance to the introduction and spread of noxious weeds and invasive plants compared to Alternative I.

Impacts from Management Specific to Alternative III

Alternative III would increase the acreage of non-native perennial and native shrubland communities through conversion of annual and native grassland communities (see the *Upland Vegetation* section). This would be accomplished through use of multiple tools including prescribed fire; chemical, mechanical, and biological treatments; seeding and planting; and targeted grazing. Treatments to convert annual communities to perennial communities would occur on about 5% of the planning area (Table 4- 14). The effects of burning, chemical, mechanical (including seeding and planting), biological, and targeted grazing treatments would be similar to those described for the No Action Alternative and Alternative I.

Shrubs would be removed on less than1% of the planning area in the Non-Native Understory VSG utilizing prescribed fire, chemical, or mechanical treatments. The effects of specific treatments would be similar to those described for the No Action Alternative and Alternatives I and II.

Native shrubland would be restored on 13% of the planning area. Treatment effects would be similar to those described in Alternative I.

Vegetation on about 1% of the planning area would be removed to create unvegetated fuel breaks. This would be accomplished through use of prescribed fire, chemical, mechanical, or targeted grazing treatments. General effects of these treatments are described for the No Action Alternative and Alternative I. Complete lack of competitive plant or biological soil crust cover would increase potential for introduction and spread of noxious weeds and invasive plants. Maintenance of unvegetated fuel breaks would require repeated, integrated treatment to keep them from becoming conduits for introduction of noxious weeds and invasive species to adjacent areas.

The effects of treatments on areas disturbed by project construction, maintenance, or removal to reduce wildland fire size and intensity would be dependent on methods and materials. The effects of potential treatments, including seeding to establish perennial vegetation and unvegetated fuel breaks are described above.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV would increase the acreage of non-native understory and native shrubland communities through conversion of annual, non-native perennial, non-native understory, and native grassland communities (see the *Upland Vegetation* section). This would be accomplished through the use of multiple tools including prescribed fire; chemical, mechanical, and biological treatments; seeding and planting, including interseeding existing perennial grassland or shrubland communities; and targeted grazing. Treatments to convert annual to perennial communities would occur on about 5% of the planning area (Table 4- 14). The effects of burning, chemical, mechanical (including seeding and planting), biological, and targeted grazing treatments would be similar to those described for the No Action Alternative and Alternative I.

Shrubs would be restored on 39% of the planning area. Treatment effects would be similar to those described in Alternative I, but would cover the greatest area of all alternatives. Treatments to restore non-native understory to native shrubland communities would occur on about 1% of the planning area and could include chemical or targeted grazing treatments to remove or reduce non-native perennial grasses followed by interseeding native understory grasses and forbs. These could result in short-term reductions in understory cover, including biological soil crusts, with increased potential for introduction and spread of noxious weeds and invasive plants. Over the long-term, establishment of diverse native shrubland communities would diversify above- and below-ground structure and could result in decreased potential for introduction and spread of noxious weeds and invasive plants.

The effects of rehabilitating areas disturbed by project construction, maintenance, or removal with a diverse mix of native vegetation would be similar to those described for Alternative I. Management to maintain or improve cover and composition of biological soil crusts would reduce potential for introduction and spread of noxious weeds and invasive plants throughout the planning area.

Impacts from Management Specific to Alternative V

Alternative V would increase the acreage of non-native understory and native shrubland communities through conversion of annual, non-native perennial, and native grassland communities (see the *Upland Vegetation* section). This would be accomplished through the use of multiple tools including prescribed fire; mechanical and biological treatments; seeding and planting including interseeding existing perennial grassland communities; and removal of grazing. Treatments to convert annual to perennial communities would occur on about 3% of the planning area (Table 4- 14). The effects of burning, mechanical (including seeding and planting), and biological treatments would be similar to those described for the No Action Alternative and Alternative I. Since chemical treatments would only be used as a last resort, it is expected that effects due to chemical treatments would be minor.

Shrubs would be restored on 30% of the planning area. Treatment effects would be similar to those described in Alternative I.

The effects of rehabilitating areas disturbed by project construction, maintenance, or removal with a diverse mix of native vegetation would be the same as those described for Alternative IV.

The effects of management to maintain or improve cover and composition of biological soil crusts throughout the planning area would be the same as for Alternative IV.

Impacts from Wildland Fire Ecology and Management Actions

Fire can be used as a tool to reduce biomass associated with noxious weeds and invasive plants, but can also result in introduction and spread of those species (DiTomaso, 2000). Some invasive plants, such as cheatgrass, are fire-adapted, and burning can promote introduction and spread (Billings, 1994; Whisenant, 1989).

Four types of wildland fire management actions have the potential to affect noxious weeds and invasive plants: fire suppression priorities, fire suppression actions, post-fire ES&BAR, and fuels treatment actions.

Fire suppression priorities have been identified for each alternative. Locations within the planning area are designated as either Critical or Conditional Suppression Areas, depending on resource management priorities. Additional priorities have been identified to guide fire suppression in the case of multiple starts. Areas identified for critical suppression would be less likely to burn and, subsequently, less likely to have increased potential for introduction and spread of noxious weeds and invasive plants.

Fire suppression actions could result in removal of vegetation through blading, cutting, or burning. These result in localized disturbances that would be small in scale from a landscape perspective and might be restricted for resource protection. These treatments could cause soil surface disturbance that creates physical openings in communities for noxious weeds or invasive plants. Use of fire retardant can result in short-term increases in nitrogen and phosphorus. This can affect vegetation community composition by creating conditions favorable for growth of annual plants (Larson & Duncan, 1982).

ES&BAR actions performed within three years of a wildland fire can assist natural re-vegetation through the protection of the burned area or result in changes in VSGs through treatments including seeding and planting of native or non-native vegetation. Actions that result in VSG changes through ES&BAR are analyzed in detail under *Impacts from Upland Vegetation Actions*. Management of burned areas to promote natural re-vegetation following fire would generally result in decreased potential for introduction and spread of noxious weeds and invasive plants.

Fuels treatment actions modify vegetation community composition and structure to reduce the potential for fire spread. Fuels treatment actions are normally applied to manage vegetation and other resources including WUI, cultural sites, and wildlife and special status species habitat. Actions that result in VSG changes through fuels reduction are analyzed in detail under *Impacts from Upland Vegetation Actions*.

The effects of wildland fire ecology and management actions were assessed based on critical suppression priorities and the decreased potential for acreages to burn, which would also decrease the potential for introduction and spread of noxious weeds and invasive plants. Suppression actions and fuels reduction measures such as fuel breaks were assessed for potential to result in soil surface disturbance, which would increase potential for introduction and spread of noxious weeds and invasive plants.

Impacts from Management Specific to the No Action Alternative

Under the No Action Alternative, the entire planning area is under full suppression; therefore, there is no prioritization for wildland fire suppression activities. The lack of prioritization reduces the potential for critical resource needs to be identified and acted on in the event of multiple starts. There is a higher potential for any location in the planning area to burn under the No Action Alternative as compared to the action alternatives. There is also greater potential that areas treated for ES&BAR or restoration could burn or re-burn before becoming fully established. The No Action Alternative could perpetuate the current trend of increased introduction and spread of noxious and invasive weeds through higher potential for continued fire disturbance.

Impacts from Management Common to All Action Alternatives

The use of BMPs would reduce the unintentional introduction of noxious weeds and invasive plants through minimizing soil surface disturbance, use of wash stations, and careful placement of staging areas and base camps. Management actions common to all action alternatives provide a framework to reduce potential for resource loss and provide guidance for vegetation treatment application and rest following treatment. These actions would generally reduce fire-related disturbance and increase vegetation treatment success, and thus would result in short-and long-term decrease in potential for introduction and spread of noxious weeds and invasive plants.

Impacts from Management Specific to Alternative I

Alternative I identifies 481,000 acres (35% of the planning area) as Critical Suppression Areas with priorities in the WUI; the Bruneau-Jarbidge, Lower Bruneau Canyon, Middle Snake, and Salmon Falls Creek ACECs; and key sage-grouse habitat. Unburned patches of native grassland and native shrubland within the perimeter of an active fire would be protected, while unburned annual and non-native perennial communities would be allowed to burn. Based on suppression priorities in Alternative I, priority VSGs would be Native Grassland and Native Shrubland.

Critical suppression priorities would protect 59% of priority VSGs in the planning area prior to implementation of vegetation treatments and 52% of the planning area upon completion of proposed treatments (Table 4- 75).

Fire management priorities for critical suppression would not fully protect native grassland and shrubland communities within the planning area. Native grassland would be relatively resilient if burned. However, burning results in a pulse of nitrogen that increases potential for noxious weed and invasive plant introduction and spread (Svejcar, 2003). Short-term reduction or removal of vegetation and biological soil crusts due to fire or suppression activities could also contribute to increased potential for introduction and spread of noxious weeds and invasive plants.

Allowing wildland fire to burn annual and non-native perennial communities within the perimeter of an active fire would facilitate restoration of these communities to native shrubland. However, these areas would be at increased risk of invasion and spread of noxious weeds and invasive plants over the short-term until subsequent establishment of seeded perennial vegetation.

Approximately 11,000 acres of vegetated fuel breaks (less than 1% of the planning area) would be created under Alternative I. Fuel breaks placed to protect restoration and ES&BAR treatments would enhance the potential for treatment success and lessen the potential need for re-treatment due to subsequent wildland fire. However, fuel breaks also create linear disturbances that can facilitate introduction and spread of noxious weeds and invasive plants (Merriam, et al., 2006). Actions to locate fuel breaks in existing disturbance corridors and to treat noxious weeds and invasive plants in fuels reduction projects would reduce this potential. The effects of fuels treatment methods are described under *Impacts from Upland Vegetation Actions.*

Soil surface disturbance associated with fire suppression activities and facilities (see the *Soil Resources* section) would locally increase potential for introduction and spread of noxious weeds and invasive plants.

Impacts from Management Specific to Alternative II

Alternative II identifies 172,000 acres (13% of the planning area) as Critical Suppression Areas with WUI as a priority. Unburned patches of native and non-native perennial communities within the perimeter of an active fire would be protected, while unburned annual communities would be allowed to burn. Based on suppression priorities in Alternative II, priority VSGs would be Native Grassland and Non-Native Perennial.

Critical suppression priorities would protect 23% of priority VSGs in the planning area prior to implementation of vegetation treatments and 20% of the planning area upon completion of proposed treatments (Table 4- 76).

Fire management priorities under Alternative II provide low levels of protection to resources outside of WUI. Native and non-native perennial grasslands would be relatively resilient if burned. Critical suppression priorities do not extend to native shrubland or non-native understory communities under Alternative II; therefore, these areas would be more likely to burn. Burned areas would be susceptible to increased potential for introduction and spread of noxious weeds and invasive plants as described in Alternative I. Allowing wildland fire to burn annual communities within the perimeter of an active fire would facilitate conversion of these communities to non-native perennial; however, these areas would be at risk for introduction and spread of noxious weeds and invasive plants over the short-term until subsequent establishment of perennial vegetation.

Approximately 13,000 acres of vegetated fuel breaks (less than1% of the planning area) would be created under Alternative II. Fuel breaks placed to protect commercial facilities and in non-native perennial communities to protect native communities would result in some linear disturbance that could facilitate introduction and spread of noxious weeds and invasive plants. Integration of noxious weed and invasive plant treatments into fuels reduction projects would reduce this potential.

Soil surface disturbance associated with fire suppression activities and facilities (see the *Soil Resources* section) would locally increase the potential for introduction and spread of noxious weeds and invasive plants.

Impacts from Management Specific to Alternative III

Alternative III identifies 469,000 acres (34% of the planning area) as Critical Suppression Areas with priorities in WUI, the Bruneau-Jarbidge and Salmon Falls Creek ACECs, and key sage-grouse habitat. Unburned patches of native and non-native perennial communities within the perimeter of an active fire would be protected, while unburned annual communities would be allowed to burn. Based on suppression priorities in Alternative III, priority VSGs would be Native Shrubland (key sage-grouse habitat), Native Grassland, and Non-Native Perennial.

Critical suppression priorities would protect 40% of priority VSGs in the planning area prior to implementation of vegetation treatments and 39% of the planning area upon completion of proposed treatments (Table 4- 77).

Fire management priorities for critical suppression would not fully protect the priority VSGs within the planning area. Native grassland and non-native perennial communities would be relatively resilient if burned. The effects of burning perennial and annual communities within the perimeter of an active fire would be the same as those described for Alternative I.

Alternative III contains the largest network of fuel breaks, placed in strategic locations to disrupt the continuity of fuels and to protect important resources such as sage-grouse and slickspot peppergrass habitat. Approximately 25,000 acres of vegetated fuel breaks (2% of the planning area) and 11,000 acres of unvegetated fuel breaks (less than 1% of the planning area) would be installed under Alternative III. This action could reduce the potential for disturbance and associated risk of noxious weed and invasive plant introduction and spread associated with large fires. However, it would also create a network of linear disturbance areas that can facilitate the introduction and spread of noxious weeds and invasive plants (Merriam, et al., 2006). Treatment of noxious weeds and invasive plants in fuels reduction projects would reduce this potential. Effects of fuels treatment methods are described under *Impacts from Upland Vegetation Actions.*

Soil surface disturbance associated with fire suppression activities and facilities (see the *Soil Resources* section) would locally increase the potential for introduction and spread of noxious weeds and invasive plants.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV-A identifies 594,000 acres (43% of the planning area) as Critical Suppression Areas and Alternative IV-B (the Preferred Alternative) identifies 555,000 acres (40% of the planning area) as Critical Suppression Areas, with priorities in the WUI; the Bruneau-Jarbidge, Inside Desert, Jarbidge Foothills, and Lower Bruneau Canyon ACECs; and key sage-grouse habitat. Unburned patches of native grassland and native shrubland within the perimeter of an active fire would be protected, while unburned annual and non-native perennial communities would be allowed to burn. Based on suppression priorities in Alternative IV, priority VSGs would be Native Grassland and Native Shrubland.

Critical suppression priorities under Alternative IV-A would protect 73% of priority VSGs in the planning area prior to implementation of vegetation treatments and 58% of the planning area upon completion of proposed treatments; critical suppression priorities under Alternative IV-B would protect 68% and 54%, respectively (Table 4- 78).

The effects of wildland fire management and fuels reduction actions would be similar to those described for Alternative I. Critical suppression priorities would tend to reduce the risk of burning in native plant communities, which would reduce potential for post-fire introduction and spread of noxious weeds and invasive plants.

Impacts from Management Specific to Alternative V

Alternative V identifies 1,067,000 acres (78% of the planning area) as Critical Suppression Areas with priorities in WUI; the Lower Bruneau Canyon, Middle Snake, and Sagebrush Sea ACECs; and key sage-grouse habitat. Unburned patches of native grassland and native shrubland within the perimeter of an active fire would be protected, while unburned annual and non-native perennial communities would be allowed to burn. Based on suppression priorities in Alternative V, priority VSGs would be Native Grassland and Native Shrubland.

Critical suppression priorities would protect 100% of priority VSGs in the planning area prior to implementation of vegetation treatments and upon completion of proposed treatments (Table 4- 79). Critical suppression priorities would tend to reduce the risk of burning in native plant communities to the greatest extent of all the alternatives. This would reduce potential for post-fire introduction and spread of noxious weeds and invasive plants.

The effects of wildland fire management and fuels reduction actions would be similar to those described for Alternative I, except that there would be no new fire suppression infrastructure. This would reduce the amount of localized disturbance and, thus, potential for introduction and spread of noxious weeds and invasive plants at those sites.

Approximately 7,000 acres of vegetated fuel breaks (less than 1% of the planning area) would be created under Alternative V. Fuel breaks placed along roads would increasing the width of disturbance and the associated potential for introduction and spread of noxious weeds and invasive plants (Gelbard & Belnap, 2003; Gelbard & Harrison, 2003; Merriam, et al., 2006). Additional discussion regarding effects of roads is found under *Impacts from Transportation and Travel Actions*.

Impacts from Livestock Grazing Actions

Livestock grazing can alter herbaceous cover and influence species composition and structure of vegetation communities (Saab, et al., 1995), including noxious weeds and invasive plants. The type and intensity of effects depends on factors such as type of livestock and grazing system used, including stocking rate, season of use, use levels, and location and density of livestock facilities (e.g., fences, water, salt). Effects can be due to herbivory or trampling and can be direct (e.g., removal of vegetation, trampling plants) or indirect (e.g., soil surface disturbance). Livestock can spread seed through their digestive system or by transporting seed attached to hair (DiTomaso, 2000). In some cases, targeted grazing can be applied to control or eliminate specific plants such as noxious weeds or invasive plants (Launchbaugh, et al., 2008; Olson & Wallander, 1998).

Livestock grazing actions were evaluated based on potential to directly or indirectly reduce introduction and spread of noxious weeds and invasive plants. Specific actions, including assignment of grazing systems and forage allocations on an allotment level, would be addressed in implementation-level plans.

Impacts from Management Specific to the No Action Alternative

Under the No Action Alternative, 1,414,000 acres (97% of the planning area) would be available for livestock grazing and 51,000 acres (3% of the planning area) would be unavailable.

The potential for introduction and spread of noxious weeds and invasive plants would be reduced in areas closed to grazing due to anticipated changes in plant communities where noxious weeds and invasive plants are not currently abundant or dominant (see the *Upland Vegetation* section). The absence of livestock would reduce the potential spread of noxious weed and invasive plant seeds by animals or activities associated with construction, use, and maintenance of livestock facilities. Existing established populations of noxious weeds and invasive plants would not likely decrease under grazing exclusion in these areas without active treatment. Invasive annuals could be reduced in ungrazed areas where they are not dominant due to anticipated increased cover of perennial plants and biological soil crusts.

Under the No Action Alternative, allocated AUMs would range from a minimum of 200,000 under current conditions to a maximum of 260,000 if vegetation objectives are achieved. Livestock use would be expected to maintain or slightly increase the current level of noxious weed and invasive plant introduction and spread.

Authorization of TNR or an increase in AUMs due to increased forage production could result in decreased biological soil crust cover. Management actions that would incorporate wildlife forage and cover needs, or that would improve ecological condition to good or better, would tend to maintain or improve vegetation and biological soil crust cover and reduce the potential for the introduction and spread of noxious weeds and invasive plants. Livestock concentration areas including water and supplement locations, holding areas, stock driveways, and fence lines would be expected to be more vulnerable to noxious weed and invasive plant introduction and spread compared to surrounding areas due to removal of desirable vegetation and soil disturbance.

Increases in the miles of pipelines and fences and numbers of reservoirs, wells, or springs would result in increased density of linear disturbance and disturbed areas radiating from watering points. Installation and maintenance of pipelines results in linear disturbance from burial and, unless pipelines are installed along existing roads, the creations and maintenance of primitive roads through repeated use. This could create conduits for noxious weed and invasive plant introduction and spread (Gelbard & Belnap, 2003; Gelbard & Harrison, 2003). Likewise, construction and maintenance of fences could have similar effects. Fence construction does not result in the same degree of soil disturbance as pipeline construction, but primitive roads often form on one or both sides of the fence due to maintenance and other uses. Repeated livestock trailing along fences can also create linear disturbances that may be vulnerable to noxious weed and invasive plant colonization. The potential for introduction of noxious weeds or invasive plants would be reduced by application of BMPs (Appendix E).

Construction, installation, and maintenance of watering facilities including reservoirs, wells, troughs, and spring developments can result in both linear disturbance corridors due to access needs, and a zone of disturbance that radiates out from the watering location (Brooks & Berry, 2006; Lange, 1969; Rogers & Lange, 1971). The size of the impacted area depends on levels and consistency of use, but complete removal of vegetation can occur within a 50 to 100 foot radius of a watering site. The effects resulting from high use can radiate for several hundred feet from a watering site and can include removal of herbaceous cover, damage to shrubs from trampling, and introduction and spread of noxious weeds and invasive plants (Brooks & Berry, 2006; Vallentine, 2001). Similar effects can be found at locations where salt or supplements are offered.

Actions that exclude livestock from reservoirs and springs and prohibit placement of salting, feeding, holding facilities, or stock driveways in riparian areas would reduce the potential for introduction and spread of noxious weeds and invasive plants in those areas.

Impacts from Management Common to All Action Alternatives

Management actions for livestock grazing common to all action alternatives provide guidance and design criteria for implementation-level planning to reduce resource impacts. These actions would help maintain or improve vegetation cover and structure and would tend to reduce potential for introduction and spread of noxious weeds and invasive plants.

Implementation of drought management guidelines would be expected to retain adequate vegetation cover during periodic drought cycles and reduce vulnerability of plant communities to the introduction and spread of noxious weeds and invasive plants. Implementation of guidelines in the ARMS and minimizing disturbance at developed springs would be expected to reduce the potential for introduction and spread of noxious weeds and invasive plants in those areas.

Impacts from Management Specific to Alternative I

Under Alternative I, 1,381,000acres would be available and 84,000 acres would be unavailable to livestock grazing. This would include areas in the Middle Snake ACEC and Wildlife Tracts that would be restored from annual communities to native shrubland, and the Deadman/Yahoo SRMA which would be treated to convert annual communities to native grassland and non-native perennial communities. These areas occur within VMAs A and B and include some of the driest sites in the planning area. Because restoration treatments can be slow to establish in low precipitation zones, the potential for success of restoration treatments in these areas and long-term maintenance of restored native shrubland would be increased through minimizing the effects associated with livestock trampling and grazing (Stevens, 2004). Short- and long-term success of vegetation treatments would decrease the potential for introduction and spread of noxious weeds and invasive plants. The long-term effects of livestock exclusion would be the same as described for the No Action Alternative.

Under Alternative I, allocated AUMs would be dependent on production and would range from a minimum of 194,000[8] under current conditions to a maximum of 269,000 if vegetation objectives are achieved. Livestock allocations would be similar to those described for the No Action Alternative. However, since use would be allocated over about 3% fewer acres in the planning area, impacts could be spread over a slightly smaller area. This effect would be minor on the scale of the planning area.

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[8] AUMs for the action alternatives are provided for analysis and comparative purposes only. See the *Livestock Grazing* section for more details on the basis for AUM calculations.

Allocation of more than 60% of vegetation production for native and non-native perennial grass, shrub, and forb production to watershed and wildlife would promote landscape stability due to the retention of plant biomass and structure (Pellant, et al., 2005). This would tend to reduce potential for introduction and spread of noxious weeds and invasive plants. Annual grass production is unpredictable and highly variable on an annual basis (Vallentine & Stevens, 1994). Allocation of annual grass production to livestock could result in greater use of perennial grasses in years when annual grass production is low. In years with high annual grass production, use would likely coincide with critical growing periods for perennial grasses, and could result in a reduction in cover and increased susceptibility for invasion of perennial communities by invasive annual grasses (Blaisdell & Pechanec, 1949; Chambers, et al., 2007).

Estimated utilization levels to achieve resource and use objectives of 30% to 40% for native communities and 40% to 50% for non-native communities are generally considered to be of moderate intensity (Holecheck, 1988; Holecheck, et al., 1998). These utilization levels would tend to maintain or decrease current levels of introduction and spread of noxious weeds and invasive plants. Utilization at the upper end of the ranges would tend to keep vegetation conditions static; utilization at the lower end of the ranges or below would be required for improvement (Holecheck, et al., 1999). Biological soil crusts are more sensitive to livestock disturbance than vascular plants and would likely be more abundant and diverse in native communities with lower utilization (Ponzetti & McCune, 2001; Rogers & Lange, 1971; Warren & Eldridge, 2001). Periodic heavy use (up to 70% every 5 years) in non-native communities would tend to leave communities vulnerable to introduction and spread of noxious weeds and invasive plants (Chambers, et al., 2007; Ellison, 1960). Effects of targeted grazing are discussed under *Impacts from Upland Vegetation Actions*. The effects of TNR would be similar to those described for the No Action Alternative.

The number, type, and density of range infrastructure developments under Alternative I would be similar to the No Action Alternative; however, locations could be modified to meet resource objectives. The effects of range infrastructure developments would be similar to those described for the No Action Alternative.

Removal of fences could result in short-term disturbance due to access for removal of posts, wire, and other components. Long-term effects of fence removal to upland vegetation would be dependent on continued use of established primitive roads or trails by humans or livestock, but could include recovery of vegetation adjacent to the former fence line. Recovery could be facilitated by treatment of noxious weeds or invasive plants.

Impacts from Management Specific to Alternative II

Under Alternative II, 1,406,000 acres (96% of the planning area) would be available for livestock grazing and 59,000 acres (4% of the planning area) would be unavailable. The effects of livestock grazing exclusion would be the same as those described for the No Action Alternative.

Allocations would tend to promote retention of shrub and forb biomass. High allocation of annual grass production could provide substantial forage in years where growing conditions support annual grass production. However, this production is unpredictable (Vallentine & Stevens, 1994) and, as described for Alternative I, high allocation could result in over-use of perennial grasses in years when annual grasses are not abundant. In years with high annual grass production, use would likely coincide with critical growing periods for perennial grasses, and could result in a reduction in cover and increased susceptibility for invasion of perennial communities by annual grasses (Blaisdell & Pechanec, 1949; Chambers, et al., 2007).

Estimated utilization levels to achieve resource and use objectives of 40% to 50% for native communities and 50% to 60% for non-native perennial communities are considered to be of moderate to high intensity (Holecheck, 1988; Holecheck, et al., 1998). These utilization levels would tend to increase the potential for the introduction and spread of noxious weeds and invasive plants. Utilization at the upper end of the ranges would tend to result in eventual degradation of plant communities; utilization at the lower end of the ranges would be necessary to maintain static conditions (Holecheck, et al., 1999). It is expected that biological soil crusts would be reduced in both cover and species abundance under moderate to high utilization (Ponzetti & McCune, 2001; Rogers & Lange, 1971; Warren & Eldridge, 2001). Periodic short-term heavy use (up to 70% every 5 years) is expected to have results similar to those described for Alternative I.

The effects of TNR, targeted grazing, and the installation, construction, and maintenance of grazing facilities would be similar to those described for Alternative I. It is expected that the number and density of all types of range infrastructure developments under Alternative II would increase compared to the No Action Alternative to accommodate increased vegetation allocations for livestock. This would increase potential for noxious weed and invasive plant introduction and spread due to higher density of disturbed areas.

The designation of Reserve Common Allotments would provide flexibility for proactive treatments for noxious weeds and invasive plants. The ability to provide post-treatment rest could improve treatment success, reduce dominance of noxious weeds and invasive plants in localized areas, and reduce the potential for introduction and spread of noxious weeds and invasive plants into adjacent areas.

Impacts from Management Specific to Alternative III

Under Alternative III, 1,404,000 acres (96% of the planning area) would be available for livestock grazing and 61,000 acres (4% of the planning area) would be unavailable. The effects from closing areas to grazing would be the same as those described for the No Action Alternative.

The effects of vegetation allocations would be similar to those described for Alternative II. Estimated utilization levels to achieve wildland fire and resource objectives are 30% to 40% for native communities and 50% to 60% for non-native perennial communities. The effects of proposed utilization levels on native communities would be similar to those described for Alternative I; the effects of proposed utilization levels on non-native communities would be similar to Alternative II. The effects of TNR, targeted grazing, and the installation, construction, maintenance, and removal of grazing facilities would be similar to those described for Alternative I; the effects of designating Reserve Common Allotments would be similar to those described for Alternative II. It is expected that the number and density of all types of range infrastructure developments under Alternative III would increase compared to the No Action Alternative to accommodate increased vegetation allocations for livestock. This would increase potential for noxious weed and invasive plant introduction and spread due to higher density of disturbed areas.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Under Alternative IV-A, 1,320,000 acres (90% of the planning area) would be available for livestock grazing and 145,000 acres (10% of the planning area) would be unavailable; under Alternative IV-B (the Preferred Alternative), 1,352,000 acres (92% of the planning area) would be available for livestock grazing and 113,000 acres (8% of the planning area) would be unavailable. Areas unavailable to livestock grazing include areas in the Inside Desert ACEC identified for restoration of non-native perennial communities to native shrubland. The effects on restoration treatments would be similar to those described in Alternative I. Long-term effects of making areas unavailable to livestock would be similar to those described for the No Action Alternative, but would occur over larger and more contiguous areas.

Allocation of the majority (more than 70%) of vegetation production for native and non-native perennial grass, and all annual shrub, and forb production to watershed and wildlife would promote landscape stability due to retention of plant biomass and structure (Pellant, et al., 2005) (see discussion in the *Upland Vegetation* section). This would tend to reduce potential for introduction and spread of noxious weeds and invasive plants.

Estimated utilization levels to achieve resource objectives of 20% to 30% for native communities and 30% to 40% for non-native communities are generally considered to be of light intensity (Holecheck, 1988; Holecheck, et al., 1998). These utilization levels would tend to reduce potential for introduction and spread of noxious weeds and invasive plants. Utilization within these ranges, particularly at the lower end of the ranges or below would tend to result in improvement of vegetation community condition (Holecheck, et al., 1999) and reduce potential for invasion by noxious weeds and invasive plants (Chambers, et al., 2007). Light utilization levels proposed under Alternative IV would also tend to promote greater cover and species abundance for biological soil crusts (Ponzetti & McCune, 2001; Rogers & Lange, 1971; Warren & Eldridge, 2001).

The effects of TNR would be similar to Alternative I. However, since TNR would not be allowed in pastures with more than 25% native communities (by cover), excluding Sandberg/non-native areas, the proportion of landscape affected would be less than in the No Action Alternative or Alternatives I, II, or III. Areas unavailable for TNR would increase with conversion of annual and non-native communities to native communities through vegetation treatment.

The effects of TNR, targeted grazing, and the installation, construction, maintenance, and removal of grazing facilities would be similar to those described for Alternative I; the effects of designating Reserve Common Allotments would be similar to those described for Alternative II. It is expected that the number and density of all types of range infrastructure developments under Alternative IV would decrease compared to the No Action Alternative due to decreased allocations. This would decrease potential for introduction and spread of noxious weeds and invasive plants due to lower density of disturbed areas.

Impacts from Management Specific to Alternative V

Under Alternative V, 1,156,000 acres (79% of the planning area) would be available for livestock grazing and 309,000 acres (21% of the planning area) would be unavailable. This would include areas in the Lower Bruneau Canyon and Middle Snake ACECs identified for restoration of annual and non-native perennial communities to native shrubland and non-native understory. The effects on restoration treatments would be similar to those described in Alternative I. Long-term effects would be similar to those described for the No Action Alternative, but would occur over the largest and most contiguous areas of all the alternatives.

The effects of vegetation allocations in Alternative V would be similar to Alternative IV. There would be no TNR or targeted grazing under Alternative V, and forage on acquired lands and in allotments where permits are relinquished, sold, or cancelled would be held for the life of the plan for wildlife habitat and watershed protection. Alternative V would provide the greatest level of landscape stability due to retention of plant biomass and structure (Pellant, et al., 2005) (see the *Upland Vegetation* section). This would tend to reduce potential for introduction and spread of noxious weeds and invasive plants. The effects of estimated utilization levels would be similar to Alternative IV, except utilization levels would likely be 10% to 20% in the Sagebrush Sea ACEC. This would include about 70% of the planning area and would promote the success of treatments to convert annual communities and native grassland to native shrubland by minimizing post-treatment effects associated with livestock trampling and grazing (Stevens, 2004). This would further reduce short- and long-term potential for introduction and spread of noxious weeds and invasive plants.

The effects of installation, construction, maintenance, and removal of grazing facilities would be similar to those described for Alternative I. The lack of Reserve Common Allotments under Alternative V would reduce flexibility for post-treatment rest of treated areas. It is expected that the number and density of all types of range infrastructure developments under Alternative V would decrease substantially compared to the No Action Alternative to accommodate decreased allocations, especially in the Sagebrush Sea ACEC. Since no new pipelines would be authorized, Alternative V would reduce the potential for linear disturbance and introduction of noxious weeds and invasive plants throughout the planning area.

Impacts from Transportation and Travel Actions

Routes and route density can influence human-related disturbance including introduction and spread of noxious weeds and invasive plants (Gelbard & Belnap, 2003; Gelbard & Harrison, 2003). Changes in travel designation and seasonal restrictions can influence vegetation continuity and condition. Transportation and travel management actions were evaluated based on potential to reduce or increase the introduction and spread of noxious weeds and invasive plants.

Impacts from Management Specific to the No Action Alternative

Under the No Action Alternative, 77% of the planning area would be open to cross-country motorized vehicle use, 16% would be limited to designated routes, 5% would be limited to inventoried ways, and 2%

would be closed to motorized vehicle use. The majority of the closed area is WSA, where canyonland topography restricts travel. Under the No Action Alternative, it is expected that cross-country motorized use would increase and that additional unplanned routes would be created by repeated use. This would result in a long-term increase in route density within the planning area.

The No Action Alternative would result in increased potential for introduction and spread of noxious weeds and invasive plants. Cross-country motorized use and formation of new routes disrupts vegetation, biological soil crusts, and soil to creating openings for plant establishment to occur (Belnap & Eldridge, 2001; Gelbard & Belnap, 2003; Gelbard & Harrison, 2003; Masters & Sheley, 2001; Stohlgren, et al., 2001). Increased route density would provide a greater density of disturbed areas for introduction and spread of noxious weeds and invasive plants.

Impacts from Management Common to All Action Alternatives

Management actions common to all action alternatives provide guidance and protective mechanisms for route or use designations. These actions are not specific to management of noxious weeds and invasive plants. Guidance for travel management planning would encourage consideration of noxious weeds in designation, modification, or closure of routes.

Impacts from Management Specific to Alternative I

Under Alternative I, less than 1% of the planning area would be open to cross-country motorized vehicle use, 93% would be limited to designated routes, 5% would be limited to designated ways, and 4% would be closed to motorized vehicle use. Approximately 3,600 acres of the Deadman/Yahoo SRMA, contained within the Deadman/Yahoo TMA, would be designated open to cross-country motorized vehicle use. This relatively small area currently has a high density of motorized use, which would be expected to continue under the open designation. This would result in areas with concentrated disturbance and high potential for introduction and spread of noxious weeds and invasive plants.

Route density is expected to decrease over approximately 48% of the planning area. This decrease would be focused in the Canyonlands, Jarbidge Foothills, and Snake River TMAs. Focus on increases in core habitat for mule deer in the Canyonlands and Jarbidge Foothills TMAs would tend to decrease the number and density of routes and associated human disturbance in native plant communities and reduce the risk of noxious weed and invasive plant introduction and spread. Approximately 49% of the planning area would retain the current level of route density, primarily in the Devil Creek TMA. Since the focus of this TMA would be to balance livestock grazing management needs with restoration activities, it is anticipated that route locations would continue to access existing livestock facilities and could be modified on establishment of new facilities. These routes could facilitate introduction of new noxious weeds and invasive plants and spread of existing populations into adjacent areas.

Actions that allow game retrieval within 300 feet of a designated route and access to camp sites within 25 feet of a designated route would result in disturbance of vegetation and soils that could increase potential for expansion of noxious weeds and invasive plants beyond the designated route corridor. Disturbance due to this cross-country motorized vehicle use would have the greatest effect on native shrublands due to crushing of shrubs and biological soil crusts. Exemptions on limitations or prohibitions to cross-country motorized use or use of closed routes would have effects similar to those described for the No Action Alternative.

Areas closed to motorized vehicle use would be free of the impacts associated with cross-country motorized vehicle use and roads described for the No Action Alternative. Closure would allow vegetation and biological soil crust recovery and would decrease potential for noxious weed and invasive plant introduction and spread associated with human activities. However, these areas are small and isolated; therefore, effect would be minimal on the scale of the planning area.

Seasonal closures or restrictions on primitive roads, trails, and open areas would reduce potential for human-caused wildland fire. This would reduce potential for fire-associated introduction and spread of noxious weeds and invasive plants.

Implementation of BMPs to control noxious weeds and invasive plants in roadside areas would reduce potential for introduction and spread in areas that would be open and limited to designated routes.

Impacts from Management Specific to Alternative II

Under Alternative II, none of the planning area would be open to cross-country motorized vehicle use, 93% would be limited to designated routes, 5% would be limited to designated ways, and 2% would be closed to motorized vehicle use. The lack of open designation would eliminate impacts described for the No Action Alternative and Alternative I.

Route density would be expected to increase in about 85% of the planning area, primarily within the Bruneau Desert TMA to facilitate access for commercial uses. The impacts of increased route density within the Bruneau Desert TMA would be similar to the impacts described for the No Action Alternative. Route density would be expected to remain the same in about 15% of the planning area, primarily within the Canyonlands TMA to facilitate livestock grazing with mitigation for impacts to resources. Impacts within the Canyonlands TMA would be similar to those described for the Devil Creek TMA in Alternative I.

Unlimited motorized access off designated routes for game retrieval and within 100 feet of a designated route for camp site access in areas not closed to motorized use would result in impacts similar to those described in Alternative I, but would apply to most of the planning area. Exemptions on limits or prohibitions to cross-country travel or use of closed routes would have effects similar to those described for the No Action Alternative.

The Bruneau-Jarbidge Canyon would be closed to motorized vehicle use under Alternative II; the canyon is physically restrictive to motorized transportation. The effects of closure would be the same as described for Alternative I. The effects of implementation of BMPs would be similar to those described for Alternative I.

Impacts from Management Specific to Alternative III

Under Alternative III, less than 1% of the planning area would be open to cross-country motorized vehicle use, 93% would be limited to designated routes, 5% would be limited to designated ways, and 2% would be closed to motorized vehicle use. The effects of designated open areas in the Deadman/Yahoo SRMA, which coincides with the Deadman/Yahoo TMA, would be similar to those described for Alternative I.

Route density would be expected to increase in approximately 2% of the planning area, primarily within the Deadman/Yahoo TMA to facilitate motorized recreational opportunities. Impacts of increased route density within the Deadman/Yahoo TMA would be similar to impacts described for Alternative I. Route density would be expected to remain the same in about 98% of the planning area, primarily within the Devil Creek, Jarbidge Foothills, Snake River, and West Side TMAs. These TMAs would be managed to improve access and facilitate wildland fire prevention and suppression. Management might not increase route density, but could improve surface condition. Improvement of road condition could result in wider disturbance areas adjacent to roads due to maintenance activities, including mowing of roadside areas, and increased potential for introduction and spread of noxious weeds and invasive plants due to increased use (Gelbard & Belnap, 2003).

The lack of motorized access off designated routes for game retrieval and limiting motorized access to camp sites to within 25 feet of a designated route would reduce off-road disturbance and associated potential for noxious weed and invasive plant introduction and spread relative to the No Action Alternative and Alternatives I and II. Exemptions on limitations or prohibitions to cross-country travel or use of closed routes would have effects similar to those described for the No Action Alternative.

Closed areas under Alternative III would be limited to the Salmon Falls Creek ACEC and Bruneau-Jarbidge Canyon, which are physically restrictive to motorized transportation. The effects of these closures would be similar to those described for Alternative I.

The effects of seasonal closures for wildland fire prevention and BMPs would be similar to those described for Alternative I.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Under Alternative IV, less than 1% of the planning area would be open to cross-country motorized vehicle use, 89% would be limited to designated routes, 5% would be limited to designated ways, and 5% would be closed to motorized vehicle use. The effects of designated open areas in the Deadman/Yahoo SRMA, which coincides with the Deadman/Yahoo TMA, would be similar to those described for Alternative I.

Route density would be expected to increase in approximately 2% of the planning area, primarily within the Deadman/Yahoo TMA to facilitate motorized recreational opportunities. The impacts of increased route density within the Deadman/Yahoo TMA would be similar to impacts described for Alternative I. Route density would be expected to decrease in approximately 98% of the planning area, primarily within the Canyonlands, Devil Creek, Jarbidge Foothills, and Snake River TMAs. These TMAs would be managed for protection of sage-grouse and big game habitat and restoration activities while continuing to provide public access. Route reduction would tend to facilitate success of vegetation treatments by reducing potential for post-treatment human disturbance, as well as noxious weed and invasive plant introduction and spread.

The lack of motorized access off designated routes for game retrieval and limiting motorized access to camp sites to within 25 feet of a designated route would reduce off-road disturbance relative to the No Action Alternative and Alternatives I and II. Exemptions on limitations or prohibitions to cross-country travel or use of closed routes would have effects similar to those described for the No Action Alternative.

Closed areas under Alternative IV would include the Bruneau-Jarbidge Canyon and non-WSA lands managed for their wilderness characteristics. The effects would be similar to those described for Alternative I, but would extend to a broader geographic area.

The effects of seasonal closures for wildland fire prevention and BMPs would be similar to those described for Alternative I.

Impacts from Management Specific to Alternative V

Under Alternative V, less than 1% of the planning area would be open to cross-country motorized vehicle use, 89% would be limited to designated routes, none would be limited to designated ways, and 11% would be closed to motorized vehicle use. The effects of designated open areas in the Yahoo SRMA, which coincides with the Yahoo TMA, would be similar to those described for Alternative I, but would be spatially reduced by about 80%.

Route density would be expected to increase in less than 1% of the planning area, primarily within the Yahoo TMA to facilitate motorized recreational opportunities. Impacts of increased route density within the Yahoo TMA would be similar to impacts described for Alternative I, but would apply to less than 1% of the spatial area of Alternative I. Route density would be expected to decrease in approximately 99% of the planning area, primarily within the Devil Creek, Jarbidge Foothills, Snake River, and West Side TMAs. These TMAs would be managed for increasing core habitat size for sage-grouse and other special status species and accommodating restoration activities. Route reduction in Alternative V would do the most of all the alternatives to reduce potential noxious weed and invasive plant introduction and spread due to human disturbance.

Since the density of routes within the planning area would be reduced, lack of motorized access off designated routes for game retrieval and limiting motorized access to camp sites to within 25 feet of a designated route would reduce off-road disturbance and associated potential for introduction and spread of noxious weeds and invasive plants to the greatest degree of all the alternatives. Application of motorized vehicle restrictions to lessees, BLM permit holders, and ROW holders would reduce the potential for cross-country motorized vehicle use to the greatest degree of all the alternatives and would eliminate most impacts associated with cross-country motorized vehicle use described in the No Action Alternative.

Closed areas under Alternative V would include WSAs (including inventoried ways) and non-WSA lands managed for their wilderness characteristics. The effects would be similar to those described for Alternative I but would cover the largest geographic area of all the alternatives.

The effects of seasonal closures for wildland fire prevention and BMPs would be similar to those described for Alternative I.

Impacts from Land Use Authorizations Actions

Land use authorizations, including road and utility ROWs and communication sites, typically have multiple components including infrastructure such as buildings, power transmission lines, meteorological towers, wind turbines, and roads for access. Activities associated with ROWs and communication sites can result in areas of soil surface disturbance with the potential for noxious weed and invasive plant introduction and spread. Construction of infrastructure components typically includes road improvement for use by heavy equipment. Buried cable or pipelines would result in disturbance of soils from trenching as well as access roads. Authorizations could include clearing areas of vegetation around structures and gravelling to reduce fire and provide parking.

Maintenance of facilities authorized by land use authorizations requires one or more access routes. Access routes may have a gravel or native surface, depending on the frequency, season, and type of maintenance needed. The effects of ROWs granted to provide access to Federal, State, and private land are usually limited to construction, use, and maintenance of roads. The relationship between noxious weeds and invasive plants and access routes for land use authorizations would be the same as described under *Impacts from Transportation and Travel*. All applications would be subject to detailed analysis on a case-by-case basis.

Impacts from Management Specific to the No Action Alternative

Under the No Action Alternative, potential utility development areas are identified for 75,000 acres (5% of the planning area).

The No Action restricts new communication sites to existing locations as much as possible. This would reduce potential for introduction and spread of noxious weeds and invasive plants by reducing soil surface disturbance associated with construction of access roads. Placement of communication sites at new locations would likely require new access roads and pads. At the landscape scale, impacts due to construction of new communication sites would be localized, but could provide entry points for noxious weed and invasive plant introduction and spread. The effects associated with access routes are described in detail under *Impacts from Transportation and Travel Actions.*

ROWs for roads, above-ground power transmission lines, buried power transmission lines or pipelines, or other linear facilities are highly variable regarding size of disturbance and type of access route. The effects regarding noxious weeds and invasive plants would be analyzed in more detail at the project level but would be similar to impacts described for buried pipelines under *Impacts from Livestock Grazing Actions* and roads in *Impacts from Transportation and Travel Actions*. Authorized agricultural uses or trespasses could locally increase potential for noxious weed and invasive plant introduction and spread to adjacent areas. Implementation of BMPs for all special use permits, road use permits, and easements would reduce potential for introduction and spread of noxious weeds and invasive plants in stipulated areas and adjacent lands.

Under the No Action Alternative, potential wind development areas are identified for 156,000 acres, 11% of the planning area. Impacts of wind developments to soils would include excavation for placement of meteorological towers, turbines, substation and maintenance facilities, power transmission lines, and construction, use, and maintenance of roads. Construction, use, and maintenance of meteorological towers would locally increase potential for the introduction and spread of noxious weeds and invasive plants. Impacts related to construction, use, and maintenance of wind turbines, substation and maintenance facilities, and power transmission lines would be similar to impacts from meteorological towers but would be larger in scale. Specific impacts relative to noxious weeds and invasive plants would be analyzed in detail for individual projects. Impacts of construction, use, and maintenance of access roads would be the same as impacts described under *Impacts from Transportation and Travel Actions.*

Impacts from Management Common to the No Action and All Action Alternatives

Use of BLM wind energy development program policies and BMPs would result in stipulated control of noxious weeds and invasive plants resulting from construction, maintenance and use of wind energy facilities.

Impacts from Management Common to All Action Alternatives

Management actions common to all alternatives would generally reduce potential for introduction and spread of noxious weeds and invasive plants by encouraging location of new ROWs and communication sites within existing disturbed corridors or sites. This would reduce the number of new access roads and pads and the effects associated with those developments.

Impacts from Management Specific to Alternative I

Under Alternative I, potential utility development areas are identified on 71,000 acres, 5% of the planning area. The effects of activities associated with construction, use, and maintenance of communication sites and ROWs relative to noxious weeds and invasive plants would be similar to those described for the No Action Alternative, but could occur over a slightly smaller geographic area.

Under Alternative I, potential wind development areas are identified on 60,000 acres, 4% of the planning area. Impacts of wind developments relative to noxious weeds and invasive plants would be the same as those described for the No Action Alternative, but would potentially occur on 39% of the geographic area. Wind energy would be encouraged in areas with annual grassland or non-native perennial grass communities. These areas have been altered by wildland fire or other disturbances, resulting in changes in vegetation composition, including presence of noxious weeds and invasive plants. Implementation of BMPs for control of noxious weeds and invasive plants would reduce potential for introduction and spread to other areas as a result of construction, maintenance, or use of wind energy facilities.

Impacts from Management Specific to Alternative II

Under Alternative II, potential utility development areas are identified on 77,000 acres, 6% of the planning area. The effects of activities associated with construction, use, and maintenance of communication sites and ROWs relative to introduction and spread of noxious weeds and invasive plants would be similar to those described for the No Action Alternative, but could occur over a slightly larger geographic area.

Under Alternative II, potential wind development areas are identified on 162,000 acres, 12% of the planning area. Impacts of wind developments relative to noxious weeds and invasive plants would be the same as those described for the No Action Alternative, but would occur on a slightly larger geographic area.

Impacts from Management Specific to Alternative III

Under Alternative III, potential utility development areas are identified on 71,000 acres, 5% of the planning area. The effects of activities associated with construction, use, and maintenance of communication sites and ROWs relative to potential for introduction and spread of noxious weeds and invasive plants would be the same as those described for Alternative I.

Under Alternative III, potential wind development areas are identified on 60,000 acres, 4% of the planning area. Impacts of wind developments relative to noxious weeds and invasive plants would be the same as those described for Alternative I.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Under Alternative IV, potential utility development areas are identified on 70,000 acres, 5% of the planning area. The effects of activities associated with construction, use, and maintenance of communication sites and ROWs relative to introduction and spread of noxious weeds and invasive plants would be the same as those described for Alternative I.

Under Alternative IV, potential wind development areas are identified on 59,000 acres, 4% of the planning area. Impacts of wind developments relative to noxious weeds and invasive plants would be the same as those described for Alternative I.

Impacts from Management Specific to Alternative V

Under Alternative V, potential utility development areas are identified on 59,000 acres, 4% of the planning area. The effects of activities associated with construction, use, and maintenance of communication sites and ROWs relative to noxious weeds and invasive plants would be the same as those described for Alternative I, but could occur over a slightly smaller geographic area.

Under Alternative V, potential wind development areas are identified on 59,000 acres, 4% of the planning area. Impacts of wind developments relative to noxious weeds and invasive plants would be the same as those described for Alternative I.

Impacts from Minerals Actions

Activities associated with mineral leasing and development can result in areas of soil surface disturbance with the potential for noxious weed and invasive plant introduction and spread. Surface occupancy for leasable, salable, and locatable mineral extraction would include some or all of the following developments and activities: removal of surface vegetation, alteration of landforms, construction of new or use and maintenance of existing transportation routes, heavy equipment operations, presence of personnel, overhead powerlines, surface piping, access restrictions, and permanent structures.

The relationship between noxious weeds and invasive plants and access routes for all mineral resources would be the same as described under *Impacts from Transportation and Travel Actions*. Applications would be subject to detailed analysis on a case-by-case basis.

Impacts from Management Specific to the No Action Alternative

Under the No Action Alternative, 317,000 acres (23% of the planning area) would be open for surface occupancy and have potential for oil and gas leasing. In areas closed to development or open with NSO restrictions, there would be little potential for noxious weeds and invasive plant introduction and spread due to oil and gas exploration and development activities. Areas open and with potential for exploration and development would be more likely to have some level of disturbance resulting from vegetation removal and disruption of soils for construction, use, and maintenance of facilities and roads. This would increase the potential for introduction and spread of noxious weeds and invasive plants within the designated open area. The relationship between the potential for introduction and spread of noxious weeds and invasive plants and access routes for minerals resources is the same as described under *Impacts from Transportation and Travel Actions*. According to the RFDS for oil and gas development (Appendix U), approximately 90 acres of surface disturbance are expected to occur in the planning area as a result of oil and gas exploration and development over the life of the plan. This is less than 0.1% of the potential oil and gas areas that would be available for oil and gas leasing.

Under the No Action Alternative, 388,000 acres (28% of the planning area) would be open to surface occupancy and have medium to high potential for geothermal leasing. Impacts would be the same as those described for potential oil and gas leasing, but could occur over a larger geographic area. According to the RFDS for geothermal development (Appendix V), between 185 and 230 acres of surface disturbance are expected to occur in the planning area as a result of geothermal exploration and development over the life of the plan. This is less than 0.1% of the potential geothermal areas that would be available for geothermal leasing.

Under the No Action Alternative, the acreage on which salable mineral development occurs is expected to increase from approximately 1,300 acres to approximately 2,300 acres over the life of the plan. This is approximately 0.2% of the area available for salable mineral development. Individual sites would have some level of disturbance due to vegetation removal and disruption of soils for construction, use, and maintenance of facilities and roads. These locations could be prone to introduction of noxious weeds and invasive plants and use could facilitate spread to other areas.

Under the No Action Alternative, 218,000 acres (16% of the planning area) would be recommended for withdrawal from locatable mineral entry. About 84% of the planning area would have potential for some level of disturbance due to vegetation removal and disruption of soils for construction, use, and maintenance of facilities and roads. It is unlikely that disturbance would be proportional to the area open for development due to the limited potential for locatable mineral discovery in the planning area; however, disturbed areas could be prone to introduction of noxious weeds and invasive plants and use could facilitate spread to other areas. Disturbed areas are expected to be small relative to the designated open area.

Impacts from Management Common to the No Action and All Action Alternatives

Implementation of BMPs would reduce potential for introduction and spread of noxious weeds and invasive plants in areas developed for leasable and salable mineral extraction. This could also reduce potential for spread to adjacent areas.

Impacts from Management Common to All Action Alternatives

Actions common to all action alternatives for salable minerals would stipulate control of noxious weeds and invasive plants in areas with ground disturbance. This would reduce the potential for use of these sites to facilitate spread of noxious weeds and invasive plants to other areas.

Impacts from Management Specific to Alternative I

Under Alternative I, 340,000 acres (25% of the planning area) would be open to surface occupancy and have potential for oil and gas leasing. Impacts regarding the potential for noxious weed and invasive plant introduction and spread would be the same as those described for the No Action Alternative, but would potentially occur over an additional 2% of the planning area.

Under Alternative I, 399,000 acres (29% of the planning area) would be open to surface occupancy and have medium to high potential for geothermal leasing. Impacts regarding the potential for noxious weed and invasive plant introduction and spread would be the same as those described for the No Action Alternative, but could potentially occur over a an additional 1% area.

Under Alternative I, 1,194,000 acres (87% of the planning area) would be open for salable mineral development. The acreage on which salable mineral development occurs is expected to increase from approximately 1,300 acres to approximately 2,300 acres over the life of the plan. This is approximately 0.2% of the area available for salable mineral development. Areas open for salable mineral development would have greater potential for introduction and spread of noxious weeds and invasive plants due to vegetation removal and disruption of soils for construction, use, and maintenance of facilities and roads. However, the disturbed area is expected to be small relative to the designated open area, based on current and anticipated demand for salable minerals. The relationship between potential for introduction and spread of noxious weeds and invasive plants and access routes for minerals resources are the same as described under *Impacts from Transportation and Travel Actions*.

Alternative I would recommend 113,000 acres (8% of the planning area) for withdrawal from locatable mineral development. The effects of withdrawal would be the same as described for the No Action Alternative, but would occur over 8% less of the planning area. The effects of locatable mineral extraction would be the same as those described for the No Action Alternative.

Impacts from Management Specific to Alternative II

Under Alternative II, 359,000 acres (26% of the planning area) would be open to surface occupancy and have potential for oil and gas leasing. Impacts regarding the potential for introduction and spread of noxious weeds and invasive plants would be the same as for the No Action Alternative, but would potentially occur over an additional 3% of the planning area.

Under Alternative II, 416,000 acres (30% of the planning area) would be open to surface occupancy and have medium to high potential for geothermal leasing. Impacts regarding the potential for introduction and spread of noxious weeds and invasive plants would be the same as for the No Action Alternative, but would potentially occur over an additional 2% of the planning area.

Under Alternative II, 1,279,000 acres (93% of the planning area) would be open to salable mineral development. The acreage on which salable mineral development occurs is expected to increase from approximately 1,300 acres to approximately 3,300 acres over the life of the plan. This is approximately 0.2% of the area available for salable mineral development. Impacts regarding the potential for introduction and spread of noxious weeds and invasive plants would be the same as described for Alternative I, but would potentially occur over an additional 6% of the planning area.

Alternative II would recommend 42,000 acres, 3% of the planning area, for withdrawal from locatable mineral development. The effects of withdrawal would be the same as described for the No Action Alternative, but would occur over 13% less of the planning area. The effects of locatable mineral extraction would be the same as those described for the No Action Alternative.

Impacts from Management Specific to Alternative III

Under Alternative III, 359,000 acres, 26% of the planning area, would be open to surface occupancy and have potential for oil and gas leasing. Impacts regarding the potential for introduction and spread of noxious weeds and invasive plants would be the same as those described for Alternative II.

Under Alternative III, 415,000 acres, 30% of the planning area, would be open to surface occupancy and have medium to high potential for geothermal leasing. Impacts regarding the potential for introduction and spread of noxious weeds and invasive plants would be the same as those described for Alternative II.

Under Alternative III, 1,237,000 acres, 90% of the planning area, would be open to salable mineral development, with the same levels of development expected as under Alternative II. This is approximately 0.2% of the area available for salable mineral development. Impacts regarding the potential for introduction and spread of noxious weeds and invasive plants would be the same as described for Alternative I, but would potentially occur over an additional 3% of the planning area.

Alternative III would recommend 88,000 acres, 6% of the planning area, for withdrawal from locatable mineral development. The effects of withdrawal would be the same as described for the No Action Alternative, but would occur over 10% less of the planning area. The effects of locatable mineral extraction would be the same as those described for the No Action Alternative.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Under Alternative IV, 329,000 acres, 24% of the planning area, would be open to surface occupancy and have potential for oil and gas leasing. Impacts regarding the potential for introduction and spread of noxious weeds and invasive plants would be the same as those described for the No Action Alternative, but would potentially occur over an additional 1% of the planning area.

Under Alternative IV, 405,000 acres, 30% of the planning area, would be open to surface occupancy and have medium to high potential for geothermal leasing. Impacts regarding the potential for introduction and spread of noxious weeds and invasive plants would be the same as for Alternatives II and III.

Under Alternatives IV-A and IV-B (the Preferred Alternative), 1,107,000 acres (81% of the planning area) and 1,138,000 acres (83% of the planning area), respectively, would be open to salable mineral development, with the same levels of development expected as under Alternative I. Impacts regarding the potential for introduction and spread of noxious weeds and invasive plants would be the same as described for Alternative I, but would potentially occur over 6% and 4% less of the planning area, respectively.

Alternative IV would recommend 142,000 acres, 10% of the planning area, for withdrawal from locatable mineral development. The effects of withdrawal would be the same as described for the No Action Alternative, but would occur over 6% less of the planning area. The effects of locatable mineral extraction would be the same as those described for the No Action Alternative.

Impacts from Management Specific to Alternative V

Under Alternative V, 322,000 acres, 23% of the planning area, would be open to surface occupancy and have potential for oil and gas leasing. Impacts regarding the potential for introduction and spread of noxious weeds and invasive plants would be the same as those described for No Action Alternative.

Under Alternative V, 399,000 acres, 29% of the planning area, would be open to surface occupancy and have medium to high potential for geothermal leasing. Impacts regarding the potential for introduction and spread of noxious weeds and invasive plants would be the same as those described for the No Action Alternative, but would occur over an additional 1% of the planning area.

Under Alternative V, 1,184,000 acres, 86% of the planning area, would be open to salable mineral development, with the same levels of development expected as under Alternative I. Impacts regarding the potential for introduction and spread of noxious weeds and invasive plants would be the same as described for Alternative I, but would potentially occur over 1% less of the planning area.

Alternative V would recommend 48,000 acres, 4% of the planning area, for withdrawal from locatable mineral development. The effects of withdrawal would be the same as described for the No Action Alternative, but would occur over 12% less of the planning area. The effects of locatable mineral extraction would be the same as those described for the No Action Alternative.

Impacts from Areas of Critical Environmental Concern Actions

ACECs are designated to manage for identified relevant and important values, including upland and riparian vegetation, special status plants or animals, paleontological resources, or cultural resources. Management actions for relevant and important values are evaluated for potential to decrease introduction and spread of noxious weeds and invasive plants.

Impacts from Management Specific to the No Action Alternative

Actions prescribed under the No Action Alternative would limit to some extent human and livestock use and developments that would result in surface-disturbing activities. This would have the general effect of reducing potential for introduction and spread of noxious weeds and invasive plants.

Impacts from Management Specific to Alternative I

Actions prescribed under Alternative I would generally reduce the potential for the introduction and spread of noxious weeds and invasive plants by managing to reduce the amount and extent of surface-disturbing activities. Alternative I also includes specific management direction for integrated treatment of noxious weeds and invasive plants in the Bruneau-Jarbidge, Lower Bruneau Canyon, Middle Snake, and Salmon Falls Creek ACECs that would enhance the potential for control, containment, and potentially eradication. Treatments in the Bruneau-Jarbidge ACEC would be prioritized for areas with concentrated recreational and livestock use. Inclusion of the stipulation for weed-free forage and straw would further reduce potential for introduction, particularly in high-use areas.

Impacts from Management Specific to Alternative II

Existing ACEC designations would be removed and no new ACECs would be designated. The effects described in the No Action Alternatives would not occur.

Impacts from Management Specific to Alternative III

The effects of actions prescribed under Alternative III would be similar to those described for Alternative I for the Bruneau-Jarbidge and Salmon Falls Creek ACECs. Treatment priorities for the Bruneau-Jarbidge ACEC would extend to the entire ACEC, instead focusing on areas of high use.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

The effects of actions prescribed under Alternative IV would be similar to those described for Alternative I, but would apply to the Bruneau-Jarbidge, Inside Desert, Jarbidge Foothills, and Lower Bruneau Canyon ACECs. Treatment priorities in the Bruneau-Jarbidge ACEC would focus on areas with concentrated recreational and livestock use. Alternative IV-A would prioritize the greatest acreage for active integrated weed management compared to all other alternatives, followed by Alternative IV-B (the Preferred Alternative). The effects of closing areas to livestock grazing and motorized vehicle use on upland vegetation communities are described under *Impacts from Livestock Grazing Actions* and *Impacts from Transportation and Travel Actions*.

Impacts from Management Specific to Alternative V

The kinds of effects of actions prescribed under Alternative V would be similar to those described for Alternative I, but would apply to the Lower Bruneau, Middle Snake, and Sagebrush Sea ACECs. Alternative V would contain the greatest acreage of all alternatives identified for treatment. However, treatments in the Sagebrush Sea ACEC, which would comprise the majority of the area, could include passive methods, which could increase the time required for control, containment, or eradication.

Summary of Direct and Indirect Impacts

Table 4- 159 contains a summary of the impacts from proposed management by alternative. Alternatives were qualitatively rated based on the extent to which actions reduced the potential for noxious weed and invasive plant introduction and spread.

Table 4- 159. Summary of Impacts to Noxious Weeds and Invasive Species by Alternative

Section	Alternatives						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
Noxious Weeds and Invasive Plants	6	3	5	4	1		2
Upland Vegetation Communities	6	3	5	4	1		2
Wildland Fire Ecology and Management	7	4	6	5	2	3	1
Livestock Grazing	5	4	7	6	2	3	1
Transportation and Travel	6	3	5	4	2		1
Land Use Authorizations	4	3	5	3	2		1
Leasable Minerals – Potential Oil and Gas	1	3	4	4	2		1
Leasable Minerals – Potential Geothermal	1	2	3	3	2		2
Salable Minerals	1	5	7	6	2	3	4
Locatable Minerals	1	3	6	4	2		5
ACECs	6	4	7	5	1	2	3

Note: Rankings within a row are intended to convey how well each alternative reduces potential for noxious weed introduction and spread. A ranking of 1 indicates that the alternative results in low potential of noxious weed and invasive plant introduction and spread; a ranking of 7 would indicate high potential for introduction and spread. Ranking are for comparison purposes only and are not meant to be additive by alternative.

Impacts from the No Action Alternative

The No Action Alternative ranked sixth in reducing the potential for the introduction and spread of noxious weeds and invasive plants throughout the planning area. The No Action Alternative would do little to change current trends for noxious weeds and invasive plants through vegetation treatments, wildland fire management, travel management, or land use authorizations. The No Action Alternative contains the least potential for leasable, salable, and locatable mineral development compared to the action alternatives.

Overall, the No Action Alternative would result in minor adverse impacts to vegetation communities due to the limited amount of reduction in introduction and spread of noxious weeds and invasive plants.

Impacts from Alternative I

Alternative I ranked fourth for reducing the potential for the introduction and spread of noxious weeds and invasive plants. Management actions proposed under Alternative I tend to moderate disturbance to vegetation and soil resources while allowing for multiple uses.

Alternative I would result in minor beneficial impacts to vegetation communities due to the maintenance of current conditions with some potential for reduction in introduction and spread of noxious weeds and invasive plants over the long-term.

Impacts from Alternative II

Alternative II would do the least to reduce the potential for the introduction and spread of noxious weeds and invasive plants. Alternative II allows for the highest level of resource use and maintains the vegetation of the planning area in non-native perennial grasslands. This community type would be relatively stable and would provide some level of resistance to noxious weed and invasive plant introduction and spread. Higher livestock grazing allocations as well as anticipated increased number and density of livestock facilities would tend to reduce vegetation cover and disrupt soils in facility locations. Alternative II also allows for increased access for recreation, commodity use, and mineral extraction. Impacts associated with density of roads would increase potential for introduction and spread of noxious weeds and invasive plants.

Overall, Alternative II would result in moderate adverse impacts to vegetation communities due to the increased potential for the introduction and spread of noxious weeds and invasive plants.

Impacts from Alternative III

Alternative III ranked fifth for reducing the potential for the introduction and spread of noxious weeds and invasive plants. Management actions proposed under Alternative III focus primarily on creating conditions to improve fire suppression activities and reduce fire size. While less fire on the landscape would reduce potential for noxious weed and invasive plant introduction and spread, the actions proposed under Alternative III would result in an increase in short- and long-term impacts resulting primarily from construction, use, and maintenance of roads and fire suppression facilities, creation and maintenance of fire breaks, and use of livestock grazing to reduce fuels. The potential for noxious weed and invasive plant introduction and spread could also be increased due to higher potential for mineral development compared to the other alternatives except Alternative II.

Overall, Alternative III would result in minor adverse impacts to vegetation communities. Despite the reduction in fire size, the increase in soil disturbance associated with fire suppression access and fuels reduction activities would increase the potential for the introduction and spread of noxious weeds and invasive plants.

Impacts from Alternative IV (the Preferred Alternative)

Alternative IV does the most of all the alternatives to reduce the potential for the introduction and spread of noxious weeds and invasive plants throughout the planning area. Alternative IV contains specific actions that reduce the amount and extent of disturbance to vegetation, soils, and biological soil crusts. Alternative IV would provide management to reduce long-term potential for noxious weed and invasive plant introduction and spread through upland vegetation treatments to restore native shrubland communities, fire management priorities that protect existing and restored native shrubland communities, reductions in livestock grazing allocations and facilities, travel designations, land use authorizations, and mineral development. The potential for the introduction and spread of noxious weeds and invasive plants would be slightly larger in Alternative IV-B (the Preferred Alternative) than Alternative IV-A due to the decreased acres in ACEC designations, allowing for more ground-disturbing activities. Therefore, Alternative IV-A was ranked first and Alternative IV-B was ranked second for reducing potential for noxious weed and invasive plant introduction and spread.

Overall, Alternative IV would result in moderate beneficial impacts to vegetation communities due to the focus on protection and restoration of native plant communities and reduction in soil-disturbing activities associated with resource uses.

Impacts from Alternative V

Alternative V ranked third for reducing potential for introduction and spread of noxious weeds and invasive plants. Alternative V would do less to restore native shrubland communities due to a more passive approach to vegetation treatments. While this would reduce short-term impacts to existing vegetation and soils, long-term effects related to restoration of upland vegetation communities would cover a smaller geographic area compared to Alternative IV. Alternative V also contains greater potential for noxious weed and invasive plant introduction and spread associated with for potential mineral development.

Overall, Alternative V would result in minor beneficial impacts to vegetation communities due to the passive nature of vegetation treatments.

Cumulative Impacts

Past, Present, and Reasonably Foreseeable Actions

Cumulative impacts for noxious weeds and invasive plants consist of incremental effects of the alternatives when added to other past, present, and reasonably foreseeable future actions. These effects can occur over a long period of time, resulting in the gradual changes in potential noxious weed and invasive plant introduction and spread.

Because of similarities in geology, soils, and vegetation, the planning area and the following areas form the geographic boundary for the analysis of cumulative effects on noxious weeds and invasive plants: adjacent portions of BLM's Burley, Bruneau, Shoshone, and Wells FOs and Snake River Birds of Prey NCA; the South Hills Unit of the Sawtooth National Forest; and the Jarbidge Ranger District of the Humboldt-Toiyabe National Forest. This area includes Federal, State, and private lands. The temporal scope of the analysis is approximately 20 years or the life of the plan.

Past, present, and reasonably foreseeable actions for the following resource and resource uses cumulatively affect noxious weeds and invasive plants:

- Military Use
- Wildland Fire Ecology and Management
- Livestock Grazing
- Transportation and Travel
- Land Use Authorizations

These actions are described in detail in the *Introduction* to this chapter.

Summary of Cumulative Impacts

Cumulative Impacts from the No Action Alternative

Past livestock grazing and wildland fires resulted in vegetation removal and, in some areas, replacement with annual or non-native perennial communities. This conversion has been extensive throughout the cumulative analysis area, particularly in areas where the elevation is less than 5,000 feet. Wildland fires and associated impacts to plant communities are expected to continue within the planning area as well as adjacent Federal, State, and private lands. Under the No Action Alternative, frequency and scale of wildland fire is expected to occur at current or increased levels. High suppression priorities for ignitions on military ranges could shift suppression efforts away from BLM-managed lands within the planning area or adjacent Federal, State, or private lands in the event of multiple incidents. This could result in local or large-scale increases in introduction and spread of noxious weeds and invasive plants. Removal of livestock from burned public lands and shifting use elsewhere could result in potential for increased introduction and spread of noxious weeds and invasive plants on other Federal, State, or private lands.

Because most of the planning area would remain open to cross-country motorized vehicle use, users from surrounding areas with more restrictions (e.g., National Forests and the Snake River Birds of Prey NCA) would likely utilize the planning area, increasing the potential for introduction and spread of noxious weeds and invasive plants into previously unused areas.

Past and proposed future land use authorizations have occurred and could occur on adjacent Federal, State, and private lands. Increased introduction and spread of noxious and invasive weeds could occur on affected ownerships, and the effects associated with construction, use, and maintenance of access routes for facilities on adjacent lands could be additive to those described and analyzed for the No Action

Alternative. Cumulative effects from land use authorizations would be higher for the No Action Alternative than Alternatives I, III, IV, and V due to fewer restrictions on commercial development.

Cumulative Impacts from Alternative I

Under Alternative I, cumulative impacts related to wildland fire would be due to upland vegetation treatments and wildland fire management actions that would increase vegetation resilience and reduce fire size. This would potentially reduce impacts of wildland fire and associated potential for noxious weed and invasive plant introduction and spread on adjacent Federal, State, and private lands.

Alternative I would increase the acres of areas closed and limited to designated routes within the cumulative analysis area. Restrictions in the planning area may result in increased impacts on adjacent Federal and State lands where cross-country motorized vehicle use is less restricted. Increased impacts to adjacent BLM lands would be short-term since the Bruneau, Burley, and Shoshone FOs are scheduled to prepare RMPs for their respective planning areas in the near future. Likewise, the Humboldt-Toiyabe National Forest has initiated their travel management planning process. According to current policy, travel designations would substantially decrease the amount of areas open to cross-country motorized vehicle use.

Cumulative impacts for noxious weed and invasive plant introduction and spread could increase throughout the region due to potential land use authorizations for energy projects. Cumulative impacts to the planning area should be less extensive under Alternative I compared to the No Action Alternative and Alternative II, which incorporate fewer restrictions on commercial development. This could shift impacts to adjacent Federal, State, and private lands.

Cumulative Impacts from Alternative II

Cumulative impacts regarding potential for introduction and spread of noxious weeds and invasive plants under Alternative II are expected to be similar to the No Action Alternative. Alternative II prioritizes the least acres of all action alternatives for critical suppression and creates a landscape dominated by non-native perennial communities. While these plant communities are relatively resilient in the event of fire, fire management priorities would increase potential for fire spread to adjacent Federal, State, and private lands. This would increase potential in those areas for noxious weed and invasive plant introduction and spread.

Although no areas would be open to cross-country motorized vehicle use, the impacts to soil resources would be larger in scale due to the expected increase in route density associated with commercial operations. As with Alternative I, the lack of cross-country motorized vehicle opportunities would likely shift current use to adjacent Federal or State lands with fewer restrictions.

Cumulative impacts regarding the introduction and spread of noxious weeds and invasive plants through energy development under Alternative II are expected to be similar to those described for the No Action Alternative.

Cumulative Impacts from Alternative III

Under Alternative III, cumulative effects of wildland fire management on the potential for noxious weed and invasive plant introduction and spread are expected to be slightly greater than Alternative I. Increases in fire suppression infrastructure could reduce potential for fire to spread to adjacent Federal, State, and private lands. However, potential for introduction and spread of noxious weeds and invasive plants would be greater. Cumulative impacts related to transportation and travel actions and potential energy development would be similar to Alternative I.

Cumulative Impacts from Alternative IV (the Preferred Alternative)

Under Alternative IV, cumulative impacts regarding the potential for noxious weed and invasive plant introduction and spread related to wildland fire management are expected to be slightly less than Alternative I. This is due to the larger number of acres prioritized for critical suppression and the reduced potential for fire spread to adjacent Federal, State, and private lands. The cumulative effects of transportation and travel actions and potential energy development would be similar to Alternative I.

Cumulative Impacts from Alternative V

Under Alternative V, cumulative impacts regarding the potential for noxious weed and invasive plant introduction and spread related to wildland fire management would be fewest of all alternatives. Critical suppression priorities could reduce potential for spread to adjacent Federal, State, and private lands. Alternative V contains the most restrictive travel management allocations of all the alternatives. The lack of cross-country motorized vehicle opportunities would likely shift current use to adjacent Federal or State lands with fewer restrictions. Likewise, Alternative V contains the least acreage identified for utility corridors and wind energy development projects. This could shift development from the planning area onto adjacent Federal, State, or private lands.

4.3.9. Wildland Fire Ecology and Management

Analysis Methods

Indicators

The following indicators were used for the analysis of impacts to wildland fire ecology and management:

- **Fire size** – This indicator measures the effectiveness of management actions including suppression actions and vegetation treatments, both inside and outside the Wildland Urban Interface (WUI). Suppression actions can reduce the size of fires, while vegetation treatments can alter fire behavior characteristics such as rate of spread. Rate of spread directly relates to fire size with higher rate of spread indicating a larger fire size. As fire size increases, so do the costs associated with suppressing the fire.

- **Number of human-caused fires** – This indicator is a measure of the effectiveness of management actions which reduce the number of fires caused by humans. Actions that reduce the number of human-caused fires include restrictions on human activities such as travel and land use and preventative action such as education.

- **Fire Regime Condition Class (FRCC)** – BLM policy requires current and desired resource conditions related to fire management to be described in terms of FRCC. This indicator measures the effectiveness of fuels, Emergency Stabilization and Burned Area Rehabilitation (ES&BAR), and other vegetation treatment actions. FRCC is dependent on changes in fire return interval, fire severity, and vegetation. Changes are measured by the degree of departure from a historical reference condition as it pertains to both vegetation seral classes and fire frequency. Any action which alters vegetation seral classes or fire frequency could change the FRCC.

Methods and Assumptions

Impacts to wildland fire ecology and management from management in the following sections were analyzed in detail: *Wildland Fire Ecology and Management*, *Livestock Grazing*, *Recreation*, *Transportation and Travel*, and *Land Use Authorizations*. Impacts from management in the *Vegetation Communities* and *Noxious Weeds and Invasive Plants* sections were captured in the analysis of impacts from wildland fire ecology and management sections and to avoid repetition, were not discussed separately. Management from the remaining sections was excluded from detailed analysis because the management did not vary measurably between alternatives or impact the indicators for wildland fire ecology and management. **Impacts from management for wildland fire** can be found under *Impacts from Wildland Fire Ecology and Management Actions* in the *Air Quality*, *Climate Change*, *Soil Resources*, *Water Resources*, *Upland Vegetation*, *Riparian Areas and Wetlands*, *Fish*, *Wildlife*, *Special Status Plants*, *Special Status Fish and Aquatic Invertebrates*, *Special Status Wildlife*, *Noxious Weeds and Invasive Plants*, *Wild Horses*, *Cultural Resources*, *Livestock Grazing*, *Recreation*, and *Transportation and Travel* sections.

Wildland Fire Ecology and Management

Fire management actions related to suppression that affect fire size and the number of human-caused fires were identified to determine the impacts of fire suppression actions. These suppression actions include developing water sources, increasing access, implementing or engaging in prevention activities, and building infrastructure to decrease response times. The actions were analyzed collectively and are assumed to have an effect on fire size and the number of human-caused fires, both within and outside the WUI.

Since specific locations of the suppression actions are not identified, it is assumed the actions would be prioritized by VMA as identified in Chapter 2. The following fire information was ascertained for each VMA using the historical data from 1987 through 2007:

- Percentage of the total fires in the planning area
- Average number of fires per year
- Percentage of total fires caused by humans in the planning area
- Average number of fires in Critical Suppression Areas
- Acres of hazardous fuels within the WUI

To determine the effects of suppression actions for each alternative, the top two priority VMAs and their associated fire information were evaluated. This analysis was based on the assumption that alternatives that placed the suppression priority in the VMAs with the most fire activity and hazardous fuels would be more effective in reducing fire size and the number of human-caused fires.

Management actions related to vegetation treatments may result in a change to the fuel model and therefore fire behavior, including rate of spread. The analyses of vegetation treatments that affect fuel model include all vegetation treatments from management actions for *Upland Vegetation*, *Noxious Weeds and Invasive Plants*, and *Wildland Fire Ecology and Management*. A fuel model was assigned to each Successional class (S-Class) within each Potential Natural Vegetation Group (PNVG) using *Standard Fire Behavior Fuel Models* (Scott & Burgan, 2005)*.* The acres within each fuel model for each alternative were determined using the management actions for vegetation treatments by VMA. Assumptions used in this component of the analysis include:

- There is a direct relationship between rate of spread and fire size. Higher rates of spread result in larger fire size, while lower rates of spread result in smaller fire size.
- All vegetation treatments within WUI would reduce fire size regardless of changes to FRCC ratings. Vegetation treatments within WUI would be focused on reducing fire size by modifying fuel models and rates of spread.

Management actions related to vegetation treatments may result in a change to vegetation and S-Classes within PNVGs. The projected acres within each S-Class were calculated by VMA for each alternative based on all vegetation treatments from management actions for *Vegetation Communities*, *Noxious Weeds and Invasive Plants*, and *Wildland Fire Ecology and Management*. Using the projected acres within each S-Class, the projected S-Class similarity was calculated for each alternative by VMA. The projected S-Class similarity is the comparison of the proportion of the PNVG within each S-Class after vegetation treatments are implemented to the proportions in the FRCC S-Class reference condition for that PNVG. Reference conditions were determined using the *Interagency and The Nature Conservancy Fire Regime Condition Class* website (Hann, 2008) and the *Interagency Fire Regime Condition Class Guidebook* (Hann, 2004). Projected S-Class similarities were then compared to S-Class similarities calculated for baseline vegetation conditions. Projected-S Class similarities were also the basis for determining an overall FRCC rating for each PNVG in each VMA. Assumptions used in this component of the analysis include:

- Most PNVGs within the planning area have burned more frequently than the historic fire return interval. Management actions that improve FRCC (i.e., move an area toward FRCC 1) would lengthen the mean fire return interval for these PNVGs.
- All vegetation treatments would be successful as identified in the *Vegetation Communities* section.
- Vegetation treatments that may impact FRCC could be from any management action that pertains to vegetation treatments, including actions for fuels and ES&BAR.

Livestock Grazing

Management actions for livestock grazing were identified and evaluated for their effect on wildland fire ecology and management. The fire history, fuel distribution, and livestock grazing actions that would affect AUMs and utilization levels were examined. Estimated utilization levels of non-native vegetation were compared between the alternatives since areas with these vegetation types are prone to frequent fires and large fires. It was assumed higher utilization levels in non-native vegetation would have an immediate effect in decreasing fire size (Launchbaugh, et al., 2008; Strand, et al., 2007), especially in areas dominated by cheatgrass. AUMs were used to compare the No Action Alternative with the action alternatives since no levels of utilization are identified in the current management plan. While the number of AUMs could not be attributed to a specific vegetation type or area in the current plan, it was assumed that a higher amount of allowable AUMs would have more of an effect in decreasing fire size.

Since changes in vegetation affect FRCC, analyses of impacts from livestock grazing actions in the *Upland Vegetation* and *Noxious Weeds and Invasive Plants* sections were used to form a direct relationship to change in FRCC. For example, if the analysis in the *Upland Vegetation* and *Noxious Weeds and Invasive Plants* sections showed no change to vegetation from grazing, then there would be no change to FRCC from grazing.

Recreation

Management actions for recreation were identified and evaluated for their effect on wildland fire ecology and management. Each SRMA was evaluated as to type, size, location, and expected change in the amount of use. Most of the SRMAs that would be designated in each alternative are not expected to affect the number of human-caused fires. The larger SRMAs, Canyonlands and Jarbidge Foothills, promote activities associated with campfires, which are the leading human cause of wildland fires. However, these areas are not expected to see an increase in use whether they are designated as SRMAs or not and would not increase the number of human-caused fires. Similarly, recreational use in the Bruneau-Jarbidge and Jarbidge Forks SRMAs is not expected to increase; therefore, the number of human-caused fires is not expected to increase. The areas within the Balanced Rock, Little Pilgrim, and Salmon Falls Reservoir SRMAs are expected to see an increase in use and an increase in infrastructure to manage that use if they are designated. However, infrastructure such as fire rings would decrease the number of human-caused fires, while improved road systems and parking areas would decrease fuels and create barriers to fire starts and growth. As a result, this section of the analysis focuses on the areas each alternative would proactively manage for motorized recreational use, primarily OHV use. Assumptions used in this component of the analysis include:

- SRMAs managed for OHV use would increase human-caused fires more than SRMAs managed for other recreational uses.

Transportation and Travel

Management actions for transportation and travel were identified and evaluated for their effect on wildland fire ecology and management. To determine the effect of these actions, the number of acres of each travel designation (i.e., open to cross-country motorized vehicle use, limited to designated routes, limited to designated ways, or closed to motorized vehicle use) was calculated by VMA for each alternative. Assumptions used in this component of the analysis include:

- Areas identified as open to cross-country motorized vehicle use would increase human-caused wildland fires.
- Areas identified as limited to designated routes or ways and areas closed to motorized vehicle use would decrease human-caused wildland fires.

Land Use Authorizations

Management actions for land use authorizations were identified and evaluated for their effect on wildland fire ecology and management. Actions that would increase or decrease the number of acres available for utility development, wind development, and exclusion areas were identified as actions that would affect fire starts because of the increase in human activity associated with the development of projects. The difference in acres between alternatives was compared and evaluated. Assumptions used in this component of the analysis include:

- Increases in the number of acres available and with potential for development would increase human-caused wildland fires.
- Increases in the number of acres excluded for development would decrease human-caused wildland fires.

Direct and Indirect Impacts

Impacts from Wildland Fire Ecology and Management Actions

Vegetation community management directly impacts wildland fire ecology and management (Brown & Smith, 2000). This management affects the direction of ES&BAR and fuels treatments and influences fire behavior, fire regime, fire return interval, and FRCC. Many noxious weeds and invasive plants are fine fuels that carry fire across the landscape, burn rapidly, and are difficult to suppress. Many noxious weeds and invasive plants, because of their flammability, may shorten the fire return interval in the planning area as compared to the Historic Fire Regime (HFR). This is true for cheatgrass (Young & Blank, 1995).

Impacts from actions from the *Upland Vegetation* section of *Vegetation Communities* and *Noxious Weeds and Invasive Species* sections of Chapter 2 are analyzed in this section in order to avoid repetition.

Impacts from Management Specific to the No Action Alternative

In the No Action Alternative, fires would be managed for full suppression in order to reduce fire size. Indirect attack would be preferred over surface disturbance. Indirect attack implies an acceptance of a larger fire. There would be no emphasis on changing FRCC, reducing the number of human-caused fires, and reducing impact to WUI. Currently, the planning area averages 23 fires per year, of which an average of 9 fires are caused by human actions. There are 71,000 acres of hazardous fuels in WUI, which would not decrease due to the lack of emphasis on reducing hazardous fuels in WUI. It is difficult to determine a trend for increases or decreases in the number of fires from the fire history data.

While full suppression is one of the management actions, the number of acres burned is increasing per fire. The benchmark for the most acres per year is also increasing: 64,000 acres in 1987, 136,000 in 1995, 201,000 in 2005, and 438,000 in 2007. This alternative would have the least impact in reducing fire size, as shown by the trend in fire history and the lack of actions addressing changes to FRCC. With no emphasis on prevention, mitigation, or other actions to reduce fire starts, fire numbers would increase or, at minimum, stay at the current trend. FRCC would also trend towards FRCC 3 under current vegetation management direction.

Impacts from Management Common to All Action Alternatives

Management actions common to all action alternatives would decrease fire size and the number of human-caused fires.

Impacts from Management Specific to Alternative I

Under Alternative I, fire suppression management actions focus on VMAs C and B. The historical data show 61% of the fire starts, or 14 fires, occurred in VMAs C and B yearly. An average of 6 of the 14 fires occurred in the Critical Suppression Areas. Designating these areas as Critical Suppression Areas would address high hazard WUI, specific ACECs, and key sage-grouse habitat. Historically within these VMAs, an average of six fires was caused by humans yearly. Forty-four percent, or 31,000 acres, of all WUI with hazardous fuels occur within VMAs C and B, with the majority being in VMA B. Because the suppression actions in Alternative I are primarily concentrated in VMAs with a moderate amount of fire potential, this alternative would result in the second highest reduction in the number of human-caused fires and fire size outside and within the WUI.

Vegetation treatments that change the current plant community could also change the fuel model and fire behavior, including rate of spread. Each plant community is associated with a class of fire behavior. Table 4- 160 shows the change in plant community as measured by change in fire behavior class using rate of spread for each VMA. For example “No Change” for a fire with a “Very Low” rate of spread indicates there was neither an increase nor decrease, due to treatments, in the acres of vegetation associated with the "Very Low" class of rate of spread.

Table 4- 160. Change in Rate of Spread of Fire for Alternative I

Rate of Spread	VMA A	VMA B	VMA C	VMA D
Very Low (0-2 Ch/Hr [A])	No Change	No Change	No Change	No Change
Low (2-5 Ch/Hr)	No Change	No Change	No Change	No Change
Moderate (5-20 Ch/Hr)	No Change	No Change	No Change	Decrease 1%
High (20-50 Ch/Hr)	Increase 11%[B]	Increase 3%	No Change	Increase 2%
Very High (50-150 Ch/Hr)	Decrease 11%	Decrease 3%	No Change	Decrease 1%
Not Rated	No Change	No Change	No Change	No Change

[A] Ch/Hr = Chains per hour; 1 chain = 66 feet
[B] Percentages refer to the percent of acres within the planning area.

VMA A would have the most change with 11% of the VMA experiencing a reduction in rate of spread from Very High to High (Table 4- 160). When all changes are calculated for the planning area, this alternative could reduce the rate of spread on 3% of the planning area. Along with Alternative V, this alternative would reduce the rate of spread of fires across the planning area more than the No Action Alternative and less than Alternatives II, III, and IV.

Vegetation treatments within the WUI would be focused on 4,000 acres in the northern portion of the planning area. This reduction in risk to the WUI would be the same as Alternative IV (4,000 acres), more than Alternative V (3,000 acres) and the No Action Alternative (no acres), but less than Alternative II (5,000 acres) and Alternative III (6,000 acres).

Vegetation treatments have been identified for specific PNVGs. Treatments can change S-Class similarity and result in overall change in FRCC for each PNVG. Table 4- 161 shows the PNVG for each VMA which would receive vegetation treatments and the amount of change in S-Class similarity resulting in the change to the overall FRCC. Only PNVGs that were identified for treatments were analyzed and reflected in the table.

Vegetation treatments implemented for this alternative could improve S-Class similarity in all PNVGs across all VMAs except Wyoming Sagebrush Steppe and Mountain Big Sagebrush in VMA D (Table 4-161). The overall FRCC rating would improve to FRCC 1 for Wyoming Sagebrush Steppe in VMAs B and C and Basin Big Sagebrush in VMA D. All other PNVGs would be in FRCC 2, except Wyoming Sagebrush Steppe in VMA A would remain at FRCC 3.

Table 4- 161. Change in S-Class Similarity and Overall FRCC for Alternative I

VMA	PNVG	S-Class Similarity	Overall FRCC
A	Wyoming Sagebrush Steppe	Increases from 19% to 30%	Remains at FRCC 3
B	Wyoming Sagebrush Steppe	Increases from 47% to 70%	Improves from FRCC 2 to FRCC 1
C	Wyoming Sagebrush Steppe	Increases from 48% to 82%	Improves from FRCC 2 to FRCC 1
	Basin Big Sagebrush	Increases from 16% to 65%	Improves from FRCC 3 to FRCC 2
	Black & Low Sagebrush	Increases from 32% to 41%	Improves from FRCC 3 to FRCC 2
D	Wyoming Sagebrush Steppe	Decreases from 64% to 50%	Remains at FRCC 2
	Basin Big Sagebrush	Increases from 16% to 83%	Improves from FRCC 3 to FRCC 1
	Black & Low Sagebrush	Increases from 34% to 61%	Remains at FRCC 2
	Mountain Big Sagebrush	Remains at 64%	Remains at FRCC 2

When all the changes in vegetation are calculated and added to vegetation that currently meets S-Class similarity, a total of 844,000 acres would meet S-Class reference conditions in the planning area. This alternative would improve S-Class similarity and FRCC more than the No Action Alternatives and Alternatives II, III, and V, but less than Alternative IV.

Impacts from Management Specific to Alternative II

Under Alternative II, the fire suppression management actions focus on VMA A and VMA B. The historical data show 71% of the fire starts, or 17 fires, occurred yearly in these VMAs. On average, seven of those fires occurred in the Critical Suppression Areas, which would only include WUI. On average, 7 of the 17 fires were caused by humans. Over 80% of all WUI with hazardous fuels occur within VMAs A and B. Suppression actions and emphasis in Alternative II are primarily concentrated in VMAs with a high amount of fire potential; therefore, the suppression actions in this alternative would result in the highest reduction in the number of human-caused fires and fire size.

Vegetation treatments that change the current plant community could also change the fuel model and rate of spread. VMA A would have the most change with 20% of the VMA having a reduction in rate of spread (Table 4- 162). Vegetation treatments implemented for this alternative could reduce the rate of spread on 5% of the planning area as a whole, but increase the rate of spread on 1% of the planning area. The vegetation treatments in this alternative would reduce the rate of spread across the planning area to the same extent as Alternative IV, more than in the No Action Alternative and Alternatives I and V, but less than Alternative III.

Table 4- 162. Change in Rate of Spread of Fire for Alternative II

Rate of Spread	VMA A	VMA B	VMA C	VMA D
Very Low (0-2 Ch/Hr)	No Change	No Change	No Change	No Change
Low (2-5 Ch/Hr)	No Change	No Change	No Change	No Change
Moderate (5-20 Ch/Hr)	No Change	No Change	No Change	Decrease 4%
High (20-50 Ch/Hr)	Increase 20%[A]	Increase 4%	No Change	Increase 5%
Very High (50-150 Ch/Hr)	Decrease 20%	Decrease 4%	No Change	Decrease 1%
Not Rated	No Change	No Change	No Change	No Change

[A] Percentages refer to the percent of acres within the planning area.

Vegetation treatments within WUI would focus on 5,000 acres in the northern portion of the planning area and the Roseworth area. This reduction in risk to WUI would be more than in the No Action Alternative and Alternatives I, IV, and V, but less than Alternative III.

Vegetation treatments that change S-Class acres within a PNVG impact S-Class similarity and the FRCC rating. Vegetation treatments implemented for this alternative would not improve S-Class similarity in any vegetation groups across any VMA (Table 4- 163). Only PNVGs that were identified for treatments were analyzed and reflected in the table. The overall FRCC rating would remain the same as the baseline FRCC rating. There would be no PNVGs with a FRCC rating of 1.

Table 4- 163. Change in S-Class Similarity and Overall FRCC for Alternative II

VMA	PNVG	S-Class Similarity	Overall FRCC
A	Wyoming Sagebrush Steppe	Remains at 19%	Remains at FRCC 3
B	Wyoming Sagebrush Steppe	Remains at 47%	Remains at FRCC 2
C	Wyoming Sagebrush Steppe	Remains at 48%	Remains at FRCC 2
	Basin Big Sagebrush	Remains at 16%	Remains at FRCC 3
	Black & Low Sagebrush	Remains at 32%	Remains at FRCC 3
D	Wyoming Sagebrush Steppe	Remains at 64%	Remains at FRCC 2
	Basin Big Sagebrush	Remains at 16%	Remains at FRCC 3
	Black & Low Sagebrush	Remains at 34%	Remains at FRCC 2
	Mountain Big Sagebrush	Remains at 64%	Remains at FRCC 2

Currently, 543,000 acres meet S-Class reference conditions across all VMAs throughout the planning area. There would be no increase in acres that are similar to the reference condition when compared to the baseline vegetation and projected S-Class similarity. This alternative would not improve S-Class similarity and FRCC, which would be the same as the No Action Alternative.

Impacts from Management Specific to Alternative III

Under Alternative III, fire suppression management actions focuses on VMAs A and B. The historical data show 71% of the fire starts, or 17 fires, occurred yearly in these VMAs. On average, seven of those fires occurred in the Critical Suppression Areas, which would include WUI, ACECs, and key sage-grouse habitat. On average, 7 of the 17 fires were caused by humans. Over 80% of all WUI with hazardous fuels occur within VMAs A and B. Suppression actions and emphasis in Alternative III would be the same as Alternative II, with the exception of WUI having the same priority as ACECs and key sage-grouse habitat. Suppression actions and emphasis are primarily concentrated in VMAs with a high amount of fire potential; therefore, as in Alternative II, suppression actions would result in the highest reduction in the number of human-caused fires and fire size.

Vegetation treatments that change the current plant community could also change the fuel model and rate of spread. VMA A would have the most change with 17% of the VMA having a reduction in rate of spread (Table 4- 164). Vegetation treatments implemented in Alternative III could reduce the rate of spread on 6% of the planning area as a whole. This alternative would reduce the rate of spread of fires across the planning area more than the other alternatives.

Table 4- 164. Change in Rate of Spread of Fire for Alternative III

Rate of Spread	VMA A	VMA B	VMA C	VMA D
Very Low (0-2 Ch/Hr)	No Change	No Change	No Change	No Change
Low (2-5 Ch/Hr)	No Change	Decrease <1%	Decrease <1%	Decrease 1%
Moderate (5-20 Ch/Hr)	No Change	No Change	No Change	Increase 1%
High (20-50 Ch/Hr)	Increase 16%[A]	Increase 4%	Decrease 1%	Increase 2%
Very High (50-150 Ch/Hr)	Decrease 17%	Decrease 4%	No Change	Decrease 1%
Not Rated	Increase 1%	Increase 1%	Increase 1%	Increase <1%
[A] Percentages refer to the percent of acres within the planning area.				

Vegetation treatments within WUI are focused on 6,000 acres in the northern portion of the planning area, the Roseworth area, and the Three Creek area. Alternative III would reduce the risk to WUI more than the other alternatives.

Vegetation treatments that change S-Class acres within a PNVG impact S-Class similarity and FRCC. Vegetation treatments implemented for this alternative could increase S-Class similarity in all vegetation groups across all VMAs (Table 4- 165). Only PNVGs identified for treatments were analyzed and reflected in the table. The overall FRCC rating would improve to FRCC 1 for Wyoming Sagebrush Steppe in VMAs C and D and Mountain Big Sagebrush in VMA D. All other PNVGs would be in FRCC 2, except Wyoming Sagebrush Steppe in VMA A would remain at FRCC 3.

Table 4- 165. Change in S-Class Similarity and Overall FRCC for Alternative III

VMA	PNVG	S-Class Similarity	Overall FRCC
A	Wyoming Sagebrush Steppe	Increases from 19% to 30%	Remains at FRCC 3
B	Wyoming Sagebrush Steppe	Increases from 47% to 59%	Remains at FRCC 2
C	Wyoming Sagebrush Steppe	Increases from 48% to 69%	Improves from FRCC 2 to FRCC 1
	Basin Big Sagebrush	Increases from 16% to 65%	Improves from FRCC 3 to FRCC 2
	Black & Low Sagebrush	Increases from 32% to 41%	Improves from FRCC 3 to FRCC 2
D	Wyoming Sagebrush Steppe	Increases from 64% to 70%	Improves from FRCC 2 to FRCC 1
	Basin Big Sagebrush	Increases from 16% to 66%	Improves from FRCC 3 to FRCC 2
	Black & Low Sagebrush	Increases from 34% to 40%	Remains at FRCC 2
	Mountain Big Sagebrush	Increases from 64% to 70%	Improves from FRCC 2 to FRCC 1

When all the changes in vegetation are calculated and added to vegetation which currently meets S-Class reference conditions, the total would be 724,000 acres throughout the entire planning area. Alternative III would improve S-Class similarity and FRCC more than the No Action Alternative and Alternative II, but less than Alternatives I, IV, and V.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Under Alternative IV, fire management suppression actions focus on VMAs C and D. The historical data show 29% of the fire starts, or six fires, occurred yearly in these VMAs. On average, three of those fires occurred in the Critical Suppression Areas, which would include WUI, ACECs, and key sage-grouse habitat. On average, two of the six fires were caused by humans. Just 19% of all WUI with hazardous fuels occur within VMA C and VMA D. Suppression actions and emphasis in Alternative IV are primarily concentrated in VMAs with a lower amount of fire potential; therefore, suppression actions would result in the lowest reduction in the number of human-caused fires and fire size.

Vegetation treatments that change the current plant community could also change the fuel model and rate of spread. Vegetation treatments implemented for this alternative could reduce the rate of spread on 5% of the planning area. VMA A would have the most change with 20% of the VMA experiencing a reduction in rate in spread (Table 4- 166). Along with Alternative II, this alternative would reduce the rate of spread of fires across the planning area more than the No Action Alternative and Alternatives I, and V, but less than Alternative III.

Table 4- 166. Change in Rate of Spread of Fire for Alternative IV (the Preferred Alternative)

Rate of Spread	VMA A	VMA B	VMA C	VMA D
Very Low (0-2 Ch/Hr)	No Change	No Change	No Change	No Change
Low (2-5 Ch/Hr)	No Change	No Change	No Change	No Change
Moderate (5-20 Ch/Hr)	No Change	No Change	Increase <1%	Increase 1%
High (20-50 Ch/Hr)	Increase 20% [A]	Increase 4%	Decrease <1%	Decrease< 1%
Very High (50-150 Ch/Hr)	Decrease 20%	Decrease 4%	No Change	Decrease 1%
Not Rated	No Change	No Change	No Change	No Change
[A] Percentages refer to the percent of acres within the planning area.				

Vegetation treatments within WUI would be focused on 4,000 acres in the northern portion of the planning area. This reduction in risk to WUI would be the same as Alternative I, more than the No Action Alternative and Alternative V, but less than Alternatives II and III.

Vegetation treatments that change S-Class acres within a PNVG impact S-Class similarity and FRCC. Vegetation treatments implemented for Alternative IV could improve S-Class similarity in all vegetation groups across all VMAs (Table 4- 167). Only PNVGs identified for treatments were analyzed and reflected in the table. The overall FRCC rating would improve to FRCC 1 for most PNVGs including Wyoming Sagebrush Steppe in VMAs B, C and D, Basin Big Sagebrush in VMAs C and D, Black and Low Sagebrush in VMA D, and Mountain Big Sagebrush in VMA D. All other PNVGs would be in FRCC 2.

Table 4- 167. Change in S-Class Similarity and Overall FRCC for Alternative IV (the Preferred Alternative)

VMA	PNVG	S-Class Similarity	Overall FRCC
A	Wyoming Sagebrush Steppe	Increases from 19% to 45%	Improves from FRCC3 to FRCC2
B	Wyoming Sagebrush Steppe	Increases from 47% to 76%	Improves from FRCC2 to FRCC1
C	Wyoming Sagebrush Steppe	Increases from 48% to 75%	Improves from FRCC2 to FRCC1
	Basin Big Sagebrush	Increases from 16% to 89%	Improves from FRCC3 to FRCC1
	Black & Low Sagebrush	Increases from 32% to 59%	Improves from FRCC3 to FRCC2
D	Wyoming Sagebrush Steppe	Increases from 64% to 80%	Improves from FRCC2 to FRCC1
	Basin Big Sagebrush	Increases from 16% to 73%	Improves from FRCC3 to FRCC1
	Black & Low Sagebrush	Increases from 34% to 70%	Improves from FRCC2 to FRCC1
	Mountain Big Sagebrush	Increases from 64% to 75%	Improves from FRCC2 to FRCC1

When all the changes in vegetation are calculated and added to vegetation which currently meets S-Class reference conditions, the total would be 916,000 acres across the entire planning area. Alternative IV would improve S-Class similarity and FRCC more than the other alternatives.

Impacts from Management Specific to Alternative V

Under Alternative V, fire management suppression actions focus on VMAs C and B, the same as in Alternative I. The historical data show 61% of the fire starts, or 14 fires, occurred yearly in these VMAs. On average, six of those fires occurred in the Critical Suppression Areas, which would include high hazard WUI, specific ACECs, and key sage-grouse habitat. On average, 6 of the 14 fires were caused by humans. Forty-four percent of all WUI with hazardous fuels occur within VMAs C and B, with the majority in VMA B. Suppression actions and emphasis in Alternative V are primarily concentrated in VMAs with a moderate amount of fire potential; therefore, suppression actions would result in the second highest reduction in the number of human-caused fires and fire size outside and within WUI, the same as Alternative I.

Vegetation treatments that change the current plant community could also change the fuel model and rate of spread. Vegetation treatments implemented for this alternative could reduce the rate of spread on 5% of the planning area. VMA A would have the most change with 8% of the VMA having a reduction in rate in spread (Table 4- 168). Along with Alternative I, this alternative would reduce the rate of spread of fires across the planning area more than the No Action Alternative, but less than Alternatives II, III, and IV.

Table 4- 168. Change in Rate of Spread of Fire for Alternative V

Rate of Spread	VMA A	VMA B	VMA C	VMA D
Very Low (0-2 Ch/Hr)	No Change	No Change	No Change	No Change
Low (2-5 Ch/Hr)	No Change	No Change	No Change	No Change
Moderate (5-20 Ch/Hr)	No Change	No Change	No Change	Increase 1%
High (20-50 Ch/Hr)	Increase 8%[A]	Increase 3%	No Change	Decrease< 1%
Very High (50-150 Ch/Hr)	Decrease 8%	Decrease 3%	No Change	Decrease 1%
Not Rated	No Change	No Change	No Change	No Change

[A] Percentages refer to the percent of acres within the planning area.

Vegetation treatments within the WUI would be focused on 3,000 acres in the northern portion of the planning area. This reduction in risk to WUI would be less than all other action alternatives and more than the No Action Alternative.

Vegetation treatments that change S-Class acres within a PNVG impact S-Class similarity and FRCC. Vegetation treatments implemented for this alternative could improve S-Class similarity in all vegetation groups across all VMAs (Table 4- 169). Only PNVGs identified for treatments were analyzed and reflected in the table. The overall FRCC rating would improve to FRCC 1 for Wyoming Sagebrush Steppe in VMAs C and D and Basin Big Sagebrush in VMA D. All other PNVGs would be in FRCC 2, except Wyoming Sagebrush Steppe in VMA A which would remain at FRCC 3.

Table 4- 169. Change in S-Class Similarity and Overall FRCC for Alternative V

VMA	PNVG	S-Class Similarity	Overall FRCC
A	Wyoming Sagebrush Steppe	Increases from 19% to 28%	Remains at FRCC3
B	Wyoming Sagebrush Steppe	Increases from 47% to 61%	Remains at FRCC2
C	Wyoming Sagebrush Steppe	Increases from 48% to 69%	Improves from FRCC2 to FRCC1
	Basin Big Sagebrush	Increases from 16% to 65%	Improves from FRCC3 to FRCC2
	Black & Low Sagebrush	Increases from 32% to 41%	Improves from FRCC3 to FRCC2
D	Wyoming Sagebrush Steppe	Increases from 64% to 70%	Improves from FRCC2 to FRCC1
	Basin Big Sagebrush	Increases from 16% to 83%	Improves from FRCC3 to FRCC1
	Black & Low Sagebrush	Increases from 34% to 60%	Remains at FRCC2
	Mountain Big Sagebrush	Increases from 64% to 66%	Remains at FRCC2

When all the changes in vegetation are calculated and added to vegetation which currently meets S-Class reference conditions, a total of 754,000 acres across the entire planning area would meet S-class reference conditions. Alternative V would improve S-Class similarity and FRCC more than the No Action Alternative and Alternatives II and III, but less than Alternatives I and IV.

Impacts from Livestock Grazing Actions

Fine fuels include annual and perennial grasses and many forbs; these fuels can carry fire rapidly across the landscape. An examination of fire history and fuels distribution in the planning area shows a higher fire occurrence and a larger number of large fires in areas dominated by cheatgrass; these areas also have had a tendency to burn repeatedly. Livestock grazing may reduce fine fuels (Nader, et al., 2007). Table 4- 170 displays the AUMs and utilization levels by alternative, which reflect the degree to which fine fuels would be reduced in the planning area. Targeted grazing to reduce fine fuels in strategically located areas can decrease fire size as well (Launchbaugh, et al., 2008; Strand, et al., 2007). Grazing can also alter the composition of vegetation, which affects FRCC.

Table 4- 170. Livestock Grazing AUMs and Utilization by Alternative

	Alternative						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
Projected AUMs for Livestock [A]	260,000	269,000	479,000	382,000	141,000	145,000	98,000
Percent Utilization of Non-Native Vegetation [B]	N/A	40-50%	50-60%	40-50%	30-40%	30-40%	30-40%

[A] This reflects the number of AUMs that would be available for livestock based on the high end of the vegetation allocation range and the areas available for livestock grazing by alternative, combined with the 2006 vegetation production data, the most recent year for which production data are available; this number also assumes that an alternative's vegetation treatment objectives will be reached. The AUM numbers used in the analysis for Alternatives I through V are provided solely to assist the reader in comparing the effects of the alternatives and should not be construed to confine or redefine the management contained within the alternatives.

[B] Percent utilization of non-native reflect possible ranges of utilization in each alternative based on the overall goals and objectives of that alternative; these numbers are for analysis purposes only and should not be construed to confine or redefine the management contained within the alternatives.

Impacts from Management Specific to the No Action Alternative

Under the No Action Alternative, up to 260,000 AUMs could be authorized (Table 4- 170). The number of AUMs in the No Action Alternative falls in the middle among the alternatives, but percent utilization is not identified in this alternative. A higher proportion of AUMs occurs in the northern two-thirds of the planning area where forage production is higher. This also coincides with areas that have a higher occurrence of large fires and areas that have burned repeatedly. Under the No Action Alternative, grazing would continue to have an effect of slowing the growth of fires, but vegetation composition would remain the same, with a slight increase in noxious weeds and invasive plants (see the *Vegetation Communities* and *Noxious Weeds and Invasive Plants* sections). Therefore, FRCC would not improve, instead slowly moving towards an increase in areas rated as FRCC 3.

Impacts from Management Specific to Alternative I

Alternative I would result in slightly more AUMs for livestock than the No Action Alternative. Along with Alternative III, the percent utilization in non-native vegetation would cause a moderate reduction in fuel loading. Targeted grazing would also be allowed in this alternative, which would help decrease fire size by reducing fuels in localized areas. Because of the percent utilization of non-native vegetation and overall forage allocation levels, this alternative would reduce the trend towards increased fire size more than the No Action Alternative and Alternatives IV and V. Vegetation composition and condition is expected to remain static or improve slightly if utilization levels are at the lower end of the range for Alternative I (see the *Vegetation Communities* and *Noxious Weeds and Invasive Plants* sections). This would maintain the current level of FRCC or slowly move towards an increase in areas rated as FRCC 1 and FRCC 2.

Impacts from Management Specific to Alternative II

In Alternative II, areas that are predominantly cheatgrass would have more AUMs and the highest percent utilization of non-native vegetation of any alternative. The percent utilization in non-native vegetation would result in a moderate to high reduction in fuel loading and would reduce fire size the most compared to the other alternatives. Targeted grazing to reduce fire size would be allowed. These actions could result in the highest amount of fine fuel reduction in the areas dominated by cheatgrass and prone to large fire. Due to the level of utilization, Alternative II would also have the most potential for degrading plant communities and promoting invasive plants (see the *Vegetation Communities* and *Noxious Weeds and Invasive Plants* sections). This would increase the amount of area in FRCC 3.

Impacts from Management Specific to Alternative III

Alternative III would have more AUMs for livestock and higher percent utilization of non-native vegetation, than the No Action Alternative, especially in areas that are dominated by cheatgrass, but not to the degree of Alternative II. Along with Alternative I, the percent utilization in non-native vegetation would lead to a moderate reduction in fuel loading. Targeted grazing to reduce fire size would be allowed. This alternative would have the second highest reduction in fire size due to amount of livestock grazing. Vegetation condition in native communities would remain static but non-native communities would degrade and be susceptible to invasive plant encroachment (see the *Vegetation Communities* and *Noxious Weeds and Invasive Species* sections). The net effect would be static, increasing the amount of area in FRCC 3.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV would decrease AUMs for livestock and percent utilization of non-native vegetation compared to the No Action Alternative, especially in areas that are dominated by cheatgrass, but not to the extent of Alternative V. Along with Alternative V, the level of utilization in non-native vegetation would reduce fuel loading less than in the other alternatives. Targeted grazing to reduce fire size would be allowed in this alternative. This alternative would reduce fire size more than Alternative V, but less than the rest of the alternatives. The amount of livestock grazing would improve vegetation communities and reduce the potential for invasive plants (see the *Vegetation Communities* and *Noxious Weeds and Invasive Species* sections). This would improve FRCC by maintaining the acres in FRCC 1 and increasing the number of acres in FRCC 2.

Impacts from Management Specific to Alternative V

Alternative V would have the lowest number of AUMs available for livestock; as a result, the number of AUMs allocated for areas that are predominantly cheatgrass would be lower than any other alternative. Along with Alternative IV, utilization levels of non-native vegetation would reduce fuel loads the least of all alternatives. Targeted grazing would not be allowed in this alternative. This alternative would reduce fire size the least due to livestock grazing, but would improve vegetation communities and decrease the spread of invasive plants, which would increase the acres rated as FRCC 1 and FRCC 2.

Impacts from Recreation Actions

Recreation management changes the amount and density of people, which may change the number of fires caused by human activity during the fire season. The amount, frequency, and type of human activity can influence the number of wildland fire starts. Between 2001 and 2007, 39% of wildland fires were caused by items such as campfires, fireworks, and equipment; campfires account for 65% of fires caused by human activities, followed by equipment use, which accounts for 8%. Increases in recreational use would likely result in an increased number of human-caused fires (BLM, 1998b). However, most of the SRMAs that would be designated in each alternative are not expected to affect the number of human-caused fires either due to the type of recreational use, the expected changes in the amount of use, or the expected management of the SRMA. As a result, this section of the analysis focuses on the Recreation Management Zones (RMZs) each alternative would proactively manage for motorized recreational use, primarily ATV and motorcycle riding (Table 4- 171).

Impacts from Management Specific to the No Action Alternative

The No Action Alternative would continue to manage 2,700 acres in the Yahoo area for motorized recreation as part of the Hagerman-Owsley Bridge SRMA; use of this area for ATV and motorcycle riding is expected to increase during the life of the plan. Even though the area managed for this use would remain constant, the number of human-caused fires would likely increase due to increased use.

Table 4- 171. RMZs Managed for Motorized Recreational Use by Alternative (Acres)

RMZ	Alternative					
	No Action	I	II	III	IV	V
Deadman	0	13,000	0	13,000	13,000	0
Pasadena	0	1,000	0	0	0	0
Rosevear	0	18,000	0	18,000	18,000	0
Yahoo	3,000	3,000	0	3,000	3,000	3,000
Total	**3,000**	**35,000**	**0**	**34,000**	**34,000**	**3,000**

Impacts from Management Specific to Alternative I

Alternative I would manage 36,000 acres in the Deadman, Pasadena, Rosevear, and Yahoo areas for motorized recreation as part of the Deadman/Yahoo SRMA, the most acres of any alternative; use of these areas for ATV and motorcycle riding is expected to increase during the life of the plan. As a result, Alternative I would increase the number of human-caused fires the most through recreation management.

Impacts from Management Specific to Alternative II

Alternative II would not manage any areas for motorized recreation, the least of any alternative. As a result, Alternative II would increase the number of human-caused fires the least through recreation management.

Impacts from Management Specific to Alternative III

Alternative III would manage 34,000 acres in the Deadman, Rosevear, and Yahoo areas for motorized recreation as part of the Deadman/Yahoo SRMA, fewer acres than Alternative I but more than the No Action Alternative and Alternative II. Use of these areas for ATV and motorcycle riding is expected to increase during the life of the plan. As a result, Alternative III would be second in increasing human-caused fires through recreation management.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV would manage the same acres and areas for motorized recreation as Alternative III; as a result, the impacts on human-caused fires would also be the same as described for Alternative III.

Impacts from Management Specific to Alternative V

Alternative V would manage 3,030 acres in the Yahoo area for motorized recreation as part of the Yahoo SRMA, slightly more acres than the No Action Alternative. Use of this area for ATV and motorcycle riding is expected to increase during the life of the plan. As a result, Alternative V would increase human-caused fires slightly more than the No Action Alternative.

Impacts from Transportation and Travel Actions

Transportation and travel management changes the accessibility of the planning area. The amount, frequency, and type of human activity can influence the number of wildland fire starts. Between 2001 and 2007, 39% of wildland fires were caused by items such as campfires, fireworks, and equipment. Limiting access decreases the amount of exposure between people and fuels and, therefore, reduces fires.

Impacts from Management Specific to the No Action Alternative

Under the No Action Alternative, the majority of the planning area, 1,062,000 acres, would be open to cross-country motorized vehicle use (Table 4- 172). The remainder of the area would be limited to designated ways and routes or closed to motorized vehicle use. The current rate of the number of human-caused fires, especially those fires caused by motorized vehicles, would continue or increase due to increased accessibility. Transportation and travel actions in this alternative would do the least for decreasing the number of human-caused fires than the other alternatives.

Table 4- 172. Travel Designations by VMA in the No Action Alternative (Acres)

VMA	Open to Cross-Country Motorized Vehicle Use	Limited to Designated Routes	Limited to Designated Ways	Closed to Motorized Vehicle Use
A	211,000	6,000	1,000	3,000
B	540,000	17,000	55,000	17,000
C	229,000	66,000	13,000	5,000
D	82,000	127,000	0	0
Total	**1,062,000**	**216,000**	**69,000**	**25,000**

Impacts from Management Specific to Alternative I

Alternative I would have the second largest number of acres closed to motorized vehicle use in VMA B (Table 4- 173), which would help reduce the fire frequency in this VMA, which has highest occurrence of human-caused fire. The acres open to cross-country motorized vehicle use in Alternative I would be located in VMAs A and B, the VMAs with the highest number of human-caused fires. Fire starts from ATV and motorcycle riding would be concentrated in the areas open to cross-country motorized vehicle use, rather than dispersed across a larger open area as in the No Action Alternative. Along with Alternative IV, transportation and travel actions this alternative would be second best at reducing the number of human-caused fires.

Table 4- 173. Travel Designations by VMA in Alternative I (Acres)

VMA	Open to Cross-Country Motorized Vehicle Use	Limited to Designated Routes	Limited to Designated Ways	Closed to Motorized Vehicle Use
A	3,000	214,000	4,000	1,000
B	700	546,000	55,000	28,000
C	0	285,000	12,000	16,000
D	0	196,000	0	13,000
Total	**3,700**	**1,241,000**	**71,000**	**58,000**

Impacts from Management Specific to Alternative II

Alternative II would not have any areas open to cross-country motorized vehicle use; however, it also would have the fewest acres closed to motorized vehicle use (Table 4- 174). Alternative II has the smallest number of acres closed to motorized vehicle use in VMA B, the VMA with the highest fire occurrence. Along with Alternative III, transportation and travel actions in Alternative II would do the least in reducing the number of human-caused fires.

Table 4- 174. Travel Designations by VMA in Alternative II (Acres)

VMA	Open to Cross-Country Motorized Vehicle Use	Limited to Designated Routes	Limited to Designated Ways	Closed to Motorized Vehicle Use
A	0	217,000	4,000	1,000
B	0	558,000	56,000	15,000
C	0	295,000	13,000	5,000
D	0	209,000	0	0
Total	**0**	**1,279,000**	**73,000**	**21,000**

Impacts from Management Specific to Alternative III

Alternative III would have a similar acreage closed to motorized vehicle use as in Alternative II, but would increase the acreage open to cross-country motorized vehicle use (Table 4- 175). The acreage that is closed to motorized vehicle use in VMA B, the VMA with highest fire occurrence, is also similar between the two alternatives. While Alternative III has a higher number of acres closed to motorized vehicles, this is offset by the increase in acres open to cross-country motorized vehicle use. Due to the off-set and the similarity of acres of open to cross-country motorized vehicle use and closed to motorized vehicle use, Alternative III would be the same as Alternative II in reducing the number of human-caused fires.

Table 4- 175. Travel Designations by VMA in Alternative III (Acres)

VMA	Open to Cross-Country Motorized Vehicle Use	Limited to Designated Routes	Limited to Designated Ways	Closed to Motorized Vehicle Use
A	3,000	214,000	4,000	1,000
B	700	557,000	55,000	17,000
C	0	295,000	12,000	6,000
D	0	209,000	0	0
Total	**3,700**	**1,275,000**	**71,000**	**24,000**

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV would have the third largest number of acres closed to motorized vehicle use in VMA B (Table 4- 176), which has the highest occurrence of fire by humans. Areas open to cross-country motorized use would be located in VMAs A and B, the VMAs with the largest number of fires caused by humans. Due to similar acreage open to cross-country motorized vehicle use and areas closed to motorized vehicle use in VMA B, transportation and travel actions in this alternative would have similar impacts as Alternative I and would be second best at reducing the number of human-caused fires.

Table 4- 176. Travel Designations by VMA in Alternative IV (the Preferred Alternative; Acres)

VMA	Open to Cross-Country Motorized Vehicle Use	Limited to Designated Routes	Limited to Designated Ways	Closed to Motorized Vehicle Use
A	3,000	214,000	4,000	1,000
B	700	547,000	56,000	26,000
C	0	283,000	13,000	17,000
D	0	179,000	0	30,000
Total	**3,700**	**1,223,000**	**73,000**	**74,000**

Impacts from Management Specific to Alternative V

Alternative V would have the largest number of acres closed to motorized vehicle use in VMAs A and B (Table 4- 177), the VMAs with the highest occurrence of fire by humans. Due to the small number of acres open to cross-country motorized vehicle use and the large number of acres closed to motorized vehicle use, especially in VMA B, transportation and travel actions in this alternative would reduce the number of human-caused fires the most of any alternative.

Table 4- 177. Travel Designations by VMA in Alternative V (Acres)

VMA	Open to Cross-Country Motorized Vehicle Use	Limited to Designated Routes	Limited to Designated Ways	Closed to Motorized Vehicle Use
A	0	217,000	0	5,000
B	700	547,000	0	82,000
C	0	283,000	0	30,000
D	0	179,000	0	30,000
Total	**700**	**1,226,000**	**0**	**147,000**

Impacts from Land Use Authorization Actions

Land use authorizations increase human activity in the project area, which may change the number of human-caused fires. Human activities may increase the number of fires for a defined period of time when related to construction, such as the erection of a tower, or may increase fires substantially for a defined period of time and then have a decreased lingering effect, such as the construction of a road.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative does not identify any areas of exclusion and generally opens the entire planning area to development. The expected types of use would be utility lines and wind energy development. The potential utility development areas would include 75,000 acres and the potential wind development areas would include 156,000 acres, resulting in a total of 231,000 acres. Due to a lack of areas of exclusion and the amount of area which is available for development, this alternative would increase the number of human-caused fires the most of any alternative.

Impacts from Management Specific to Alternative I

In Alternative I, the potential utility development areas would include 71,000 acres, and the potential wind development areas would include 60,000 acres, resulting in a total of 131,000 acres with potential for these types of developments. Within the planning area, 95,000 acres would be excluded from development. This alternative would be similar to Alternative III in the amount of exclusion and amount of area with potential for development and therefore would be third in increasing the number of human-caused fires among all alternatives.

Impacts from Management Specific to Alternative II

In Alternative II, the potential utility development areas would include 77,000 acres, and the potential wind development areas would include 162,000 acres, resulting in a total of 239,000 acres with potential for these types of developments. Within the planning area, 94,000 acres would be excluded from development. This alternative would have the second highest increase in fire frequency among the alternatives, due to the acreage with potential for development.

Impacts from Management Specific to Alternative III

In Alternative III, the potential utility development areas would include 71,000 acres, and the potential wind development areas would include 60,000 acres, resulting in a total of 131,000 acres with potential for these types of developments. Within the planning area, 95,000 acres would be excluded from development. This alternative would be the same as Alternative I in the amount of exclusion and areas with potential for development and, therefore, would also be third in increasing the number of human-caused fires.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

In Alternative IV, the potential utility development areas would include 70,000 acres, and the potential wind development areas would include 59,000 acres, resulting in a total of 129,000 acres with potential for these types of developments. Within the planning area, 148,000 acres would be excluded from development. This alternative would be similar to Alternative I and Alternative III in the amount of potential wind and utility development, but differs in the amount of exclusion. This alternative would be next to last in increasing the number of human-caused fires because of the smaller amount of acres with potential for development and the large amount of exclusion areas.

Impacts from Management Specific to Alternative V

In Alternative V, the potential utility development areas would include 59,000 acres, and the potential wind development areas would include 42,000 acres, resulting in a total of 101,000 acres with potential for these types of developments. Within the planning area, 148,000 acres would be excluded from development. This alternative has the least amount of area with potential for development combined with the highest number of acres excluded from development and, therefore, would increase the number of human-caused fires the least.

Summary of Direct and Indirect Impacts

Direct and indirect impacts are summarized in Table 4- 178.

Table 4- 178. Summary of Impacts to Wildland Fire Ecology and Management

Indicator [A]	Alternative					
	No Action	I	II	III	IV	V
Wildland Fire Ecology and Management						
Decrease in Fire Size and Number of Human-Caused Fires through Fire Suppression Actions (1=most decrease, 4=no change)	4	2	1	1	3	2
Decrease in Fire Size in the Planning Area through Fuels Management Actions (% of planning area with decreased rate of spread)	0%	3%	5%	6%	5%	3%
Decrease in Fire Size within WUI through Fuels Management Actions (Acres with decreased rate of spread)	0	4,000	5,000	6,000	4,000	3,000
Improvement in FRCC (Acres similar to S-Class reference conditions)	543,000	844,000	543,000	724,000	916,000	754,000
Livestock Grazing						
Decrease in Fire Size (1=most decrease, 6=least decrease)	4	3	1	2	5	6
Improvement/Decline in FRCC (1=most improvement, 6=most decline)	4	3	6	5	2	1
Transportation and Travel						
Decrease in Number of Human-Caused Fires (1 = most decrease, 4 = no change)	4	2	3	3	2	1
Recreation						
Increase in Number of Human-Caused Fires (1 = least increase, 6 = most increase)	2	5	1	4	4	3
Land Use Authorizations						
Increase in Number of Human-Caused Fires (1 = least increase, 5 = most increase)	5	3	4	3	2	1

[A] Ranks indicate the order in which the alternatives would affect each indicator; they do not, however, depict the degree of difference between ranks. Ranks can only be compared within rows; a “1” in one row does not necessarily reflect the same degree of impact as a “1” in another row.

Impacts from the No Action Alternative

Overall, the No Action Alternative would be the least desirable in reducing fire size and the number of human-caused fires and improving FRCC, resulting in the largest cost for fire suppression. The No Action Alternative does not have any actions that address preventive measures for reducing fire occurrence. Management actions for land use authorizations and transportation and travel allow the largest opportunity for wildland fire starts due to the availability of area for development and cross-country motorized vehicle use. Campfires comprise 65% of the starts from human activity and will continue to be a primary cause due to the continued recreation actions. The number of human-caused fires in this alternative would remain static or increase due to the combined impacts from land use, transportation and travel, and recreation actions and the lack of prevention actions. The trend toward large fires would continue. The full suppression approach contains no emphasis on returning the fire regime to a less frequent large fire scenario. The majority of the planning area would remain at FRCC 2 and FRCC 3.

Overall, the No Action Alternative would result in minor impacts to the number of fires, fire size, or FRCC.

Impacts from Alternative I

Overall, Alternative I would be the best alternative at reducing fire size and the number of human-caused fires and improving FRCC, resulting in the smallest costs for suppressing wildland fire. The suppression actions in Alternative I would be second best at decreasing fire size and the number of human-caused fires. These impacts would be augmented from transportation and travel management actions, which would limit cross-country motorized vehicle use and decrease the number of human-caused fires and grazing actions, which would reduce fuel loading and help decrease fire size. This reduction in wildland fire starts may be countered by an increase in the number of human-caused fires from recreation management actions the most of all alternatives. Land use authorization management actions would also increase wildland fire starts. Suppression actions would help minimize these increases.

Alternative I would have the second largest number of acres with proposed vegetation treatments and third largest number of treatment acres in WUI. Vegetation treatments would play a major role in reducing fire size and improving FRCC. Three percent of the planning area would experience a decrease in rate of spread through fuels treatments. While Alternative I has a smaller number of WUI treatment acres and smaller decrease in the percentage of the rate of spread, the number of acres with an improved FRCC would be a major change.

Overall, Alternative I would result in major beneficial impacts to the number of fires, fire size, and FRCC.

Impacts from Alternative II

Alternative II would decrease fire size and the number of human-caused fires over the short-term through suppression and grazing actions, but, with no change to FRCC, fire size would continue an upward trend over the long term. Overall, this alternative would be third along with Alternative V in reducing fire size and the number of human-caused fires, improving FRCC, and reducing the cost of suppressing wildland fires.

The suppression actions in Alternative II would be the same as Alternative III and would be best at reducing fire size and the number of human-caused fires. These actions would be augmented by grazing actions, which would have the most impact in reducing fire size. This alternative would have the least impact in reducing the number of human-caused fires from transportation and travel management actions, but least amount of increase of the number of human-caused fires from recreation actions. The transportation and travel and recreation management actions may counter each of their impacts on the number of human-caused fires. Land use authorization actions have the second highest increase in the number of human-caused fires, but may be countered by suppression actions such as prevention.

Vegetation treatments and livestock grazing would play the least role in improving FRCC with no increase in acres similar to S-Class reference conditions as compared to the baseline. Among the alternatives, Alternative II would have the second largest number of acres, 5,000, devoted to WUI treatments. Five percent of the planning area would have a decrease in the rate of spread through fuels treatments. While Alternative II would have the largest number of acres with WUI treatments and treatments that affect the rate of spread, the reduction in fire size and protection of WUI would be off-set by the lack of improvement to FRCC.

Overall, Alternative II would result in moderate, short-term beneficial impacts to the number of fires, fire size, and FRCC; however, long-term impacts would be minor adverse.

Impacts from Alternative III

Alternative III would decrease fire size over the short term through suppression and grazing actions, but the number of human-caused fires would increase due to impacts from recreation and land use actions. Over the long term, fire size would continue an upward trend due to marginal improvement to FRCC. Overall, this alternative would rank second, along with Alternative IV, in reducing fire size and the number of human-caused fires, improving FRCC, and reducing the cost of suppressing wildland fire.

Suppression actions in Alternative III would be the same as in Alternative II and would be best at reducing fire size and the number of human-caused fires. These actions would be augmented by grazing actions, which would have the second most impact in reducing fire size. Transportation and travel management actions provide the least decrease to the number of human-caused fires coupled with the second largest increase from recreation actions and third largest increase from land use authorization actions. This would be combined with an overall increase in the number of human-caused fires.

Vegetation treatments would improve FRCC on 723,000 acres, but Alternative III would rank next to last among the alternatives with regard to improvement in FRCC, and livestock grazing would further inhibit improvement to FRCC. This alternative would provide for the treatment of the most WUI acres, 6,000, and provides the highest percentage, 6%, of acres treated for reducing rate of spread. The impact from improvements to WUI and reduction in the rate of spread may be off-set with the marginal improvement, fourth best, to FRCC.

Overall, Alternative III would result in moderate, short-term beneficial impacts to the number of fires, fire size, and FRCC; however, long-term impacts would be minor adverse.

Impacts from Alternative IV (the Preferred Alternative)

Alternative IV would decrease fire size over the long term due to improved FRCC and reduction in rate of spread, but fire size would continue an upward trend in the short term until FRCC improves. The number of human-caused fires would increase, but to a lesser degree than every alternative except for Alternative V. This is due to lower amounts of recreation and land use authorizations and reduced transportation and travel. Overall, this alternative would rank second, along with Alternative III, in reducing fire size and the number of human-caused fires, improving FRCC, and reducing the cost of suppressing wildland fire.

The suppression actions in Alternative IV reduce the number of human-caused fires and fire size the least of all the alternatives. However, transportation and travel management actions would help decrease the number of human-caused fires and land use authorization and recreation activities would contribute the least to the number of human-caused fires. The low amount of grazing would be second to last in reducing fire size.

Vegetation treatments would have the largest improvement on FRCC in Alternative IV, 916,000 acres, and the amount of livestock grazing would heighten improvement of FRCC. Rate of spread would decrease on 5% of the planning area. This would be the second largest decrease among the alternatives. Along with Alternative I, Alternative IV would provide for WUI treatments on 4,000 acres; the second smallest number of acres of the alternatives. Improvements in overall FRCC would benefit the WUI by reducing fire size.

Overall, Alternative IV would result in moderate, beneficial, long-term impacts to the number of fires, fire size, and FRCC despite some minor short-term impacts.

Impacts from Alternative V

Alternative V would decrease fire size over the short term due to suppression actions. The number of human-caused fires would increase, but at a lower rate than the other alternatives due to the suppression actions, less recreation and land use authorizations, and more restrictive transportation and travel actions. Over the long term, FRCC would improve and fire size would be reduced due to vegetation treatments and the reduction of livestock grazing. This change would not be as effective as in Alternative I or IV. Overall, this alternative would rank third, along with Alternative II, in reducing fire size and the number of human-caused fires, improving FRCC, and reducing the cost of suppressing wildland fires.(DEQ, 2000)

Along with Alternative I, the suppression actions in Alternative V would be second best, at reducing fire size and the number of human-caused fires. The reduction in the number of human-caused fires would be further augmented by the most decrease in the number of human-caused fires from transportation and travel management actions and the smallest increase in the number of human-caused fires from recreation and land use actions. Fire size decreases would be off-set by possible higher amounts of fuel availability due to lower amounts of utilization, allocation, and AUMs from grazing actions.

Alternative V would have the third largest number of acres with vegetation treatments (754,000 acres), making it slightly better than Alternative III in improving FRCC. Three thousand acres of WUI would be treated. Alternative V would have the lowest reduction in rate of spread, with the exception of the No Action Alternative.

Overall, Alternative V would result in moderate beneficial impacts to the number of fires, fire size, and FRCC in both the short- and long-term.

Cumulative Impacts

Past, Present, and Reasonably Foreseeable Actions

The area in which cumulative impacts were considered includes Federal and non-Federal lands within the planning area and adjacent areas managed by the BLM Twin Falls and Elko Districts, Humboldt-Toiyabe National Forest, and the USAF.

Past, present, and reasonably foreseeable actions for the following resources cumulatively affect wildland fire ecology and management:

- Population Growth
- Wildland Fire Ecology and Management
- Noxious Weeds and Invasive Plants

These actions are described in detail in the *Introduction* to this chapter.

With regard to population growth, and in addition to the discussion in the *Introduction*, the general trend of increasing human population would increase activities in and adjacent to the planning area resulting in an increased demand for recreation, travel, and land use authorizations. This is expected to result in an increase in the potential for human-caused fires proportional to the increase in activity and use. The increasing population has also resulted in an increase in the amount of WUI within and near the planning area. Any increase in the amount of WUI impacts the suppression capabilities during times when there are multiple wildland fires. WUI is normally given priority over other fires, which may result more burned acres in non-WUI areas. This could result in a continued high departure from S-Class similarity and FRCC, as well as more frequent fire return interval and larger fires for non-WUI lands. More WUI areas also would require increased emphasis on prevention and fuels treatments related to WUI.

Natural and human-made barriers limit the number of wildland fires that burn into the planning area from adjacent lands. Highway 93 and Salmon Falls Creek provide a barrier on the east side of the planning area; Interstate 84 and the Snake River on the north; and the Bruneau River on the west. The greatest potential for wildland fires from outside the planning would be from private lands along the boundary, USAF training ranges, and Federal lands south of the planning area. These Federal lands are managed by the Humboldt-Toiyabe National Forest and the Elko District BLM, Wells FO.

With regard to wildland fire ecology and management, and in addition to the discussion in the *Introduction*, the historic range of variation in frequency and severity of wildland fire has changed from its pre-settlement conditions to the present-day situation. Most vegetation types within the Great Basin have experienced wildland fire more frequently than their historic fire return interval would indicate (McKnight, 2008). Those vegetation types and changes to their historical fire return interval are characteristic of areas within the analysis area. Other areas within the analysis area have experienced less frequent wildland fire and, as a result, the severity of wildland fires has been altered. The factors that contribute to this altered fire return interval and fire severity are predominately the result of human intervention and activities. The cumulative result has been an introduction of non-native species and alteration in the vegetation communities within the planning area beyond the natural range of variation and reference S-Classes.

Human factors that have impacted vegetation include such activities as homesteading, community development, agricultural use, road construction, decades of aggressive fire suppression practices, and livestock grazing. These factors have impacted the fire return interval by increasing fire frequency in most areas, while limiting the role of wildland fire as a natural ecosystem component in other areas. Areas that experience more frequent fire are now dominated with early seral or uncharacteristic S-Classes. Areas that have not experienced fire due to suppression efforts are now dominated by mid- and late-seral stages with an uncharacteristic build up of vegetation. This combination of factors results in uncharacteristically severe wildland fires.

Fire management practices are specified in land use plans for adjacent Federal lands managed by the BLM (Twin Falls District and Elko District), Forest Service (Humboldt-Toiyabe National Forest), and the USAF (Juniper Butte and Saylor Creek Ranges). All these Federal lands are managed to prevent wildland fires and emphasize wildland fire suppression in most areas. Suppression of wildland fires on State lands within or adjacent to the planning area is managed by the BLM. Suppression of wildland fires on private lands is managed by Rural Fire Districts (RFDs) in some areas, but most private lands within the planning area have no governmental entities with jurisdictional responsibility. Wildland fires on private land areas without RFDs are usually suppressed by BLM.

A contractual agreement exists between the Twin Falls District BLM and the USAF that requires the BLM to suppress fires emanating from the Juniper Butte and Saylor Creek Ranges. A fire emanating from a training range would be given the same consideration as a fire occurring in Critical Suppression Areas when establishing priorities for multiple fires. Fires given a lower priority could increase in size compared to the same fires given a higher priority.

Future changes in land treatments and fire management direction could also impact the planning area. National direction is, at this time, moving from a full suppression to Appropriate Management Response (AMR) including Wildland Fire Use. Improvements in chemicals, seed source, and application methods would impact the success of vegetation treatments.

With regard to noxious weeds and invasive plants, and in addition to the discussion in the Introduction, the introduction of invasive non-native plants into the planning area contributes to the alteration of fire return interval and severity. These invasive plants have become well established in large areas since pre-settlement times and result in a more frequent fire return interval. This increase in wildland fire frequency has impacted the native vegetation communities, S-Classes, and FRCC.

Summary of Cumulative Impacts

Cumulative Impacts from the No Action Alternative

Increases in population would increase the demand for motorized recreation and increase the amount of WUI. As WUI increases, suppressing fires would become more complex and require the setting of priorities Preventive measures would be needed to address the increases to recreation and WUI.

Fire management objectives for adjacent land management agencies that implement Wildland Fire Use would increase the potential for a fire to cross into the planning area boundary especially along the southern border where natural and manmade barriers to wildland fire are fewer.

Improved management for noxious weeds and invasive species by adjacent land managers would decrease the spread of noxious weeds onto the planning area and slow the deterioration of the FRCC.

Cumulative Impacts from Alternative I

Fire management objectives for adjacent land management agencies implementing Wildland Fire Use would increase the potential for a fire to cross into the planning area boundary, especially along the southern border where there are fewer natural and manmade barriers to wildland fire.

Improved management for noxious weeds and invasive species by adjacent land managers would decrease the spread of noxious weeds and invasive species onto the planning area which would enhance improvements to FRCC. Advances to seed source, chemicals, and treatment application would increase the success of fuels treatments and enhance the improvements to FRCC.

Increases in population would increase the demand for motorized recreation and increase the amount of WUI. The WUI and motorized recreation primarily occur in VMAs A and B. However, suppression actions are focused in the middle portion of the planning unit, VMAs B and C. This would reduce the effectiveness of suppression actions in VMA C, because more of the suppression actions would be shifted to VMAs B and A.

Suppression priorities in the VMAs B and C would be affected by contractual agreement with USAF by focusing the priority on fires in VMA A, in order to meet the contract, where the majority of the fires on the training range occur.

Cumulative Impacts from Alternative II

Fire management objectives for adjacent land management agencies implementing Wildland Fire Use would increase the potential for a fire to cross into the planning area boundary, especially along the southern border where there a fewer natural and manmade barriers to wildland fire.

Improved management for noxious weeds and invasive species by adjacent land managers would decrease the spread of noxious weeds and invasive species onto the planning area which would slow the deterioration of FRCC.

Increases in population would increase the demand for motorized recreation and increase the amount of WUI. WUI and motorized recreation primarily occur in VMAs A and B. Suppression actions are also focused in VMAs A and B. This effectiveness of suppression actions would compensate for the increase in WUI and recreation under this alternative.

Suppression priorities in the VMAs A and B would be affected by contractual agreement with USAF by focusing the priority on fires in VMA A, where the majority of the fires on the training range occur. However, this effect would be the same as Alternative III and would be less than other alternatives.

Cumulative Impacts from Alternative III

Fire management objectives for adjacent land management agencies implementing Wildland Fire Use would increase the potential for a fire to cross into the planning area boundary, especially along the southern border where there are fewer manmade and natural barriers.

Improved management for noxious weeds and invasive species by adjacent land managers would decrease the spread of noxious weeds and invasive species onto the planning area which would enhance improvements to FRCC. Advances to seed source, chemicals, and treatment application would increase the success of fuels treatments and enhance the improvements to FRCC.

Increases in population would increase the demand for motorized recreation and increase the amount of WUI. WUI and motorized recreation primarily occur in VMAs A and B. Suppression actions are also focused in VMAs A and B. This effectiveness of suppression actions would compensate for the increase in WUI and recreation under this alternative.

Suppression priorities in the VMAs A and B would be affected by contractual agreement with USAF by focusing the priority on fires in VMA A, in order to meet the contract, where the majority of the fires on the training range occur. However, this effect would be the same as Alternative II and would be less than other alternatives.

Cumulative Impacts from Alternative IV (the Preferred Alternative)

Fire management objectives for adjacent land management agencies implementing Wildland Fire Use would increase the potential for a wildland fire to cross into the planning area boundary, especially along the southern border where there are fewer natural and manmade barriers to wildland fire. However, fire suppression actions are primarily focused in the southern portion, VMAs C and D, of the planning area which would mitigate the encroachment of fires onto the planning area.

Improved management for noxious weeds and invasive species by adjacent land managers would decrease the spread of noxious weeds and invasive species onto the planning area which would slow the deterioration of FRCC. Advances to seed source, chemicals, and treatment application would increase the success of fuels treatments and enhance the improvements to FRCC.

Increases in population would increase the demand for motorized recreation and increase the amount of WUI. WUI and motorized recreation primarily occur in VMA A and B. This would reduce the effectiveness

of suppression actions because suppression actions are focused VMAs C and D, as the increase in human-caused fires would be in the northern portion of the planning area.

Suppression priorities in the VMAs C and D would also be affected by contractual agreement with USAF by focusing the priority on fires in the northern portion of the planning unit where the majority of the fires on the training range occur.

Cumulative Impacts from Alternative V

Fire management objectives for adjacent land management agencies implementing Wildland Fire Use would increase the potential for a fire to cross into the planning area boundary, especially along the southern border.

Improved management for noxious weeds and invasive species by adjacent land managers would decrease the spread of noxious weeds and invasive species onto the planning area which would enhance improvements to FRCC. Advances to seed source, chemicals, and treatment application would increase the success of fuel treatments and enhance the improvements to FRCC.

Increases in population would increase the demand for motorized recreation and increase the amount of WUI. WUI and motorized recreation primarily occur in VMAs A and B. Suppression actions are focused in the middle portion of the planning unit, VMAs B and C. This would reduce the effectiveness of suppression actions in VMA C because more of the suppression actions would be shifted to VMAs B and A.

Suppression priorities in the VMAs B and C would also be affected by contractual agreement with USAF by focusing the priority on fires in VMA A, where the majority of the fires on the training range occur.

4.3.10. Wild Horses

Analysis Methods

Indicators

The following indicators were used for the analysis of impacts to wild horses:

- **Genetic diversity of the herd** – Herd size, or the effective reproducing population, influences the genetic diversity of a wild horse herd by affecting the size of the gene pool. A population size of 50 effective reproducing animals (i.e., a total population size of 150 to 200 wild horses) is recommended (Cothran, 2009) to maintain adequate genetic diversity (avoid inbreeding depression). Herds managed over several decades at less than 100 animals risk becoming inbred (Singer & Zeigenfuss, 2000), decreasing fitness and making the herd more susceptible to disease and physical infirmities. Because the Saylor Creek Herd Management Area (HMA) is geographically isolated from other HMAs, the Saylor Creek wild horse herd has no opportunity for natural genetic mixing with animals from adjacent herds; as a result, the herd must rely on the genetic pool within the herd to provide adequate genetic diversity.

- **Amount of forage available to wild horses** – The allocation of vegetation production for resources (e.g., watershed and wildlife) and resource uses (e.g., livestock grazing) affects whether sufficient vegetation would be available for wild horse forage needs; insufficient forage would cause stress and decrease the general health of the wild horse herd. Management that would maintain or improve rangeland health (e.g., soil stability, vegetation) within the HMA would sustain forage availability to the wild horse herd in the long term.

- **Amount of water available to wild horses** – Because natural water is not available in the HMA, wild horses are dependent on water developments for their water needs. As a result, management that would affect water developments would also affect wild horses. Not only do these water developments provide a water source for wild horses, they also affect distribution of wild horses within the HMA.

- **Level of disruption to wild horses in the HMA** – Wild horses can be disrupted or disturbed by interference with their movements or behavior within the HMA. Fewer constraints on wild horse movement and less interference with their behavior can increase the portion of the HMA used by the wild horses, increasing access to forage and decreasing impacts to rangeland health. Wild horses also benefit from being able to move to areas to escape human disturbance. Wild horse movement and behavior within the HMA can be impeded by multiple factors, including physical barriers (e.g., fences) as well as human activities.

Methods and Assumptions

Impacts to wild horses from management in the following sections of Chapter 2 were analyzed in detail: *Wild Horses*, *Upland Vegetation*, *Wildland Fire Ecology and Management*, *Livestock Grazing*, *Transportation and Travel*, *Land Use Authorizations*, and *Leasable Minerals*. Impacts from management in the *Recreation* section were not analyzed in detail because the impacts were captured in the analysis of travel and transportation actions. Impacts from management in the remaining sections were not analyzed in detail because the management did not vary measurably between alternatives or impact the indicator for wild horses. **Impacts from management for wild horses** can be found under *Impacts from Wild Horses Actions* in the *Livestock Grazing* section.

The analysis of impacts on wild horses includes both qualitative and quantitative components. Where management that would affect wild horses can be depicted spatially, GIS analyses were conducted to quantify the geographic extent of the impact. However, many management actions that would affect wild horses cannot be depicted spatially; in these cases, a qualitative analysis was conducted to characterize impacts to wild horses and the HMA.

Because wild horses are restricted to the Saylor Creek HMA, the analysis only considers actions that would result in effects to the wild horses or the HMA; effects of actions that would occur outside the HMA were not included in the analysis. For example, the analysis of impacts of upland vegetation actions in the HMA only considers actions that would occur in VMA A. For comparison purposes and to show differences between alternatives, it is assumed the relative proportions of VSGs within VMA A are the same as within the HMA. This assumption was made for analysis purposes because the location of specific vegetation treatments within VMA A would be determined at the implementation level.

Assumptions were developed based on ID Team knowledge of wild horses and HMA. These assumptions should not be construed to confine or redefine management contained within alternatives and were used to allow a comparison of impacts to wild horses resulting from the alternatives. Assumptions used in the analysis of impacts to wild horses include the following:

- Comprehensive management of wild horses and the HMA would benefit from establishment of an Appropriate Management Level (AML) based on forage and water availability.
- Comprehensive management of wild horses would benefit from a developing and implementing a Herd Management Area Plan.
- Wild horses and the HMA would benefit from management actions that keep the wild horse herd to numbers within the AML.
- Some trauma and injuries would result from capture and relocation to holding facilities. Wild horses experience stress initially associated with the roundup, transport, and holding of the animals. Stress quickly diminishes as the animals become accustomed to new surroundings.
- Management actions that allow greater motorized vehicle access to wild horses or the HMA would increase human activity and disturbance to the wild horse herd.
- Areas unavailable for livestock grazing would also be unavailable to wild horses.

Direct and Indirect Impacts

Impacts from Wild Horse Actions

Impacts from Management Specific to the No Action Alternative

Current conditions and trends observed within the HMA and described in Chapter 3 and the *Analysis of the Management Situation for the Jarbidge Planning Area* (BLM, 2007a) would continue under the No Action Alternative. The AML of 50 wild horses established in the No Action Alternative may result in loss of genetic diversity by limiting the number of reproducing animals, subsequently limiting the gene pool. Due to small herd size and no opportunity for exchange of genetic material with adjacent wild horse herds, the long-term genetic diversity of the Saylor Creek wild horse herd would be more difficult to maintain than the action alternatives with reproducing herds. The overall impact would be minor to moderate if proactive measures to conserve genetic diversity of the herd were implemented. These measures might include options such as:

- Altering population age structure through removals to promote higher numbers of reproductively successful animals,
- Altering reproducing sex ratios through removals to encourage a more even participation of reproducing males and females,
- Increasing generation intervals and reducing the rate of loss of genetic material by removing or using contraception on younger mares, and
- Periodically introducing reproducing females from other genetically similar herds to help in conservation efforts.

Keeping the wild horse population at 50 animals may require more frequent gathers, which would place additional pressure on the National Wild Horse and Burro Program to either adopt the animals or house them in long-term holding facilities.

Maintaining the wild horse herd at 50 animals would maintain or improve rangeland health and forage availability by limiting the extent of effects such as local overuse of vegetation and heavy soil disturbance near watering, loafing, and favored grazing areas. Development of a Wild Horse Management Plan would help meet *Standards for Rangeland Health* (43 CFR Subpart 4180.1) in the HMA and maintain the health of the wild horse herd by laying out a course to ensure adequate forage and water is available on the HMA and provide for proper care during gathers and adoptions.

Competition between wild horses and authorized livestock grazing for forage and water is expected, but maintaining the wild horse herd at 50 animals would limit these minor effects on forage and water availability to local areas.

Impacts from Management Specific to Alternative I

Alternative I would manage the HMA for a thriving natural ecological balance. The AML established in Alternative I of 100 to 200 reproducing wild horses would have minor, long-term effects on the genetic diversity of the wild horse herd. The AML established in Alternative I would decrease the risk of losing genetic diversity as compared to No Action Alternative by increasing the gene pool (i.e., the number of reproducing animals in the herd). As described in the No Action Alternative, proactive measures are available that can be implemented to help mitigate risk to genetic diversity associated with low reproducing numbers.

Maintaining the wild horse population between 100 and 200 animals would require more frequent gathers than Alternative III, but less frequent than in No Action Alternative. Alternative I would place additional pressure on the National Wild Horse and Burro Program to either adopt the animals or house them in long-term holding facilities.

Competition between wild horses and authorized livestock grazing for forage and water at localized areas would increase from the No Action Alternative. Because the season of use and distribution of grazing by wild horses cannot be intensively managed, some decreases in rangeland health, and potentially forage production, over the life of the plan would be expected in localized areas. Because livestock grazing can be intensely managed, some adjustments to livestock management may be necessary on an allotment-specific basis to maintain or improve rangeland health. Improving water availability would improve wild horse access and distribution throughout the HMA, reducing the opportunity for localized heavy forage use and unwanted impacts to rangeland health. Reconfiguration of fences is projected be minimal to maintain rangeland health to maintain wild horse numbers at 100 to 200 animals.

Foaling season is the most vulnerable time for the wild horse herd and overlaps the season of highest recreational use within and adjacent to the HMA. Restrictions on travel during foaling would increase mare and foal security by decreasing disruption to mares and their foals. The HMA would also be unavailable for commercial SRPs, which would also reduce disruption to wild horses.

Impacts from Management Specific to Alternative II

Alternative II calls for the Saylor Creek HMA to be managed for commercial uses. As a result, the area would be managed as an unpopulated herd area.[9] There would be a moderate short-term increase of stress to the wild horses currently in the HMA due to the gather, subsequent adoptions, and relocation to other HMAs or long-term holding facilities. However, once wild horses were removed from the HMA, there would be no need for additional gathers. The initial gather of wild horses would place pressure on the National Wild Horse and Burro Program to either adopt the animals or house them in long-term holding facilities, but this would be a one-time impact.

Removal of wild horses would eliminate related impacts to rangeland health in the HMA.

Impacts from Management Specific to Alternative III

Alternative III would increase the AML to 200 to 600 reproducing animals and would be expected to maintain adequate genetic diversity (Coates-Markle, 2000). Reconfiguration of allotment and pasture fences may be necessary to reduce disruption to wild horse movements within the HMA and increase the opportunity for the larger herd to disperse into smaller reproducing bands, allowing increased reproducing opportunity for different males.

Maintaining the wild horse population between 200 and 600 animals would require less frequent gathers than in the No Action Alternative or Alternative I. However, these gathers would include a large number of animals, which would place the most pressure on the National Wild Horse and Burro Program to either adopt the animals or house them in long-term holding facilities.

Maintaining a herd of 200 to 600 wild horses would increase the impacts on rangeland health in the HMA relative to the No Action Alternatives and Alternatives I, II, and IV. As the wild horse population approaches 600, localized over-grazing would increase in areas resulting in destabilizing soils, decreasing vigor of vegetation, and potentially decreasing forage production over the life of the plan. Adjustments to livestock numbers and seasons of use to accommodate prescribed wild horse numbers on an allotment-by-allotment basis would mitigate some of the effects of increased wild horse numbers on rangeland health. Currently, allotment and pasture configuration restricts wild horses from accessing the entire HMA. Reconfiguring allotment and pasture fences to improve distribution of wild horses throughout the HMA would decrease local impacts to rangeland health due increased wild horse numbers. More active management such as controlling water availability to affect a seasonal rotation and improve distribution of wild horses would be necessary to minimize local effects on vegetation and soil stability. However, moderate to major long-term effects to the resources due to localized over-grazing and soil disturbance are anticipated due to the lack of control of rotation or seasons of use of wild horse grazing within the HMA.

Foaling season is the most vulnerable time for the wild horse herd and overlaps the season of highest recreational use within and adjacent to the HMA. Restrictions on travel during foaling would have a major positive effect on mare and foal security by reducing disruption to mares and their foals.

[9] The HMA designation would be removed, but by law, the area’s designation as a herd area would remain.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV would establish a non-reproducing herd of up to 200 wild horses in the HMA. As a result, maintaining genetic diversity of the herd would no longer be an issue, and the population size of the herd could be more closely controlled compared to reproducing herds. An initial gather of wild horses currently in the HMA would be required, creating a short-term increase of stress to wild horses; however, future gathers would no longer be necessary for population control. The HMA would then be repopulated with either spayed or gelded animals from the original herd or animals currently being held in long-term holding facilities. Ultimately, Alternative IV would decrease disturbance to wild horses due to population control and would help relieve pressure on the national program by being able to accommodate unadoptable wild horses from other HMAs.

The effects of the availability of forage and water on wild horses would be similar to Alternative I. Maintaining a non-reproducing wild horse herd may reduce the instinct of males to breech fences to intermingle and challenge for control of neighboring mare bands. Improving control of bands of wild horses dispersed throughout allotments in the HMA would help prevent large herds from forming and would decrease localized effects of wild horse grazing.

The lack of seasonal travel restrictions would have minor, temporary effects on the security of wild horses as there would be no foaling.

Impacts from Management Specific to Alternative V

Alternative V would establish a non-reproducing herd in the HMA of up to 500 wild horses. As in Alternative IV, maintaining genetic diversity of the herd would no longer be an issue, and the population size of the herd could be more closely controlled as compared to a reproducing herd. An initial gather of reproducing wild horses currently in the HMA would be required, creating a short-term impact to the wild horses; however, additional gathers would no longer be necessary to control population size. The HMA would then be repopulated with either spayed or gelded animals from the original herd or animals currently being held in long-term holding facilities. Ultimately, Alternative V would help relieve pressure on the National Wild Horse and Burro Program by being able to accommodate unadoptable wild horses from other HMAs.

The effects of forage and water availability on wild horses would be similar to Alternative III. More aggressive adjustments to livestock numbers and seasons of use would be necessary to accommodate and to mitigate some of the effects of increased wild horse numbers on rangeland health of the HMA. Additional effects may also be mitigated by improving water availability and reconfiguring allotment and pasture fences to improve distribution of wild horses throughout the HMA. More active management to affect seasonal rotations and improve distribution of wild horses would be necessary to minimize localized impacts on vegetation and soil stability. Maintaining a non-reproducing wild horse herd may reduce the instinct of males to breech fences to intermingle and challenge for control of neighboring mare bands, improving control of bands of wild horses dispersed throughout allotments in the HMA would help prevent large herds from forming and would decrease localized effects of wild horse grazing. Moderate to major long-term local effects to the resources are anticipated due to the lack of control of rotation and seasons of use of wild horse grazing within the HMA.

The lack of seasonal travel restrictions would have minor, temporary effects on the security of wild horses as there would be no foaling.

Impacts from Upland Vegetation Actions

Changes in VSGs within the HMA due to vegetation treatments or wildland fire can affect the amount of forage available to wild horses. VSGs dominated by perennial grasses tend to provide a more stable forage base than VSGs dominated by annual grasses because annual grass production is highly dependent on the amount and timing of precipitation (Hull, 1949). Annual grass production can vary from a few hundred to several thousand pounds per acre (Hull, 1949) from year to year; as a result, the annual VSG provides an unpredictable forage base for wild horses. Annual grasses mature earlier in the season than perennial plants. As the annual grasses dry out, they become available as fuel for wildland fire four to six months earlier and remain available as fuel one to two months later than perennials, thereby lengthening the fire season (Platt & Jackman, 1946). Longer fire seasons increase the risk of wildland fires.

Table 4- 179 displays changes in upland vegetation composition in VMA A, which contains the Saylor Creek HMA.

Table 4- 179. Change in Vegetation Composition in VMA A Affecting Wild Horses (Percent)

VSG	Alternative					
	No Action	**I**	**II**	**III**	**IV**	**V**
Annual [A]	33[C]	22	13	17	13	25
Perennial [B]	64[C]	75	84	81	85	73
Total Treatment Acres	**N/A[C]**	**102,000**	**121,000**	**37,000**	**81,000**	**43,000**

[A] 33% of VMA A currently contains Annual VSG.
[B] This category includes the Non-Native Perennial, Non-Native Understory, Native Grassland, and Native Shrubland VSGs; 64% of VMA A currently contains perennial VSGs.
[C] The No Action Alternative does not segregate vegetation treatments by VMA; overall, across the planning area, the relative proportions of annual and perennial VSGs would change little as a result of vegetation treatments contained in this alternative.

Impacts from Management Specific to the No Action Alternative

The overall effect of actions proposed in VMA A for upland vegetation in the No Action Alternative would be a minor increase in the relative proportion of perennial communities through conversion of annual communities and removal of shrubs in non-native understory communities. Conversion would be primarily to non-native perennial. Actions converting annual grasslands to non-native perennial grasslands would increase the stability of forage and help to achieve *Standards for Rangeland Health* in the HMA by increasing fire return intervals and reducing the wide range of yearly production common in annual grasslands. Vegetation treatments to convert annual communities to perennial would disrupt wild horses during implementation; however, the No Action Alternative has fewer treatments relative to all action alternatives. Increasing fire return intervals would decrease the number and size of wildland fires in the HMA, thereby decreasing the disruption to wild horses due to fire activity, suppression efforts, and rehabilitation of burned areas.

Impacts from Management Common to All Action Alternatives

Management actions common to all action alternatives emphasizes protection of existing vegetation and newly treated areas by providing for the proper use of resources during seasonal periods or climatic events when the vulnerability of plant communities is increased. These actions would improve the stability of the plant communities and help achieve *Standards for Rangeland Health*. This management would be most effective for authorized actions such as livestock grazing where associated impacts can be closely controlled through allocations and site-specific grazing plans prescribing timing, rotations, and yearly monitoring criteria. Except for emergency actions that may be taken following wildland fire or during periods of extended drought (e.g., removal of wild horses to short-term holding facilities), actions common to all action alternatives are not applicable to managing grazing effects by wild horses.

Impacts from Management Specific to Alternative I

Management in Alternative I would change the composition of VMA A to contain a greater proportion of plant communities dominated by perennial vegetation (from 64% to 75% of VMA A). Non-Native Perennial would remain the dominant VSG (44% of VMA A) but treatment would focus more on native conversion. Actions to increase the proportion of perennial vegetation over annual would improve the stability of forage available to the wild horse herd and help achieve *Standards for Rangeland Health* in the long-term, but would create short-term disruptions to wild horses during restoration efforts. The scale of the restoration treatments would determine the extent of the impacts to wild horses due to management of the wild horse herd to meet treatment objectives. Management actions may include exclusion through temporary fencing, gathering and reducing numbers, or moving the entire herd to short-term holding facilities. Alternative I would have the second highest number of acres treated in VMA A of all the alternatives, and therefore would likely have the second highest level of disruption to wild horses during vegetation treatments.

The allowance of natural succession of shrubs in the Native Grassland VSG, currently 13% of the HMA, would reduce forage availability over the long-term. Increased shrub cover would decrease herbaceous production through increased competition between shrubs, grasses, and forbs. At canopy coverage of 12% to 15%, competition begins to decrease the understory herbaceous component (Winward, 1991). The creation of reference areas including 820 acres of the HMA would not have a measurable impact on forage availability.

Impacts from Management Specific to Alternative II

The wild horse herd would be depopulated under Alternative II. The effects of vegetation treatments on forage availability, rangeland health, and levels of disruption would not affect wild horses. The creation of reference areas including 40 acres of the HMA would not have a measurable impact on forage availability.

Impacts from Management Specific to Alternative III

The impacts of Alternative III would be similar to Alternative I, except treatments are designed to reduce the amount and continuity of fine fuels. The relative proportion of perennial VSGs within the HMA would increase from 64% to 81%, and Annual VSG would decrease from 33% to 17% of VMA A. Conversions would primarily be with fire-resistant or -tolerant non-native species. The shift in dominance from annual invasive to perennial vegetation would increase plant community resilience to fire disturbance (Monsen, 1994), shortening vegetation recovery following wildland fire. Conversion from annual to perennial would stabilize forage available to the wild horses. Alternative III would have the fewest acres treated in VMA A of the action alternatives, and, therefore, would likely have the least disruption to wild horses during vegetation treatments. The creation of reference areas including 200 acres of the HMA would not have a measurable impact on forage availability or access.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Actions proposed for Alternative IV would create a landscape dominated by perennial vegetation, emphasizing the amount and continuity of mid-seral native shrubland communities. The relative proportion of perennial VSGs would increase from 64% to 85% of VMA A through conversion of annual, non-native perennial, and non-native understory communities. Diversification of native grassland communities through natural succession of shrubs would be allowed to occur with additional action taken to seed and plant shrubs in existing non-native perennial communities. This process would take a minimum of about 20 years for the Wyoming Sagebrush Steppe PNVG and is unlikely to reach the late-seral stage in less than 40 years.

Successful alteration of the plant communities as described above would stabilize the forage base of the HMA and help achieve *Standards for Rangeland Health*. Long-term effects may occur as a result of increased shrub canopy, decreasing forage production due to competition between grasses and shrubs (Davies, et al., 2007; Winward, 1991).

Alternative IV would have the third highest number of acres treated in VMA A of all the alternatives, and therefore would likely have the third highest level of disruption to wild horses during vegetation treatments. The creation of reference areas including 820 acres of the HMA would not have a measurable impact on forage availability.

Impacts from Management Specific to Alternative V

Impacts of actions specific to Alternative V would be similar to Alternative IV, except the relative proportion and continuity of perennial VSGs would increase from 64% to 73% of VMA A. Conversion would be to native vegetation using primarily natural succession. Long-term impacts due to reduced forage production from competition between grasses and shrubs would be lower than in Alternative IV due to the increased emphasis on natural succession processes resulting in longer period of time to reach upland vegetation objectives.

Alternative V would have the second fewest acres treated in VMA A of the action alternatives and, therefore, would likely have the second lowest level of disruption to wild horses during vegetation treatments. The creation of reference areas including 13,000 acres of the HMA would decrease forage availability.

Impacts from Wildland Fire Ecology and Management Actions

Wildland fire ecology and management includes elements of fire suppression capabilities, fuels management, and ES&BAR. Wildland fire can impact forage production, although the direction of impact can vary. Wildland fire temporarily decreases AUMs available for wild horses in the HMA if they are excluded from burned areas to allow recovery. As the area recovers from fire, the acres of grassland vegetation could increase, which may increase AUMs available for wild horses if perennial grasses are not replaced by annual grasses. Improving wildland fire suppression capabilities would stabilize AUMs by reducing the size of wildland fire. Vegetation treatments to achieve fuels management objectives would stabilize AUMs by managing vegetation to move toward FRCC 1. ES&BAR actions would stabilize soils, return burned areas to productive plant communities, and restore or potentially increase forage available for wild horses.

Management related to wildland fire can also affect the degree to which wild horses are disrupted within the HMA. Any actions that reduce the size or occurrence of wildland fires would increase the safety and reduce the disruption to wild horses, both directly through the fire and fire suppression activities and indirectly through post-fire effects on forage. The use of temporary fences may also reduce disruption caused by wildland fires by allowing wild horses access to more unburned areas following the fire.

Impacts from Management Specific to the No Action Alternative

In the No Action Alternative, the entire HMA would continue to be managed for full suppression; however, because the entire planning area falls in this category, the No Action Alternative does not actually prioritize areas for fire suppression efforts. The No Action Alternative also does not prioritize areas for fuels treatments; however, negligible effects to wild horses are anticipated. Though the area in which the HMA is located would not be specifically identified as a high priority for suppression, the HMA and wild horses have been identified as an important resource, with appropriate suppression tactics identified for the HMA.

Impacts from Management Common to All Action Alternatives

Using AMR for wildland fires would have a major long-term effect on rangeland health in the HMA and levels of disruption to wild horses by reducing impacts from wildland fire and increasing the safety of the wild horse herd.

The goal for Fuels and ES&BAR common to all alternatives would be to reduce wildland fire hazards to WUI. Management actions would reduce fire size and occurrence within the HMA, increasing the safety of the wild horse herd and the stability of the forage base. Actions prescribed under ES&BAR would ensure quicker recovery following wildland fire events, improving the quantity and quality of the forage base in the HMA.

Impacts from Management Specific to Alternative I

Limiting the spread, size, and intensity of wildland fires would improve rangeland health in the HMA, stabilize forage availability, and increase security of the wild horses. In Alternative I, 99% of the HMA would be within a Critical Suppression Area; however, suppression priorities during multiple fire starts identify VMA A, which contains the HMA, as the lowest priority. Measures to increase water availability in high recreational use areas and reduce suppression response times may still help reduce the number of acres burned in a fire, which would help stabilize forage availability in the HMA. Improving water availability for suppression efforts would also complement efforts to increase the reliability of water sources for wild horses. Travel restrictions during high fire danger would reduce opportunity for human-caused starts and increase security for wild horses. Implementation of fuels treatments within and outside WUI would also help reduce impacts of wildland fire on wild horses and the HMA.

In Alternative I, temporary fences would be allowed to protect burned plant communities and to allow for uses in pastures with burned plant communities only if there are at least 2,000 unburned acres in the pasture. As a result, in a pasture with fewer than 2,000 unburned acres, wild horses would have to be removed from the pasture entirely or be allowed to graze in burned areas. If wild horses were removed, they would be excluded from using even larger portions of the HMA than was burned; they may even need to be gathered and relocated to short-term holding facilities, which would be stressful to individual wild horses. Allowing wild horses to graze in pastures with fewer than 2,000 unburned acres may result in major, long-term impacts to rangeland health and forage availability within the HMA because the burned areas would likely be grazed by wild horses before burned areas have recovered. The reduced vigor and production of plants in the HMA would also increase opportunities for invasive plants to occupy the area.

Impacts from Management Specific to Alternative II

Under Alternative II, the wild horse herd would be reduced to zero; therefore, management for wildland fire suppression, fuels, and ES&BAR would have no impact to wild horses.

Impacts from Management Specific to Alternative III

Acres identified as Critical Suppression Areas would be the same as in Alternative I; however, VMA A would have the second highest priority during multiple fire starts rather than lowest as in Alternative I. Assigning the HMA a higher priority for suppression would increase the stability and availability of forage to wild horses, and decrease the disturbance associated with rehabilitation efforts following wildland fire. Forage availability would be affected less than in Alternative I, as the emphasis on improving water availability would be throughout the planning area and more actions would be implemented to reduce response time for suppression efforts. Travel restrictions would be more expansive than in Alternative I, further reducing the opportunity for human-caused starts and increasing security for wild horses.

Management direction under *Fuels and Emergency Stabilization and Burned Area Rehabilitation* in Chapter 2 would offer a broader range of tools and treatments to limit fire size, spread, and intensity as compared to Alternative I. More fuels treatments within WUI and more fuel breaks outside WUI would be implemented, improving the ability to suppress and contain starts to smaller acreages. The use of unvegetated fuel breaks in Alternative III may increase opportunity for noxious weeds and invasive plants to occupy the site.

Temporary fences would be allowed to protect burned plant communities in Alternative III. As a result, Alternative III would cause the least disruption to wild horses of the action alternatives due to temporary fence management direction by allowing wild horses to graze in unburned areas while allowing burned areas to recover.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV would impact forage available to wild horses and rangeland health within the HMA similarly to Alternative I, except the emphasis on improving water availability throughout the planning area would provide a better opportunity to distribute wild horses throughout the HMA and reduce localized grazing impacts as compared to Alternative I.

Fuels and ES&BAR actions would have similar effects on forage stability and disruption as Alternative I, except more acres for fuels reduction treatments, especially acres identified for restoration to FRCC I, within and outside WUI would occur, further reducing impacts to wild horses as compared to Alternative I.

Temporary fences would be allowed to protect burned plant communities in Alternative IV, but would not be allowed in pastures with native plant communities or in pastures with fewer than 2,000 unburned acres. Approximately 20% of the HMA consists of native vegetation; however, as areas within the HMA are restored to native vegetation, the areas available for using temporary fences would decrease, increasing the disruption to wild horses. If partially burned pastures contained native plant communities or fewer than 2,000 acres of unburned vegetation, wild horses would have to be removed from the pastures entirely or be allowed to graze in burned areas. Alternately, allowing wild horses to graze in partially burned pastures may result in major, long-term impacts to rangeland health and forage availability within the HMA because the burned areas would likely be grazed by wild horses before burned areas have recovered. The reduced vigor and production of plants in the HMA would also increase opportunities for invasive plants to occupy the area.

Impacts from Management Specific to Alternative V

The impacts of Alternative V on forage available to wild horses and rangeland health within the HMA would be similar to Alternative I, except water availability for fire suppression would be maintained at current levels, reducing the effectiveness of measures to reduce fire size and intensity.

Impacts from fuels and ES&BAR management actions on forage stability and disruption to wild horses would be similar to Alternative I, except fewer acres of fuels treatments outside WUI would be allowed. The emphasis on restoration of burned areas to native communities is similar to Alternative I except only native species would be allowed.

Alternative V would not allow installation of temporary fences to protect burned areas. The impacts of this would be similar to those described for Alternative IV, but would apply to the entire HMA.

Impacts from Livestock Grazing Actions

The Saylor Creek HMA is comprised of portions of eight livestock grazing allotments. Forage for wild horses has been accounted for when allocating AUMs for livestock at the planning level. Allotment-specific allocations will be determined during the permit renewal process to address site-specific resource needs and move the HMA toward meeting *Standards for Rangeland Health*. Fences associated with livestock management can disrupt wild horses by restricting their movement within the HMA. Artificial water sources developed for livestock management are the only water sources available to wild horses in the HMA. Competition between livestock and wild horses for limited resources may create conflicts between permittees and wild horses, particularly as the wild horse population increases.

Table 4- 180 displays areas available and unavailable for livestock grazing within the HMA.

Table 4- 180. Areas Available and Unavailable for Livestock Grazing in the Saylor Creek HMA by Alternative (Acres)

Livestock Grazing Management	Alternative					
	No Action	I	II	III	IV	V
Available [A]	95,000	92,000	95,000	95,000	94,000	81,000
Unavailable	0	3,000	100	300	900	14,000

[A] Acres available to livestock within the HMA are available to wild horses.

Impacts from Management Specific to the No Action Alternative

Livestock numbers and management within allotments in the HMA would be in relative balance with the wild horse herd with adequate water and forage available to the wild horse herd. Allocation of forage to livestock across the planning area would be between 160,000 and 260,000 AUMs.

An indirect effect of making areas unavailable for livestock grazing is the exclusion of wild horses from those areas as well. Only 19 acres would be unavailable for livestock grazing in the No Action Alternative. This would cause little, if any, disruption to wild horse movement or access to portions of the HMA.

Impacts from Management Common to All Action Alternatives

Management common to all action alternatives provides broad direction to assist in achieving resource objectives for *Upland Vegetation* and *Wildland Fire Ecology and Management*. These guidelines would balance livestock authorizations with other resources and would help achieve *Standards for Rangeland Health*, providing long-term benefits to the HMA and wild horse herd.

Impacts from Management Specific to Alternative I

Under Alternative I, vegetation allocation would result in between 196,000 and 267,000[10] AUMs available for livestock across the planning area and would allow livestock grazing in 97% of the HMA. Sufficient

[10] This reflects the number of AUMs that would be available for livestock based on the vegetation allocation and the areas available for livestock grazing by alternative, combined with the 2006 vegetation production data, the most recent year for which production data are available; this number also assumes that an alternative's vegetation

vegetation would be available for wild horse forage needs. There may be negligible to minor disruptions to wild horse movement by making reference areas, Wildlife Tracts, and areas open to cross-country motorized vehicle use inaccessible to wild horses. This would only occur in 3% of the HMA.

Management actions in Alternative I provide guidance for season of use, utilization, and installation of infrastructure specific to livestock management that would manage livestock grazing in balance with resource needs (e.g., wild horses, upland vegetation). Guidance for the maintenance and alteration of existing infrastructure to achieve resource objectives, including those for wild horses, would provide a moderate, long-term benefit to wild horses by utilizing infrastructure to reduce impacts to rangeland health and reduce disruption to wild horses. Management regarding range infrastructure would also provide sufficient water for wild horse needs.

Impacts from Management Specific to Alternative II

Under Alternative II, the wild horse herd would be reduced to zero. As a result, livestock grazing management under this alternative would not have an effect on the availability of forage or disruption of the wild horse herd.

Impacts from Specific to Alternative III

Under Alternative III, livestock grazing would be allowed in 99% of the HMA. This would cause little, if any, disruption to wild horse movement or access to portions of the HMA. The vegetation production allocation for Alternative III, resulting in between 302,000 and 382,000 AUMs for livestock across the planning area, would provide sufficient forage for wild horses. These allocations are the second highest for livestock and the highest for wild horses of all the action alternatives. More conflicts between livestock grazing permittees and wild horses are anticipated, increasing disruption to wild horses, as both livestock and wild horse numbers would increase through the life of the plan.

Increased pressure on water sources due to the high wild horse numbers in this alternative, principally livestock water pipelines and troughs, would necessitate major improvement to some facilities. Improvements may include additional storage, extension of pipelines, and more troughs. A complete replacement of the Tuanna Pipeline would be necessary due to its age and poor condition in order to provide sufficient water for the higher number of wild horses in this alternative.

Other management actions would be implemented to maintain and improve native plant diversity and decrease fire size by reducing fuels in non-native perennial communities. Decreasing fire size would provide major long-term benefits to the HMA, but increased localized competition between livestock and wild horses for available forage may affect the ability of rangelands in those areas to achieve rangeland health standards.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Under Alternative IV, livestock grazing would be allowed in 99% of the HMA. This would cause little, if any, disruption to wild horse movement or access to portions of the HMA. Sufficient vegetation would be available for wild horse forage needs.

Implementation of Alternative IV would result in a reduced allocation of vegetation to livestock across the planning area compared to the current level, between 89,000 and 141,000 AUMs in IV-A and 92,000 and 145,000 AUMs in IV-B (the Preferred Alternative), in order to achieve resource objectives for native plant communities and restoration of non-native perennial communities. These reductions in allocation for livestock would help move the HMA towards meeting *Standards for Rangeland Health*, but may also result in accumulation of fine fuels, increasing risk of wildland fire starts, as wild horse numbers would remain comparatively low. Competition between wild horses and livestock for available forage and water is expected to decrease. The decreased livestock allocation would increase BLM's ability to adjust

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treatment objectives will be reached. The AUM numbers used the analysis for Alternatives I through V are provided solely to assist the reader in comparing the effects of the alternatives and should not be construed to confine or redefine the management contained within the alternatives.

allotment and pasture boundaries to improve distribution of wild horses throughout the HMA, resulting in improvements to rangeland health and reduced disruption to wild horse movements.

The decreased livestock allocation would also increase BLM's responsibility for maintaining livestock watering facilities to meet the needs of wild horses. Currently, one of the wells that provide water for livestock and wild horses in the HMA is on private land. If the amount of forage available to livestock in the HMA decreases substantially, the permittees would no longer need to maintain or provide access to those private water rights within the HMA. In that case, in order to maintain sufficient water availability for wild horses, water rights would need to be secured, and new wells would need to be drilled on BLM-managed land.

Impacts from Management Specific to Alternative V

Alternative V would have similar impacts to wild horses as Alternative IV, except fewer AUMs would be available to livestock, between 49,000 and 98,000 AUMs across the planning area. Decreases in allocation to livestock would not occur evenly across the planning are but would be allotment specific. If decreases occur within the HMA, competition between wild horses and livestock for forage and water would decrease. Sufficient vegetation would be available for wild horse forage needs.

Under Alternative V, livestock grazing would be allowed in 86% of the HMA. There would be moderate disruptions to wild horse movement by making reference areas and Wildlife Tracts inaccessible to wild horses; this would also decrease the wild horses' ability to access large portions (14%) of the HMA.

As discussed in Alternative IV, BLM would have additional responsibilities for maintaining water supply pipelines and obtaining water rights to ensure adequate water for wild horse needs. However, the demand for water by wild horses in this alternative would be higher due to the higher wild horse numbers in Alternative V. In addition, Alternative V would not allow construction of new pipelines, potentially making providing adequate water for wild horses difficult.

Impacts from Transportation and Travel Actions

Human activity within the HMA is commonly associated with roads, as they provide human access to the HMA. The impacts of human activity on wild horses can be both direct (e.g., human harassment of wild horses) and indirect (e.g., wild horses moving from or avoiding areas with high amounts of human activity). During foaling season, human activity can disrupt mares and their foals, reducing their security. Therefore, management that would affect the amount of human access in the HMA would affect the degree to which wild horse movement or behavior would be disrupted.

There is also a strong association between soil disturbance and motorized vehicle use, especially along roads and trails. Disturbance of soils and associated vegetation communities increases the opportunity for accelerated soil erosion and the introduction and spread of noxious weeds and invasive plants. This often results in decreased forage production and increased fire risk, especially if disturbed sites are occupied by annual grasses such as cheatgrass. Therefore, management that would affect the amount of soil disturbance due to motorized vehicles would affect forage availability and rangeland health within the HMA.

The impacts of transportation and travel management on wild horse indicators would be proportional to the miles of roads within the HMA and acres open to cross-country motorized vehicle use. These factors also reflect impacts of recreation on wild horses, since the primary recreational activity occurring within the HMA is motorized recreation.

Table 4- 181 displays the transportation and travel management prescribed for lands within the HMA.

Table 4- 181. Travel Designations and Route Density Changes in the Saylor Creek HMA by Alternative (Acres)

Management Decisions	Alternative					
	No Action	I	II	III	IV	V
Travel Designation						
Open to Cross-Country Motorized Vehicle Use	95,000	2,000	0	2,000	2,000	0
Limited to Designated Routes	100	93,000	95,000	93,000	93,000	95,000
Expected Changes in Route Density as a Result of TMAs [A]						
Increase in Route Density	N/A	18,000	95,000	18,000	18,000	0
No Change in Route Density	N/A	0	0	77,000	0	0
Decrease in Route Density	N/A	77,000	0	0	77,000	95,000

[A] The No Action Alternative does not have TMAs.

Impacts from Management Specific to the No Action Alternative

Under the No Action Alternative, 99% of the HMA would continue to be open to cross-country motorized vehicle use. It is expected that the current growth in popularity of recreational uses in and immediately adjacent to the HMA, predominantly motorized recreation, would continue. The most popular seasons for motorized recreational activity are spring and early summer, which coincides with foaling season. Increases in motorized recreation are expected to result in increases in the amount of disruption and stress to the wild horses.

Impacts to forage availability, rangeland health, and disruption to the wild horse herd resulting from this alternative would be moderate in the short term, but would increase in the long term as user-created OHV play areas expand further into the HMA. Additional impacts are expected from transportation routes associated with land use authorizations.

Impacts from Management Common to All Action Alternatives

The authorized officer has the authority to implement travel restrictions or closures to protect resource values. Development of a CTTMP would create partnerships and provide additional guidance to effectively manage access and travel in the HMA. Long-term, major improvements in rangeland health in the HMA and reduced levels of disruption to the wild horse herd are expected from these management actions.

Impacts from Management Specific to Alternative I

Long-term improvements in rangeland health and forage production, as well as reduced levels of disruption and increased security of wild horses, are expected to result from limiting motorized vehicle use in 98% of the HMA to designated routes. Seasonal restrictions on travel in the HMA would also result in less disruption to wild horses during foaling season. Only 2% of the HMA would be open to cross-country motorized vehicle use. Areas within and adjacent to the HMA are expected to continue increasing in popularity for motorized recreational use; route density in 19% of the HMA is expected to increase. As a result, rangeland health is expected to decrease in these areas by increasing the amount of bare ground, accelerating soil erosion, decreasing forage production, and increasing risk of human-caused wildland fire, invasive species, and noxious weeds. Developing a travel management plan for the Deadman/Yahoo TMA would provide guidance to help mitigate those effects by designating routes for recreational use that would minimize impacts to rangeland health in the HMA and disruption to wild horses. In contrast, route density is expected to decrease in 81% of the HMA. In these areas, impacts due to routes and human access are expected to decrease.

Seasonal closures or restrictions on primitive roads, trails, and open areas would reduce potential for human-caused wildland fire, reducing the potential for conversion of more desirable vegetation types to less desirable.

Impacts from Management Specific to Alternative II

In Alternative II, the wild horse herd would be reduced to zero and the HMA status would be removed. Actions taken under this alternative are expected to have no impacts to the wild horse herd as implementation of the CTTMP would follow removal of wild horses from the HMA.

Impacts from Management Specific to Alternative III

Management in Alternative III would be similar to Alternative I, except that route density is not expected to change on 81% of the HMA. Impacts of routes and human activity in those areas would not decrease as it would in Alternative I.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Management in Alternative IV would be similar to Alternative I, except there would be no seasonal travel restrictions during foaling season. Because Alternative IV would manage for a non-reproducing herd, there would be no disruption to mares and their foals.

Impacts from Management Specific to Alternative V

Management in Alternative V would be similar to Alternative I, except no areas would be open to cross-country motorized vehicle use in the HMA and route density is expected to decrease throughout the HMA. Not having an open area in and immediately adjacent to the HMA and the decrease in route density would improve rangeland health and reduce disruption to wild horses. While Alternative V would not include a seasonal travel restriction during foaling season, it would contain a non-reproducing herd resulting in no disruption to mares and their foals.

Impacts from Land Use Authorizations Actions

Management actions for land use authorizations may affect wild horses by increasing human access to the HMA and increasing disruption to wild horses. Construction and maintenance of the authorized project or structure and associated infrastructure may result in displacement of wild horses from portions of the HMA where the activities are occurring.

Table 4- 182 displays the acres within the HMA identified for ROW avoidance, as well as the acres with potential for utility and wind energy development. None of the alternatives identify ROW exclusion areas in the HMA.

Table 4- 182. ROW Avoidance Areas and Potential Land Use Authorizations in the Saylor Creek HMA (Acres)

Land Use Authorization	Alternative					
	No Action	I	II	III	IV	V
ROW Avoidance	<100	64,000	64,000	64,000	64,000	64,000
Potential Utility Development Areas	12,000	12,000	12,000	12,000	12,000	12,000
Potential Wind Development Areas	2,000	1,000	2,000	1,000	1,000	1,000

Impacts from Management Specific to the No Action Alternative

The No Action Alternative would allow for the consideration of land use authorizations in and adjacent to the HMA; less than 100 acres within the HMA would be located within an avoidance area. As a result, 13% of the HMA has potential for utility development, and 2% of the HMA has potential for wind energy development. Potential effects of these land use authorizations would be temporary displacement of wild horses from preferred grazing areas due to human activity associated with construction and maintenance of the authorization and associated infrastructure (e.g., powerline, wind turbine, road). The intensity and duration of the effects on wild horses would vary depending on mitigation conducted during construction and maintenance of the authorization.

Impacts from Management Common to All Action Alternatives

Management common to all action alternatives, such as focusing new rights-of-way in disturbance corridors and co-locating new communication sites with existing sites, would generally help reduce effects of land use authorizations on wild horses.

Impacts from Management Specific to Alternatives I, III, and IV

Two avoidance areas would overlap 67% of the HMA in Alternative I: the Oregon NHT and the USAF MOA. The Oregon NHT intersects the extreme northeast corner of the HMA; the avoidance area for the USAF MOA covers 63,000 acres of the HMA. When accounting for the avoidance areas and other management direction in Alternative I, similar proportions of the HMA would have potential for utility and wind energy development as in the No Action Alternative. These developments would have the same impacts on wild horses as described for the No Action Alternative.

Alternative I would identify a ROW corridor in the northern portion of the HMA. Encouraging placement of new utilities within this corridor would concentrate effects to wild horses to a smaller area than if utilities are placed anywhere in the HMA.

Impacts from Management Specific to Alternative II

Under this alternative, the wild horse herd would be reduced to zero, resulting in no impacts to the wild horse herd.

Impacts from Management Specific to Alternative V

Impacts from Alternative V would be similar to those described under Alternative I, but to a lesser extent as impacts due to utility development would occur on a smaller area; 9% of the HMA would have potential for utility development.

Impacts from Leasable Minerals Actions

Within the HMA, 61,000 acres have been identified as having potential for oil and gas leasing. Both short- and long-term effects to wild horses would occur if oil and gas exploration and development were to occur. Short-term effects would occur primarily during exploration and the implementation phase of the project as increased human activity disturbs the wild horses. Exploration activity is expected to be relatively short, over several weeks or months, but intense, requiring 10 to 15 people and five to seven vehicles (Appendix U). Seismic reflection (use of explosives) is the preferred method and would pose the most disturbances to the wild horse herd.

Increased human activity would temporarily displace wild horses from the immediate vicinity of construction; however, wild horses would quickly become acclimated to the new permanent infrastructure and resume utilization of the area. Construction and maintenance of new roads and infrastructure (e.g., pump stations, pipelines) would permanently remove and alter vegetation, affecting long-term forage availability. Development is anticipated to be limited to two wells, approximately 30 acres, during exploration, with one well producing oil. Five additional wells would be drilled at the producing well, increasing surface occupancy to a total of 90 acres. Increased route density on approximately 10 acres per well, would improve access and increase human activity and ground disturbance thereby increasing the potential for introduction and spread of noxious weeds and invasive species and reducing the stability of the forage base.

Each well utilizes 5,000 to 15,000 gallons of water per day, requiring acquisition of water rights. Depending upon the location of and number of oil and supporting water wells, there is potential to affect the water table and production of existing wells supplying water to the wild horse herd.

Within the HMA, 95,000 acres have been identified as having potential for geothermal leasing. Increased human activity would increase disturbance to wild horses but effects would be short-term and associated with project implementation and construction (Appendix V). Surface disturbance due to exploration and development activities is expected to occur on 185 to 230 acres over the life of the plan. Wild horses would become accustomed to the permanent structures, but disturbance from increased human activity would continue with operation and maintenance.

Impacts from Management Specific to the No Action Alternative

In the No Action Alternative, the portions of the HMA with potential for oil and gas leasing or geothermal leasing would be available for leasing subject to standard lease terms. Based on the RFDSs (Appendices U and V), approximately 90 acres of surface disturbance due to oil and gas leasing and 185 to 230 acres of surface disturbance due to geothermal leasing could occur within the HMA, which would affect forage availability and disrupt wild horses in those areas.

Impacts from Management Common to All Alternatives and Management Specific to Alternatives I, II, III, IV, and V

Even though leasable mineral allocations differ in the action alternatives for the planning area as a whole, the allocations within the HMA remain the same. Of the 61,000 acres with potential for oil and gas leasing within the HMA, 61,000 acres within the HMA would be available for oil and gas leasing subject to standard lease terms, and approximately 400 acres would be available for lease with surface restrictions for the Oregon NHT and RCAs. Based on the RFDS for oil and gas development (Appendix U), approximately 90 acres of surface disturbance could occur within the HMA, which would affect forage availability and disrupt wild horses in those areas.

Of the 95,000 acres within the HMA with medium potential for geothermal leasing, 95,000 acres would be available for geothermal leasing subject to standard lease terms, fewer than 100 acres would be available with controlled surface use restrictions, and 300 acres would be available with no surface occupancy. Based on the RFDS for geothermal development (Appendix V), 185 to 230 acres of surface disturbance could occur within the HMA, which would affect forage availability and disrupt wild horses in those areas.

Summary of Direct and Indirect Impacts

Table 4- 183 summarizes the impacts to indicators for wild horses for each relationship analyzed.

Table 4- 183. Summary of Impacts to Wild Horses

Indicator [A]	Alternative					
	No Action	I	II	III	IV	V
Wild Horses						
Genetic diversity of the Wild Horse Herd (1=high, 2=low)	2	2	N/A	1	N/A	N/A
Improvement in Water Availability (1=most, 3=none)	3	2	N/A	1	2	2
Improvement in Rangeland Health within the HMA (1=most likely, 3=least likely)	1	2	N/A	3	2	3
Disruption to Wild Horse Movement or Behavior (1=least, 3=most)	3	2	N/A	1	2	1
Upland Vegetation						
Improvement in Forage Availability (1=most, 3=none)	3	2	N/A	1	1	2
Improvement in Rangeland Health within the HMA (1=most likely, 3=least likely)	3	2	N/A	1	1	2
Disruption to Wild Horse Movement or Behavior (1=least, 4=most)	1	4	N/A	2	3	2
Wildland Fire Ecology and Management						
Improvement in Forage Availability (1=most, 4=least)	4	1	N/A	2	2	3

Indicator [A]	Alternative					
	No Action	I	II	III	IV	V
Improvement in Water Availability (1=most, 3=none)	3	2	N/A	1	1	3
Disruption to Wild Horse Movement or Behavior (1=least, 5=most; based on temporary fence restrictions)	1	3	N/A	2	4	5
Livestock Grazing						
Improvement in Water Availability (1=most, 3=least)	1	1	N/A	1	2	3
Disruption to Wild Horse Movement or Behavior (1=least, 3=most; based on amount of access to the entire HMA and potential conflict with livestock)	2	3	N/A	3	1	2
Transportation and Travel						
Disruption to Wild Horse Movement or Behavior (1=least, 4=most)	4	2	N/A	3	2	1
Land Use Authorizations						
Disruption to Horse Movement or Behavior (1=least, 3=most)	3	2	N/A	2	2	1
Leasable Minerals						
Disruption to Wild Horse Movement or Behavior and Improvement in Forage Availability (1=impacts are the same across all alternatives)	1	1	1	1	1	1

[A] Rankings indicate the order in which the alternatives would affect each indicator; they do not, however, depict the degree of difference between ranks. Ranks can only be compared within rows; a “1” in one row does not necessarily reflect the same degree of impact as a “1” in another row.

Impacts from the No Action Alternative

Overall, the No Action Alternative would have the most impact to wild horses.

Maintaining the low AML, 50 wild horses, in the No Action Alternative would make maintaining the genetic diversity of the wild horse herd the most difficult of any of the alternatives. Because the number of reproducing animals in a herd of this size would be limited, additional actions to introduce genetic variability would have to be taken to avoid inbreeding and subsequent inheritable mental and physical infirmities (Coates-Markle, 2000). The impacts to wild horses would be minor and negative.

Out of all the alternatives, the fewest actions would be taken to convert annual grasslands to perennial vegetation in the No Action Alternative, resulting in the least amount of improvement of forage availability and stability in the HMA and negligible impacts. Rangeland health in the HMA would be likely experience minor beneficial impacts, primarily due to the low wild horse numbers. Water availability in the No Action Alternative would remain the same.

This alternative would be the least favorable for reducing disruption to wild horses due to the expected increase in human activity, primarily motorized recreation use and land use authorizations, as well as the lack of direction to remove or realign fences to facilitate wild horse movements. Retention of areas open to cross-country motorized vehicle use would exacerbate human-wild horse conflicts, particularly during the foaling period.

Impacts from Alternative I

Overall, Alternative I would impact wild horses less than the No Action Alternative and Alternative V, but more than Alternatives III and IV.

The AML established in this alternative, 100 to 200 reproducing wild horses, is still expected to limit genetic diversity of the herd, making it necessary to periodically introduce new genetic material to the herd. With the AML two to four times higher than in the No Action Alternative, maintaining genetic diversity would be somewhat easier, but more difficult than in Alternative III. The impacts to wild horses would be minor and negative.

This alternative would stabilize forage availability for wild horses through fuels management and conversion of plant communities to a higher proportion of perennials. The overall improvement in forage availability would be minor and beneficial, similar to Alternatives III and IV. Rangeland health in the HMA would be likely to improve, due to relatively low wild horse numbers as well as vegetation management, resulting in minor beneficial impacts. Water availability for wild horses would improve to a similar degree as in Alternative IV, although not as much as in Alternative III.

Alternative I would reduce disruption to wild horse movements and behavior more than in the No Action Alternative and Alternative III, but less than Alternatives IV and V. Disruption due to human activity associated with roads and land use authorizations would be reduced. Sources of disruption would include vegetation treatments, restrictions on temporary fencing following fire, the amount of the HMA unavailable for livestock grazing, and the increased allocation of forage to livestock (i.e., either more livestock in the HMA or livestock grazing in the HMA longer as compared to the No Action Alternative); however, because most disruption is due to human activity, the overall level of disruption to wild horses would decrease.

Impacts from Alternative II

Reducing the wild horse herd to zero would have the major negative impacts on wild horses during the process of gathering and relocating wild horses. Forage and water availability for wild horses would no longer be an issue, nor would disturbance to wild horses. Conflicts between wild horses and resource uses, including livestock grazing and motorized recreation, would be eliminated. In the long term, the HMA would experience moderate beneficial impacts to vegetation and soils following the removal of the horses.

Impacts from Alternative III

Overall, Alternative III would impact wild horses less than all alternatives except Alternative IV.

Maintaining a reproducing herd at an AML of 200 to 600 wild horses would provide moderate beneficial impacts as the alternative has the most opportunity to maintain the genetic diversity of the wild horse herd.

The moderate negative impacts to rangeland health from wild horses would be similar to Alternative V; however, vegetation treatments in the HMA would mitigate those impacts to a degree. Effects due to wild horse grazing would be evident when wild horse numbers approach the maximum allowed. Additional management actions to improve distribution and some seasonal control of wild horse grazing would have to be considered in order to achieve resource objectives.

Forage availability would improve due to wildland fire management and vegetation treatments, resulting in minor to moderate beneficial impacts. Improvements to water systems to increase reliability and supply of water would accommodate the increases in wild horse allocations.

Conflicts between livestock grazing, motorized recreation, and wild horses are expected to remain high, although conflicts with motorized recreation would decrease compared to the No Action Alternative. Overall, levels of disruption to wild horses would decrease through the removal of fences to facilitate wild horse movement and the smallest amount of vegetation treatments in VMA A of the action alternatives.

Impacts from Alternative IV (the Preferred Alternative)

Overall, Alternative IV would impact wild horses less than any other alternative, although impacts would still occur.

There would be negligible impacts on the genetic diversity of the herd as the 200 wild horses would be managed as a non-reproducing herd.

Rangeland health within the HMA would be improved the most of all the alternatives, due to the comparatively low wild horse numbers and the large areas converted from annual and non-native perennial grasslands to native shrublands. These impacts would be moderate and beneficial.

Forage availability would improve due to wildland fire management and vegetation treatments, resulting in minor to moderate beneficial impacts. Reductions in livestock allocations in this alternative may create a conflict in water rights acquisition and the water supply in one major pipeline that supplies water for wild horses in the HMA.

Levels of disruption to wild horses would be similar to Alternative V and would be lowest of all the alternatives, primarily due to reductions in human activity from management for transportation and travel and land use authorizations. The realignment of fences to facilitate wild horse movement and relatively low numbers of livestock would also contribute to lower levels of disruption.

Impacts from Alternative V

Overall, Alternative V would have the most impact on wild horses of all alternatives except the No Action Alternative. There would be negligible impacts on the genetic diversity of the herd as the 500 wild horses would be managed as a non-reproducing herd.

The effects of wild horse grazing on rangeland health and forage availability would be moderate and negative and the greatest of all alternatives. Increased numbers and limited ability to control grazing effects by the wild horses would expand and intensify the areas of heavy grazing and soil disturbance near water, loafing, and favored grazing areas. Alternative V would also have fewer vegetation treatments to increase the amount of perennial vegetation as compared to Alternatives I through IV. Reduction in forage allocated to livestock would mitigate some effects of wild horses by decreasing livestock-related effects to soils and vegetation. However, decreased controls of grazing use (season of use, utilization levels) would limit the benefits of mitigating actions. Decreased livestock allocation would increase flexibility in restructuring allotment and pasture boundaries to improve distribution of wild horses throughout the HMA.

Reductions in livestock allocations in this alternative may create a conflict in water rights acquisition and the water supply of one major pipeline that supplies water for wild horses in the HMA. Management prohibiting new pipelines would limit opportunities to use water to improve distribution of wild horses throughout the HMA or relocate existing infrastructure due to resource concerns.

Levels of disruptions to wild horses from human activity would be the lowest of all the alternatives, primarily due to reductions in human activity from management for transportation and travel and land use authorizations. Fourteen percent of the HMA would be inaccessible as an indirect impact of making those areas unavailable for livestock grazing.

Cumulative Impacts

Past, Present, and Reasonably Foreseeable Actions

Because the Saylor Creek HMA is geographically isolated from other HMAs in Idaho and northern Nevada, there is no migration of wild horses between Saylor Creek and any other HMAs. Therefore, the impacts of the alternatives would only affect wild horses within the Saylor Creek HMA. As a result, cumulative impacts to wild horses will focus only on cumulative impacts to wild horses in the Saylor Creek HMA.

Past, present, and reasonably foreseeable actions for the following resource and resource use cumulatively affect wild horses:

- Wild Horses
- Land Use Authorizations

These actions are described in detail in the *Introduction* to this chapter.

Summary of Cumulative Impacts

Cumulative Impacts from the No Action Alternative

If wild horse gathers were to occur less frequently, the population of wild horses in the HMA would exceed 50 wild horses more often. The need to address genetic diversity would continue. Because forage has been allocated on the basis of 50 wild horses and wild horses have a higher priority for forage than livestock, accommodating the additional wild horses would either result in less forage available for livestock or in decreases in rangeland health.

The No Action Alternative contains the highest levels of disruption to wild horse movement and behavior, and cross-country motorized vehicle use would be allowed. As a result, activities associated with construction and maintenance of the Gateway West Transmission Line would increase the level of disruption over the long term.

Cumulative Impacts from Alternative I

If wild horse gathers were to occur less frequently, the population of wild horses in the HMA would exceed 200 wild horses more often. As wild horse numbers approached 200 head, genetic diversity of the herd may no longer be an issue. However, because forage has been allocated on the basis of 200 wild horses, the additional wild horses could decrease rangeland health.

Alternative I resulted in an intermediate amount of disruption to wild horses; constructing and maintaining the Gateway West Transmission Line would temporarily increase the level of disruption. However, because motorized vehicle use would be limited to designated routes, the impact of construction and maintenance activities would be less than in the No Action Alternative.

Cumulative Impacts from Alternative II

Removal of wild horses from the HMA would occur in one gather to minimize costs. Removal of wild horses would eliminate related grazing effects on rangeland health and genetic diversity concerns. Presumably, wild horses would still be removed prior to construction of the Gateway West Transmission Line; as a result, there would be no cumulative effects associated with the construction and maintenance of that project or other human activity.

Cumulative Impacts from Alternative III

If wild horse gathers were to occur less frequently, the population of wild horses in the HMA would reach or exceed 600 wild horses more often. Genetic diversity would not be a concern as the wild horse population would be maintained at levels to maintain an adequate gene pool. Because forage has been allocated on the basis of 600 wild horses, accommodating the additional wild horses could result in decreases in rangeland health.

Alternative III would result in a high level of disruption to wild horses, although not as high as in the No Action. Constructing and maintaining the Gateway West Transmission Line would temporarily increase disruption to wild horses, but because motorized vehicle use would be limited to designated routes, the impact would be less than in the No Action Alternative.

Cumulative Impacts from Alternative IV (the Preferred Alternative)

The population of wild horses in the HMA would not be affected by wild horse gathers occurring less frequently; a non-reproducing herd would not result in excess wild horses that need to be gathered, and genetic diversity of the herd would not be an issue. However, the increased demand for areas to house wild horses gathered from other HMAs aside from long-term holding facilities would mean the HMA would likely contain the maximum 200 wild horses a majority of the time. As a result, there would be no cumulative effects on forage availability or rangeland health.

Along with Alternative V, Alternative IV resulted in the least disruption to wild horses. Constructing and maintaining the Gateway West Transmission Line would temporarily increase disruption to wild horses, but because motorized vehicle use would be limited to designated routes, the impact would be less than in the No Action Alternative.

Cumulative Impacts from Alternative V

The population of wild horses in the HMA would not be affected by wild horse gathers occurring less frequently; a non-reproducing herd would not result in excess wild horses needing to be gathered, and genetic diversity of the herd would no longer be an issue. However, the increased demand for areas to house wild horses gathered from other HMAs aside from long-term holding facilities would mean the HMA would likely contain the maximum 500 wild horses a majority of the time. As a result, there would be no cumulative effects on forage availability or rangeland health.

Along with Alternative IV, Alternative V resulted in the least disruption to wild horses. Constructing and maintaining the Gateway West Transmission Line would increase disruption to wild horses, but because motorized vehicle use would be limited to designated routes, the impact would be less than in the No Action Alternative.

4.3.11. Paleontological Resources

Analysis Methods

Indicators

The following indicator was used for the analysis of impacts to paleontological resources:

- **The physical integrity of paleontological resources** – Integrity refers not only to the condition of individual fossils but also to the relationship between fossils and their stratigraphic context (i.e., their association with the geologic layer in which they became fossilized). Fossil integrity is important for the accurate taxonomic classification of individual specimens, including identification of the genus or species represented, while contextual integrity is critical for proper age assessments of fossil localities. Physical disturbance that results in destruction of fossils or removal from their stratigraphic context diminishes or destroys the scientific, educational, and recreational value of paleontological resources.

Methods and Assumptions

Impacts to paleontological resources from management in the following sections of Chapter 2 were analyzed in detail: *Paleontological Resources*, *Transportation and Travel*, *Land Use Authorizations*, *Land Tenure*, *Minerals*, and *Areas of Critical Environmental Concern*. Management from the remaining sections was not analyzed in detail because the management did not vary measurably between alternatives or impact the indicator for paleontological resources. **Impacts from management for paleontological resources** are found under *Impacts from Paleontological Resources Actions* in the *Land Use Authorizations*, *Leasable Minerals*, and *Locatable Minerals* sections.

In order to assess impacts to the physical integrity of paleontological resources, it is necessary to identify the areas where fossils are known or expected to occur. For this analysis, the Potential Fossil Yield Classification system, as described in Chapter 3, was used to predict the distribution and density of paleontological resources. Geologic formations were assigned to a Potential Fossil Yield (PFY) Class based on research conducted in southern Idaho between 1870 and 2006 by researchers from the Idaho Museum of Natural History, the University of Michigan Museum of Paleontology, the University of California Museum of Paleontology, the Smithsonian National Museum, USGS, National Park Service, and BLM (Winterfeld & Rapp, 2009). A spatial representation of the PFY classes was produced in GIS by correlating the named fossil-bearing formations identified in the above study with the digital version of the

Geologic Map of Idaho produced by the USGS (Johnson & Raines, 1996) from the original paper map created by the IDL, Bureau of Mines and Geology (Bond, 1978). Although the base map was produced at a larger scale (1:500,000) than most of our spatial data, it is currently the best available source of mapped surface geology for the planning area and is adequate for landscape-scale analyses. Finally, the PFY spatial dataset was compared to the digital footprints of the use allocations and management actions in Chapter 2 that may impact fossil resources.

The following assumptions were used when analyzing impacts to paleontological resources:

- The PFY classification system adequately represents the known and expected occurrence of fossil resources in the planning area and can be compared to proposed management decisions to produce a quantifiable assessment of probable effects at the landscape scale.
- The potential for impacts to paleontological resources would be proportional to the acres of land in each PFY class that overlap areas affected by surface-disturbing management actions or use allocations.
- Paleontological resources are rare and irreplaceable. Impacts to paleontological resources from surface and subsurface disturbance are long term.
- Surface-disturbing uses in PFY Class 1 and Class 2 units would have low to very low potential to impact the integrity of important paleontological resources.
- Surface-disturbing uses in Class 3 units would have low potential to impact the integrity of important paleontological resources due to the low number of localities known or expected.
- As noted in Chapter 3, no Class 4 units have been identified in the planning area.
- Surface-disturbing uses in Class 5 units would have the greatest potential to impact the integrity of important paleontological resources and could result in increased costs to project proponents and BLM for impact assessment and mitigation. For these reasons, the analysis of impacts to paleontological resources will focus on the Class 5 units.

Direct and Indirect Impacts

Impacts from Paleontological Resource Actions

Impacts from Management Specific to the No Action Alternative

Management actions under the No Action Alternative would ensure that known paleontological localities would continue to be protected, maintained, or enhanced for their scientific and educational values.

Impacts from Management Common to All Action Alternatives

Management actions provide both general direction and specific measures to manage paleontological resources for their scientific and educational values. Compared to the No Action Alternative, the action alternatives take a more proactive approach to paleontological resource management by focusing attention on fossil-bearing geologic formations rather than concentrating only on known localities and by emphasizing a variety of physical, administrative, and educational measures to protect the resource. This approach is more systematic and efficient and should result in fewer impacts to the integrity of important fossil resources.

Impacts from Management Specific to Alternative I

This alternative would provide the highest level of emphasis for paleontological resources by combining standard reactive management actions with enhanced proactive inventory, monitoring, and research.

Impacts from Management Specific to Alternatives II and III

Paleontological research would be permitted when required for specific development projects or when proposed by qualified paleontologists for academic studies. Alternatives II and III would continue to promote management of paleontological resources but would place a greater emphasis on reactive management compared to Alternative I.

Impacts from Management Specific to Alternatives IV and V

Impacts to paleontological resources under these alternatives would be very similar to Alternatives II and III. Research may be restricted to avoid conflicts with restoration projects but, in most cases, adjustments in research designs could be made to ensure compatibility with restoration objectives.

Impacts from Transportation and Travel Actions

Fossils and fossil localities may be affected both directly and indirectly by travel-related activities. Cross-country motorized vehicle use, in particular, is known to impact soils through compaction, vegetation removal, and accelerated erosion (Ouren, et al., 2007; Sampson, 2007). When surface soils contain fossils, or provide a protective matrix around fossil deposits, vehicle use can damage or destroy the fossil resources through direct impact or cause their displacement and accelerated weathering due to exposure. Most documented fossil localities occur on steep hillside exposures of the Glenns Ferry Formation, a PFY Class 5 unit located in the northern portion of the planning area. Several of these same hillsides have become popular OHV play areas.

The variables used to evaluate the effects of transportation and travel management on paleontological resources are: the overlap between PFY Class 5 units and areas open to cross-country motorized vehicle use, closed to motorized vehicle use, and limited to designated routes; and areas of projected route density increases or decreases, as identified in TMA objectives. Open areas, characterized by unrestricted motorized travel, would have the highest potential for impacts to the integrity of paleontological resources. Closed areas, assuming compliance and enforcement, would have a very low potential for motorized vehicle effects, while the use of designated routes is expected to have a low to moderate potential for travel-related impacts, depending on whether route density decreases or increases. Table 4- 184 summarizes the relationships between the transportation and travel actions and paleontological resources.

Table 4- 184. Travel Designations and Route Density Changes in PFY Class 5 Areas by Alternative (Acres)

Transportation and Travel Management Actions	Alternative					
	No Action	I	II	III	IV	V
Travel Designations						
Open to Cross-country Motorized Vehicle Use	118,000	200	0	300	300	300
Closed to Motorized Vehicle Use	800	<100	<100	<100	<100	800
Limited to Designated Routes	2,000	121,000	121,000	121,000	121,000	120,000
Route Density Change from TMA Focus						
Expected Route Density Increase	N/A[A]	17,000	121,000	15,000	15,000	2,000
Expected Route Density Decrease	N/A[A]	105,000	0	0	107,000	120,000
No Expected Route Density Change	N/A[A]	0	800	107,000	0	0

[A] The No Action Alternative does not contain TMAs.

Impacts from Management Specific to the No Action Alternative

Under the No Action Alternative, over 97% of PFY Class 5 lands would remain open to cross-country motorized vehicle use while less than 1% would be closed to motorized vehicle use and less than 2% would be limited to designated routes. With the exception of the Sand Point ACEC and the Oregon NHT corridor, where motorized travel is limited to designated routes, this alternative offers very little protection to paleontological resources from transportation and travel related impacts.

TMAs are not identified in the No Action Alternative.

Impacts from Management Specific to Alternative I

Under this alternative, only 300 acres of PFY Class 5 lands would be open to cross-country motorized vehicle use; fewer than 100 acres would be closed to motorized vehicle use; and 121,000, nearly 100%, would be limited to designated routes.

Alternative I would create five TMAs, only three of which would overlap PFY Class 5 lands. In the Snake River TMA, which includes approximately 85% of the PFY Class 5 lands, route density is expected to decrease. An additional 14% of Class 5 lands fall within the Deadman/Yahoo TMA, where route density is expected to increase. The remaining 1% of PFY Class 5 lands are within the Canyonlands TMA, where route density is expected to decrease.

Impacts from Management Specific to Alternative II

Under Alternative II, no areas would be open to cross-country motorized vehicle use. As with Alternative I, fewer than 100 acres of PFY Class 5 lands would be closed to motorized vehicle use, and the remaining 99.9% would be limited to designated routes.

Approximately 99% of the PFY Class 5 lands in the planning area would be in the Bruneau Desert TMA under this alternative. Route density in this TMA is expected to increase. The remaining Class 5 lands would be in the Canyonlands TMA where route density is expected to remain static.

Impacts from Management Specific to Alternative III

Travel designations for PFY Class 5 lands would be identical to Alternative I.

Under Alternative III, the Snake River TMA would include approximately 86% of the Class 5 lands; travel route density is expected to remain the static. An additional 12% of PFY Class 5 lands would fall within the Deadman/Yahoo TMA where route density is expected to increase. The remaining 2% of PFY Class 5 lands would be included in the West Side TMA where route density is expected to remain the same.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Travel designations for PFY Class 5 lands would be identical to Alternative I.

Under Alternative IV, the Snake River TMA would include approximately 87% of the PFY Class 5 lands; travel route density in this TMA is expected to decrease. An additional 12% of PFY Class 5 lands would fall in the Deadman/Yahoo TMA where route density is expected to increase. The remaining 1% of PFY Class 5 lands would be included in the Canyonlands TMA where route density is expected to decrease.

Impacts from Management Specific to Alternative V

Under Alternative V, 300 acres of PFY Class 5 lands would be open to cross-country motorized vehicle use; 800 acres would be closed to motorized vehicle use; and 120,000, or 99.2%, would be limited to designated routes.

The Snake River TMA would include 97% of PFY Class 5 lands under this alternative. Route density in this TMA is expected to decrease. The West Side TMA and the Yahoo TMA would split the remaining 3% of the PFY Class 5 lands. Route density is expected to decrease in the West Side TMA and to increase in the Yahoo TMA.

Impacts from Land Use Authorizations

Land use authorizations are subject to NEPA, including an assessment of potential impacts to paleontological resources, prior to authorization. Pre-authorization investigations normally rely on surface observations of proposed construction areas. However, some large-scale projects typically disturb both surface and subsurface sediments. Major transmission lines, buried gas pipelines, road construction, and wind energy developments, in particular, require substantial subsurface excavations that may impact buried fossil deposits. Each alternative identifies areas where utility development and wind energy development have potential to occur and ROW exclusion areas where development would not be authorized. For this analysis, each of these land use allocations is compared to PFY Class 5 lands, by alternative, to quantify levels of potential impacts. Table 4- 185 summarizes the impacts of land use authorizations actions on paleontological resources.

Table 4- 185. Land Use Authorization Allocations in PFY Class 5 Areas (Acres)

Land Use Authorization Restriction and Development in PFY Class 5 Areas	Alternative					
	No Action	I	II	III	IV	V
Utility Avoidance Zone	2,000	N/A	N/A	N/A	N/A	N/A
ROW Exclusion Area	N/A	1,000	800	1,000	1,000	1,000
Potential Utility Development Area	16,000	16,000	16,000	16,000	16,000	15,000
Potential Wind Development Area	23,000	17,000	23,000	17,000	17,000	17,000

Impacts from Management Specific to the No Action Alternative

The No Action Alternative would place approximately 2% of the PFY Class 5 lands, including the Sand Point ACEC, in a utility avoidance zone. Management of this zone mixes various levels of restriction and, although not directly comparable, resembles a combination of the ROW avoidance and ROW exclusion areas identified in the action alternatives. Approximately 13% of PFY Class 5 lands would overlap with the potential utility development area, and approximately 19% of PFY Class 5 lands would overlap with the potential wind development area.

Impacts from Management Specific to Alternatives I, III, and IV

Under Alternatives I, III, and IV, approximately 1% of PFY Class 5 lands, including the Sand Point ACEC, would be in the exclusion area for ROWs. Approximately 14% of PFY Class 5 lands would overlap with the potential utility development area, and approximately 14% of PFY Class 5 lands would overlap with the potential wind development area.

Impacts from Management Specific to Alternative II

Under Alternative II, less than 1% of PFY Class 5 lands would be in the exclusion area for ROWs. The overlap of PFY Class 5 lands with the potential utility development area would be the same as Alternative I. Approximately 19% of PFY Class 5 lands would overlap with the potential wind development area.

Impacts from Management Specific to Alternative V

The overlap of PFY Class 5 lands with the exclusion area for ROWs would be the same as Alternative I. Approximately 12% of PFY Class 5 lands would overlap with the potential utility development area. The overlap of PFY Class 5 lands with the potential wind development area would be the same as Alternative I.

Impacts from Land Tenure Actions

Fossil resources are considered part of the surface estate (BLM Manual 8720) and, therefore, belong to the surface land owner. When lands containing fossil deposits leave Federal ownership, through sale or exchange, any protections afforded them by Federal laws and regulations are dissolved. The action alternatives divide the planning area into Land Tenure Zones that determine the types of transactions available for land tenure adjustments. Zone 1 lands would be retained, Zone 2 lands could be disposed of through exchange or Recreation and Public Purposes Act of 1954 (R&PP) lease, and Zone 3 lands could be disposed of through sale, exchange, or R&PP lease. The No Action Alternative uses a similar scheme to identify specific lands for potential disposal. In terms of potential impacts, the No Action Alternative Zones T1 (sale), T2 (sale or exchange) and T4 (available for agricultural disposal) are equivalent to Zone 3 in the action alternatives; No Action Zone T3 (exchange only) is equivalent to action alternative Zone 2.

For this analysis, land tenure allocations were compared to lands with the highest potential for paleontological resources as identified in the PFY classification system. Alternatives which make the most PFY Class 5 lands available for disposal have the greatest potential to impact paleontological resources. Table 4- 186 summarizes the impacts of land tenure actions on paleontological resources.

Table 4- 186. Land Tenure Zones for PFY Class 5 Areas by Alternative (Acres)

Land Tenure Allocation	Alternative					
	No Action	I	II	III	IV	V
Land Tenure Zone 1[A]	92,000	97,000	80,000	97,000	98,000	98,000
Land Tenure Zone 2[B]	0	22,000	32,000	22,000	20,000	24,000
Land Tenure Zone 3[C]	29,000	2,000	9,000	2,000	3,000	0

[A] Includes No Action retention lands.
[B] Includes No Action Zone T3.
[C] Includes No Action Zones T1, T2, and T4.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative allocates less than 1% of PFY Class 5 lands to Land Tenure Zone T1 (sale only) and 24% to T4 (agricultural disposal). T4 lands containing surface exposures of important paleontological resources would be found unsuitable for disposal. No PFY Class 5 lands are included in zones T2 (sale or exchange) or T3 (exchange only). Lands in these zones would be available for transfer out of Federal ownership. All other lands would be retained.

Impacts from Management Common to the No Action and All Action Alternatives

Criteria for consideration when contemplating sales of public land are identified. Although not specifically mentioned, paleontological resources would be one of the public land values to be weighed against the public benefits that could accrue from a particular sale, and any proposal would be analyzed through the NEPA process. In the absence of specific proposals, this action provides no measurable impacts to analyze.

Impacts from Management Common to All Action Alternatives

The management actions under this heading provide general guidance for land tenure transactions. Allocations and actions that could benefit paleontological resources include closing the planning area to new DLE/CA applications and making known paleontological localities a priority for acquisition. Paleontological resources would not, however, be listed as a characteristic of lands to be retained.

Impacts from Management Specific to Alternatives I and III

Alternatives I and III would place approximately 80% of PFY Class 5 lands within Land Tenure Zone 1, approximately 18% in Zone 2, and the remaining 2% in Zone 3. As stated above, Zone 1 provides the most protection for paleontological resources against loss through sale or exchange.

Impacts from Management Specific to Alternative II

Under Alternative II, approximately 66% of PFY Class 5 lands would fall into Zone 1 while 26% would be in Zone 2 and 8% in Zone 3.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Under Alternative IV, just over 80% of PFY Class 5 lands would fall into Zone 1 while 17% would be in Zone 2 and just under 3% in Zone 3.

Impacts from Management Specific to Alternative V

Alternative V would place just over 80% of Class 5 lands within Land Tenure Zone 1, just over 19% in Zone 2, and no acres in Zone 3. This alternative would manage the most acres of PFY Class 5 lands for retention and, therefore, would have the least impact from land tenure actions on the integrity of paleontological resources.

Impacts from Minerals Actions

The development of leasable, salable, and locatable minerals has the potential to impact the integrity of paleontological resources through both surface and subsurface disturbance related to extraction activities and associated infrastructure. Mineral extraction may require earth moving, tunneling, blasting, drilling, road construction, or other earth-disturbing actions, all of which could damage or destroy fossil resources.

Leasable minerals include energy resources such as oil, gas, and geothermal waters. The RFDS for oil and gas development potential indicates an area of approximately 306,000 acres in the planning area has potential for oil and gas leasing. Approximately 91,000 of those acres are classified as PFY Class 5. The RFDS assumes that 10 to 20 leases may be offered over the next 20 years, resulting in two to three geophysical exploration programs and one to two exploration wells. Total surface disturbance associated with oil and gas development is estimated at 90 acres (Appendix U).

Geothermal resources may also be present beneath PFY Class 5 units on the Snake River Plain in the northern portion of the planning area. Approximately 9,000 acres have a high potential for geothermal leasing and another 357,000 acres have medium potential for leasing. These areas include all 121,000 acres of PFY Class 5 lands in the planning area. Geothermal extraction would require the drilling of deep wells and the construction of power plants to convert the geothermal steam to electricity. New roads and powerlines may also be required. Total surface disturbance associated with geothermal development is estimated at 185 to 230 acres (Appendix V).

With the current focus on developing new sources of domestic energy, future oil and gas and geothermal developments in the planning area are possibilities that warrant analysis. To accomplish this, the potential oil and gas and geothermal development areas and the areas closed to leasable mineral development for each alternative are compared to the PFY Class 5 areas. Alternatives with the most PFY Class 5 lands open to development would have the greatest potential to impact the integrity of paleontological resources while those with the most PFY Class 5 areas closed to mineral leasing would offer the most protection from impacts.

Salable minerals include sand, gravel, and decorative stone. Sand and gravel pits are common in the fossiliferous northern portion of the planning area. The extraction of sand and gravel requires extensive surface and subsurface disturbance and is a fairly common source of impact to, and discovery of, paleontological localities (Winterfeld & Rapp, 2009). To evaluate the potential effects of salable mineral management allocations and actions, the areas available and closed to salable minerals in each alternative were compared to the PFY Class 5 lands. Alternatives with the most PFY Class 5 acres open to salable mineral development have the greatest potential to impact the integrity of paleontological resources while those with the most Class 5 acres closed to mineral sales would offer the most protection from impact.

Locatable minerals include gold, silver, other metals, some gemstones, and other rare minerals with commercial or industrial value. Locatable mineral development usually involves destructive extraction methods such as blasting, trenching, tunneling, or large-scale earth moving. Although no large, economically viable locatable mineral deposits have been found in the planning area, a few mining claims are active along the Bruneau River, Salmon Falls Creek, and the Snake River. Even though the potential for development is low, in the absence of protective restrictions, fossil resources are at risk from mineral exploration. In the past, several terraces along the Snake River, including the one at Sand Point, have been subjected to destructive and commercially unproductive mining activity. In order to assess the potential impacts to fossil resources from locatable mineral actions, the areas recommended for withdrawal from the mining laws were compared to the PFY Class 5 geologic units. For purposes of analysis, it is assumed that withdrawal requests will be granted. Alternatives with the most PFY Class 5 acres withdrawn from locatable mineral entry would have the least potential to impact paleontological resources. Table 4- 187 summarizes impacts to paleontological resources from minerals actions.

Impacts from Management Specific to the No Action Alternative

Most of the planning area would be open to mineral leasing under the No Action Alternative, including the Sand Point ACEC and all other known paleontological localities. Although an NSO restriction would apply to these areas, this restriction would only protect surface deposits. Because the 1987 Jarbidge RMP did not include maps or detailed descriptions of the open and closed area allocations for mineral leasing, it is not possible to determine the amount of PFY Class 5 lands in each category. According to the RFDS for oil and gas development (Appendix U), approximately 90 acres of surface disturbance are expected to occur in the planning area as a result of oil and gas exploration and development over the life of the plan. This is less than 0.1% of the potential oil and gas areas that would be available for oil and gas leasing.

Table 4- 187. Allocation of PFY Class 5 Areas for Leasable, Salable, and Locatable Mineral Development (Acres)

Mineral Allocations of Class 5 Areas			Alternative					
			No Action	I	II	III	IV	V
Leasable Minerals	Potential Oil and Gas Areas	Closed	N/A[A]	4,000	0	300	1,000	4,000
		Open [B]	N/A[A]	87,000	91,000	91,000	90,000	87,000
	Potential Geothermal Areas	Closed	N/A[A]	5,000	800	1,000	2,000	5,000
		Open [B]	N/A[A]	117,000	121,000	120,000	119,000	117,000
Salable Minerals	Closed		4,000	7,000	800	7,000	7,000	10,000
	Open		118,000	114,000	121,000	114,000	114,000	111,000
Locatable Minerals	Recommended for Withdrawal		4,000	7,000	4,000	4,000	5,000	7,000

[A] The 1987 RMP does not include maps or detailed descriptions of the areas open and closed to leasable mineral development, making comparisons between the No Action Alternatives and the action alternatives impossible.
[B] Includes open, open with No Surface Occupancy, open with seasonal restrictions, and open with controlled surface use restrictions.

Similarly, according to the RFDS for geothermal development (Appendix V), between 185 and 230 acres of surface disturbance are expected to occur in the planning area as a result of geothermal exploration and development over the life of the plan. This is less than 0.1% of the potential geothermal areas that would be available for geothermal leasing.

Under the No Action Alternative, approximately 1,300 acres (1%) of PFY Class 5 lands would continue to be managed for material use sites. New sites for salable mineral development would be considered, after NEPA analysis, over most of the PFY Class 5 lands, excluding approximately 3% due to restrictions associated with the Sand Point ACEC and the Oregon NHT protective corridor. An additional 1,000 acres of salable mineral development is expected under the No Action Alternative.

Approximately 3% of the PFY Class 5 lands, including the Sand Point ACEC, would be recommended for withdrawal from the general mining laws. However, demand for locatable minerals in the planning area is not expected to change from present levels; thus, the potential for impacts to occur in the life of the plan is low.

Impacts from Management Common to All Action Alternatives

Although fossil localities are not specifically addressed under leasable minerals, all action alternatives allow for the development of site-specific resource condition objectives and lease stipulations, which could provide protection for paleontological resources.

Terms and conditions for commercial development of salable mineral sites, under all action alternatives, would contain a prohibition on disturbing important paleontological sites.

Locatable mineral management actions common to all action alternatives address mitigation of unnecessary and undue degradation of resources and negative effects to riparian areas. Since they apply to all alternatives, they produce no measurable differences for analysis.

Impacts from Management Specific to Alternative I

Approximately 4% of the 121,000 acres of PFY Class 5 lands in the high and medium areas of potential geothermal development, including those within the Sand Point ACEC, would be closed to geothermal leasing under this alternative. The remaining 96% would be open to exploration and development. According to the RFDS for geothermal development (Appendix V), between 185 and 230 acres of surface disturbance are expected to occur in the planning area as a result of geothermal exploration and development over the life of the plan. This is less than 0.1% of the potential geothermal areas that would be available for geothermal leasing.

Of the 91,000 acres of Class 5 lands in the areas of potential oil and gas development, 4% would be closed to leasing and 96% would be open to exploration and development. According to the RFDS for oil and gas development (Appendix U), approximately 90 acres of surface disturbance are expected to occur in the planning area as a result of oil and gas exploration and development over the life of the plan. This is less than 0.1% of the potential oil and gas areas that would be available for oil and gas leasing.

Approximately 6% of PFY Class 5 lands, including those within the Sand Point ACEC, would be closed to salable mineral development under this alternative. The remaining 94% would be open to exploration and development. The acreage on which salable mineral development occurs is expected to increase from approximately 1,300 acres to approximately 2,300 acres over the life of the plan. This is approximately 0.2% of the area available for salable mineral development.

Under Alternative I, 6% of the PFY Class 5 lands, including the Sand Point ACEC, would be recommended for withdrawal from the general mining laws. However, demand for locatable minerals in the planning area is not expected to change from present levels; thus, the potential for impacts to occur in the life of the plan is low.

Impacts from Management Specific to Alternative II

Less than 1% of PFY Class 5 lands would be closed to geothermal leasing under this alternative, while more than 99%, including the Sand Point ACEC, would be open to exploration and development. Alternative II would make all PFY Class 5 lands within the potential oil and gas areas open to exploration and development. However, as in Alternative I, less than 0.1% of the potential oil and gas areas and potential geothermal areas that are available for leasing are expected to be developed.

Less than 1% of PFY Class 5 lands would be closed to salable mineral development under Alternative II. The remaining 99%, including lands within the Sand Point ACEC, would be open to exploration and development. The acreage on which salable mineral development occurs is expected to increase from approximately 1,300 acres to approximately 3,300 acres over the life of the plan. This is approximately 0.2% of the area available for salable mineral development.

Under Alternative II, 3% of the PFY Class 5 lands would be recommended for withdrawal from the general mining laws. The entire Sand Point fossil locality would not be withdrawn, but portions of the fossil-bearing deposits located within the Oregon NHT corridor would be recommended for withdrawal. However, demand for locatable minerals in the planning area is not expected to change from present levels; thus, the potential for impacts to occur in the life of the plan is low.

Impacts from Management Specific to Alternative III

Approximately 1% of PFY Class 5 lands, including those within the Sand Point ACEC, would be closed to geothermal leasing under this alternative while 99% would be open to exploration and development. With only 300 PFY Class 5 acres closed, over 99% of the areas of potential oil and gas development would be open to leasing. However, as in Alternative I, less than 0.1% of the potential oil and gas areas and potential geothermal areas that are available for leasing are expected to be developed.

Impacts to paleontological resources from salable mineral actions under this alternative would be the same as Alternative II.

Under Alternative III, 4% of the PFY Class 5 lands, including those within the Sand Point ACEC, would be recommended for withdrawal from the general mining laws. However, demand for locatable minerals in the planning area is not expected to change from present levels; thus, the potential for impacts to occur in the life of the plan is low.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Less than 2% of PFY Class 5 lands, including those within the Sand Point ACEC, would be closed to geothermal leasing under this alternative while approximately 98% would be open to exploration and development. Oil and gas leasing would be closed on 1% of PFY Class 5 lands within the area of potential oil and gas development and available on the remaining 99% under Alternative IV. However, as in Alternative I, less than 0.1% of the potential oil and gas areas and potential geothermal areas that are available for leasing are expected to be developed.

Impacts to paleontological resources from salable mineral actions under this alternative would be the same as Alternative I.

Under Alternative IV, 4% of the PFY Class 5 lands, including those within the Sand Point ACEC, would be recommended for withdrawal from the general mining laws. However, demand for locatable minerals in the planning area is not expected to change from present levels; thus, the potential for impacts to occur in the life of the plan is low.

Impacts from Management Specific to Alternative V

The impacts from Alternative V are essentially the same as Alternative I for both geothermal and oil and gas leasing.

Approximately 8% of PFY Class 5 lands, including those within the Sand Point ACEC, would be closed to salable mineral development under this alternative. The remaining 92% would be open to exploration and development. The acreage on which salable mineral development occurs is expected to increase from approximately 1,300 acres to approximately 2,300 acres over the life of the plan. This is approximately 0.2% of the area available for salable mineral development.

Under Alternative V, 6% of the PFY Class 5 lands, including those within the Sand Point ACEC, would be recommended for withdrawal from the general mining laws. However, demand for locatable minerals in the planning area is not expected to change from present levels; thus, the potential for impacts to occur in the life of the plan is low.

Impacts from Areas of Critical Environmental Concern Actions

The Sand Point ACEC is the only ACEC that includes paleontological resources as a relevant and important value. The special management actions associated with the Sand Point ACEC would protect paleontological resources from development and deterioration and ensure their availability for scientific research and education. A management decision to designate Sand Point as an ACEC would help preserve the integrity of the fossil deposits, while a decision not to designate would remove protection, potentially exposing the fossils to damage and loss. Table 4- 188 displays the PFY Class 5 areas that would be managed in the Sand Point ACEC by alternative.

Table 4- 188. PFY Class 5 Areas Managed in the Sand Point ACEC by Alternative (Acres)

	Alternative					
	No Action	**I**	**II**	**III**	**IV**	**V**
Class 5 Acres	300	500	0[A]	500	500	500
[A] Alternative II does not designate the Sand Point ACEC.						

Impacts from Management Specific to the No Action Alternative

The No Action Alternative would continue management of the existing Sand Point ACEC, which contains relevant and important paleontological values. Of the 800 acres in the ACEC, 300 acres are PFY Class 5. The specific management actions for this ACEC are designed to protect the physical integrity of paleontological resources by minimizing or eliminating natural and human-caused surface-disturbing activities and by ensuring that the fossils are available for scientific research and education.

Impacts from Management Specific to Alternatives I, III, IV, and V

Alternatives I, III, IV, and V would designate an expanded Sand Point ACEC, increasing its size from 800 acres to 950 acres to include additional fossil resources on the adjacent Morgan Property. Approximately 500 acres of PFY Class 5 lands are included in the ACEC under this alternative. The specific management actions for this ACEC are designed to protect the physical integrity of paleontological resources by minimizing or eliminating natural and human-caused surface-disturbing activities and by ensuring that the fossils are available for scientific research and education.

Impacts from Management Specific to Alternative II

Under Alternative II, the Sand Point ACEC would not be designated, and no special management actions to protect the Sand Point fossils would be in effect. With the exception of the Oregon NHT corridor, lands within the current ACEC would be open to most forms of commercial development.

Summary of Direct and Indirect Impacts

Each alternative contains a variety of allocations and management actions that could impact the integrity of paleontological resources. Table 4- 189 summarizes the effects of the alternatives on lands with very high potential for fossil resources (i.e., PFY Class 5 geologic units).

Table 4- 189. Acres with High Potential for Impacts to PFY Class 5 Lands by Alternative

Management	Alternative					
	No Action	I	II	III	IV	V
Transportation and Travel	118,000	300	0	300	300	300
Utility Development	16,000	16,000	16,000	16,000	16,000	15,000
Wind Development	23,000	17,000	23,000	17,000	17,000	17,000
Land Tenure	29,000	25,000	41,000	25,000	24,000	24,000
Oil and Gas Development	N/A	87,000	91,000	91,000	90,000	87,000
Geothermal Development	N/A	117,000	121,000	120,000	119,000	117,000
Salable Mineral Development	118,000	114,000	121,000	114,000	114,000	111,000
Locatable Mineral Development	117,000	114,000	117,000	117,000	117,000	114,000

Impacts from the No Action Alternative

On the whole, the No Action Alternative would potentially result in fewer impacts to the integrity of paleontological resources than Alternative II, but more than Alternatives I, III, IV, and V. The No Action Alternative would make the most PFY Class 5 acres vulnerable to impacts from mineral, utility, and wind energy development of all alternatives except Alternative II. This alternative would also make the most PFY Class 5 acres vulnerable to transportation-related impacts, with over 97% of the Class 5 area open to cross-country motorized vehicle use. Compared to Alternative II, the No Action Alternative would have more areas closed to motorized vehicle use and mineral development, identified for ROW exclusion, and retained in Federal ownership. The No Action Alternative would also provide special management direction to maintain the integrity of paleontological resources through ACEC designation. Overall, the No Action Alternative would result in moderate adverse impacts, primarily due to the number of acres of PFY Class 5 open to cross-country motorized vehicle use.

Impacts from Alternative I

Alternative I would result in fewer impacts to the integrity of paleontological resources than the No Action Alternative and Alternatives II, III, and IV, but more than Alternative V. However, the differences between Alternatives I, III, IV, and V are subtle. Alternative I would have fewer impacts to PFY Class 5 areas due to leasable and locatable mineral development than Alternatives III and IV, but similar impacts as Alternative V. Alternative I would have more impacts to PFY Class 5 areas from transportation and salable mineral management than Alternative V, but similar impacts as Alternatives III and IV. Impacts due to ROW exclusion, retention of PFY Class 5 lands in Federal ownership, and special management through ACEC designation would be similar for Alternatives I, III, IV, and V. Overall, Alternative I would result in minor adverse impacts to paleontological resources.

Impacts from Alternative II

Alternative II would have the highest potential to impact the integrity of paleontological resources of all the alternatives. Not only would Alternative II make the most PFY Class 5 acres vulnerable to impacts from mineral, utility, and wind energy development, it would also potentially retain fewer PFY Class 5 acres in Federal ownership (Zone 1) than any of the other alternatives. Alternative II would also have the least special management directed toward maintaining the integrity of paleontological resources. Overall, Alternative II would result in moderate adverse impacts, primarily due to the lack of ACEC protection for the Sand Point area and the number of acres that could leave BLM-management through land tenure transactions.

Impacts from Alternative III

On the whole, Alternative III would result in fewer impacts to the integrity of paleontological resources than the No Action Alternative and Alternative II, but more than Alternatives I, IV, and V; however, the differences between Alternatives I, III, IV, and V are subtle. Alternative III would affect more PFY Class 5 areas due to leasable mineral development and would retain fewer acres in Federal ownership than Alternative IV, but the two alternatives would have similar impacts from other management. Compared to the No Action Alternative and Alternative II, Alternative III would have less salable mineral development, less utility and wind energy development, and more special management through ACEC designation; more PFY Class 5 lands would be retained in Federal ownership than Alternative II and the No Action Alternative as well. Overall, Alternative III would result in minor adverse impacts to paleontological resources.

Impacts from Alternative IV (the Preferred Alternative)

Alternative IV would result in fewer impacts to the integrity of paleontological resources than the No Action Alternative and Alternatives II and III, but more than Alternatives I and V; however, the differences between Alternatives I, III, IV, and V are subtle. Alternative IV would have fewer impacts on PFY Class 5 areas due to leasable and locatable mineral development than Alternative III, with more acres retained in Federal ownership as well. However, Alternative IV would have slightly more impacts on PFY Class 5 areas due to leasable and locatable mineral development as compared to Alternative I. Overall, Alternative IV would result in minor adverse impacts to paleontological resources.

Impacts from Alternative V

Alternative V would result in fewer impacts to the integrity of paleontological resources than any of the other alternatives; however, the differences between Alternatives I, III, IV, and V are subtle. Alternative V would have fewer PFY Class 5 areas affected by transportation management, salable mineral development, and utility development than Alternative I, but other management would be similar to Alternatives I, III, IV, and V. Overall, Alternative V would result in minor adverse impacts to paleontological resources.

Cumulative Impacts

Past, Present, and Reasonably Foreseeable Actions

This section considers past, present, and reasonably foreseeable future actions that would affect paleontological resources in and adjacent to the planning area. The Snake River Plain, from Grand View in the west to Salmon Falls Creek in the east, forms the geographic boundary of the cumulative impacts analysis. This area contains two of the most productive fossil-bearing geologic units in Idaho: the Glenns Ferry and Chalk Hills Formations. In addition to BLM-managed lands, the area includes National Park Service lands, State lands, and extensive private holdings. In the 1980s, important steps were taken to preserve the two largest concentrations of fossils in or near the planning area. In 1987, BLM designated the Sand Point ACEC and the Hagerman Paleontologic ACEC with special management provisions to reduce impacts to fossil deposits from a variety of sources including unauthorized fossil collecting, cross-country motorized vehicle use, locatable minerals exploration, livestock grazing, and erosion. In 1988, the National Park Service acquired the Hagerman ACEC through legislation establishing the Hagerman Fossil Beds National Monument. Current management of these sites has eliminated or reduced most threats to the integrity of paleontological resources.

Past, present, and reasonably foreseeable actions for the following resource uses cumulatively affect paleontological resources:

- Transportation and Travel
- Land Use Authorizations
- Minerals

These actions are described in detail in the *Introduction* to this chapter.

With regard to transportation and travel actions, and in addition to the discussion in the *Introduction*, BLM-managed PFY Class 5 lands in the analysis area are largely open to cross-country motorized vehicle use outside of special designations and, therefore, are vulnerable to travel-related impacts. The Sand Point ACEC, Snake River Birds of Prey NCA, Oregon NHT, and Hagerman Fossil Beds National Monument restrict motorized travel to designated routes. In the near future, the BLM Bruneau, Burley, and Shoshone FOs will be preparing resource management plans that are expected, in line with current policy, to limit motorized travel to designated routes.

Each of the land use authorization projects discussed in the *Introduction* require substantial surface and subsurface disturbance in or near PYC Class 5 geologic units. If wind development projects prove to be profitable, project proposals are expected to increase on Federal, State, and private lands.

Summary of Cumulative Impacts

Cumulative Impacts from the No Action Alternative

Under current management, extensive portions of BLM-managed land in the planning area would remain open to cross-country motorized vehicle use. As a result, riders from surrounding areas with more restrictions may look for recreation opportunities in the planning area, increasing existing impacts to PFY Class 5 lands and spreading new impacts to previously undisturbed areas.

The No Action Alternative has more PFY Class 5 acres excluded from ROW development than any of the other alternatives and could, therefore, have a greater effect on ROW alignment, which could lead to a greater use of State and private lands to transect the planning area.

With the exception of Alternative II, the No Action Alternative would make the most PFY Class 5 public lands available for wind energy development. When added to the existing and proposed wind energy developments on adjacent private lands, the No Action Alternative has a higher potential for cumulative impacts to the integrity of paleontological resources than Alternatives I, III, IV, and V.

Cumulative Impacts from Alternatives I, III, and IV

Under these alternatives, the area available for cross-country motorized vehicle use would be greatly reduced. In the short term, this may result in increased impacts to paleontological resources on State lands or adjacent BLM lands with more lenient travel plans. In the long term, designation of OHV trail systems in the planning area and updated travel plans in adjacent FOs should result in a reduction in direct, indirect, and cumulative impacts to paleontological resources from cross-country motorized vehicle use throughout the analysis area.

Construction impacts to PFY Class 5 units from utility and wind energy developments would affect paleontological resources on Federal, State, and private lands. With linear ROWs, the impacts to State and private lands should occur in proportion to the overall land ownership pattern within the ROW. With wind energy developments, more restrictions on BLM lands could translate to increased development, and consequent impacts to fossils, on State and private lands.

The direct and indirect impacts of land use authorizations under these alternatives, when added to the present and reasonably foreseeable future energy and mineral developments on Federal, State, and private lands would result in fewer cumulative impacts than the No Action Alternative and Alternative II and about the same as Alternative V.

Cumulative Impacts from Alternative II

Cumulative impacts from cross-country motorized vehicle use would be very similar to those described for Alternatives I, III, and IV.

Alternative II would place the fewest restrictions on ROW locations and would potentially affect the highest percentage of PFY Class 5 units in the potential wind development area of all the alternatives.

Based on the analysis of direct and indirect impacts and the current and expected impacts to PFY Class 5 geologic units on State and private lands, Alternative II would produce more cumulative impacts to paleontological resources than the No Action Alternative and Alternatives I, III, IV, and V.

Cumulative Impacts from Alternative V

Cumulative impacts from cross-country motorized vehicle use would be very similar to those described under Alternatives I, III, and IV, although Alternative II would close more PFY Class 5 acres to such use.

Alternative V would close the most PFY Class 5 acres to salable mineral development. Sand and gravel needs that cannot be met in the 92% of PFY Class 5 lands that remain available for development would be met through the development of State and private lands.

Based on the analysis of direct and indirect impacts and the current and expected impacts to PFY Class 5 geologic units on State and private lands, Alternative V would produce fewer cumulative impacts to paleontological resources than the No Action Alternative and Alternatives I, II, III, and IV.

4.3.12. Cultural Resources

Analysis Methods

Indicators

The following indicators were used for the analysis of impacts to cultural resources:

- **The physical integrity of important traditional, cultural, archaeological, and historic sites** – Integrity, in a cultural resource context, is the ability of a site or property to convey its importance. In the planning area, most cultural resources are important for their traditional, scientific, and public values (Appendix I). The great majority of sites are prehistoric and historic archaeological sites. For these sites, integrity is primarily related to the condition of their archaeological deposits and constructed features (i.e., the degree to which they are unmixed, intact, and retain spatial patterning among artifacts and cultural features). Actions that result in ground disturbance have a high potential to impact the integrity of cultural resources. Actions that limit or eliminate surface-disturbing activities would protect the integrity of cultural resources.

- **The setting (i.e., the physical, visual, or acoustic environment) of cultural resources** – Landscapes, viewsheds, man-made features and soundscapes are integral components of many places of traditional cultural importance to Native American tribes and to those historic sites with interpretive potential and public value. In the planning area, the integrity of the historical setting is a critical element for intact segments of the Oregon NHT and Kelton and Toana Freight Roads. In addition, certain topographic features and archaeological, historic, and rock art sites play prominent roles in contemporary traditional Native American religious beliefs and practices. Actions that affect the viewshed of these places, add new facilities, or add loud and sustained noise could negatively affect the attributes of a place of traditional cultural importance to Native American tribes that give it value and may diminish an historic site’s ability to convey its importance to the public. Actions that reduce or eliminate physical, visual, and acoustic impacts in the vicinity of historic roads and trails and places of traditional cultural importance would enhance the values and functions associated with these sites.

Methods and Assumptions

Impacts to cultural resources from management in the following sections of Chapter 2 were analyzed in detail: *Cultural Resources*, *Wildland Fire Ecology and Management*, *Visual Resources*, *Livestock Grazing*, *Recreation*, *Transportation and Travel*, *Land Use Authorizations*, *Minerals*, and *Areas of Critical Environmental Concern*. Management from the remaining sections was not analyzed in detail because the management did not vary measurably between alternatives or impact the indicator for cultural resources and would be subject to NEPA and NHPA Section 106 compliance. **Impacts from management for cultural resources** can be found under *Impacts from Cultural Resources Actions* in the *Land Use Authorizations* section.

Impacts to cultural resources are difficult to quantify with precision because the management actions being analyzed would be applied at the landscape scale; they do not identify specific projects or the exact locations where impacts would occur. Also, cultural resource inventory information is not available for the entire planning area. It is possible to estimate impacts based on the relationships between proposed resource use allocations, activities, and restrictions and areas where cultural resources are more or less likely to be found. To aid in the evaluation of the effects of management decisions on cultural resources, BLM developed a landscape-scale model of site density for the planning area. As described in Chapter 3, the model is based on previous site density projections (Fawcett, 1997; Young, 1984) and refined by data from more recent intensive cultural resource inventories. The purpose of the model is to predict whether relatively large, moderate, or low numbers of cultural resources are present within a given area of the planning area. The model cannot predict specific site locations or the actual number of sites affected by a given decision, nor is it designed to limit or encourage particular uses in particular areas or serve as a substitute for cultural resource inventory and consultation. It is simply a tool for predicting relative site densities.

For this analysis, a site density model was used to compare the footprint of management actions expected to affect the integrity of cultural resources within high, medium, and low site density zones. Effects are expressed in terms of potential increases or decreases in levels of surface disturbance or, in some cases, in changes to the visual character of the landscape. While not precise, this method helps identify quantifiable differences among alternatives.

The following assumptions were used when analyzing impacts to cultural resources:

- The site density model described in Chapter 3 adequately represents the density of cultural resources in the planning area and can be compared to proposed management decisions to produce a quantifiable assessment of probable effects at the landscape scale.
- The potential for impacts to cultural resources would be proportional to the acres of land in each density zone that overlap areas affected by surface-disturbing management actions or allocations.
- Management actions and land use allocations that restrict surface development and disturbance generally prevent, reduce, or eliminate impacts to the integrity of cultural resources.
- Adverse impacts to cultural resources related to future Federal undertakings would be reduced or eliminated through stipulations or mitigation measures developed in consultation with the affected tribes, State Historic Preservation Offices (SHPOs), and Advisory Council on Historic Preservation, as appropriate. These protective measures would be developed during project planning and enforced during implementation.
- Given BLM's preservation obligations, which include site identification, evaluation, and mitigation of effects (BLM 8100 Manual), management actions and land use allocations that lead to increased physical impacts to cultural resources would also lead to increased economic impacts to BLM or to project proponents.
- Cultural resources are fragile and irreplaceable. In general, impacts to cultural resources from surface disturbance are long-term.

Direct and Indirect Impacts

Impacts from Cultural Resource Actions

Impacts from Management Specific to the No Action Alternative

In addition to standard regulatory compliance direction, the No Action Alternative requires that all "significant cultural sites" (i.e., those determined eligible for the National Register) would be retained in Federal ownership, establishes protective corridors for the Oregon NHT and Kelton Freight Road, and identifies seven areas for project-level planning and special management. The management actions for this alternative promote cultural resource protection through avoidance of adverse effects or mitigation.

Impacts from Management Common to All Action Alternatives

Management actions under this heading provide guidelines for the protection of cultural resources. The action alternatives differ from No Action Alternative in their allocation of cultural resources to traditional, scientific, conservation, public, or experimental value; their explicit recognition of the role of tribal consultation in cultural resource management; and their addition of the Toana Freight Road and associated protective corridor to the previously established Oregon NHT and Kelton Freight Road corridors. In addition, the action alternatives provide more detailed, updated guidance for proactive cultural resource work and for standard NHPA Section 106 compliance.

Impacts from Management Specific to Alternative I

Alternative I differs from the No Action Alternative in that it would allow the flexibility, under limited circumstances, to exchange lands containing important cultural resources for lands with resources of equal or greater natural or cultural resource value. It is difficult to assess the effects of this action in the absence of a specific proposal; however, given tribal and SHPO involvement, it is likely that adverse effects to cultural resources would be satisfactorily resolved before lands containing important sites leave Federal ownership.

Alternative I would create a 300-foot buffer around playas to protect associated cultural resources. New ground disturbance would be avoided or minimized within this protective zone.

Impacts from Management Specific to Alternative II

Alternative II would allow lands containing important cultural resources to leave Federal ownership through exchange or sale, under limited circumstances and after appropriate consultation and mitigation, with no requirement to balance the loss with the acquisition of lands with resources of equal or greater value. Although such transactions have been rare in the past, this management action has a greater potential to affect the integrity of important cultural resources than the No Action Alternative and the other action alternatives.

Under Alternative II, the protective zone surrounding playas would consist of a 150-foot buffer.

Impacts from Management Specific to Alternative III

Under this alternative, the impacts to important cultural resources from land tenure adjustments would be the same as Alternative I.

Alternative III offers less protection for cultural resources associated with playas than any of the action alternatives. As with Alternative II, the protective zone would be 150 feet surrounding playas, but this restriction would not apply to fire suppression activities.

Impacts from Management Specific to Alternatives IV and V

Impacts from cultural resources actions in Alternatives IV and V are essentially the same as Alternative I. The only difference is a greater emphasis on research and monitoring using agreements and partnerships with tribes, historical societies, and colleges. In comparison to No Action Alternative and Alternatives I, II, and III, this proactive approach to cultural resource management would increase BLM's ability to protect important sites and to collect important information for use in future land use decisions.

Impacts from Wildland Fire Ecology and Management Actions

Wildland fire impacts the integrity of cultural resources in several ways. Direct effects include the destruction of historic structures, wooden parts of farming and ranching equipment, and other organic artifacts; damage to pigments and stone surfaces at rock art sites; and in some circumstances, physical alteration of obsidian and ceramic artifacts (Buenger, 2003; Johnson, 2004). Indirect effects include surface damage from fire suppression actions (e.g., dozer or hand-dug fire lines, cross-country travel by heavy fire trucks, fire camps, and staging areas) and increased erosion and artifact theft due to the loss of vegetative cover. Because the footprint of suppression activities is always smaller than the footprint of the fire, the most important factor affecting cultural resource integrity is fire size. Priority for firefighting is attached to Critical Suppression Areas, and it is assumed that suppression efforts would result in smaller fires. Therefore, cultural resources in Critical Suppression Areas should suffer fewer impacts than cultural resources in Conditional Suppression Areas.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative calls for full suppression throughout the planning area; because of the lack of any prioritization for fire suppression efforts, there would be no areas in the planning area that are anticipated to have fewer impacts to cultural resources. Special management restrictions on suppression actions (similar to MIST guidelines) would apply to WSAs and the Oregon NHT.

Impacts from Management Specific to Alternative I

Out of the 675,000 acres in the High Cultural Resource Density Zone, 46% would be in Critical Suppression Areas and 54% would be in Conditional Suppression Areas (Table 4- 190). Of the 512,000 acres in the Moderate Cultural Resource Density Zone, 27% would be in Critical Suppression Areas and 73% would be in Conditional Suppression Areas. Of the 187,000 acres in the Low Cultural Resource Density Zone, 17% would be in Critical Suppression Areas and 83% would be in Conditional Suppression Areas.

Table 4- 190. Fire Suppression Areas by Cultural Resource Density Zones in Alternative I (Acres)

Fire Suppression Area	Cultural Density Zone			Total Acres
	High Density	Moderate Density	Low Density	
Critical Suppression Areas	312,000	137,000	31,000	480,000
Conditional Suppression Areas	363,000	374,000	156,000	893,000
Note: Shaded cells represent acres with higher potential for impacts to the physical integrity and setting of cultural resources due to wildland fires.				

Impacts from Management Specific to Alternative II

Out of the 675,000 acres in the High Cultural Resource Density Zone, 15% would be in Critical Suppression Areas and 85% would be in Conditional Suppression Areas (Table 4- 191). Of the 512,000 acres in the Moderate Cultural Resource Density Zone, 8% would be in Critical Suppression Areas and 92% would be in Conditional Suppression Areas. Of the 187,000 acres in the Low Cultural Resource Density Zone, 16% would be in Critical Suppression Areas and 84% would be in Conditional Suppression Areas.

Table 4- 191. Fire Suppression Areas by Cultural Resource Density Zones in Alternative II (Acres)

Fire Suppression Area	Cultural Density Zone			Total Acres
	High Density	Moderate Density	Low Density	
Critical Suppression Areas	104,000	39,000	30,000	**173,000**
Conditional Suppression Areas	571,000	473,000	157,000	**1,201,000**
Note: Shaded cells represent acres with higher potential for impacts to the physical integrity and setting of cultural resources due to wildland fires.				

Impacts from Management Specific to Alternative III

Out of the 675,000 acres in the High Cultural Resource Density Zone, 44% would be in Critical Suppression Areas and 56% acres would be in Conditional Suppression Areas (Table 4- 192). Of the 512,000 acres in the Moderate Cultural Resource Density Zone, 27% would be in Critical Suppression

Areas and 73% would be in Conditional Suppression Areas. Of the 187,000 acres in the Low Cultural Resource Density Zone, 16% would be in Critical Suppression Areas and 84% would be in Conditional Suppression Areas.

Table 4- 192. Fire Suppression Areas by Cultural Resource Density Zones in Alternative III (Acres)

Fire Suppression Area	Cultural Density Zone			Total Acres
	High Density	Moderate Density	Low Density	
Critical Suppression Areas	300,000	138,000	31,000	**469,000**
Conditional Suppression Areas	375,000	374,000	156,000	**905,000**
Note: Shaded cells represent acres with higher potential for impacts to the physical integrity and setting of cultural resources due to wildland fires.				

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Out of the 675,000 acres in the High Cultural Resource Density Zone, 59% would be in Critical Suppression Areas and 41% acres would be in Conditional Suppression Areas in Alternative IV-A (Table 4- 193). In Alternative IV-B (the Preferred Alternative), 55% would be in Critical Suppression Areas and 45% would be in Conditional Suppression Areas.

Table 4- 193. Fire Suppression Areas by Cultural Resource Density Zones in Alternative IV (the Preferred Alternative; Acres)

Fire Suppression Area	Cultural Resource Density Zone			Total Acres
	High Density	Moderate Density	Low Density	
Critical Suppression Areas				
Alternative IV-A	398,000	165,000	31,000	**594,000**
Alternative IV-B	370,000	154,000	31,000	**555,000**
Conditional Suppression Areas				
Alternative IV-A	277,000	347,000	156,000	**780,000**
Alternative IV-B	305,000	358,000	156,000	**819,000**
Note: Shaded cells represent acres with higher potential for impacts to the physical integrity and setting of cultural resources due to wildland fires.				

Out of the 512,000 acres in the Moderate Cultural Resource Density Zone, 32% would be in Critical Suppression Areas and 68% would be in Conditional Suppression Areas in Alternative IV-A. In Alternative IV-B, 30% would be in Critical Suppression Areas and 70% would be in Conditional Suppression Areas.

Out of the 187,000 acres in the Low Cultural Resource Density Zone, 16% would be in Critical Suppression Areas and 84% would be in Conditional Suppression Areas in Alternative IV-A. In Alternative IV-B, 17% would be in Critical Suppression Areas and 83% would be in Conditional Suppression Areas.

Impacts from Management Specific to Alternative V

Out of the 675,000 acres in the High Cultural Resource Density Zone, 96% would be in Critical Suppression Areas and 4% would be in Conditional Suppression Areas (Table 4- 194). Of the 512,000 acres in the Moderate Cultural Resource Density Zone, 75% would be in Critical Suppression Areas and 25% would be in Conditional Suppression Areas. Of the 187,000 acres in the Low Cultural Resource Density Zone, 17% would be in Critical Suppression Areas and 83% would be in Conditional Suppression Areas.

Table 4- 194. Fire Suppression Areas by Cultural Resource Density Zones in Alternative V (Acres)

Fire Suppression Areas	Cultural Resource Density Zone			Total Acres
	High Density	Moderate Density	Low Density	
Critical Suppression Areas	650,000	386,000	31,000	**1,067,000**
Conditional Suppression Areas	25,000	125,000	156,000	**306,000**
Note: Shaded cells represent acres with higher potential for impacts to the physical integrity and setting of cultural resources due to wildland fires.				

Impacts from Visual Resource Actions

Managing public lands according to the VRM Class objectives identified in Chapter 2 would affect the physical integrity and setting of important cultural resources by controlling the manner and degree of authorized changes to the visual landscape within a particular VRM Class. VRM Classes I and II maintain the setting of cultural resources by restricting developments that alter the existing viewshed. VRM Class III management would allow moderate alteration of the existing landscape, and VRM Class IV managed lands would provide little or no restriction on visual intrusions to the landscape. For this analysis, the acres in each VRM Class for each alternative are compared with the Cultural Resource Density Zones. Alternatives that contain the most VRM Class I and Class II lands in the High Cultural Resource Density Zone would result in the least disturbance to the setting of cultural resources.

Impacts from Management Specific to the No Action Alternative

Under the No Action Alternative, 242,000 acres would be managed to retain their existing visual character (VRM Class I and II; Table 4- 195). These areas include 31% of lands in the High Cultural Resource Density Zone, 4% of lands in the Moderate Cultural Resource Density Zone, and 5% of lands in the Low Cultural Resource Density Zone. The visual character of the remaining 1,133,000 acres would have more potential to change, as they would be in VRM Classes III and IV.

Table 4- 195. VRM Classes by Cultural Resource Density Zones in the No Action Alternative (Acres)

VRM Class	Cultural Resource Density Zone			Total Acres
	High Density	Moderate Density	Low Density	
Class I	105,000	16,000	8,000	**129,000**
Class II	104,000	6,000	3,000	**113,000**
Class III	208,000	69,000	14,000	**291,000**
Class IV	258,000	421,000	163,000	**842,000**

Impacts from Management Specific to Alternative I

Under Alternative I, a total of 312,000 acres would be managed to retain their existing visual character (VRM Class I and II; Table 4- 196). These areas include 44% of lands in the High Cultural Resource Density Zone, 3% of lands in the Moderate Cultural Resource Density Zone, and 1% of lands in the Low Cultural Resource Density Zone. The visual character of the remaining 1,063,000 acres would have more potential to change, as they would be in VRM Classes III and IV.

Table 4- 196. VRM Classes by Cultural Resource Density Zones in Alternative I (Acres)

VRM Class	Cultural Resource Density Zone			Total Acres
	High Density	Moderate Density	Low Density	
Class I	115,000	15,000	1,000	**131,000**
Class II	180,000	0	1,000	**181,000**
Class III	94,000	2,000	23,000	**119,000**
Class IV	287,000	495,000	162,000	**944,000**

Impacts from Management Specific to Alternative II

Under Alternative II, a total of 114,000 acres would be managed to retain their existing visual character (VRM Class I and II; Table 4- 197). These areas include 15% of lands in the High Cultural Resource Density Zone, 2% of lands in the Moderate Cultural Resource Density Zone, and 1% of lands in the Low Cultural Resource Density Zone. The visual character of the remaining 1,260,100 acres would have more potential to change, as they would be in VRM Classes III and IV.

Table 4- 197. VRM Classes by Cultural Resource Density Zones in Alternative II (Acres)

VRM Class	Cultural Resource Density Zone			Total Acres
	High Density	Moderate Density	Low Density	
Class I	89,000	13,000	1,000	**103,000**
Class II	10,000	0	1,000	**11,000**
Class III	19,000	<100	100	**19,100**
Class IV	557,000	499,000	185,000	**1,241,000**

Impacts from Management Specific to Alternative III

Under Alternative III, a total of 114,000 acres would be managed to retain their existing visual character (VRM Class I and II; Table 4- 198). These areas include 15% of lands in the High Cultural Resource Density Zone, 2% of lands in the Moderate Cultural Resource Density Zone, and 1% of lands in the Low Cultural Resource Density Zone. The visual character of the remaining 1,260,000 acres would have more potential to change, as they would be in VRM Classes III and IV.

Table 4- 198. VRM Classes by Cultural Resource Density Zones in Alternative III (Acres)

VRM Class	Cultural Resource Density Zone			Total Acres
	High Density	Moderate Density	Low Density	
Class I	89,000	13,000	1,000	**103,000**
Class II	10,000	0	1,000	**11,000**
Class III	286,000	3,000	47,000	**336,000**
Class IV	290,000	496,000	138,000	**924,000**

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Under Alternative IV, a total of 197,000 acres would be managed to retain their existing visual character (VRM Class I and II; Table 4- 199). These areas include 27% of lands in the High Cultural Resource Density Zone, 2% of lands in the Moderate Cultural Resource Density Zone, and 1% of lands in the Low Cultural Resource Density Zone. The visual character of the remaining 1,175,000 acres would have more potential to change, as they would be in VRM Classes III and IV.

Table 4- 199. VRM Classes by Cultural Resource Density Zones in Alternative IV (the Preferred Alternative; Acres)

<table>
<tr><th colspan="2" rowspan="2">VRM Class</th><th colspan="3">Cultural Resource Density Zone</th><th rowspan="2">Total Acres</th></tr>
<tr><th>High Density</th><th>Moderate Density</th><th>Low Density</th></tr>
<tr><td colspan="2">Class I</td><td>115,000</td><td>13,000</td><td>1,000</td><td>129,000</td></tr>
<tr><td colspan="2">Class II</td><td>67,000</td><td>0</td><td>1,000</td><td>68,000</td></tr>
<tr><td rowspan="2">Class III</td><td>Alternative IV-A</td><td>255,000</td><td>63,000</td><td rowspan="2">47,000</td><td>365,000</td></tr>
<tr><td>Alternative IV-B</td><td>240,000</td><td>47,000</td><td>334,000</td></tr>
<tr><td rowspan="2">Class IV</td><td>Alternative IV-A</td><td>236,000</td><td>436,000</td><td rowspan="2">138,000</td><td>810,000</td></tr>
<tr><td>Alternative IV-B</td><td>252,000</td><td>452,000</td><td>842,000</td></tr>
</table>

Impacts from Management Specific to Alternative V

Under Alternative V, a total of 373,000 acres would be managed to retain their existing visual character (VRM Class I and II; Table 4- 200). These areas include 53% of lands in the High Cultural Resource Density Zone, 2% of lands in the Moderate Cultural Resource Density Zone, and 1% of lands in the Low Cultural Resource Density Zone. The visual character of the remaining 1,001,000 acres would have more potential to change, as they would be in VRM Classes III and IV.

Table 4- 200. VRM Classes by Cultural Resource Density Zones in Alternative V (Acres)

VRM Class	Cultural Resource Density Zone			Total Acres
	High Density	Moderate Density	Low Density	
Class I	90,000	13,000	1,000	**104,000**
Class II	268,000	0	1,000	**269,000**
Class III	289,000	336,000	23,000	**648,000**
Class IV	28,000	163,000	162,000	**353,000**

Impacts from Livestock Grazing Actions

Livestock trampling is known to cause horizontal and vertical displacement of artifacts; break or alter stone tools and ceramics (Broadhead, 1999; Osborn, et al., 1987); compact soils; and, in riparian settings, damage streambanks leading to accelerated erosion and soil loss (Fleischner, 1994; Kauffman, et al., 1983). These impacts diminish the integrity of archaeological sites by obscuring spatial relationships among surface artifacts and by mixing more recent cultural materials with older subsurface deposits. Studies indicate the severity of livestock grazing effects is correlated with the intensity of grazing use (Clary & Kinney, 2000; Trimble & Mendel, 1995a). For this analysis, areas unavailable for livestock grazing are used to evaluate impacts to cultural resources (Table 4- 201). These areas would not be grazed by livestock and, therefore, would not be affected by livestock grazing. It is assumed that available areas would be grazed and, therefore, would be affected.

Table 4- 201. Areas Unavailable for Livestock Grazing by Cultural Resource Density Zone by Alternative (Acres)

Cultural Resource Density Zone	Alternative						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
High Density	40,000	57,000	47,000	47,000	96,000	81,000	161,000
Moderate Density	4,000	12,000	5,000	7,000	40,000	23,000	108,000
Low Density	7,000	15,000	7,000	7,000	9,000	9,000	40,000
Total Acres Unavailable to Grazing	**51,000**	**84,000**	**59,000**	**61,000**	**145,000**	**113,000**	**309,000**

Impacts from Management Specific to the No Action Alternative

The No Action Alternative allocates most of the planning area to livestock grazing (Table 4- 201). Only 51,000 acres are not available for livestock use. Approximately 6% of the High Cultural Resource Density Zone, less than 1% of the Moderate Density Zone, and 4% of the Low Density Zone would be unavailable for livestock grazing.

Impacts from Management Specific to Alternative I

This alternative would make 84,000 acres unavailable for livestock grazing (Table 4- 201), including 8% of the High Cultural Resource Density Zone, 2% of the Moderate Cultural Resource Density Zone, and 8% of the Low Cultural Resource Density Zone.

Impacts from Management Specific to Alternative II

This alternative would make 59,000 acres unavailable for livestock grazing (Table 4- 201), including 7% of the High Cultural Resource Density Zone, 1% of the Moderate Cultural Resource Density Zone, and 4% of the Low Cultural Resource Density Zone.

Impacts from Management Specific to Alternative III

This alternative would make 61,000 acres unavailable for livestock grazing (Table 4- 201), including 7% of the High Cultural Resource Density Zone, 1% of the Moderate Cultural Resource Density Zone, and 4% of the Low Cultural Resource Density Zone.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

In Alternative IV-A, 145,000 acres would be unavailable for livestock use (Table 4- 201), including 14% of the High Cultural Resource Density Zone, 8% of the Moderate Cultural Resource Density Zone, and 5% of the Low Cultural Resource Density Zone. In Alternative IV-B (the Preferred Alternative), 113,000 acres would be unavailable for livestock use (Table 4- 201), including 12% of the High Cultural Resource Density Zone, 5% of the Moderate Cultural Resource Density Zone, and 5% of the Low Cultural Resource Density Zone.

Impacts from Management Specific to Alternative V

This alternative would make 309,000 acres unavailable for livestock grazing (Table 4- 201), including 24% of the High Cultural Resource Density Zone, 21% of the Moderate Cultural Resource Density Zone, and 22% of the Low Cultural Resource Density Zone.

Impacts from Recreation Actions

A variety of impacts can occur when cultural resources and recreation activities share the same space. Inadvertent impacts related to camping, hunting, fishing, and boating include surface disturbance from digging fire pits, trash pits, and latrines; vegetation loss and streambank erosion from trails and human trampling; dismantling of historic structures; and construction of new features (Sullivan III, et al., 2002). All of these activities can diminish the integrity of cultural resources by modifying surface artifact relationships or mixing surface and subsurface cultural material.

Recreational use of public lands in the planning area is expected to increase along with general population growth. It is reasonable to assume that increased recreational use would increase the potential for inadvertent impacts to cultural resources. Focused management, such as SRMA allocation, in areas of concentrated recreational use would help reduce impacts to cultural resources, especially in areas where use is already established and is likely to continue with or without active management. Unfocused or reactive management of such areas would increase the potential for adverse impacts. For this analysis, areas where recreation activity is expected to increase, based on objectives, are compared to the Cultural Resource Density Model.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative would allocate five SRMAs totaling 78,000 acres. These SRMAs are not mapped and no detailed descriptions or management guidelines were included in the 1987 Jarbidge RMP. Although precise comparisons are not possible, based on general location, the Hagerman-Owsley Bridge SRMA is mostly in the Low Cultural Resource Density Zone while the Bruneau-Jarbidge, Jarbidge Forks, Oregon Trail, and Salmon Falls Creek SRMAs are largely in the High Cultural Resource Density Zone.

Impacts from Management Specific to Alternative I

Of the eight SRMAs allocated in Alternative I, four are expected to experience a measurable increase in use. These include the Balanced Rock, Deadman/Yahoo, Little Pilgrim, and Salmon Falls Reservoir SRMAs. Overall, 1% of the High Cultural Resource Density Zone, less than 1% of the Moderate Density Zone, and 17% of the Low Density Zone would be within SRMAs with increased use (Table 4- 202).

Table 4- 202. SRMAs with Expected Increased Use by Cultural Resource Density Zone in Alternative I (Acres)

SRMA	Cultural Resource Density Zone			Total Acres
	High Density	Moderate Density	Low Density	
Balanced Rock SRMA	400	0	0	**400**
Deadman/Yahoo SRMA	2,000	2,000	32,000	**36,000**
Little Pilgrim SRMA	300	0	0	**300**
Salmon Falls Reservoir SRMA	5,000	0	0	**5,000**

Recreational use of the remaining SRMAs and the Extensive Recreation Management Area (ERMA) is expected to remain stable or increase slightly. Any increases would be dispersed over relatively large areas and should not result in measurable impacts at the landscape scale.

Impacts from Management Specific to Alternative II

Two of the four SRMAs designated in Alternative II, Little Pilgrim and Salmon Falls Reservoir, are expected to experience a measurable increase in use. Together, these include less than 1% of the High Cultural Resource Density Zone and none of the Moderate and Low Density Zones (Table 4- 203).

Table 4- 203. SRMAs with Expected Increased Use by Cultural Resource Density Zone in Alternative II (Acres)

SRMA	Cultural Resource Density Zone			Total Acres
	High Density	Moderate Density	Low Density	
Little Pilgrim SRMA	300	0	0	**300**
Salmon Falls Reservoir SRMA	5,000	0	0	**5,000**

Recreational use of the remaining SRMAs and the ERMA is expected to remain stable or increase slightly. Any increases would be dispersed over relatively large areas and should not result in measurable impacts at the landscape scale. Under this alternative, demand for OHV opportunities would be met through R&PP lease or land exchange with non-Federal entities.

Impacts from Management Specific to Alternative III

Four of the six SRMAs designated in Alternative III are expected to experience a measurable increase in use. These include the Balanced Rock, Deadman/Yahoo, Little Pilgrim, and Salmon Falls Reservoir SRMAs. The overall percentage of areas within the High, Moderate, and Low Cultural Resource Density Zones would be essentially the same as Alternative I (Table 4- 204).

Table 4- 204. SRMAs with Expected Increased Use by Cultural Resource Density Zone in Alternative III (Acres)

SRMA	Cultural Resource Density Zone			Total Acres
	High Density	Moderate Density	Low Density	
Balanced Rock SRMA	400	0	0	**400**
Deadman/Yahoo SRMA	2,000	2,000	31,000	**35,000**
Little Pilgrim SRMA	300	0	0	**300**
Salmon Falls Reservoir SRMA	5,000	0	0	**5,000**

Recreational use of the remaining SRMAs and the ERMA is expected to remain stable or increase slightly. Any increases would be dispersed over relatively large areas and should not result in measurable impacts at the landscape scale.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Two of the five SRMAs designated in Alternative IV, Deadman/Yahoo and Salmon Falls Reservoir, are expected to experience a measurable increase in use. Together these include less than 1% of the High and Moderate Cultural Resource Density Zones and approximately 17% of the Low Density Zone (Table 4- 205).

Table 4- 205. SRMAs with Expected Increased Use by Cultural Resource Density Zone in Alternative IV (the Preferred Alternative; Acres)

SRMA	Cultural Resource Density Zone			Total Acres
	High Density	Moderate Density	Low Density	
Deadman/Yahoo SRMA	2,000	2,000	31,000	**35,000**
Salmon Falls Reservoir SRMA	5,000	0	0	**5,000**

Recreational use is expected to increase at the Little Pilgrim fishing hole. This area would not be an SRMA in Alternative IV and would not receive pro-active management, thereby increasing the potential for impacts to cultural resources.

With the exception of the areas identified above, recreational use of the remaining SRMAs and ERMA is expected to remain stable or increase slightly. Any increases would be dispersed over relatively large areas and should not result in measurable impacts at the landscape scale.

Impacts from Management Specific to Alternative V

Only one of the three SRMAs in Alternative V, the Yahoo SRMA, is expected to experience a measurable increase in use. The Yahoo SRMA includes less than 1% of the High Cultural Resource Density Zone, less than 1% of the Moderate Density Zone, and 1% of the Low Density Zone (Table 4- 206).

Table 4- 206. SRMAs with Expected Increased Use by Cultural Resource Density Zone in Alternative V (Acres)

SRMA	Cultural Resource Density Zone			Total Acres
	High Density	Moderate Density	Low Density	
Yahoo SRMA	1,000	500	2,000	**3,500**

Recreational use is expected to increase at the Little Pilgrim fishing hole; the Deadman, Pasadena, and Rosevear OHV areas; and Salmon Falls Reservoir. These areas would not be SRMAs in Alternative V and would not receive pro-active management, thereby increasing the potential for impacts to cultural resources.

With the exception of the areas identified above, recreational use of the remaining SRMAs and ERMA is expected to remain stable or increase slightly. Any increases would be dispersed over relatively large areas and should not result in measurable impacts at the landscape scale.

Impacts from Transportation and Travel Actions

Potential impacts to cultural resources from transportation and travel are closely linked to the size and location of areas that are open to cross-country motorized vehicle use or closed to motorized vehicle use. The effects of cross-country motorized vehicle use that diminish the integrity of cultural resources include surface disruption of soils, compaction of surface and subsurface soils, destruction of vegetation, accelerated erosion, deflation of cultural deposits, and displacement and damage to artifacts and cultural features (Sampson, 2007). Off-site impacts to setting include long-lasting scars on the landscape and short-term noise effects during actual use.

Studies also suggest that vandalism and looting of archaeological sites is highly correlated with ease of access and degree of remoteness (Downer, 1992; Sullivan III, et al., 2002). Areas open to cross-country motorized vehicle use, closed to motorized vehicle use, and limited to designated routes, and areas with reduced route densities, are the variables used to evaluate the effects of transportation and travel on cultural resources. Open areas have the highest potential for impacts to cultural resources, and, assuming compliance and enforcement, closed areas have a very low potential for transportation and travel effects, while the use of designated routes and ways is expected to have a low to moderate potential for travel-related impacts.

Impacts from Management Specific to the No Action Alternative

Under the No Action Alternative, 57% of acres in the High Density Zone would be open to cross-country motorized vehicle use, use would be limited on 40%, and 3% would be closed to motorized vehicle use (Table 4- 207). Within the Moderate Cultural Resource Density Zone, approximately 97% would be open to cross-country motorized vehicle use, use would be limited on 3%, and less than 1% would be closed to motorized vehicle use. Within the Low Cultural Resource Density Zone, 99% would be open to cross country motorized vehicle use and less than 1% would be limited or closed to motorized vehicle use.

Table 4- 207. Travel Designations by Cultural Resource Density Zones in No Action Alternative (Acres)

Travel Designation	Cultural Resource Density Zone			Total Acres
	High Density	Moderate Density	Low Density	
Open	382,000	494,000	185,000	**1,061,000**
Limited to Designated Routes or Ways	269,000	17,000	300	**286,300**
Closed	24,000	100	1,000	**25,100**

TMAs are not identified in the No Action Alternative.

Impacts from Management Common to All Action Alternatives

The management actions under this heading generally promote resource protection. In particular, the guidelines for future route designations in areas limited to designated routes should help maintain the physical integrity and setting of important cultural resources. While these actions would benefit cultural resources locally, they would produce no measurable effects at the landscape scale.

Impacts from Management Specific to Alternative I

Under Alternative I, less than 1% of acres in the High Cultural Resource Density Zone would be open to cross-country motorized vehicle use, use would be limited on 91%, and 8% would be closed to motorized use (Table 4- 208). Within the Moderate Cultural Resource Density Zone, no acres would be open to cross-country motorized vehicle use, used would be limited on 99%, and less than 1% would be closed to motorized vehicle use. Within the Low Cultural Resource Density Zone, 2% would be open to cross-country motorized vehicle use, use would be limited on 98%, and no acres would be closed to motorized vehicle use.

Alternative I would create five TMAs that would affect route density in the planning area (Table 4- 208). Route density in the Deadman/Yahoo TMA is expected to increase by an unknown amount. This TMA includes approximately 1% of the High Cultural Resource Density Zone, less than 1% of the Moderate Density Zone, and 18% of the Low Density Zone.

Table 4- 208. Travel Designations and Route Density by Cultural Resource Density Zone in Alternative I (Acres)

	Cultural Resource Density Zone			Total Acres
	High Density	Moderate Density	Low Density	
Travel Designation				
Open	300	0	3,000	**3,300**
Limited to Designated Routes or Ways	618,000	512,000	184,000	**1,314,000**
Closed	57,000	<100	0	**57,000**
Expected Change in Route Density				
Increase	6,000	2,000	33,000	**41,000**
Decrease	382,000	131,000	154,000	**667,000**
No Change	287,000	379,000	0	**666,000**

Route densities in the Canyonlands TMA, the Jarbidge Foothills TMA, and the Snake River TMA are expected to decrease by an unknown amount. Together, these TMAs include 57% of the High Cultural Resource Density Zone, 26% of the Moderate Density Zone, and 82% of the Low Density Zone.

Route density in the Devil Creek TMA is expected to remain stable. This TMA includes 46% of the High Cultural Resource Density Zone, 74% of the Moderate Density Zone, and none of the Low Density Zone.

Impacts from Management Specific to Alternative II

Under Alternative II, no acres in the High Cultural Resource Density Zone would be open to cross-country motorized vehicle use, use would be limited on 97%, and 3% would be closed to motorized vehicle use (Table 4- 209). Within the Moderate Cultural Resource Density Zone, no acres would be open, less than 1% would be closed, and over 99% would be limited. Within the Low Cultural Resource Density Zone, all 187,000 acres would be limited to designated routes.

Table 4- 209. Travel Designations and Route Density by Cultural Resource Density Zone in Alternative II (Acres)

	Cultural Resource Density Zone			Total Acres
	High Density	Moderate Density	Low Density	
Travel Designation				
Open	0	0	0	**0**
Limited to Designated Routes or Ways	654,000	512,000	187,000	**1,353,000**
Closed	21,000	<100	0	**21,000**
Expected Change in Route Density				
Increase	478,000	497,000	186,000	**1,161,000**
Decrease	0	0	0	**0**
No Change	197,000	15,000	1,000	**213,000**

Alternative II creates two TMA that would affect route density in the planning area (Table 4- 209). Route density in the Bruneau Desert TMA is expected to increase by an unknown amount. This TMA includes

71% of the High Cultural Resource Density Zone, 97% of the Moderate Density Zone, and 99% are in the Low Density Zone.

Route density in the Canyonlands TMA is expected to remain the same. This TMA includes 29% of the High Cultural Resource Density Zone, 3% of the Moderate Density Zone, and less than 1% of the Low Density Zone.

Impacts from Management Specific to Alternative III

Under Alternative III, less than 1% of acres in the High Cultural Resource Density Zone would be open to cross-country motorized vehicle use, use would be limited on 96%, and 3% would be closed to motorized vehicle use (Table 4- 210). Within the Moderate Cultural Resource Density Zone, no acres would be open to cross-country motorized vehicle use, use would be limited on over 99%, and less than 1% would be closed to motorized vehicle use. Within the Low Cultural Resource Density Zone, 2% would be open to cross-country motorized vehicle use, use would be limited on 98%, and no acres would be closed to motorized vehicle use.

Alternative III creates five TMAs that would affect route density in the planning area (Table 4- 210). Route density in the Deadman/Yahoo TMA is expected to increase by an unknown amount. This TMA includes less than 1% of the High Cultural Resource Density Zone, less than 1% of the Moderate Density Zone, and 17% of the Low Density Zone.

Table 4- 210. Travel Designations and Route Density by Cultural Resource Density Zone in Alternative III (Acres)

	Cultural Resource Density Zone			Total Acres
	High Density	Moderate Density	Low Density	
Travel Designation				
Open	300	0	3,000	**3,300**
Limited to Designated Routes or Ways	652,000	512,000	184,000	**1,343,000**
Closed	23,000	<100	0	**23,000**
Expected Change in Route Density				
Increase	2,000	2,000	31,000	**35,000**
Decrease	0	0	0	**0**
No Change	673,000	510,000	156,000	**1,339,000**

Route densities in the Devil Creek, Jarbidge Foothills, Snake River, and West Side TMAs are expected to stay the same. These TMAs include over 99% of the High Cultural Resource Density Zone, over 99% of the Moderate Density Zone, and 83% of the Low Density Zone.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Under Alternative IV, less than 1% of acres in the High Cultural Resource Density Zone would be open to cross-country motorized vehicle use, use would be limited on 89%, and 11% would be closed to motorized vehicle use (Table 4-211). Within the Moderate Cultural Resource Density Zone, no acres would be open to cross-country motorized vehicle use, use would be limited on over 99%, and less than 1% would be closed to motorized vehicle use. Within the Low Cultural Resource Density Zone, 2% would be open to cross-country motorized vehicle use, use would be limited on 98%, and no acres would be closed to motorized vehicle use.

Alternative IV creates five TMAs that would affect route density in the planning area (Table 4-211). Route density in the Deadman/Yahoo TMA is expected to increase by an unknown amount. This TMA includes less than 1% of the High Cultural Resource Density Zone, less than 1% of the Moderate Density Zone, and 17% of the Low Density Zone.

Table 4-211. Travel Designations and Route Density by Cultural Resource Density Zone in Alternative IV (the Preferred Alternative; Acres)

	Cultural Resource Density Zone			Total Acres
	High Density	Moderate Density	Low Density	
Travel Designation				
Open	300	0	3,000	**3,300**
Limited to Designated Routes or Ways	601,000	512,000	184,000	**1,297,000**
Closed	74,000	<100	0	**74,000**
Expected Change in Route Density				
Increase	2,000	2,000	31,000	**35,000**
Decrease	673,000	510,000	156,000	**1,339,000**
No Change	0	0	0	**0**

Route densities in the Canyonlands, Devil Creek, Jarbidge Foothills, and Snake River TMAs are expected to decrease by an unknown amount. These TMAs include over 99%of the High Cultural Resource Density Zone, over 99% of the Moderate Density Zone, and 83% of the Low Density Zone.

Impacts from Management Specific to Alternative V

Under Alternative V, less than 1% of acres in the High Cultural Resource Density Zone would be open to cross-country motorized vehicle use, use would be limited on 80%, and almost 20% would be closed to motorized vehicle use (Table 4-212). Within the Moderate Cultural Resource Density Zone, no acres would be open to cross-country motorized vehicle use, use would be limited on 98%, and 2% would be closed to motorized vehicle use. Within the Low Cultural Resource Density Zone, less than 1% would be open to cross-country motorized vehicle use, use would be limited on 99%, and less than 1% would be closed to motorized vehicle use.

Alternative V creates five TMAs would affect route density in the planning area (Table 4-212). Route density in the Yahoo TMA is expected to increase by an unknown amount. This TMA includes less than 1% of the High Cultural Resource Density Zone, less than 1% of the Moderate Density Zone, and less than 2% of the Low Density Zone.

Table 4-212. Travel Designations and Route Density by Cultural Resource Density Zone in Alternative V (Acres)

	Cultural Resource Density Zone			Total Acres
	High Density	Moderate Density	Low Density	
Travel Designation				
Open	300	0	400	**700**
Limited to Designated Routes or Ways	542,000	499,000	185,000	**1,226,000**
Closed	133,000	13,000	1,000	**147,000**
Expected Change in Route Density				
Increase	900	500	2,000	**3,400**
Decrease	674,000	511,000	185,000	**1,370,000**
No Change	0	0	0	**0**

Route densities in the Devil Creek, Jarbidge Foothills, Snake River, and West Side TMAs are expected to decrease by an unknown amount. These TMAs include over 99%of the High Cultural Resource Density Zone, over 99% of the Moderate Density Zone, and 99% of the Low Density Zone.

Impacts from Land Use Authorization Actions

Land use authorizations are subject to NEPA and NHPA Section 106; however, an increasing demand for ROWs increases the potential to impact cultural resources. Large energy development projects (e.g., major power lines and wind farms) typically disturb larger areas and are more difficult to reroute or adjust to avoid cultural resources. Mitigation, while an important option, still results in some loss of archaeological data and could diminish tribal connections to sites of traditional cultural importance. ROW exclusion areas reduce potential damage to the integrity of cultural resources from development impacts. In contrast, identified utility corridors are expected to be fully developed, thereby increasing the potential to impact cultural resources.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative identifies 110,000 acres for utility avoidance. These include 13 %of the High Cultural Resource Density Zone, 4% of the Moderate Density Zone, and less than 1% of the Low Density Zone. This category mixes various levels of restriction and is not directly comparable to the ROW avoidance and ROW exclusion areas identified in the action alternatives.

Under the No Action Alternative, 75,000 acres have potential for utility development. The area includes 4% of the High Cultural Resource Density Zone, 3% of the Moderate Density Zone, and 17% of the Low Density Zone (Table 4-213).

Under the No Action Alternative, 155,000 acres have potential for wind development (Table 4-213). The area includes 16% of the High Cultural Resource Density Zone, 1% of the Moderate Density Zone, and 21% of the Low Density Zone.

Table 4-213. Potential Utility and Wind Development Areas by Cultural Resource Density Zone in the No Action Alternative (Acres)

Type of Development	Cultural Resource Density Zone			Total Acres
	High Density	Moderate Density	Low Density	
Potential Utility Development	29,000	14,000	32,000	**75,000**
Potential Wind Development	109,000	7,000	39,000	**155,000**

Impacts from Management Common to All Action Alternatives

The management actions under this heading generally promote resource protection. In particular, the guidelines for co-locating future communications sites with existing towers and placing new ROWs in previously disturbed locations should help maintain the physical integrity and setting of important cultural resources. While these actions would benefit cultural resources locally, they would produce no measurable effects at the landscape scale.

Impacts from Management Specific to Alternative I

Under Alternative I, 95,000 acres would be excluded from consideration for ROWs, including 12% of the High Cultural Resource Density Zone, over 2% of the Moderate Density Zone, and 1% of the Low Density Zone. Cultural resources in these areas would suffer no loss of integrity from land use authorizations.

Under Alternative I, 71,000 acres would have potential for utility development (Table 4-214). This area includes 4% of the High Cultural Resource Density Zone, 3% of the Moderate Density Zone, and 17% of the Low Density Zone. Construction-related surface disturbance from this development and the addition of new structures would increase the potential to impact the physical integrity and setting of cultural resources within the utility corridors.

Under Alternative I, 61,000 acres would have potential for wind development (Table 4-214). This area includes 4% of the High Cultural Resource Density Zone, less than 1% of the Moderate Density Zone, and 16% of the Low Density Zone. Construction-related surface disturbance from this development and the addition of new structures would increase the potential to impact the physical integrity and setting of cultural resources.

Table 4-214. Potential Utility and Wind Development Areas by Cultural Resource Density Zone in Alternative I (Acres)

Type of Development	Cultural Resource Density Zone			Total Acres
	High Density	Moderate Density	Low Density	
Potential Utility Development	25,000	14,000	32,000	**71,000**
Potential Wind Development	26,000	4,000	31,000	**61,000**

Impacts from Management Specific to Alternative II

Under this alternative, 94,000 acres would be excluded from consideration for ROWs. This area includes 12% of the High Cultural Resource Density Zone, over 2% of the Moderate Density Zone, and 1% is in the Low Density Zone. Cultural resources in these areas would suffer no loss of integrity due to land use authorizations.

Under Alternative II, 77,000 acres would have potential for utility development (Table 4-215). This area includes 5% of the High Cultural Resource Density Zone, 3% of the Moderate Density Zone, and 17% of the Low Density Zone. Construction-related surface disturbance from this development and the addition of new structures would increase the potential to impact the physical integrity and setting of cultural resources within the utility corridors.

Under Alternative II, 162,000 acres would have the potential for wind development (Table 4-215). This area includes 17% of the High Cultural Resource Density Zone, 1% of the Moderate Density Zone, and 21% of the Low Density Zone. Construction-related surface disturbance from this development and the addition of new structures would increase the potential to impact the physical integrity and setting of cultural resources.

Table 4-215. Potential Utility and Wind Development Areas by Cultural Resource Density Zone in Alternative II (Acres)

Type of Development	Cultural Resource Density Zone			Total Acres
	High Density	Moderate Density	Low Density	
Potential Utility Development	31,000	14,000	32,000	**77,000**
Potential Wind Development	115,000	7,000	40,000	**162,000**

Impacts from Management Specific to Alternative III

Under this alternative, 95,000 acres would be excluded from consideration for ROWs. This area includes 12% of the High Cultural Resource Density Zone, more than 2% of the Moderate Density Zone, and 1% of the Low Density Zone. Cultural resources in these areas would suffer no loss of integrity due to land use authorizations.

Under Alternative III, 71,000 acres have the potential for utility development (Table 4- 216). This area includes 4% of the High Cultural Resource Density Zone, 3% of the Moderate Density Zone, and 17% of the Low Density Zone. Construction-related surface disturbance from this development and the addition of new structures would increase the potential to impact the physical integrity and setting of cultural resources within the utility corridors.

Under Alternative III, 61,000 acres have the potential for wind development (Table 4- 216). This area includes 4% of the High Cultural Resource Density Zone, less than 1% of the Moderate Density Zone, and 16% of the Low Density Zone. Construction-related surface disturbance from this development and the addition of new structures would increase the potential to impact the physical integrity and setting of cultural resources.

Table 4- 216. Potential Utility and Wind Development Areas by Cultural Resource Density Zone in Alternative III (Acres)

Type of Development	Cultural Resource Density Zone			Total Acres
	High Density	Moderate Density	Low Density	
Potential Utility Development	25,000	14,000	32,000	**71,000**
Potential Wind Development	26,000	4,000	31,000	**61,000**

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Under this alternative, 148,000 acres would be excluded from consideration for ROWs. This area includes 20% of the High Cultural Resource Density Zone, over 2% of the Moderate Density Zone, and less than 1% of the Low Density Zone. Cultural resources in these areas would suffer no loss of integrity due to land use authorizations.

Under Alternative IV, 70,000 acres would have the potential for utility development (Table 4-217). This area includes 4% of the High Cultural Resource Density Zone, 3% of the Moderate Density Zone, and 17% of the Low Density Zone. Construction-related surface disturbance from this development and the addition of new structures would increase the potential to impact the physical integrity and setting of cultural resources within the utility corridors.

Under Alternative IV, 60,000 acres would have the potential for wind development (Table 4-217). This area includes 4% of the High Cultural Resource Density Zone, less than 1% of the Moderate Density Zone, and 16% of the Low Density Zone. Construction-related surface disturbance from this development and the addition of new structures would increase the potential to impact the physical integrity and setting of cultural resources.

Table 4-217. Potential Utility and Wind Development Areas by Cultural Resource Density Zone in Alternative IV (the Preferred Alternative; Acres)

Type of Development	Cultural Resource Density Zone			Total Acres
	High Density	Moderate Density	Low Density	
Potential Utility Development	24,000	14,000	32,000	**70,000**
Potential Wind Development	25,000	4,000	31,000	**60,000**

Impacts from Management Specific to Alternative V

Under this alternative, 148,000 acres would be excluded from consideration for ROWs. This area includes 20% of the High Cultural Resource Density Zone, more than 2% of the Moderate Density Zone, and less than 1% of the Low Density Zone. Cultural resources in these areas would suffer no loss of integrity due to land use authorizations.

Under Alternative V, 59,000 acres would have the potential for utility development (Table 4- 218). This area includes 3% of the High Cultural Resource Density Zone, 3% of the Moderate Density Zone, and 12% of the Low Density Zone. Construction-related surface disturbance from this development and the addition of new structures would increase the potential to impact the physical integrity and setting of cultural resources within the utility corridors.

Under Alternative V, 42,000 acres would have the potential for wind development (Table 4- 218). This area includes less than 2% of the High Cultural Resource Density Zone, less than 1% of the Moderate Density Zone, and 16% of the Low Density Zone. Construction-related surface disturbance from this development and the addition of new structures would increase the potential to impact the physical integrity and setting of cultural resources.

Table 4- 218. Potential Utility and Wind Development Areas by Cultural Resource Density Zone in Alternative V (Acres)

Type of Development	Cultural Resource Density Zone			Total Acres
	High Density	Moderate Density	Low Density	
Potential Utility Development	23,000	14,000	22,000	**59,000**
Potential Wind Development	10,000	800	31,000	**41,800**

Impacts from Minerals Actions

The development of leasable, salable, and locatable minerals has the potential to impact the physical integrity and setting of cultural resources through surface and subsurface disturbance related to extraction activities and associated infrastructure. Mineral extraction may require earth moving, tunneling, blasting, drilling, road construction, or other surface-disturbing actions, all of which could damage or destroy cultural resources.

Leasable minerals include energy resources such as oil, gas, and geothermal waters. An assessment of oil and gas development potential indicates an area of 306,000 acres of BLM-managed surface in the planning area have potential for oil and gas leasing. Of these, 45% are in the High Cultural Resource Density Zone, 9% are in the Moderate Density Zone, and 46% are in the Low Density Zone. The RFDS for oil and gas development assumes that 10 to 20 leases may be offered over the next 20 years, resulting in two to three geophysical exploration programs and one to two exploration wells. Total surface disturbance associated with oil and gas development is estimated at 90 acres (Appendix U).

Geothermal resources may also be present beneath the Snake River Plain in the northern portion of the planning area. Approximately 9,000 acres have a high potential for geothermal leasing and another 357,000 acres have medium potential for leasing. The remaining 1,008,000 acres in the planning area have low potential. Geothermal extraction would require the drilling of deep wells and the construction of power plants to convert the geothermal steam to electricity. New roads and powerlines may also be required. The RFDS for geothermal development assumes that 20 megawatts (MW) of power would be developed over the life of the plan. Total surface disturbance associated with geothermal development is estimated at 185 to 230 acres (Appendix V).

With the current focus on developing new sources of domestic energy, future oil and gas and geothermal developments in the planning area are possibilities that warrant analysis. To accomplish this, the areas closed to leasable mineral development, combined with the areas open for leasing but with NSO restrictions, are compared to the High, Moderate, and Low Cultural Resource Density Zones. Alternatives with the most lands open to development in the High and Moderate Cultural Resource Density Zones would have the greatest potential to impact the integrity of cultural resources while those with the most areas closed to mineral leasing or open with NSO restrictions in the High and Moderate Cultural Resource Density Zones would offer the most protection from impacts.

Salable minerals include sand, gravel, and decorative stone. The extraction of sand and gravel requires extensive surface and subsurface ground disturbance which could impact the physical integrity of cultural resources, especially buried sites. The removal of decorative stone could disturb Native American hunting blinds, or other features associated with talus slopes. To evaluate the potential effects of salable mineral management allocations and actions, the areas available and closed to salable mineral development in each alternative are compared to the High, Moderate, and Low Cultural Resource Density Zones. Alternatives with the most acres open to salable mineral development within the High and Moderate Cultural Resource Density Zones have the greatest potential to impact the integrity of cultural resources while those with the most acres closed to mineral sales in the High and Moderate Zones would offer the most protection from impact. Even though most of the planning area would be open to salable mineral development in all of the alternatives, the ID Team estimates a maximum of 2,000 acres of new development would occur over the life of the plan. Proposals for new material pits would be subject to NEPA analysis, tribal consultation, NHPA Section 106 compliance, and, at a minimum, standard resource protection stipulations.

Locatable minerals include gold, silver, other metals, some gemstones and other rare minerals with commercial or industrial value. Locatable mineral development usually involves destructive extraction methods, e.g., blasting, trenching, tunneling, or large scale earth moving. Unlike leasable and salable minerals, locatable mineral exploration and development are not discretionary BLM actions. Surface-disturbing actions would be subject to the unnecessary or undue degradation standard required by the Federal Land Policy and Management Act of 1976 (FLPMA) and the performance standards found at 43 CFR 3809.420. Although no large, economically viable locatable mineral deposits have been found in the planning area, a few mining claims are active along the Bruneau River, Salmon Falls Creek, and the Snake River. Even though the potential for development is low, in the absence of protective restrictions, cultural resources are at risk from mineral exploration. In the past, several terraces along the Snake River, including the one at Sand Point, have been subjected to destructive but commercially unproductive mining activity. In order to assess the potential impacts to cultural resources from locatable mineral actions, the areas recommended for withdrawal from the mining laws are compared to the Cultural Resource Density Zones. For purposes of analysis, it is assumed that withdrawal requests will be granted. Alternatives with the most acres withdrawn from locatable mineral entry in the High and Moderate Cultural Resource Density Zones would have the least potential to impact cultural resources.

Impacts from Management Specific to the No Action Alternative

Most of the planning area would be open to mineral leasing under the No Action Alternative. An NSO restriction would apply to the Oregon NHT, the cultural resource complexes, most of the WSA lands, and riparian areas. This restriction would reduce impacts related to oil and gas or geothermal development on surface artifacts and features. Since the 1987 Jarbidge RMP does not include maps or detailed descriptions of the open and closed area allocations for mineral leasing, it is not possible to compare the amount of land in each category with the High, Moderate, and Low Cultural Resource Density Zones. For the planning area as a whole, the No Action Alternative would make 204,000 acres of the Federal mineral estate unavailable for mineral leasing, including 3,000 acres in the potential oil and gas areas and 64,000 acres in the potential geothermal areas. An additional 140,000 acres would be available under an NSO restriction, including 22,000 acres in the potential oil and gas areas and 41,000 acres in the potential geothermal areas. According to the RFDS for oil and gas development (Appendix U), approximately 90 acres of surface disturbance are expected to occur in the planning area as a result of oil and gas exploration and development over the life of the plan. This is less than 0.1% of the potential oil and gas areas that would be available for oil and gas leasing. Similarly, according to the RFDS for geothermal development (Appendix V), between 185 and 230 acres of surface disturbance are expected to occur in the planning area as a result of geothermal exploration and development over the life of the plan. This is less than 0.1% of the potential geothermal areas that would be available for geothermal leasing.

Under the No Action Alternative, approximately 1,300 acres would continue to be managed for material use sites. New sites for salable mineral development would be considered, as needed, throughout the planning area. This alternative would make more land susceptible to impacts from salable mineral development than any of the alternatives. An additional 1,000 acres of salable mineral development is expected under the No Action Alternative.

Under the No Action Alternative, 118,000 acres would continue to be withdrawn from the general mining laws while an additional 218,000 acres would be recommended for withdrawal. This alternative would make less area susceptible to impacts from locatable mineral development than any of the alternatives. Demand for locatable minerals in the planning area is not expected to change from present levels; thus, the potential for impacts to occur in the life of the plan is low.

Impacts from Management Common to All Action Alternatives

The standard cultural resource protection stipulation attached to each lease would ensure thorough consideration of cultural resources prior to any surface-disturbing activities. Terms and conditions for commercial development of salable mineral sites, under all action alternatives, would contain a prohibition on disturbing important cultural resources.

Impacts from Management Specific to Alternative I

Alternative I would eliminate or reduce impacts to the integrity and setting of cultural resources from oil and gas development on 9% of the potential oil and gas areas through administrative closure or NSO restrictions (Table 4- 219). These same restrictions would apply to 8% of the high and medium potential geothermal areas. According to the RFDS for geothermal development (Appendix V), between 185 and 230 acres of surface disturbance are expected to occur in the planning area as a result of geothermal exploration and development over the life of the plan. This is less than 0.1% of the potential geothermal areas that would be available for geothermal leasing. Similarly, according to the RFDS for oil and gas development (Appendix U), approximately 90 acres of surface disturbance are expected to occur in the planning area as a result of oil and gas exploration and development over the life of the plan. This is less than 0.1% of the potential oil and gas areas that would be available for oil and gas leasing.

This alternative would make 24% of the High Cultural Resource Density Zone, 3% of the Moderate Density Zone, and less than 1% of the Low Density Zone unavailable for salable mineral development. For the planning area as a whole, 13% of the BLM surface estate would be closed to mineral sales and 87% would be open (Table 4- 219). The acreage on which salable mineral development occurs is expected to increase from approximately 1,300 acres to approximately 2,300 acres over the life of the plan. This is approximately 0.2% of the area available for salable mineral development.

Under Alternative I, 113,000 acres of BLM surface estate would be recommended for withdrawal from the general mining laws. This area includes 16% of the High Cultural Resource Density Zone, 1% of the Moderate Density Zone, and less than 1% of the Low Density Zone (Table 4- 219). However, demand for locatable minerals in the planning area is not expected to change from present levels; thus, the potential for impacts to occur in the life of the plan is low.

Table 4- 219. Mineral Allocations by Cultural Resource Density Zone in Alternative I (Acres)

Mineral Allocations	Cultural Resource Density Zone			Total Acres
	High Density	Moderate Density	Low Density	
Leasable Minerals				
Oil and Gas				
Open or Open with Restrictions [A]	110,000	2,000	139,000	**251,000**
Closed or Open with No Surface Occupancy	29,000	0	900	**29,900**
Geothermal				
Open or Open with Restrictions [A]	31,000	119,000	185,000	**335,000**
Closed or Open with No Surface Occupancy	28,000	600	2,000	**30,600**
Salable Minerals				
Open	510,000	496,000	186,000	**1,192,000**
Closed	162,000	15,000	1,000	**178,000**
Locatable Mineral				
Recommended for Withdrawal	105,000	7,000	1,000	**113,000**

[A] Includes open, open with seasonal restrictions, and open with controlled surface use restrictions. These designations offer less protection from surface disturbance than NSO, and therefore, increased potential to impact cultural resources.

Impacts from Management Specific to Alternative II

Alternative II would eliminate or reduce impacts to the integrity and setting of cultural resources from oil and gas development on 5% of the potential oil and gas areas through administrative closure or NSO restrictions (Table 4- 220). These same restrictions would apply to 4% of the high and medium potential geothermal areas. However, as in Alternative I, less than 0.1% of the potential oil and gas areas and potential geothermal areas that are available for leasing are expected to be developed.

This alternative would make 12% of the High Cultural Resource Density Zone, 3% of the Moderate Density Zone, and less than 1% of the Low Density Zone unavailable for salable mineral development. For the planning area as a whole, 7% of the BLM surface estate would be closed to mineral sales and 93% would be open (Table 4- 220). The acreage on which salable mineral development occurs is expected to increase from approximately 1,300 acres to approximately 3,300 acres over the life of the plan. This is approximately 0.2% of the area available for salable mineral development.

Under Alternative II, 41,000 acres of BLM surface estate would be recommended for withdrawal from the general mining laws. This area includes 6% of the High Cultural Resource Density Zone (Table 4- 220). However, demand for locatable minerals in the planning area is not expected to change from present levels; thus, the potential for impacts to occur in the life of the plan is low.

Impacts from Management Specific to Alternative III

Alternative III would eliminate or reduce impacts to the integrity and setting of cultural resources from oil and gas development on 5% of the potential oil and gas areas through administrative closure or NSO restrictions (Table 4- 221). These same restrictions would apply to 4% of the high and medium potential geothermal areas. However, as in Alternative I, less than 0.1% of the potential oil and gas areas and potential geothermal areas that are available for leasing are expected to be developed.

Table 4- 220. Mineral Allocations by Cultural Resource Density Zone in Alternative II (Acres)

Mineral Allocations	Cultural Resource Density Zone			Total Acres
	High Density	Moderate Density	Low Density	
Leasable Minerals				
Oil and Gas				
Open or Open with Restrictions [A]	125,000	27,000	140,000	**292,000**
Closed or Open with No Surface Occupancy	14,000	0	0	**14,000**
Geothermal				
Open or Open with Restrictions [A]	45,000	119,000	186,000	**350,000**
Closed or Open with No Surface Occupancy	15,000	400	1,000	**16,400**
Salable Minerals				
Open	593,000	498,000	186,000	**1,277,000**
Closed	80,000	13,000	1,000	**94,000**
Locatable Mineral				
Recommended for Withdrawal	41,000	0	0	**41,000**

[A] Includes open, open with seasonal restrictions, and open with controlled surface use restrictions. These designations offer less protection from surface disturbance than NSO, and therefore, increased potential to impact cultural resources.

This alternative would make 18% of the High Cultural Resource Density Zone, 3% of the Moderate Density Zone, and less than 1% of the Low Density Zone unavailable for salable mineral development. For the planning area as a whole, 10% of the BLM surface estate would be closed to mineral sales and 90% would be open (Table 4- 221). Salable mineral development is expected to occur on the same number of acres as in Alternative II.

Under Alternative III, 88,000 acres of BLM surface estate would be recommended for withdrawal from the general mining laws. This area includes 12% of the High Cultural Resource Density Zone, less than 1% of the Moderate Density Zone, and less than 0.01% of the Low Density Zone (Table 4- 221). However, demand for locatable minerals in the planning area is not expected to change from present levels; thus, the potential for impacts to occur in the life of the plan is low.

Table 4- 221. Mineral Allocations by Cultural Resource Density Zone in Alternative III (Acres)

Mineral Allocations	Cultural Resource Density Zone			Total Acres
	High Density	Moderate Density	Low Density	
Leasable Minerals				
Oil and Gas				
Open or Open with Restrictions [A]	124,000	27,000	141,000	**292,000**
Closed or Open with No Surface Occupancy	14,000	0	0	**14,000**
Geothermal				
Open or Open with Restrictions [A]	44,000	119,000	186,000	**349,000**
Closed or Open with No Surface Occupancy	16,000	400	1,000	**17,400**
Salable Minerals				
Open	551,000	498,000	186,000	**1,235,000**
Closed	122,000	13,000	1,000	**136,000**
Locatable Minerals				
Recommended for Withdrawal	83,000	5,000	0	**88,000**

[A] Includes open, open with seasonal restrictions, and open with controlled surface use restrictions. These designations offer less protection from surface disturbance than NSO, and therefore, increased potential to impact cultural resources.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV would eliminate or reduce impacts to the integrity and setting of cultural resources from oil and gas development on 14% of the potential oil and gas areas through administrative closure or NSO restrictions (Table 4- 222). These same restrictions would apply to 7% of the high and medium potential geothermal areas. However, as in Alternative I, less than 0.1% of the potential oil and gas areas and potential geothermal areas that are available for leasing are expected to be developed.

This alternative would make 33% of the High Cultural Resource Density Zone, 9% of the Moderate Density Zone, and less than 1% of the Low Density Zone unavailable for salable mineral development. For the planning area as a whole, 19% of the BLM surface estate would be closed to mineral sales and 81% would be open (Table 4- 222). Salable mineral development is expected to occur on the same number of acres as in Alternative I.

Under Alternative IV, 142,700 acres of BLM surface estate would be recommended for withdrawal from the general mining laws. This area includes 19% of the High Cultural Resource Density Zone, over 2% of the Moderate Density Zone, and less than 1% of the Low Density Zone (Table 4- 222). However, demand for locatable minerals in the planning area is not expected to change from present levels; thus, the potential for impacts to occur in the life of the plan is low.

Table 4- 222. Mineral Allocations by Cultural Resource Density Zone in Alternative IV (the Preferred Alternative; Acres)

Mineral Allocations	Cultural Resource Density Zone			Total Acres
	High Density	Moderate Density	Low Density	
Leasable Minerals				
Oil and Gas				
Open or Open with Restrictions [A]	97,000	27,000	141,000	**265,000**
Closed or Open with No Surface Occupancy	41,000	0	0	**41,000**
Geothermal				
Open or Open with Restrictions [A]	37,000	119,000	186,000	**342,000**
Closed or Open with No Surface Occupancy	23,000	400	1,000	**24,400**
Salable Minerals				
Open	450,000	469,000	186,000	**1,105,000**
Closed	223,000	42,000	1,000	**266,000**
Locatable Minerals				
Recommended for Withdrawal	129,000	13,000	700	**142,700**

[A] Includes open, open with seasonal restrictions, and open with controlled surface use restrictions. These designations offer less protection from surface disturbance than NSO, and therefore, increased potential to impact cultural resources.

Impacts from Management Specific to Alternative V

Alternative V would eliminate or reduce impacts to the integrity and setting of cultural resources from oil and gas development on 16% of the potential oil and gas areas through administrative closure or NSO restrictions (Table 4- 223). These same restrictions would apply to 8% of the high and medium potential geothermal areas. However, as in Alternative I, less than 0.1% of the potential oil and gas areas and potential geothermal areas that are available for leasing are expected to be developed.

This alternative would make 26% of the High Cultural Resource Density Zone, 3% of the Moderate Density Zone, and 1% of the Low Density Zone unavailable for salable mineral development. For the planning area as a whole, 14% of the BLM surface estate would be closed to mineral sales and 86% would be open (Table 4- 223). Salable mineral development is expected to occur on the same number of acres as in Alternative I.

Under Alternative V, 47,900 acres of BLM surface estate would be recommended for withdrawal from the general mining laws. This area includes 7% of the High Cultural Resource Density Zone, none of the Moderate Density Zone, and less than 1% of the Low Density Zone (Table 4- 223). However, demand for locatable minerals in the planning area is not expected to change from present levels; thus, the potential for impacts to occur in the life of the plan is low.

Table 4- 223. Mineral Allocations by Cultural Resource Density Zone in Alternative V (Acres)

Mineral Allocations	Cultural Resource Density Zone			Total Acres
	High Density	Moderate Density	Low Density	
Leasable Minerals				
Oil and Gas				
Open or Open with Restrictions [A]	92,000	27,000	140,000	**259,000**
Closed or Open with No Surface Occupancy	47,000	0	900	**47,900**
Geothermal				
Open or Open with Restrictions [A]	31,000	119,000	185,000	**335,000**
Closed or Open with No Surface Occupancy	28,000	400	2,000	**30,400**
Salable Minerals				
Open	498,000	498,000	185,000	**1,181,000**
Closed	174,000	13,000	2,000	**189,000**
Locatable Minerals				
Recommended for Withdrawal	47,000	0	900	**47,900**

[A] Includes open, open with seasonal restrictions, and open with controlled surface use restrictions. These designations offer less protection from surface disturbance than NSO, and therefore, increased potential to impact cultural resources.

Impacts from Areas of Critical Environmental Concern Actions

Cultural resources are relevant and important values for four nominated ACECs: Bruneau-Jarbidge, Jarbidge Foothills, Sagebrush Sea, and Sand Point. Each of these special designations includes management actions that would reduce impacts to cultural resources from development and deterioration. Designation of these ACECs helps preserve the integrity of cultural resources, while a decision not to designate would remove protection, potentially exposing sites to damage and loss.

Impacts from Management Specific to the No Action Alternative

Under the No Action Alternative, the Bruneau-Jarbidge and Sand Point ACECs would continue to be managed for their relevant and important cultural resource values.

Management actions expected to reduce impacts to the physical integrity and setting of important cultural resources in the Bruneau-Jarbidge ACEC (85,000 acres) include:

- Recommended withdrawal from locatable mineral development
- NSO restrictions for leasable minerals
- Management as VRM Class I or II
- Restrictions on utility ROWs
- Motorized vehicle use limited to designated routes or ways

Of the total acres in the Bruneau-Jarbidge ACEC under the No Action Alternative, over 91% are in the High Cultural Resource Density Zone, 8% are in the Moderate Density Zone, and less than 1% is in the Low Density Zone (Table 4- 224).

Management actions expected to protect the physical integrity and setting of important cultural resources in the Sand Point ACEC (800 acres) include:

- Recommended withdrawal from locatable mineral development
- NSO restriction for leasable minerals

- Restrictions on surface-disturbing activities
- Restrictions on utility ROWs
- Motorized vehicle use limited to designated routes

Of the total acres in this ACEC, 99% are in the High Cultural Resource Density Zone, none are in the Moderate Density Zone, and 1% is in the Low Density Zone (Table 4- 224).

Table 4- 224. ACECs by Cultural Resource Density Zones in the No Action Alternative (Acres)

ACEC	Cultural Resource Density Zone			Total Acres
	High Density	Moderate Density	Low Density	
Bruneau-Jarbidge ACEC	78,000	7,000	400	**85,400**
Sand Point ACEC	800	0	0	**800**

Impacts from Management Specific to Alternative I

Under Alternative I, the Bruneau-Jarbidge and Sand Point ACECs would be managed for their relevant and important cultural resource values.

Management actions expected to protect the physical integrity and setting of important cultural resources in the Bruneau-Jarbidge ACEC (85,000 acres) include:

- Recommended withdrawal from locatable mineral development
- Closure to leasable and salable mineral development
- Management as VRM Class I, except for an existing powerline corridor that would be in VRM Class III
- Restrictions on ROWs
- Management as a Critical Suppression Area
- Use of MIST guidelines during fire suppression operations

Of the total acres in the Bruneau-Jarbidge ACEC under Alternative I, over 91% are in the High Cultural Resource Density Zone, 8% are in the Moderate Density Zone, and less than 1% is in the Low Density Zone (Table 4- 225).

Management actions expected to protect the physical integrity and setting of important cultural resources in the Sand Point ACEC (950 acres) include:

- Recommended withdrawal from locatable mineral development
- Closure to leasable and salable mineral development
- Restrictions on surface-disturbing activities including exclusion from ROWs and limitations on grazing facilities
- Management as Land Tenure Zone 1
- Use of MIST guidelines during fire suppression operations

Of the total acres in this ACEC in Alternative I, over 99% are in the High Cultural Resource Density Zone, none are in the Moderate Density Zone, and less than 1% is in the Low Density Zone (Table 4- 225).

Table 4- 225. ACECs by Cultural Resource Density Zones in Alternative I (Acres)

ACEC	Cultural Resource Density Zone			Total Acres
	High Density	Moderate Density	Low Density	
Bruneau-Jarbidge ACEC	78,000	7,000	400	**85,400**
Sand Point ACEC	950	0	0	**950**

Impacts from Management Specific to Alternative II

No ACECs would be designated under this alternative. Those protective measures solely related to ACEC management would not be enacted.

Impacts from Management Specific to Alternative III

Under Alternative III, the Bruneau-Jarbidge and Sand Point ACECs would be managed for their relevant and important cultural resource values.

Management actions expected to protect the physical integrity and setting of important cultural resources in the Bruneau-Jarbidge ACEC (57,000) include:

- Recommend withdrawal from locatable mineral development
- Closure to leasable and salable mineral development
- Management as VRM Class I
- Restrictions on ROWs
- Management as a Critical Suppression Area

Of the total acres in the Bruneau-Jarbidge ACEC under Alternative III, 92% are in the High Cultural Resource Density Zone, 8% are in the Moderate Density Zone, and none are in the Low Density Zone (Table 4- 226).

Management actions expected to protect the physical integrity and setting of important cultural resources in the Sand Point ACEC would be the same as in Alternative I. Of the total acres in this ACEC in Alternative III, over 99% are in the High Cultural Resource Density Zone, none are in the Moderate Density Zone, and less than 1% is in the Low Density Zone (Table 4- 226).

Table 4- 226. ACECs by Cultural Resource Density Zones in Alternative III (Acres)

ACEC	Cultural Resource Density Zone			Total Acres
	High Density	Moderate Density	Low Density	
Bruneau-Jarbidge ACEC	53,000	5,000	0	**58,000**
Sand Point ACEC	950	0	0	**950**

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Under Alternative IV, the Bruneau-Jarbidge, Jarbidge Foothills, and Sand Point ACECs would be managed for their relevant and important cultural resource values.

Management actions expected to protect the physical integrity and setting of important cultural resources in the Bruneau-Jarbidge ACEC (123,000 acres) include:

- Recommended withdrawal from locatable mineral development
- Closure to leasable and salable mineral development
- Management as VRM Class I, except for an existing powerline corridor that would be in VRM Class III
- Restrictions on ROWs restrictions
- Management as a Critical Suppression Area
- Use of MIST guidelines during fire suppression operations

Of the total acres in the Bruneau-Jarbidge ACEC under Alternative IV, 89% are in the High Cultural Resource Density Zone, 10% are in the Moderate Density Zone, and 1% is in the Low Density Zone (Table 4- 227).

Management actions expected to protect the physical integrity and setting of important cultural resources in the Sand Point ACEC would be the same as in Alternative I. Of the total acres in this ACEC in Alternative IV, over 99% are in the High Cultural Resource Density Zone, none are in the Moderate Density Zone, and less than 1% is in the Low Density Zone (Table 4- 227).

Table 4- 227. ACECs by Cultural Resource Density Zones in Alternative IV (the Preferred Alternative; Acres)

<table>
<tr><th colspan="2" rowspan="2">ACEC</th><th colspan="3">Cultural Resource Density Zone</th><th rowspan="2">Total Acres</th></tr>
<tr><th>High Density</th><th>Moderate Density</th><th>Low Density</th></tr>
<tr><td colspan="2">Bruneau-Jarbidge ACEC</td><td>110,000</td><td>13,000</td><td>700</td><td>123,700</td></tr>
<tr><td rowspan="2">Jarbidge Foothills ACEC</td><td>Alternative IV-A</td><td>163,000</td><td>0</td><td>0</td><td>163,000</td></tr>
<tr><td>Alternative IV-B</td><td>66,000</td><td>0</td><td>0</td><td>66,000</td></tr>
<tr><td colspan="2">Sand Point ACEC</td><td>950</td><td>0</td><td>0</td><td>950</td></tr>
</table>

Management actions expected to protect the physical integrity and setting of important cultural resources in the Jarbidge Foothills ACEC include a reduction in transportation route density and management as a Critical Suppression Area. Alternative IV-A manages 163,000 acres as the Jarbidge Foothills ACEC, while Alternative IV-B (the Preferred Alternative) manages 66,000 acres as the Jarbidge Foothills ACEC; all acres in the ACEC are in the High Cultural Density Zone.

Impacts from Management Specific to Alternative V

Under Alternative V, the Sagebrush Sea and Sand Point ACECs would be managed to protect their relevant and important cultural resource values.

Management actions expected to protect the physical integrity and setting of important cultural resources in the Sagebrush Sea ACEC (958,000 acres) include:

- Restrictions on ROWs
- Management as a Critical Suppression Area
- Reduced transportation route density
- Reduced grazing utilization levels

Of the total acres in the Sagebrush Sea ACEC, 64% are in the High Cultural Resource Density Zone, 36% are in the Moderate Density Zone, and none are in the Low Density Zone (Table 4- 228).

Management actions expected to protect the physical integrity and setting of important cultural resources in the Sand Point ACEC would be the same as in Alternative I, expect the ACEC would be closed to livestock grazing. Of the total acres in this ACEC in Alternative V, over 99% are in the High Cultural Resource Density Zone, none are in the Moderate Density Zone, and less than 1% is in the Low Density Zone (Table 4- 228).

Table 4- 228. ACECs by Cultural Resource Density Zones in Alternative V (Acres)

ACEC	Cultural Resource Density Zone			Total Acres
	High Density	Moderate Density	Low Density	
Sagebrush Sea ACEC	614,000	344,000	0	**958,000**
Sand Point ACEC	950	0	0	**950**

Summary of Direct and Indirect Impacts

The alternatives contain a variety of allocations and management actions that could impact the integrity of important cultural resources and their settings. Table 4- 229 summarizes the effects of the alternatives on lands in the High and Moderate Cultural Resource Density Zones. The summary comparison is limited to the High and Moderate Zones because management actions in those zones have the highest potential to impact cultural resources. The Low Density Zone comprises less than 14% of the planning area, and the data associated with this zone do not affect the outcome of the analysis.

Impacts from the No Action Alternative

The No Action Alternative would result in more impacts to the integrity and setting of cultural resources than any of the action alternatives except Alternative II. The No Action Alternative would make more of the High and Moderate Cultural Resource Density Zones susceptible to impacts from wildland fire, livestock grazing, and transportation and travel management than any of the other alternatives. Surface disturbance and visual intrusions related to utility and wind energy development would be more under the No Action Alternative than under Alternatives I, III, IV, and V, but less than under Alternative II. ACEC designations under the No Action Alternative would result in less susceptibility to impacts on substantially more land in the High and Moderate Cultural Resource Density Zones than Alternatives II and III, about the same as Alternative I, and substantially less than Alternatives IV and V. Overall, moderate adverse impacts to the integrity of cultural resources may be expected due to the relative lack of restrictions on and increased use of cross-country motorized vehicles.

Table 4- 229. Impact Susceptibility in the High and Moderate Cultural Resource Density Zones (Acres)

Impact Susceptibility	Alternative						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
Wildland Fire Ecology and Management							
High [A]	1,187,000	737,000	1,044,000	749,000	624,000	663,000	150,000
Visual Resources							
Moderate [B]	277,000	96,000	19,000	289,000	318,000	287,000	625,000
High [C]	679,000	782,000	1,056,000	786,000	672,000	704,000	191,000
Livestock Grazing							
High [D]	1,143,000	1,118,000	1,135,000	1,133,000	1,051,000	1,082,000	918,000
Transportation and Travel Management							
Moderate [E]	286,000	1,130,000	1,166,000	1,163,000	1,113,000		1,041,000
High [F]	876,000	300	0	300	300		300
Land Use Authorizations							
Utility Development							
High [G]	43,000	39,000	45,000	39,000	38,000		37,000
Wind Development							
High [H]	116,000	30,000	122,000	30,000	29,000		10,800
ACECs							
High [I]	874,000	874,000	959,000	901,000	699,000	770,000	0

[A] High = Conditional Suppression Areas
[B] Moderate = VRM Class III
[C] High = VRM Class IV
[D] High = available to livestock grazing
[E] Moderate = travel limited to designated routes or inventoried ways
[F] High = open to cross-country motorized vehicle use
[G] High = potential utility development areas
[H] High = potential wind development areas
[I] High = areas with relevant and important cultural resource values where ACEC management is not proposed

Impacts from Alternative I

Alternative I would result in more impacts to the integrity and setting of cultural resources than Alternatives IV and V, but less than the No Action Alternative and Alternatives II and III. More of the High and Moderate Cultural Resource Density Zones would be vulnerable to impacts from wildland fire, livestock grazing, and utility and wind development under this alternative than under Alternatives IV and V. Alternative I would make less of the High and Moderate Density Zones vulnerable to impacts from these same activities in comparison to the No Action Alternative and Alternative II and approximately the same amount as Alternative III. In addition, Alternative I would reduce motorized access to more of the High and Moderate Cultural Resource Density Zones through closure than the No Action Alternative and Alternatives II and III, but not as much as Alternative IV or V. Under Alternative I, the visual setting of cultural resources would be less susceptible to visual intrusions than under the No Action Alternative and Alternative IV, substantially less susceptible in relation to Alternatives II and III, but substantially more susceptible in relation to Alternative V. ACEC designations under Alternative I would make substantially less land in the High and Moderate Cultural Resource Density Zones susceptible to impacts than Alternatives II and III, about the same as the No Action Alternative, and substantially more than Alternatives IV and V. Overall, Alternative I would result in minor adverse impacts to the integrity of cultural resources.

Impacts from Alternative II

Alternative II would result in the highest level of impacts to the integrity and setting of cultural resources of all the alternatives. More of the High and Moderate Cultural Resource Density Zones would be vulnerable to impacts from visual intrusions, utility development, and wind development than any of the alternatives and only the No Action Alternative would make more area vulnerable to impacts from wildland fire, transportation and travel, and livestock grazing. Although the No Action Alternative would make slightly more acres available for livestock grazing, Alternative II would allow the highest levels of forage utilization of all the alternatives. No ACECs would be designated under Alternative II; no special management provisions designed to reduce impacts to cultural resources would be implemented. Overall, moderate adverse impacts to the integrity of cultural resources may be expected due to increased opportunities for commercial uses and the increase in access as a result of those uses.

Impacts from Alternative III

Alternative III would result in more impacts to the integrity and setting of cultural resources than Alternatives I, IV, and V, but less than the No Action Alternative and Alternative II. More of the High and Moderate Cultural Resource Density Zones would be vulnerable to impacts from wildland fire, utility development and wind development under this alternative than under Alternatives IV and V and more area would be vulnerable to impacts from livestock and travel and transportation management than under Alternatives I, IV, and V. Only Alternative II would make more of the High and Moderate Density Zones vulnerable to impacts from visual intrusions. ACEC designations under Alternative III would provide special protective management on substantially more land in the High and Moderate Cultural Resource Density Zones than Alternative II, but substantially less than the No Action Alternative and Alternatives I, IV, and V. Overall, Alternative III would result in minor adverse impacts to the integrity of cultural resources.

Impacts from Alternative IV (the Preferred Alternative)

Alternative IV would result in a lower level of impacts to the integrity and setting of cultural resources than all of the alternatives except Alternative V. More of the High and Moderate Cultural Resource Density Zones would be susceptible to impacts from wildland fire, livestock grazing, transportation and travel, and ACEC management under Alternative IV than under Alternative V but less than under the No Action Alternative and Alternatives I, II, and III. Alternative IV would make substantially less area susceptible to visual intrusions than Alternatives II and III, more than the No Action Alternative, but substantially more than Alternatives I and V. Impacts from utility development in the High and Moderate Cultural Resource Density Zones under Alternative IV would be slightly less than the No Action Alternative and Alternatives I, II, and III, and slightly more than Alternative V. Under Alternative IV, wind development would affect substantially more land than under Alternative V, substantially less land than the No Action Alternative and Alternative II, slightly less land than Alternatives I and III.

ACEC designations under Alternative IV-A would provide special protective management on substantially more land in the High and Moderate Cultural Resource Density Zones than the No Action Alternative and Alternatives I, II, III, and IV-B (the Preferred Alternative), but substantially less than Alternative V. Alternative IV-B would provide special management on more lands than the No Action Alternative and Alternative I, II, and III, but substantially less than Alternatives IV-A and V.

Overall, Alternative IV would result in minor adverse impacts to the integrity of cultural resources.

Impacts from Alternative V

Alternative V would result in the lowest level of impacts to the integrity and setting of cultural resources of any of the alternatives. Fewer acres in the High and Moderate Cultural Resource Density Zones would be vulnerable to impacts from visual intrusions, livestock grazing, transportation and travel, and wind development under this alternative than under the No Action Alternative and Alternatives I, II, III, and IV. Although the area open to cross-country motorized travel is slightly more than Alternative II and the same as the other action alternatives, the area closed to motorized vehicle use is much larger under Alternative V. Impacts from utility development would be the same as Alternative IV, but less than the other alternatives. ACEC designations under Alternative V would provide special protective management on substantially more land in the High and Moderate Cultural Resource Density Zones than any of the other alternatives. Overall, Alternative V would result in minor adverse impacts to the integrity of cultural resources.

Cumulative Impacts

Past, Present, and Reasonably Foreseeable Actions

Cumulative impacts to archaeological sites, historic sites, and traditional cultural properties consist of the incremental effects of the alternatives when added to other past, present, and reasonable foreseeable future actions. These effects can occur over a long period of time, resulting in the gradual but permanent loss of archaeological information and the degradation of places of traditional cultural importance to the tribes.

Because of strong similarities among types of archaeological, historic, and traditional cultural resources, the planning area and adjacent portions of the BLM Burley, Bruneau, Shoshone, and Wells FOs and Snake River Birds of Prey NCA, as well as the South Hills Unit of the Sawtooth National Forest and the Jarbidge Ranger District of the Humboldt-Toiyabe National Forest, form the geographic boundary for the analysis of cumulative effects to cultural resources. The area includes Federal, State, and private lands within the boundary. The temporal scope of the analysis is approximately 20 years or the life of the plan. The following represent the past, present, and reasonably foreseeable future actions whose effects provide the context for the cumulative impacts analysis for cultural resources.

Past, present, and reasonably foreseeable actions for the following resource and resource uses cumulatively affect cultural resources:

- Military Use
- Wildland Fire Ecology and Management
- Livestock Grazing
- Recreation
- Land Use Authorizations

These actions are described in detail in the *Introduction* to this chapter.

With regard to recreation actions, and in addition to the discussion in the *Introduction*, an increase in recreation would likely lead to heavier use of existing sites as well as the spread of dispersed use into less heavily used areas. Cumulative effects to cultural resources would vary with the degree of management exerted on recreational activities throughout the analysis area.

With regard to land use authorizations, and in addition to the discussion in the *Introduction*, these developments have or will result in improved access to remote or inaccessible areas and are expected to result in unavoidable impacts to the physical integrity and setting of cultural resources. Mitigation measures and project design features should alleviate direct effects to archaeological sites, but adverse impacts to traditional cultural properties and nationally recognized historic sites, including their settings, are more difficult to resolve.

Summary of Cumulative Impacts

Cumulative Impacts from the No Action Alternative

Under the No Action Alternative, fire size and intensity and associated impacts to cultural resources in the analysis area are expected to continue to increase. Recreation and OHV use would continue to be lightly managed, thereby increasing the risks of vandalism and inadvertent impacts to archaeological sites. Because extensive areas would remain open to cross-country motorized vehicle use, riders from surrounding areas with more restrictions (e.g., National Forests and the Birds of Prey NCA) may converge on the planning area, increasing existing impacts and spreading new impacts to previously unused areas, while decreasing impacts to surrounding areas with more restrictions. The cumulative effects of livestock grazing on cultural resources in the analysis area would continue to build at a moderate rate in comparison to the other alternatives. Effects from land use authorizations would be higher than Alternatives I, III, IV, and V due to fewer restrictions on commercial development.

Cumulative Impacts from Alternative I

Impacts on cultural resources related to wildland fire are expected to decrease in the analysis area compared to the current trend because of more aggressive use of fuels treatments and vegetation restoration projects to reduce fire size and intensity. Likewise, increased management of dispersed and concentrated recreational activity should reduce related vandalism and inadvertent impacts to cultural resources. Impacts to cultural resources from motorized recreation would be greatly reduced in the long term under this alternative. Restrictions in the planning area, however, may result in increased impacts on adjacent Federal and State lands where motorized recreational use is less restricted. Any increased impacts to adjacent BLM lands may be short term since the Bruneau, Burley, and Shoshone FOs will prepare resource management plans for their respective planning areas in the near future, and it is assumed, following current policy, their travel and transportation allocations would substantially decrease the amount of areas open to cross-country motorized vehicle use in the region. Impacts from livestock grazing are expected to continue on Federal, State, and private lands in the analysis area, but riparian, wildlife, cultural resource, and grazing management actions under Alternative I should reduce future grazing related impacts to cultural resources compared to the No Action Alternative. Finally, impacts to the setting of important traditional and historic sites are expected to increase throughout the region due to the development of new energy projects. These impacts should be less extensive than under the No Action Alternative and Alternative II, which incorporate fewer restrictions on commercial development.

Cumulative Impacts from Alternative II

Cumulative impacts from livestock grazing and commercial development would be highest under this alternative. Although no areas would be open to cross-country motorized vehicle use, the benefits to cultural resources may be offset by the expected increase in route density associated with commercial operations. As with Alternative I, the lack of cross-country motorized recreation opportunities would likely push current users onto adjacent lands with fewer restrictions. This alternative also places less land in Critical Suppression Areas than any other alternative and would convert more vegetation to non-native perennial forage, relying on heavier grazing use, among other means, to reduce fuels. In terms of effects on cultural resources, this strategy would use one impact agent to control another.

Cumulative Impacts from Alternative III

Direct impacts to cultural resources from wildland fire may be reduced in this alternative, but the effects of suppression, road development or improvement, and surface-disturbing fuels treatments are likely to increase in comparison to the other alternatives. Livestock grazing impacts would be second only to Alternative II. Cumulative impacts related to recreation, cross-country motorized vehicle use, and energy projects would be similar to Alternative I.

Cumulative Impacts from Alternative IV (the Preferred Alternative)

Cumulative impacts to cultural resources from wildland fire, utility and wind energy development would be similar to Alternative I. Recreation use would be managed more closely than under the No Action Alternative, but less intensely than Alternatives I, II, and III. Cumulative impacts from livestock grazing would be reduced compared to the No Action Alternative and Alternatives I, II, and III.

Cumulative Impacts from Alternative V

Alternative V would result in the fewest direct, indirect, and cumulative impacts to cultural resources from commercial use and development because it incorporates more restrictions than the other alternatives. Impacts from wildland fire should decrease compared to the current trend but it would take more time to achieve objectives due to a less aggressive fuels and restoration program. Recreation use would be managed more closely than under the No Action Alternative, but less intensely than Alternatives I, II, and III.

4.3.13. Visual Resources

Analysis Methods

Indicators

The following indicator was used for the analysis of impacts to visual resources:

- **Visual resource inventory (VRI) Class** – VRI Classes are the categories BLM uses to classify visual character and are a way to communicate the degree of visual quality in an area. VRI Class I indicates high visual quality, while VRI Class IV indicates low visual quality (BLM Manual H-8410-1). The visual resource inventory conducted in late 2007 and early 2008 classified the visual resources in the planning area. Changes in the VRI Class would be a result of impacts to visual quality.

Methods and Assumptions

Impacts to visual resources from management in the following sections of Chapter 2 were analyzed in detail: *Visual Resources*, *Non-WSA Lands with Wilderness Characteristics*, *Land Use Authorizations*, and *Areas of Critical Environmental Concern*. Management from the remaining sections was not analyzed in detail because the management did not vary measurably between alternatives, impact the indicator for visual resources, or because the management involves potential site-specific impacts from project proposals that are not known at this time. **Impacts from management for visual resources** can be found under *Impacts from Visual Resources Actions* in the *Tribal Rights and Interests*, *Cultural Resources*, *Non-WSA Lands with Wilderness Characteristics*, *Land Use Authorizations*, *Leasable Minerals*, *Salable Minerals*, *Locatable Minerals*, *National Historic Trails*, and *Wild and Scenic Rivers* sections.

The impacts from management in each section are described independent of the other sections. Under *Summary of Direct and Indirect Impacts*, the impacts are summarized and the interaction between the relationships is explained.

Visual Resource Management

Visual resources are managed by assigning visual resource management (VRM) classes to geographic areas. The objective for each VRM Class describes how that class should be managed (BLM Handbook H-8410-1):

- VRM Class I areas are managed to preserve the existing character of the landscape. The level of change to the landscape should be very low and must not attract attention.
- VRM Class II areas are managed to retain the existing character of the landscape. The level of change to the landscape should be low and repeat the basic elements of form, line, color, and texture found in the natural features of the landscape.
- VRM Class III areas are managed to partially retain the existing character of the landscape. The level of change to the landscape can be moderate and should repeat the basic elements found in the natural landscape. Management activities may attract attention, but should not dominate the view of the casual observer.
- VRM Class IV areas are managed to provide for activities that require major modification of the landscape. The level of change to the landscape can be high, and management activities may dominate the view and be the major focus of attention. Impacts can still be minimized through location and design by repeating the basic elements found in the natural landscape.

Using this framework, areas managed for VRM Class I retain their VRI Class, no matter what VRI Class that may be. For example, an area inventoried as VRI Class III and managed as VRM Class I remains VRI Class III because the management preserves the existing character. If that same area was managed as VRM Class II, III, or IV, the potential to change the landscape exists, potentially altering the character of the landscape enough that future inventories would result in a reclassification. A management class that improves the visual quality of an area does not exist, although this may happen through management actions that improve vegetation or remove structures.

In order to assess the impacts of VRM on visual resources, VRM Classes were compared to VRI Classes using GIS to identify potential impacts to VRI Classes. For example, if an area was inventoried at VRI Class I, but the proposed management is VRM Class IV, the potential for a decrease in the visual quality, and thus VRI Class, exists.

Non-Wilderness Study Area (WSA) Lands with Wilderness Characteristics

Non-WSA lands with wilderness characteristics were compared to the VRI Classes for those areas. It was assumed that managing these lands for their wilderness characteristics would maintain or improve the VRI Class, while not managing these lands for those characteristics has the potential to decrease the VRI Class.

Land Use Authorizations

Land use authorizations can involve structures including buildings, roads, and transmission lines. Structures can detract from the visual quality of an area, especially if they do not repeat the basic elements of the landscape. Two allocations under the umbrella of land use authorizations are likely to have landscape-level impacts to visual resources: utility development and wind energy developments. Areas identified as potential utility development areas were compared to the VRI Class for those areas using GIS. Based on current demand for utility corridors, it was assumed that development would occur in all identified corridors within the life of the plan. Such development is assumed to decrease the VRI Class by adding structures to the landscape.

Land use authorization allocations allowing wind energy development could also impact visual resources. Wind towers do not often repeat the basic elements of the landscape. Wind energy development also involves ancillary features such as roads, structures, and transmission lines that also impact visual resources. Areas available for wind energy development with high wind resource potential (i.e., potential wind energy development areas) were compared spatially to VRI Classes for those areas. Due to current interest in wind energy, it was assumed that these areas with high potential would have wind energy development within the life of the plan. Such development is assumed to decrease the VRI Class.

Areas of Critical Environmental Concern (ACECs)

Just over 2,500 acres in the Salmon Falls Creek area and 132,000 acres in the Bruneau-Jarbidge area were determined to have relevant and important scenic values during the evaluation of nominated ACECs. ACEC management with regard to scenic relevant and important values is handled through the designation of VRM Classes and restrictions on wind and utility development. Lands would have to be in VRM Class I or II to maintain relevant and important scenic values.

The boundary of the Salmon Falls Creek ACEC is the same in all alternatives in which it appears and encompasses all lands with relevant and important scenic values. The boundary of the Bruneau-Jarbidge ACEC has several variations, so the number of acres with ACEC management is compared to the number of acres with relevant and important scenic values.

Direct and Indirect Impacts

Impacts from Visual Resource Actions

VRM Classes outline the level of change that could occur within that class. Identifying an area as a specific management class does not guarantee that change will take place. The discussion below identifies the number of acres that may retain or lose visual quality due to management in a specific VRM Class; however, the potential for every acre to lose visual quality due to management in a specific VRM Class is extremely low.

The 2008 VRI for the planning area identified 103,000 acres as VRI Class I, 60,000 acres as VRI Class II, 51,000 acres as VRI Class III, and 1,160,000 acres as VRI Class IV. Although tables display impacts to all VRI Classes, only impacts to VRI Class I and II lands are discussed in the text, as these are the lands with the most visual quality and most vulnerable to a change in VRI Class.

Impacts from Management Specific to the No Action Alternative

Under the No Action Alternative, 88% of VRI Class I lands would be in VRM Class I, resulting in preservation of the existing visual character of those lands. Additionally, 9% would be in VRM Class II, allowing a low level of change; less than 1% would be in VRM Class III, potentially resulting in only partially retaining the character of those lands; and 2% acres would be in VRM Class IV, potentially resulting in a high level of change to those acres.

With regard to VRI Class II lands, 13% would be in VRM Class I, resulting in preservation of the existing visual character of those lands. Additionally, 42% would be in VRM Class II, allowing a low level of change; 30% would be in VRM Class III, potentially resulting in only partially retaining the character of those lands; and 13% would be in VRM Class IV, potentially resulting in a high level of change to those acres.

Table 4- 230 displays the number of acres of each VRI Class in each VRM Class for the No Action Alternative. Compared to the other alternatives, the No Action Alternative would have the greatest reduction of VRI Class I areas due to the No Action Alternative VRM Classes and the largest reduction of VRI II areas.

Table 4- 230. VRM Classes by VRI Classes in the No Action Alternative (Acres)

VRM Class	VRI Class I	VRI Class II	VRI Class III	VRI Class IV
VRM Class I	91,000	8,000	2,000	28,000
VRM Class II	9,000	25,000	18,000	60,000
VRM Class III	1,000	18,000	31,000	242,000
VRM Class IV	2,000	9,000	500	830,000
Note: Shading represents the potential for low, moderate, or high levels of change.				

Impacts from Management Specific to Alternative I

Under Alternative I, nearly all VRI Class I acres would be in VRM Class I, resulting in preservation of the existing visual character of those lands. Less than 1% of VRI I acres would be in VRM Class II or VRM Class III, potentially resulting in only partially retaining the character of those lands.

With regard to VRI Class II lands, 20% would be in VRM Class I, resulting in preservation of the existing visual character of those lands. Additionally, 72% would be in VRM Class II, allowing a low level of change; 7% would be in VRM Class III, potentially resulting in only partially retaining the character of those lands; and no acres would be in VRM Class IV, potentially resulting in a high level of change to those acres.

Table 4- 231 displays the number of acres in each VRI Class by VRM Class for Alternative I. Alternative I would have less impact to VRI Class I lands than the No Action Alternative, but a similar impact as in the other action alternatives. Alternative I would have a large positive impact with regards to the limited amount of change allowed to VRI II lands.

Table 4- 231. VRM Classes by VRI Classes in Alternative I (Acres)

VRM Class	VRI Class I	VRI Class II	VRI Class III	VRI Class IV
VRM Class I	103,000	12,000	1,000	14,000
VRM Class II	<100	43,000	47,000	91,000
VRM Class III	200	4,000	3,000	111,000
VRM Class IV	0	0	0	944,000
Note: Shading represents the potential for low, moderate, or high levels of change.				

Impacts from Management Specific to Alternative II

Under Alternative II, nearly all VRI Class I acres would be in VRM Class I, resulting in preservation of the existing visual character of those lands. Additionally, less than 1% of VRI Class I acres would be in VRM Class II, III, or IV.

With regard to VRI Class II lands, less than 1% would be managed as VRM Class I, resulting in preservation of the existing visual character of those lands. Additionally, 3% would be in VRM Class II, allowing a low level of change; 16% would be in VRM Class III, potentially resulting in only partially retaining the character of those lands; and 78% would be in VRM Class IV, potentially resulting in a high level of change to those acres.

Table 4- 232 displays the number of acres in each VRI Class by VRM Class for Alternative II. Alternative II would have less impact to VRI Class I lands than the No Action Alternative, but a similar impact as in other action alternatives. Very few VRI Class II acres would experience no change to visual character; most VRI Class II lands would have the potential for moderate change to visual character under this alternative.

Table 4- 232. VRM Classes by VRI Classes in Alternative II (Acres)

VRM Class	VRI Class I	VRI Class II	VRI Class III	VRI Class IV
VRM Class I	103,000	100	0	<100
VRM Class II	<100	2,000	1,000	7,000
VRM Class III	200	56,000	50,000	229,000
VRM Class IV	0	1,000	0	923,000
Note: Shading represents the potential for low, moderate, or high levels of change.				

Impacts from Management Specific to Alternative III

Under Alternative III, nearly all VRI Class I acres would be in VRM Class I, resulting in preservation of the existing visual character of those lands. Additionally, less than 1% of VRI Class I acres would be in VRM Class II or III.

With regard to VRI Class II lands, less than 1% would be in VRM Class I, resulting in preservation of the existing visual character of those lands. Additionally, 3% would be in VRM Class II, allowing a low level of change; 83% would be in VRM Class III, potentially resulting in only partially retaining the character of those lands; and 2% would be in VRM Class IV, potentially resulting in a high level of change to those acres.

Table 4- 233 displays the number of acres in each VRI Class by VRM Class for Alternative III. Alternative II would have less impact to VRI Class I lands than the No Action Alternative, but a similar impact as the other action alternatives. Very few VRI Class II lands would experience no change to visual character.

Table 4- 233. VRM Classes by VRI Classes in Alternative III (Acres)

VRM Class	VRI Class I	VRI Class II	VRI Class III	VRI Class IV
VRM Class I	103,000	100	0	<100
VRM Class II	<100	2,000	1,000	7,000
VRM Class III	200	56,000	50,000	229,000
VRM Class IV	0	1,000	0	923,000
Note: Shading represents the potential for low, moderate, or high levels of change.				

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Under Alternative IV, nearly all VRI Class I acres would be in VRM Class I, resulting in preservation of the existing visual character of those lands. Less than 1% would be in VRM Class II or III.

With regard to VRI Class II lands, 23% would be in VRM Class I, resulting in preservation of the existing visual character of those lands. Additionally, 68% would be in VRM Class II, allowing a low level of change; 7% would be in VRM Class III, potentially resulting in only partially retaining the character of those lands; and less than 1% would be in VRM Class IV, potentially resulting in a high level of change to those acres.

Table 4- 234 displays the number of acres in each VRI Class by VRM Class for Alternative IV. Alternative IV would have less impact to VRI Class I lands than the No Action Alternative, but a similar impact as in

the other action alternatives. Alternative IV would protect more VRI Class II lands from change than any other alternative expect Alternative V.

Table 4- 234. VRM Classes by VRI Classes in Alternative IV (the Preferred Alternative; Acres)

VRM Class		VRI Class I	VRI Class II	VRI Class III	VRI Class IV
VRM Class I		103,000	14,000	1,824	9,469
VRM Class II		<100	413,000	8,187	20,113
VRM Class III	Alternative IV-A	200	4,000	41,143	320,435
	Alternative IV-B				288,636
VRM Class IV	Alternative IV-A	0	100	18	809,839
	Alternative IV-B				841,638
Note: Shading represents the potential for low, moderate, or high levels of change.					

Impacts from Management Specific to Alternative V

Under Alternative V, nearly all VRI Class I acres would be in VRM Class I, resulting in preservation of the existing visual character of those lands. Less than 1% of VRI Class I acres would be in VRM Class II or III.

With regard to VRI Class II lands, 1% would be managed as VRM Class I, resulting in preservation of the existing visual character of those lands. Additionally, 93% would be in VRM Class II, allowing a low level of change, and 5% would be managed as VRM Class III, potentially resulting in only partially retaining the character of those lands.

Table 4- 235 displays the number of acres in each VRI Class by VRM Class for Alternative V. Alternative V would have less impact to VRI Class I lands than the No Action Alternative, but a similar impact as in the other action alternatives. Alternative V would protect fewer VRI Class II lands from change than any other alternative.

Table 4- 235. VRM Classes by VRI Classes in Alternative V (Acres)

VRM Class	VRI Class I	VRI Class II	VRI Class III	VRI Class IV
VRM Class I	103,000	700	0	<100
VRM Class II	<100	56,000	48,000	165,000
VRM Class III	200	3,000	3,000	642,000
VRM Class IV	0	0	0	353,000
Note: Shading represents the potential for low, moderate, or high levels of change.				

Impacts from Non-WSA Lands with Wilderness Characteristics Actions

Visual character is related to the criteria used to determine the presence of wilderness characteristics. Wilderness characteristics include opportunities for solitude, opportunities for primitive, unconfined recreation, and naturalness. Criteria used to determine whether wilderness characteristics are present include the absence of roads; structures such as developed recreation facilities, fences, pipelines, and powerlines; and modifications such as vegetative treatment areas and mines (BLM, 2008b). These structures can create visual contrast levels that cause them to be "substantially noticeable." The presence of such structures changes the visual quality of the area.

Consideration of the presence of native vegetation communities is also an indicator of visual quality. Vegetation plays an important role in the visual resource inventory process and the presence of native vegetation communities enhances the visual character of the area.

Management decisions to preserve the wilderness character of non-WSA lands with wilderness characteristics also help to preserve the visual character of the area, while a decision not to manage those lands for their wilderness characteristics may result in a reduction of visual quality.

The 2007 Wilderness Characteristics Inventory identified 53,000 acres with wilderness characteristics. Of those, 3,000 are in VRI Class I, 24,000 are in VRI Class II, 8,000 are in VRI Class III, and 18,000 are in

VRI Class IV. Although tables display impacts to all VRI Classes, only impacts to VRI Class I and II lands are discussed in the text, as these are the lands with the most visual quality and most vulnerable to a change in VRI Class.

Impacts from Management Specific to the No Action and Alternatives II and III

None of the non-WSA lands with wilderness characteristics would be managed for those characteristics under the No Action Alternative. Thus, none of those acres would receive management for wilderness characteristics that could benefit their visual resources.

Impacts from Management Specific to Alternative I

Under Alternative I, 67% of VRI Class I lands with wilderness characteristics would be managed for their wilderness characteristics, management that would benefit their visual quality; 33% would not be managed for their wilderness characteristics.

With regard to VRI Class II lands, 67% with wilderness characteristics would be managed for their wilderness characteristics, management that would benefit their visual quality; 33% would not be managed for their wilderness characteristics.

Table 4- 236 displays management for wilderness characteristics for each VRI Class in Alternative I. Fewer VRI Class I and II lands would be preserved through the management of non-WSA lands with wilderness characteristics for those wilderness characteristics in Alternative I than in Alternatives IV and V, but would protect more than the No Action Alternative and Alternatives II and III.

Table 4- 236. Management for Non-Wilderness Study Area Lands with Wilderness Characteristics by VRI Class in Alternative I (Acres)

Management for Non-WSA Lands with Wilderness Characteristics	VRI Class I	VRI Class II	VRI Class III	VRI Class IV
Acres Managed for Their Wilderness Characteristics	2,000	16,000	2,000	15,000
Acres Not Managed for Their Wilderness Characteristics	1,000	8,000	7,000	3,000

Note: Shaded cells represent acres that are more likely to experience changes to the existing visual character because they are not being managed for their wilderness characteristics.

Impacts from Management Specific to Alternatives IV and V

All of the non-WSA lands with wilderness characteristics would be managed for those characteristics under Alternative IV. Thus, all of those acres would receive management that could benefit their visual resources.

Impacts from Land Use Authorization Actions

Land use authorizations can involve building structures. The presence of structures can detract from the visual quality of an area, especially if those structures do not repeat the basic elements of the landscape. Two allocations under the umbrella of land use authorizations are likely to have landscape-level impacts to visual resources: utility corridors and wind energy developments. Areas identified as utility corridors were compared spatially to the VRI Class for those areas. Based on current demand for utility corridors, it was assumed that development would occur in all identified corridors within the life of the plan. Such development is assumed to decrease the VRI Class by adding structures to the landscape.

Land use authorization allocations allowing wind energy development could also impact visual resources. Wind towers do not often repeat the basic elements of the landscape. Wind energy development also involves ancillary features such as roads, structures, and transmission lines that also impact visual resources. Areas available for wind energy development with high wind resource potential (i.e., potential wind energy development areas) were compared spatially to VRI Classes for those areas. Due to current interest in wind energy, it was assumed that these areas would have wind energy development within the life of the plan. Such development is assumed to decrease the VRI Class.

Impacts from Management Specific to the No Action Alternative

Utility development is expected to occur on 76,000 acres during the life of the plan under the No Action Alternative. Of these acres, less than 1% are VRI Class I, 11% are VRI Class II, less than 1% are VRI Class III, and 89% are VRI Class IV. This development would decrease the visual quality of those acres through the addition of structures; however the impacts to VRI Class I acres would be more severe than to VRI Class IV acres.

Wind energy development is expected to occur on 156,000 acres during the life of the plan under the No Action Alternative. Of these acres, none are VRI Class I, 18% are VRI Class II, 17% are VRI Class III, and 66% are VRI Class IV. This development would decrease the visual quality of those acres through the addition of structures; however the impacts to VRI Class II acres would be more severe than to VRI Class IV acres.

Table 4- 237 displays the number of acres in potential utility and wind development areas for each VRI Class in the No Action Alternative. The No Action Alternative would have the fewest VRI Class I acres available for utility development than any of the alternatives, but one of the highest acreages of VRI Class II lands available for utility development. While none of the alternatives would have VRI Class I lands available for wind energy development, the No Action Alternative would have one of the highest acreages of VRI Class II lands available for wind energy development.

Table 4- 237. Potential Utility and Wind Development Areas by VRI Class in the No Action Alternative (Acres)

Development Areas	VRI Class I	VRI Class II	VRI Class III	VRI Class IV
Potential Utility Development Area	<100	8,000	300	68,000
Potential Wind Development Area	0	23,000	26,000	107,000

Impacts from Management Specific to Alternative I

Utility development could potentially occur on 71,000 acres during the life of the plan under Alternative I. Of these acres, less than 1% are VRI Class I, 3% are VRI Class II, less than 1% are VRI Class III, and 97% are VRI Class IV. This development would decrease the visual quality of those acres through the addition of structures; however the impacts to VRI Class I acres would be more severe than to VRI Class IV acres.

Wind energy development could potentially occur on 59,000 acres during the life of the plan under Alternative I. Of the acres where wind energy development is expected, none are VRI Class I, 14% are VRI Class II, 5% are VRI Class III, and 81% are VRI Class IV. This development would decrease the visual quality of those acres through the addition of structures; however, the impacts to VRI Class II acres would be more severe than to VRI Class IV acres.

Table 4- 238 displays the number of acres in each VRI Class that are available for utility or wind energy development in Alternative I. More VRI Class I acres would be available for utility development than in the No Action Alternative, but the number of acres available would be the same as the other action alternatives. Alternative I would have fewer VRI Class II acres available for utility development than the No Action Alternative and Alternative II, the same number of acres available as Alternative III, and more acres available than Alternatives IV and V. None of the alternatives would have VRI Class I lands available for wind energy development. Alternative I would have fewer VRI Class II acres available for wind energy development than the No Action Alternative and Alternative II, a similar number available as Alternative III and IV, and more acres available than Alternative V.

Table 4- 238. Potential Utility and Wind Development Areas by VRI Class in Alternative I (Acres)

Development Areas	VRI Class I	VRI Class II	VRI Class III	VRI Class IV
Potential Utility Development Area	200	2,000	300	69,000
Potential Wind Development Area	0	8,000	3,000	48,000

Impacts from Management Specific to Alternative II

Utility development could potentially occur on 71,000 acres during the life of the plan under Alternative I. Of these acres, less than 1% are VRI Class I, 13% are VRI Class II, less than 1% are VRI Class III, and 97% are VRI Class IV. This development would decrease the visual quality of those acres through the addition of structures; however the impacts to VRI Class I acres would be more severe than to VRI Class IV acres.

Wind energy development could potentially occur on 162,000 acres during the life of the plan under Alternative I. Of the acres where wind energy development is expected, none are VRI Class I, 14% are VRI Class II, 16% are VRI Class III, and 70% are VRI Class IV. This development would decrease the visual quality of those acres through the addition of structures; however the impacts to VRI Class II acres would be more severe than to VRI Class IV acres.

Table 4- 239 displays the number of acres in each VRI Class that are available for utility or wind energy development in Alternative II. More VRI Class I acres would be available for utility development than in the No Action Alternative, but the number of acres available would be the same as the other action alternatives. Alternative II would have more VRI Class II acres available for utility development than any other alternative. Alternative II would have more VRI Class I and II acres available for wind energy development than any other alternative.

Table 4- 239. Potential Utility and Wind Development Areas by VRI Class in Alternative II (Acres)

Development Areas	VRI Class I	VRI Class II	VRI Class III	VRI Class IV
Potential Utility Development Area	200	8,000	300	69,000
Potential Wind Development Area	0	23,000	26,000	113,000

Impacts from Management Specific to Alternative III

Utility development could potentially occur on 71,000 acres during the life of the plan under Alternative III. Of these acres, less than 1% are VRI Class I, 3% are VRI Class II, less than 1% are VRI Class III, and 97% are VRI Class IV. This development would decrease the visual quality of those acres through the addition of structures; however the impacts to VRI Class I acres would be more severe than to VRI Class IV acres.

Wind energy development could potentially occur on 60,000 acres during the life of the plan under Alternative III. Of the acres where wind energy development is expected, none are VRI Class I, 15% are VRI Class II, 5% are VRI Class III, and 80% are VRI Class IV. This development would decrease the visual quality of those acres through the addition of structures; however the impacts to VRI Class II acres would be more severe than to VRI Class IV acres.

Table 4- 240 displays the number of acres in each VRI Class that are available for utility or wind energy development in Alternative III. More VRI Class I acres would be available for utility development than in the No Action Alternative, but the number of acres available would be the same as the other action alternatives. Alternative III would have more VRI Class II acres available for utility development than Alternatives IV and V, the same number of acres as Alternative I, and fewer acres than the No Action Alternative and Alternative III. Along with Alternatives I, IV, and V, Alternative III would have the fewest number of acres VRI Class I available for wind energy development. Alternative III would have fewer acres of VRI Class II lands available for wind energy development than the No Action Alternative and Alternatives I and II.

Table 4- 240. Potential Utility and Wind Development Areas by VRI Class in Alternative III (Acres)

Development Areas	VRI Class I	VRI Class II	VRI Class III	VRI Class IV
Potential Utility Development Area	200	2,000	300	69,000
Potential Wind Development Area	0	9,000	3,000	48,000

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Utility development could potentially occur on 71,000 acres during the life of the plan under Alternative IV. Of these acres, less than 1% are VRI Class I, 1% are VRI Class II, less than 1% are VRI Class III, and 97% are VRI Class IV. This development would decrease the visual quality of those acres through the addition of structures; however the impacts to VRI Class I acres would be more severe than to VRI Class IV acres.

Wind energy development could potentially occur on 59,000 acres during the life of the plan under Alternative IV. Of the acres where wind energy development is expected, none are VRI Class I, 14% are VRI Class II, 5% are VRI Class III, and 81% are VRI Class IV. This development would decrease the visual quality of those acres through the addition of structures; however the impacts to VRI Class II acres would be more severe than to VRI Class IV acres.

Table 4- 241 displays the number of acres in each VRI Class that are available for utility or wind energy development in Alternative IV. More VRI Class I acres would be available for utility development than in the No Action Alternative, but the number of acres available would be the same as the other action alternatives. Along with Alternative V, Alternative IV would have the fewest number of VRI Class II acres available for utility development. Along with Alternatives I, III and V, Alternative IV would have the fewest number of VRI Class I acres available for wind energy development. Alternatives IV and V would have the fewest VRI Class II acres available for wind energy development.

Table 4- 241. Potential Utility and Wind Development Areas by VRI Class in Alternative IV (the Preferred Alternative; Acres)

Development Areas	VRI Class I	VRI Class II	VRI Class III	VRI Class IV
Potential Utility Development Area	200	1,000	200	69,000
Potential Wind Development Area	0	8,000	3,000	48,000

Impacts from Management Specific to Alternative V

Utility development could potentially occur on 60,000 acres during the life of the plan under Alternative V. Of these acres, less than 1% are VRI Class I, 2% are VRI Class II, less than 1% are VRI Class III, and 97% are VRI Class IV. This development would decrease the visual quality of those acres through the addition of structures; however the impacts to VRI Class I acres would be more severe than to VRI Class IV acres.

Wind energy development could potentially occur on 42,000 acres during the life of the plan under Alternative IV. Of the acres where wind energy development is expected, none are VRI Class I or II, 5% are VRI Class III, and 95% are VRI Class IV. This development would decrease the visual quality of those acres through the addition of structures.

Table 4- 242 displays the number of acres in each VRI Class that are available for utility or wind energy development in Alternative V. More VRI Class I acres would be available for utility development than in the No Action Alternative, but the number of acres available would be the same as the other action alternatives. Along with Alternative IV, Alternative IV would have the fewest number of VRI Class II acres available for utility development. Along with Alternatives I, III and IV, Alternative V would have the fewest number of acres VRI Class I available for wind energy development. Alternatives IV and V would have the fewest VRI Class II acres available for wind energy development.

Table 4- 242. Potential Utility and Wind Development Areas by VRI Class in Alternative V (Acres)

Development Areas	VRI Class I	VRI Class II	VRI Class III	VRI Class IV
Potential Utility Development Area	200	1,000	200	58,000
Potential Wind Development Area	0	0	2,000	40,000

Impacts from Area of Critical Environmental Concern (ACEC) Actions

Scenic values are included in the evaluation for relevant and important values when determining whether an area meets the criteria for ACEC management. Two ACEC nominations included scenic values:

nominations for the Salmon Falls Creek ACEC and the Bruneau-Jarbidge ACEC. Relevant and important scenic values were identified on 3,000 acres in the Salmon Falls Creek area and 132,000 acres in the Bruneau-Jarbidge area.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative directs 3,000 acres with relevant and important scenic values to be managed as the Salmon Falls Creek ACEC and 85,000 acres to be managed as the Bruneau-Jarbidge ACEC. Of the 88,000 acres under ACEC management, 88% are in VRM Class I. Of the 44,000 acres with relevant and important scenic values without ACEC management, 95% are in VRM Class I (Table 4- 243). Overall, 91% of lands with relevant and important scenic values are managed in VRM Class I or II in the No Action Alternative. This is a higher percentage of lands with relevant and scenic values in VRM Class I or II than in Alternatives II and III, but a lower percentage than in Alternatives I, IV, and V.

Table 4- 243. Relevant and Important Scenic Values by VRM Class in the No Action Alternative (Acres)

ACEC Management	VRM Class I	VRM Class II	VRM Class III	VRM Class IV
Salmon Falls Creek ACEC	0	3,000	0	0
Bruneau-Jarbidge ACEC	65,000	10,000	5,000	5,000
No ACEC Management	36,0000	6,000	<100	2,000

Utility development could potentially occur on 2,000 acres with relevant and important scenic values in the No Action Alternative (Table 4- 244). Of these acres, 82% are in lands with ACEC management, and 18% are in lands without ACEC management. While the No Action Alternative has more acres of utility development on lands with relevant and important scenic values than Alternatives IV and V and fewer acres than Alternatives I, II, and III, this development occurs on less than 1% of lands with relevant and important scenic values.

The No Action and Alternative II are the only alternatives where lands with relevant and important scenic values overlap potential wind energy development areas, although wind energy development could potentially occur on fewer acres in the No Action Alternative than Alternative II (Table 4- 244). This development occurs on less than 1% of the lands with relevant and important scenic values.

Table 4- 244. Relevant and Important Scenic Values by Potential Utility and Wind Energy Development Areas in the No Action Alternative (Acres)

ACEC Management	Potential Utility Development Areas	Potential Wind Energy Development Areas
Salmon Falls Creek ACEC	<100	0
Bruneau-Jarbidge ACEC	1,000	1,000
No ACEC Management	300	500

Impacts from Management Specific to Alternative I

Alternative I directs 3,000 acres with relevant and important scenic values to be managed as the Salmon Falls Creek ACEC and 85,000 acres to be managed as the Bruneau-Jarbidge ACEC. Of the 88,000 acres under ACEC management, 98% are in VRM Class I or II (Table 4- 245). Of the 44,000 acres without ACEC management, 98% are in VRM Class I or II. Overall, 98% of lands with relevant and important scenic values are in VRM Class I or II. Along with Alternative IV, Alternative I has the highest percentage of lands with relevant and important scenic values in VRM Class I or II.

Table 4- 245. Relevant and Important Scenic Values by VRM Class in Alternative I (Acres)

ACEC Management	VRM Class I	VRM Class II	VRM Class III	VRM Class IV
Salmon Falls Creek ACEC	3,000	0	100	0
Bruneau-Jarbidge ACEC	83,000	600	2,000	0
No ACEC Management	40,000	3,000	600	<100

Utility development could potentially occur on 2,000 acres with relevant and important scenic values in Alternative I (Table 4- 246). Of these acres, 84% are in lands with ACEC management, and 16% are in lands without ACEC management. While Alternative I has more acres of utility development on lands with relevant and important scenic values than the No Action Alternative and Alternatives IV and V and the same number of acres as Alternatives II and III, this development occurs on less than 1% of lands with relevant and important scenic values.

Along with Alternatives III, IV, and V, lands with relevant and important scenic values do not overlap potential wind energy development areas in Alternative I (Table 4- 246).

Table 4- 246. Relevant and Important Scenic Values by Potential Utility and Wind Energy Development Areas in Alternative I (Acres)

ACEC Management	Potential Utility Development Areas	Potential Wind Energy Development Areas
Salmon Falls Creek ACEC	100	0
Bruneau-Jarbidge ACEC	2,000	0
No ACEC Management	300	0

Impacts from Management Specific to Alternative II

Alternative II does not provide ACEC management for any acres with relevant and important scenic values. Seventy-five percent of the acres with relevant and important scenic values are in VRM Class I (Table 4- 247). Along with Alternative III, Alternative II has the lowest percentage of lands with relevant and important scenic values in Management Class I or II.

Table 4- 247. Relevant and Important Scenic Values by VRM Class in Alternative II (Acres)

ACEC Management	VRM Class I	VRM Class II	VRM Class III	VRM Class IV
No ACEC Management	98,000	600	100	33,000

Utility development could potentially occur on 2,000 acres with relevant and important scenic values in Alternative II (Table 4- 248). This development occurs on less than 1% of lands with relevant and important scenic values.

Along with the No Action Alternative, Alternative II is the only alternative where lands with relevant and important scenic values overlap potential wind energy development areas, although wind energy development could potentially occur on fewer acres in the No Action Alternative than Alternative II (Table 4- 248). This development occurs on less than 1% of the lands with relevant and important scenic values.

Table 4- 248. Relevant and Important Scenic Values by Potential Utility and Wind Energy Development Areas in Alternative II (Acres)

ACEC Management	Potential Utility Development Areas	Potential Wind Energy Development Areas
No ACEC Management	2,000	7,000

Impacts from Management Specific to Alternative III

Alternative III directs 3,000 acres with relevant and important scenic values to be managed as the Salmon Falls Creek ACEC and 57,000 acres to be managed as the Bruneau-Jarbidge ACEC. Of the 75,000 acres under ACEC management, 56% are in VRM Class I or II. Of the 57,220 acres without ACEC management, nearly all are in VRM Class I or II (Table 4- 249). Overall, 75% of lands with relevant and important scenic values are in VRM Class I or II. Along with Alternative II, Alternative III has the lowest percentage of lands with relevant and important scenic values in VRM Class I or II.

Table 4- 249. Relevant and Important Scenic Values by VRM Class in Alternative III (Acres)

ACEC Management	VRM Class I	VRM Class II	VRM Class III	VRM Class IV
Salmon Falls Creek ACEC	3,000	0	100	0
Bruneau-Jarbidge ACEC	39,000	600	29,000	4,000
No ACEC Management	57,000	0	0	<100

Utility development could potentially occur on 2,000 acres with relevant and important scenic values in Alternative III (Table 4- 250). Of these acres, 5% are in lands with ACEC management, and 95% are in lands without ACEC management. While Alternative III has more acres of utility development on lands with relevant and important scenic values than the No Action Alternative and Alternatives IV and V and the same number of acres as Alternatives I and II, this development occurs on less than 1% of lands with relevant and important scenic values.

Along with Alternatives I, IV, and V, lands with relevant and important scenic values do not overlap potential wind energy development areas in Alternative III (Table 4- 250).

Table 4- 250. Relevant and Important Scenic Values by Potential Utility and Wind Energy Development Areas in Alternative III (Acres)

ACEC Management	Potential Utility Development Areas	Potential Wind Energy Development Areas
Salmon Falls Creek ACEC	100	0
Bruneau-Jarbidge ACEC	0	0
No ACEC Management	2,000	0

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV directs 57,000 acres with relevant and important scenic values to be managed as the Bruneau-Jarbidge ACEC. Of the acres under ACEC management, 99% are in VRM Class I or II. Of the acres without ACEC management, 92% are in VRM Class I or II (Table 4- 251). Overall, 98% of lands with relevant and important scenic values are in VRM Class I or II. Along with Alternative I, Alternative IV has the highest percentage of lands with relevant and important scenic values in VRM Class I or II.

Table 4- 251. Relevant and Important Scenic Values by VRM Class in Alternative IV (the Preferred Alternative; Acres)

ACEC Management	VRM Class I	VRM Class II	VRM Class III	VRM Class IV
Bruneau-Jarbidge ACEC	121,000	600	2,000	0
No ACEC Management	60,000	0	100	<100

Utility development could potentially occur on 2,000 acres with relevant and important scenic values in Alternative IV (Table 4- 252). Of these acres, 63% are in lands with ACEC management, and 17% are in lands without ACEC management. Along with Alternative V, Alternative IV has fewer acres of utility development on lands with relevant and important scenic values than the other alternatives. This development occurs on less than 1% of lands with relevant and important scenic values.

Along with Alternatives I, III, and V, lands with relevant and important scenic values do not overlap potential wind energy development areas in Alternative IV (Table 4- 252).

Table 4- 252. Relevant and Important Scenic Values by Potential Utility and Wind Energy Development Areas in Alternative IV (the Preferred Alternative; Acres)

ACEC Management	Potential Utility Development Areas	Potential Wind Energy Development Areas
Bruneau-Jarbidge ACEC	700	0
No ACEC Management	400	0

Impacts from Management Specific to Alternative V

Alternative V does not provide for management of the Bruneau-Jarbidge or Salmon Falls Creek ACECs. Instead, those areas are included in the Sagebrush Sea ACEC, which does not include specific management for scenic values; however, 95% of these acres are in VRM Class I or II (Table 4- 253). This is a higher percentage of lands with relevant and scenic values in VRM Class I or II than in the No Action Alternative and Alternatives II and III, but a lower percentage than in Alternatives I and IV.

Table 4- 253. Relevant and Important Scenic Values by VRM Class in Alternative V (Acres)

ACEC Management	VRM Class I	VRM Class II	VRM Class III	VRM Class IV
No ACEC Management	99,000	27,000	5,000	2,000

Utility development could potentially occur on 1,000 acres with relevant and important scenic values in Alternative V (Table 4- 254). Along with Alternative IV, Alternative V has fewer acres of utility development on lands with relevant and important scenic values than the other alternatives. This development occurs on less than 1% of lands with relevant and important scenic values.

Along with Alternatives I, III, and IV, lands with relevant and important scenic values do not overlap potential wind energy development areas in Alternative V (Table 4- 254).

Table 4- 254. Relevant and Important Scenic Values by Potential Utility and Wind Energy Development Areas in Alternative V (Acres)

ACEC Management	Potential Utility Development Areas	Potential Wind Energy Development Areas
No ACEC Management	1,000	0

Summary of Direct and Indirect Impacts

Table 4- 255 and Table 4- 256 summarize the impacts of the alternatives on lands in VRI Class I and II. The comparison among alternatives was limited to VRI Class I and II lands because they are the most susceptible to impacts due to their high visual quality. Decisions regarding ACEC management are captured in decisions related to VRM Classes and land use authorizations. In addition, the comparison among alternatives indicates factors other than ACEC management are involved in the maintenance of relevant and important scenic values.

Table 4- 255. Impacts to VRI Class I Lands by Alternative (Acres)

	Alternative					
	No Action	I	II	III	IV	V
VRM Classes						
VRM Class I	91,000	103,000	103,000	103,000	103,000	103,000
VRM Class II	9,000	<100	<100	<100	<100	<100
VRM Class III	1,000	200	200	200	200	200
VRM Class IV	2,000	0	<100	0	0	0
Management for Wilderness Characteristics						
Yes	0	2,000	0	0	3,000	3,000
No	3,000	1,000	3,000	3,000	0	0
Allowed Land Use Authorizations						
Utility Development	<100	200	200	200	200	200
Wind Development	0	0	0	0	0	0
Footprint Acres Receiving Highest Level of Protection [A]	**97,000**	**102,000**	**100,000**	**100,000**	**103,000**	**103,000**

[A] Footprint acres receiving the highest level of protection are those acres in VRM Class I or II that have protection for wilderness characteristics if they are present, and are not expected to have utility or wind energy development. Because many of the acres listed above overlap, the footprint acres are not a sum of the acres listed above.

Table 4- 256. Impacts to VRI Class II Lands by Alternative (Acres)

	Alternative					
	No Action	I	II	III	IV	V
VRM Classes						
VRM Class I	8,000	12,000	100	100	14,000	700
VRM Class II	25,000	43,000	2,000	2,000	41,000	56,000
VRM Class III	18,000	4,000	10,000	56,000	4,000	3,000
VRM Class IV	9,000	0	47,000	1,000	100	0
Management for Wilderness Characteristics						
Yes	0	16,000	0	0	24,000	24,000
No	24,000	8,000	24,000	24,000	0	0
Allowed Land Use Authorizations						
Utility Development	8,000	2,000	8,000	2,000	1,000	1,000
Wind Development	23,000	8,000	23,000	9,000	8,000	0
Footprint Acres Receiving Highest Level of Protection [A]	**11,000**	**38,000**	**2,000**	**2,000**	**47,000**	**57,000**

[A] Footprint acres receiving the highest level of protection are those acres in Management Class I or II that have protection for wilderness characteristics if they are present, and are not expected to have utility or wind energy development. Because many of the acres listed above overlap, the footprint acres are not a sum of the acres listed above.

Each of the relationships described in the tables offer a different layer of protection for overlapping acres. VRM Classes determine the amount of change allowed in a landscape, protection for wilderness characteristics limit the existence of structures in the landscape, and management for land use authorizations determine whether specific structures can be placed in an area. Considering these relationships together, the most protective management an area could receive would be to be in VRM Class I or II, have management for wilderness characteristics if they are present, and prohibiting utility or wind energy development. Because VRI Class I and II lands are the most sensitive, these lands were examined to determine the number of acres that would receive the most protective management within each alternative.

Impacts from the No Action Alternative

Of the 103,000 acres of VRI Class I lands, 94% would receive the highest level of protection. Of the 60,000 acres of VRI Class II lands, 20% acres would receive the highest level of protection. The No Action Alternative could result in negligible adverse impacts to VRI Class I lands and major adverse impacts to VRI Class II lands as a result of areas open to land use authorizations.

Impacts from Alternative I

Of the 103,000 acres of VRI Class I lands, 99% would receive the highest level of protection. Of the 60,000 acres of VRI Class II lands, 63% would receive the highest level of protection. Alternative I has more VRI Class I and II acres receiving the highest level of protection than Alternatives II and III, the same number of acres as in the No Action Alternative, and fewer acres than Alternatives IV and V. Alternative I could result in negligible adverse impacts to VRI Class I and minor adverse impacts to VRI Class II lands as a result of areas open to land use authorizations.

Impacts from Alternative II

Of the 103,000 acres of VRI Class I lands, 97% would receive the highest level of protection. Of the 60,000 acres of VRI Class II lands, 3% would receive the highest level of protection. Along with Alternative III, Alternative II would have the fewest number of VRI Class I and II acres receiving the highest level of protection. Alternative II could result in negligible adverse impacts to VRI Class I and major adverse impacts to VRI Class II lands as a result of areas open to land use authorizations.

Impacts from Alternative III

Of the 103,000 acres of VRI Class I lands, 97% would receive the highest level of protection. Of the 60,000 acres of VRI Class II lands, 3% would receive the highest level of protection. Along with

Alternative II, Alternative III would have the fewest number of VRI Class I and II acres receiving the highest level of protection. Alternative III could result in negligible adverse impacts to VRI Class I and minor adverse impacts to VRI Class II lands as a result of areas open to land use authorizations.

Impacts from Alternative IV (the Preferred Alternative)

Of the 103,000 acres of VRI Class I lands, nearly all would receive the highest level of protection. Of the 60,000 acres of VRI Class II lands, 78% would receive the highest level of protection. Along with Alternative V, Alternative IV would have the largest number of VRI Class I acres receiving the highest level of protection. Only Alternative V would have more acres of VRI Class II lands receiving the highest level of protection than Alternative IV. Alternative IV could result in negligible adverse impacts to VRI Class I and minor adverse impacts to VRI Class II lands as a result of areas open to land use authorizations.

Impacts from Alternative V

Of the 103,000 acres of VRI Class I lands, nearly all would receive the highest level of protection. Of the 60,000 acres of VRI Class II lands, 95% would receive the highest level of protection. Along with Alternative IV, Alternative V would have the largest number of VRI Class I acres receiving the highest level of protection. Alternative V would have the largest number of VRI Class II acres receiving the highest level of protection. Alternative V could result in negligible adverse impacts to VRI Class I and Class II lands as a result of areas open to land use authorizations.

Cumulative Impacts

Past, Present, and Reasonably Foreseeable Actions

The planning area did not have a VRI prior to the 2008 inventory. Thus, it is not possible to evaluate how visual resources have changed due to past actions. While vegetation is an important part of scenic quality, changes to vegetation are discussed in the *Vegetation Communities* section.

Present and reasonably foreseeable actions for the planning area involve those actions that occur on non-BLM managed or owned lands. These actions include management for visual resources and utility and wind energy development in the planning area. The 2008 VRI took into account the visual resources on non-BLM managed and owned lands (Table 4- 257).

Table 4- 257. VRI Classes for All Lands in the Planning Area in 2008

Land Status	VRI I	VRI II	VRI III	VRI IV
BLM-Managed Lands	103,000	60,000	51,000	1,160,000
Non-BLM Managed Lands	5,000	27,000	28,000	380,000
Total	**108,000**	**87,000**	**79,000**	**1,540,000**

For the analysis of cumulative impacts on visual resources, assumptions were made regarding the management of non-BLM managed lands within the planning area boundary. The first assumption was that non-BLM owned lands would be managed by the landowner for use; this management would be similar to VRM Class IV. Of these lands, 5,000 acres were VRI Class I, 27,000 acres were VRI Class II, 28,000 acres were VRI Class III, and 380,000 acres were VRI Class IV.

The second assumption is that utility development would occur on non-BLM owned lands in potential utility development areas when proposed. Utility development on non-BLM owned lands is expected to occur on no VRI Class I acres, 4,000 VRI Class II acres, 500 VRI Class III acres, and 24,000 VRI Class IV acres. Potential wind energy development would occur on non-BLM owned lands when proposed.

Because the concept of wilderness characteristics only applies to BLM-owned lands, the cumulative impacts of wilderness characteristics on visual resources were not analyzed.

Summary of Cumulative Impacts

Cumulative Impacts from the No Action Alternative

The analysis of cumulative impacts for the No Action Alternatives identifies an increase in the number of acres in VRM Class IV (Table 4- 258). For VRI Class I lands, 47% of those in VRM Class IV are managed by BLM; 53% are not managed by BLM. For VRI Class II lands, 24% of those in VRM Class IV are managed by the BLM; 76% are not managed by BLM. With regards to VRM Classes, management on non-BLM lands has more impact to visual resources than management on BLM-managed lands. The No Action Alternative has the smallest cumulative impact on VRI Class I lands than the other alternatives, but the second largest cumulative impact on VRI Class II lands.

Table 4- 258. VRM Classes by VRI Classes for All Lands in the Planning Area in the No Action Alternative (Acres)

VRM Class	VRI Class I	VRI Class II	VRI Class III	VRI Class IV
VRM Class I	91,000	8,000	2,000	28,000
VRM Class II	9,000	25,0000	18,000	60,000
VRM Class III	1,000	18,000	31,000	242,000
VRM Class IV	5,000	36,000	29,000	1,210,000

All of the VRI Class I lands within potential utility development areas in the No Action Alternative are managed by BLM; 65% of VRI Class II lands with potential for utility development are managed by BLM, 35% are not managed by BLM (Table 4- 259). With regard to potential utility development, management on BLM lands has more impact to visual resources than management on non-BLM managed lands. The No Action Alternative has a smaller cumulative impact on Inventory Class I lands, but the second largest cumulative impact on Inventory Class II lands.

None of the VRI Class I lands with potential wind energy development in the No Action Alternative are managed by BLM; 64% of VRI Class II lands with potential wind energy development are managed by BLM, 36% are not managed by BLM (Table 4- 259). With regards to potential wind energy development, management on non-BLM lands has more impact to VRI Class I lands, while management on BLM-managed lands has more impacts of VRI Class II lands. The No Action Alternative has the second largest cumulative impact on VRI Class I and II lands.

Table 4- 259. VRI Classes for Potential Utility and Wind Development Areas for All Lands in the Planning Areas in the No Action Alternative (Acres)

Development Areas	VRI Class I	VRI Class II	VRI Class III	VRI Class IV
Potential Utility Development Areas	<100	12,000	800	92,000
Potential Wind Development Areas	1,000	40,000	41,000	242,000

Cumulative Impacts from Alternative I

The analysis of cumulative impacts for Alternative I identifies an increase in the number of acres in VRM Class IV (Table 4- 260). For VRI Class I lands, none of the lands managed in VRM Class IV are managed by BLM. For VRI Class II lands, less than 1% of those managed in VRM Class IV are managed by the BLM; nearly all are not managed by BLM. With regard to VRM Classes, management on non-BLM lands have more impact to visual resources than management on BLM-managed lands. Alternative I has a larger cumulative impact on VRI Class I lands than the No Action Alternative, but a similar cumulative impact as the rest of the alternatives. Alternative I has a smaller cumulative impact on VRI Class II lands than the No Action Alternative and Alternative II, but a similar cumulative impact as the remainder of the alternatives.

Table 4- 260. VRM Classes by VRI Classes for All Lands in the Planning Area in Alternative I (Acres)

VRM Class	VRI Class I	VRI Class II	VRI Class III	VRI Class IV
VRM Class I	103,000	12,000	1,000	14,000
VRM Class II	<100	43,000	47,000	91,000
VRM Class III	200	4,000	3,000	111,000
VRM Class IV	5,000	27,000	28,000	1,888,000

All of the VRI Class I lands with potential utility development in Alternative I are managed by BLM; 40% of VRI Class II lands with potential utility development are managed by BLM, 60% are not managed by BLM (Table 4- 261). With regards to potential utility development, management on BLM-managed lands has more impacts to VRI Class I lands, but management on non-BLM managed lands has more impacts to VRI Class II lands. Alternative I has a larger cumulative impact on VRI Class I lands than the No Action Alternative, but a similar cumulative impact as the rest of the alternatives. Alternative I has a smaller cumulative impact on VRI Class II lands than the No Action Alternative and Alternative II, but a larger cumulative impact than Alternatives IV and V.

All of the VRI Class I lands with potential wind energy development in Alternative I are managed by BLM; 90% of VRI Class II lands with potential wind energy development are managed by BLM, 10% are not managed by BLM (Table 4- 261). With regards to potential wind energy development, management on BLM-managed lands has more impact to visual resources than management on non-BLM managed lands. Alternative I has a smaller cumulative impact on VRI Class I lands than the No Action Alternative and Alternative II, and a similar cumulative impact as the remainder of the alternatives. Alternative I has the second largest cumulative impact on VRI Class II lands.

Table 4- 261. VRI Classes for Potential Utility and Wind Development Areas for All Lands in the Planning Areas in Alternative I (Acres)

Development Areas	VRI Class I	VRI Class II	VRI Class III	VRI Class IV
Potential Utility Development Areas	200	5,000	800	93,000
Potential Wind Development Areas	200	11,000	5,000	84,000

Cumulative Impacts from Alternative II

The analysis of cumulative impacts for Alternative II identifies an increase in the number of acres in VRM Class IV (Table 4- 262). For VRI Class I lands, less than 1% of the lands managed in VRM Class IV are managed by BLM; nearly all of the lands managed in VRM Class IV are non-BLM managed lands. For VRI Class II lands, 64% of those lands managed in VRM Class IV are managed by the BLM; 36% are not managed by BLM. With regards to VRM Classes, management on non-BLM managed lands have more impact to VRI Class I lands, while management on BLM-managed lands have more impact to VRI Class II lands. Alternative II has a larger cumulative impact on VRI Class I lands than the No Action Alternative and a similar cumulative impacts to the other alternatives. Alternative II has the largest cumulative impact on VRI Class II lands.

Table 4- 262. VRM Classes by VRI Classes for All Lands in the Planning Area in Alternative II (Acres)

VRM Class	VRI Class I	VRI Class II	VRI Class III	VRI Class IV
VRM Class I	103,000	100	0	60
VRM Class II	<100	2,000	1,000	7,000
VRM Class III	200	10,000	100	9,000
VRM Class IV	5,000	75,000	78,000	1,523,000

All of the VRI Class I lands with potential utility development in Alternative II are managed by BLM; 65% of VRI Class II lands with potential utility development are managed by BLM, 35% are not managed by BLM (Table 4- 263). With regards to potential utility development, management on BLM-managed lands has more impacts to visual resources than management on non-BLM managed lands. Alternative II has a larger cumulative impact on VRI Class I lands than the No Action Alternative and a similar cumulative impact as the other alternatives. Alternative II has the largest cumulative impact on VRI Class II lands.

Under Alternative II, 64% of the VRI Class I lands with potential wind development are managed by BLM; 36% are not managed by BLM (Table 4- 263). 68% of Inventory Class II lands with potential wind development are managed by BLM, 32% are not managed by BLM. With regards to potential wind development, management on BLM-managed lands has more impact to visual resources than management on non-BLM managed lands. Alternative II has the largest cumulative impact on VRI I and II lands.

Table 4- 263. VRI Classes for Potential Utility and Wind Development Areas for All Lands in the Planning Areas in Alternative II (Acres)

Development Areas	VRI Class I	VRI Class II	VRI Class III	VRI Class IV
Potential Utility Development Areas	200	12,000	800	93,000
Potential Wind Development Areas	2,000	45,000	45,000	258,000

Cumulative Impacts from Alternative III

The analysis of cumulative impacts for Alternative III identifies an increase in the number of acres in VRM Class IV (Table 4- 264). For VRI Class I lands, none of the lands managed in VRM Class IV are managed by BLM. For VRI Class II lands, 4% of those lands in VRM Class IV are managed by the BLM; 96% are not managed by BLM. With regards to VRM Classes, management on non-BLM managed lands has more impact to visual resources than management on BLM-managed lands. Alternative III has a larger cumulative impact on VRI Class I lands than the No Action Alternative and a similar cumulative impact as the other alternatives. Alternative III has a smaller cumulative impact on VRI Class II lands than the No Action Alternative and Alternative II, but a larger cumulative impact than the other alternatives.

Table 4- 264. VRM Classes by VRI Classes for All Lands in the Planning Area in Alternative III (Acres)

VRM Class	VRI Class I	VRI Class II	VRI Class III	VRI Class IV
VRM Class I	103,000	100	0	<100
VRM Class II	<100	2,000	1,000	7,000
VRM Class III	200	56,000	50,000	229,000
VRM Class IV	5,000	28,000	28,000	1,303,000

All of the VRI Class I lands with potential utility development in Alternative III are managed by BLM; 40% of VRI Class II lands with potential utility development are managed by BLM, 60% are not managed by BLM (Table 4- 265). With regards to potential utility development, management on BLM-managed lands has more impacts to VRI Class I lands, while management on non-BLM managed lands has more impact to VRI Class II lands. Alternative III has a larger cumulative impact on VRI Class I lands than the No Action Alternative and a similar cumulative impact as the other alternatives. Alternative II has a smaller cumulative impact on VRI Class II lands than the No Action Alternative and Alternative II, but a larger cumulative impact than Alternatives IV and V.

All of the VRI Class I lands with potential wind development in Alternative III are managed by BLM; 90% of VRI Class II lands with potential wind development are managed by BLM, 10% are not managed by BLM (Table 4- 265). With regards to potential wind development, management on BLM-managed lands has more impact to visual resources than management on non-BLM managed lands. Alternative III has a smaller cumulative impact to VRI Class I lands than the No Action Alternative and Alternative II and a similar cumulative impact to the other alternatives. Alternative III has a smaller cumulative impact on VRI Class II lands than the No Action Alternative and Alternative II, but a larger impact than Alternatives I, IV, and V.

Table 4- 265. VRI Classes for Potential Utility and Wind Development Areas for All Lands in the Planning Areas in Alternative III (Acres)

Development Areas	VRI Class I	VRI Class II	VRI Class III	VRI Class IV
Potential Utility Development Areas	200	5,000	800	93,000
Potential Wind Development Areas	200	11,000	5,000	84,000

Cumulative Impacts from Alternative IV (the Preferred Alternative)

The analysis of cumulative impacts for Alternative IV identifies an increase in the number of acres in Management Class IV (Table 4- 266). For VRI Class I lands, none of the lands managed in VRM Class IV are managed by BLM. For VRI Class II lands, less than 1% of those lands in VRM Class IV are managed by the BLM; most are not managed by BLM. With regards to VRM Classes, management on non-BLM managed lands have more impact to visual resources than management on BLM-managed lands. Alternative V has a larger cumulative impact on VRI Class I lands than the No Action Alternative and a similar cumulative impact to the other alternatives. Alternative IV has a smaller cumulative impact on VRI

Class II lands than the No Action Alternative and Alternatives II and III, but a larger cumulative impact than Alternatives I and V.

Table 4- 266. VRM Classes by VRI Classes for All Lands in the Planning Area in Alternative IV (the Preferred Alternative; Acres)

VRM Class		VRI Class I	VRI Class II	VRI Class III	VRI Class IV
VRM Class I		103,000	14,000	2,000	9,000
VRM Class II		<100	41,000	8,000	20,000
VRM Class III	Alternative IV-A	2000	4,000	41,000	320,000
	Alternative IV-B				289,000
VRM Class IV	Alternative IV-A	5,000	27,000	28,000	1,190,000
	Alternative IV-B				1,222,000

All of the VRI Class I lands with potential utility development in Alternative IV are managed by BLM; 28% of VRI Class II lands with potential utility development are managed by BLM, 72% are not managed by BLM (Table 4- 267). With regards to potential utility development, management on BLM-managed lands has more impacts to VRI Class I lands, while management on non-BLM managed lands has more impact to VRI Class II lands. Alternative IV has a larger cumulative impact on VRI Class I lands than the No Action Alternative and a similar impact as the other alternatives. Along with Alternative V, Alternative IV has the smallest cumulative impact on VRI Class II lands.

All of the VRI Class I lands with potential wind development in Alternative IV are managed by BLM; 90% of VRI Class II lands with potential wind development are managed by BLM, 10% are not managed by BLM (Table 4- 267). With regards to potential wind development, management on BLM-managed lands has more impact to visual resources than management on non-BLM managed lands. Alternative III has a smaller cumulative impact on VRI Class I lands than the No Action Alternative and Alternative II and a similar cumulative impact as the other alternatives. Along with Alternative V, Alternative IV has the smallest cumulative impact on VRI Class II lands.

Table 4- 267. VRI Classes for Potential Utility and Wind Development Areas for All Lands in the Planning Areas in Alternative IV (the Preferred Alternative; Acres)

Development Areas	VRI Class I	VRI Class II	VRI Class III	VRI Class IV
Potential Utility Development Areas	200	4,000	700	93,000
Potential Wind Development Areas	200	10,000	5,000	83,000

Cumulative Impacts from Alternative V

The analysis of cumulative impacts for Alternative V identifies an increase in the number of acres in VRM Class IV (Table 4- 268). For VRI Class I and II lands, none of the lands in VRM Class IV are managed by BLM. For VRI Class II lands, less than 1% of those lands in VRM Class IV are managed by BLM; most are not managed by BLM. With regards to VRM Classes, management on non-BLM managed lands has more impact to visual resources than management on BLM-managed lands. Alternative V has a larger cumulative impact on VRI Class I lands than the No Action Alternative and a similar cumulative impact as the other alternatives. Alternative V has the smallest cumulative impact on VRI Class II lands.

Table 4- 268. VRM Classes by VRI Classes for All Lands in the Planning Area in Alternative V (Acres)

VRM Class	VRI Class I	VRI Class II	VRI Class III	VRI Class IV
VRM Class I	103,000	700	0	<100
VRM Class II	<100	56,000	58,000	165,000
VRM Class III	200	3,000	3,000	642,000
VRM Class IV	5,000	27,000	28,000	733,000

All of the VRI Class I lands with potential utility development in Alternative V are managed by BLM; 28% of VRI Class II lands with potential utility development are managed by BLM, 72% are not managed by BLM (Table 4- 269). With regards to potential utility development, management on BLM-managed lands has more impacts to VRI Class I lands, while management on non-BLM managed lands has more impact to VRI Class II lands. Alternative V has a larger cumulative impact on VRI Class I lands than the No Action Alternative and a similar cumulative impact to the other alternatives. Along with Alternative IV, Alternative V has the smallest cumulative impact to VRI Class II lands.

All of the VRI Class I lands with potential wind development in Alternative V are managed by BLM; 90% of VRI Class II lands with potential wind development are managed by BLM, 10% are not managed by BLM (Table 4- 269). With regards to potential wind development, management on BLM-managed lands has more impact to visual resources than management on non-BLM managed lands. Alternative V has a smaller cumulative impact on VRI Class I lands than the No Action Alternative and Alternative II and a similar cumulative impact as the other alternatives. Along with Alternative IV, Alternative V has the smallest cumulative impact on VRI Class II lands.

Table 4- 269. VRI Classes for Potential Utility and Wind Development Areas for All Lands in the Planning Areas in Alternative V (Acres)

Development Areas	VRI Class I	VRI Class II	VRI Class III	VRI Class IV
Potential Utility Development Areas	200	4,000	700	78,000
Potential Wind Development Areas	200	10,000	5,000	83,000

4.3.14. Non-WSA Lands with Wilderness Characteristics

OPLMA releases some lands from wilderness review in the planning area. Management described in Chapter 2 for non-WSA lands with wilderness characteristics and the discussion in this chapter of potential impacts from this management does not include lands with wilderness characteristics released from wilderness review under OPLMA. As described in the errata sheet at the front of Volume 1, the wilderness inventory for lands released from wilderness review will be updated to make a determination regarding wilderness characteristics, and the Proposed RMP/Final EIS will incorporate those findings as appropriate.

Analysis Methods

Indicators

The following indicators were used for the analysis of impacts to non-Wilderness Study Area (WSA) lands with wilderness characteristics:

- **Acres with naturalness**
- **Acres with opportunities for solitude**
- **Acres with opportunities for primitive, unconfined recreation**

These indicators were selected because they represent the values required for an area to be considered to have wilderness characteristics.

Methods and Assumptions

Impacts to non-WSA land with wilderness characteristics from management in the following sections of Chapter 2 were analyzed in detail: *Non-WSA Lands with Wilderness Characteristics*, *Visual Resources*, *Livestock Grazing*, *Recreation*, *Transportation and Travel*, *Land Use Authorizations*, and *Minerals*. Management from the remaining sections was not analyzed in detail because the management did not vary measurably between alternatives or impact the indicators for non-WSA land with wilderness characteristics. **Impacts from management for non-WSA lands with wilderness characteristics** can be found under *Impacts from Non-WSA Lands with Wilderness Characteristics Actions* in the *Geologic Features*, *Visual Resources*, and *Recreation* sections.

The planning area contains seven areas outside WSAs that possess wilderness characteristics. Although BLM does not consider identification or designation of new WSAs in this RMP, it does consider whether non-WSA lands with wilderness characteristics would be managed for those values and how these characteristics may be impacted by resource and resource use allocations and actions. To the extent possible, these impacts are quantified by overlaying use allocations with the non-WSA lands with wilderness characteristics using GIS.

There is no established significance threshold for the loss of wilderness characteristics outside of designated wilderness or WSAs. For the purpose of this analysis and for the comparison of alternatives, any change to individual wilderness characteristics that would result in the value being diminished or no longer present within an area is considered to decrease or remove wilderness character. Impacts of each alternative are analyzed and described only on those lands with wilderness characteristics outside WSAs identified and described in Chapters 2 and 3. It is assumed that there are no impacts to wilderness characteristics on other lands outside WSAs because wilderness characteristics do not occur on those lands.

Direct and Indirect Impacts

Impacts from Non-WSA Lands with Wilderness Characteristics Actions

Table 4- 270 displays the number of acres outside WSAs that would be managed for wilderness character under each alternative.

Table 4- 270. Non-WSA Lands Managed for Wilderness Character by Alternative (Acres)

	Alternative					
	No Action	I	II	III	IV	V
Acres Managed for Wilderness Character	0	34,000	0	0	53,000	53,000

Impacts from Management Specific to the No Action Alternative and Alternatives II and III

The No Action Alternative and Alternatives II and III would not manage any lands outside WSAs to maintain wilderness characteristics. Absence of this management would allow decreases to the naturalness, opportunities for solitude, and opportunities for primitive, unconfined recreation in areas that currently possess wilderness characteristics.

Impacts from Management Specific to Alternative I

Alternative I would manage four areas of non-WSA lands with wilderness characteristics to retain their undeveloped character and to provide opportunities for primitive recreational activities and solitude: Hole in the Ground, Columbet Table, Long Draw, and East Fork Jarbidge (34,000 acres). Management in Land Tenure Zone 1 and VRM Class II, closure to motorized vehicles, closure to leasable and salable mineral exploration or development, allowance for range infrastructure to protect or enhance wilderness characteristics, and allocation for ROW avoidance would maintain wilderness character in these four areas.

The remaining three areas with wilderness characteristics (Black Canyon, Corral Creek, and the Salmon Falls Creek; 19,000 acres) would be managed for other resources and uses that may not be compatible with maintaining wilderness characteristics. As a result, naturalness, opportunities for solitude, and opportunities for primitive, unconfined recreation would likely decrease.

Impacts from Management Specific to Alternatives IV and V

Alternatives IV and V would manage all seven areas of non-WSA lands with wilderness characteristics to retain their undeveloped character and to provide opportunities for primitive recreational activities and solitude (53,000 acres). Management in Land Tenure Zone 1 and VRM Class II, closure to motorized vehicles, closure to leasable and salable mineral development or exploration, allowance for range infrastructure to protect or enhance wilderness characteristics, and allocation for ROW exclusion would maintain wilderness character in these seven areas.

Impacts from Visual Resource Actions

Scenic values contribute to the naturalness of an area and are an important component of wilderness characteristics. Scenic values include the aesthetic of the natural landscape, the presence of native vegetation, and the absence of infrastructure and imprint of human activity. VRM actions have the potential to impact non-WSA lands with wilderness characteristics, depending on the VRM Class. The more the VRM Class would retain the existing character of an area, the more likely the scenic values contributing toward naturalness of an area would be retained. Because VRM Classes I and II would retain the existing visual landscape of the area, naturalness in areas allocated to VRM Class I or II would be maintained. Conversely, because VRM Classes III and IV would allow for more substantial visual modifications, naturalness in areas allocated to VRM Class III or IV would decrease. Table 4- 271 displays the VRM Class for areas with wilderness characteristics outside WSAs by alternative.

Table 4- 271. VRM Class for Non-WSA Lands with Wilderness Characteristics (Acres)

VRM Class	Alternative					
	No Action	I	II	III	IV	V
I	11,000	17,000	3,000	3,000	18,000	3,000
II	14,000	35,000	0	0	33,000	49,000
III	15,000	1,000	500	50,000	1,000	1,000
IV	12,000	0	50,000	0	0	0

Impacts from Management Specific to the No Action Alternative

In the No Action Alternative, 48% of non-WSA lands with wilderness characteristics would be managed to retain their existing visual character, which would result in maintaining their naturalness. More substantial visual modifications would be allowed on the remaining 52% of non-WSA lands with wilderness characteristics; if these modifications were to occur, naturalness would decrease in these areas.

Impacts from Management Specific to Alternatives I, IV, and V

In Alternatives I, IV, and V, 98% of non-WSA lands with wilderness characteristics would be managed to retain their existing visual character, which would result in maintaining their naturalness. More substantial visual modifications would be allowed on the remaining 2% of non-WSA lands with wilderness characteristics; if these modifications were to occur, naturalness would decrease in these areas.

Impacts from Management Specific to Alternatives II and III

In Alternatives II and III, 5% of non-WSA lands with wilderness characteristics would be managed to retain their existing visual character, which would result in maintaining their naturalness. More substantial visual modifications would be allowed on the remaining 95% of non-WSA lands with wilderness characteristics; if these modifications were to occur, naturalness would decrease in these areas.

Impacts from Livestock Grazing Actions

Livestock grazing can impact wilderness characteristics through changes in naturalness such as presence of sheep or cattle, reduced vegetation cover, trampling or trailing, changes in species composition, soil compaction, and impacts to water quality. The presence of livestock does not necessarily preclude the existence of wilderness characteristics. However, the stocking density, infrastructure, and vegetation and soil disturbances resulting from grazing activities can contribute to changes in wilderness characteristics. Impacts to non-WSA lands with wilderness characteristics from livestock grazing management actions would occur in proportion to the area available to livestock grazing under each alternative Table 4- 272 displays areas with wilderness characteristics outside WSAs available and unavailable for livestock grazing by alternative.

Table 4- 272. Non-WSA Lands with Wilderness Characteristics Available and Unavailable for Livestock Grazing (Acres)

Livestock Grazing Management	Alternative					
	No Action	I	II	III	IV	V
Unavailable for Livestock Grazing	7,000	7,000	7,000	7,000	7,000	21,000
Available for Livestock Grazing	46,000	46,000	46,000	46,000	46,000	32,000

Range infrastructure such as fences, pipelines, and water developments can impact the naturalness of the area depending on how visually prominent they are. Maintenance and construction of range improvements can also result in changes in naturalness and opportunities for solitude. Conversely, rangeland infrastructure can be designed and placed to enhance wilderness characteristics. For example, perimeter fencing could limit the presence of livestock, or a spring development could contribute to offsite watering. These impacts will be considered where specified.

Impacts from Management Specific to the No Action Alternative

In the No Action Alternative, 87% of non-WSA lands with wilderness characteristics would be available for livestock grazing and associated infrastructure development. This would allow construction and maintenance of fences, pipelines, and other livestock-related facilities that may decrease the opportunities for solitude and primitive, unconfined recreation by increasing the potential for human contact and for the use of motorized vehicles. This also would potentially decrease the degree of naturalness in these areas by increasing the number of man-made structures, such as fences and holding facilities, or evidence of construction of improvements, such as pipelines.

Impacts from Management Specific to Alternative I

In Alternative I, 86% of non-WSA lands with wilderness characteristics would be available for livestock grazing. The portions of non-WSA lands with wilderness characteristics within the Bruneau or Jarbidge Canyons or reference areas would be unavailable for livestock grazing. The closure of these areas would maintain the existing degree of naturalness and opportunities for solitude.

This alternative would allow construction and maintenance of range infrastructure on a case-by-case basis, consistent with maintenance of existing wilderness characteristics within the Long Draw, Hole in the Ground, Columbet Table, and East Fork Jarbidge areas. This would have no impact to naturalness, or the opportunities for solitude and primitive, unconfined recreation in these areas. Because the Black Canyon, Corral Creek, and Salmon Falls Creek areas would not be managed to maintain their wilderness character, naturalness in these areas would potentially decrease by allowing range improvements and development, such as fences and holding facilities, or evidence of construction of improvements, such as pipelines. The opportunities for solitude and primitive, unconfined recreation would also decrease in these areas due to increased human contact and use of motorized vehicles.

Impacts from Management Specific to Alternatives II and III

In Alternatives II and III, 87% of non-WSA lands with wilderness characteristics would be available for livestock grazing. The portions of non-WSA lands with wilderness characteristics within the Bruneau or Jarbidge Canyons and reference areas would be unavailable for livestock grazing. The closure of these areas would help maintain the existing degree of naturalness and opportunities for solitude.

This alternative would allow construction and maintenance of range infrastructure to promote livestock distribution or management. Because none of the seven areas with wilderness characteristics would be managed to maintain their wilderness character, naturalness in these areas would potentially decrease by allowing range improvements and development, such as fences and holding facilities, or evidence of construction of improvements, such as pipelines. The opportunities for solitude and primitive, unconfined recreation would also decrease in these areas due to increased likelihood of human contact and use of motorized vehicles.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

In Alternative IV, 86% of non-WSA lands with wilderness characteristics would be available for livestock grazing. The portions of non-WSA lands with wilderness characteristics within the Bruneau or Jarbidge Canyons and reference areas would be unavailable for livestock grazing. The closure of these areas would also maintain the existing degree of naturalness and opportunities for solitude where applicable.

This alternative would allow construction and maintenance of range infrastructure on a case-by-case basis, consistent with maintenance of existing wilderness characteristics within all seven areas with wilderness characteristics. This would have no impact to naturalness or the opportunities for solitude and primitive, unconfined recreation in these areas.

Impacts from Management Specific to Alternative V

In Alternative V, portions of Long Draw, Hole-in-the-Ground, Columbet Table, East Fork Jarbidge, and Black Canyon, and all of the Salmon Falls Creek and Corral Creek areas would be unavailable for livestock grazing (40%). The remaining 60% of non-WSA lands with wilderness characteristics would be available for livestock grazing. Range infrastructure and developments would be allowed only if they are consistent with resource objectives. No new pipelines or spring developments would be authorized. These actions would maintain the existing wilderness characteristics and would have no impact to naturalness or the opportunities for solitude and primitive, unconfined recreation.

Impacts from Recreation Actions

Wilderness characteristics include opportunities for solitude and primitive, unconfined recreation. A primitive or unconfined recreational experience includes dispersed, undeveloped recreation activities that do not require developed facilities or use of motorized equipment. Recreational activities that fit this description include hiking, primitive camping, hunting, fishing, viewing wildlife and natural scenery, whitewater boating, mountain biking, and equestrian use. SRMAs that manage for these types of experiences would tend to maintain wilderness characteristics, while SRMAs that focus on more developed recreational experiences would decrease wilderness characteristics.

Because ERMAs involve custodial management and are not managed for any particular recreational activity, activities in these areas would be more likely to result in a decrease in wilderness characteristics than in an SRMA managed for a primitive setting. Recreation in an ERMA is not managed in a way that would restrict or limit certain activities to maintain a particular setting. The absence of recreation management consistent with preservation of wilderness characteristics could allow for impacts resulting from mechanized recreation, large groups, or placement of developed facilities.

Table 4- 273 displays recreation management within areas with wilderness characteristics outside WSAs.

Table 4- 273. Recreation Management in Non-WSA Lands with Wilderness Characteristics (Acres)

Recreation Management	Alternative					
	No Action	I	II	III	IV	V
SRMA Managed for Primitive Recreation	0	53,000	0	0	31,000	0
ERMA	53,000	0	53,000	53,000	21,000	53,000

Impacts from Management Specific to the No Action Alternative and Alternatives II, III, and V

The No Action Alternative and Alternatives II, III, and V would not designate any SRMAs on non-WSA lands with wilderness characteristics; all of these areas would be managed as ERMA. Recreational activities within the ERMA such as motorized and mechanized vehicle use (e.g., ATV and motorcycle riding) and group recreational activities could decrease naturalness or the opportunities for solitude and primitive, unconfined recreation.

Impacts from Management Common to All Action Alternatives

Where wilderness characteristics are recognized and managed for, any SRP authorization would be stipulated to maintain the naturalness and opportunities for solitude and primitive, unconfined recreation.

Impacts from Management Specific to Alternative I

All seven non-WSA lands with wilderness characteristics occur within the Canyonlands and Jarbidge Foothills SRMAs (100%). These SRMAs would be managed to promote undeveloped recreational use and non-motorized recreation, such as wildlife and scenery viewing, hunting, hiking, equestrian activities, and primitive camping. As a result, management and use of these SRMAs would maintain naturalness and the opportunities for solitude and primitive, unconfined recreation within all seven areas with wilderness characteristics outside WSAs.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Four non-WSA lands with wilderness characteristics occur within the Canyonlands SRMA. As in Alternative I, the management of the Canyonlands SRMA focuses on promoting undeveloped recreational use and non-motorized recreation. This management would maintain naturalness and the opportunities for solitude and primitive, unconfined recreation in the Long Draw, Hole in the Ground, Columbet Table, and East Fork Jarbidge areas (60%). The remaining three non-WSA lands with wilderness characteristics would be managed as an ERMA (40%); although the areas would be closed to motorized vehicle use, the impacts from recreation in these areas would be the similar as those described for the No Action Alternative because mechanized vehicle use and group activities would be allowed.

Impacts from Transportation and Travel Actions

Impacts to wilderness characteristics from transportation and travel management actions can be analyzed by the presence of routes or evidence of cross-country travel, which ultimately leads to a decrease in naturalness. The use of motorized vehicles both on and off designated routes decreases opportunities for solitude. In addition, because the non-WSA lands with wilderness characteristics do not contain transportation routes, allocating these areas as limited to designated routes provides an opportunity to create new routes within these areas. Transportation management that closes areas to motorized vehicle use in non-WSA lands with wilderness characteristics is anticipated to maintain those characteristics. Table 4- 274 displays the transportation and travel allocations within non-WSA lands with wilderness characteristics.

Table 4- 274. Travel Designations within Non-WSA Lands with Wilderness Characteristics (Acres)

Allocation Type	Alternative					
	No Action	I	II	III	IV	V
Open to Cross-Country Motorized Vehicle Use	13,000	0	0	0	0	0
Limited to Designated Routes	40,000	19,000	53,000	53,000	0	0
Closed to Motorized Vehicle Use	0	34,000	0	0	53,000	53,000

Impacts from Management Specific to the No Action Alternative

The No Action Alternative would designate the seven non-WSA lands with wilderness characteristics as both open to cross-country motorized vehicle use and limited to designated routes depending on location, resources, and resource protections. The limitations within this alternative would be:

- Long Gulch, Hole-in-the-Ground, and Columbet Table areas
  - Bighorn sheep habitat – limited to designated roads and trails
  - Crucial mule deer and antelope winter range – seasonal limitations to over the snow vehicles
- East Fork Jarbidge, Black Canyon, Corral Creek, and Salmon Falls Creek areas
  - Crucial mule deer and antelope winter range – seasonal limitations to over the snow vehicles

Travel that is seasonally limited in areas with wilderness characteristics would serve to maintain the opportunities for solitude and primitive, unconfined recreation. This would, however, continue to allow motorized cross-country travel in the remainder of areas and time periods, essentially decreasing the wilderness character. The creation and designation of new routes in areas limited to designated routes would also decrease the degree of naturalness and opportunities for solitude.

Impacts from Management Specific to Alternative I

Under Alternative I, the Long Draw, Hole-in-the-Ground, Columbet Table, and East Fork Jarbidge areas would be closed to motorized vehicle use. In addition, game retrieval with motorized vehicles and motorized cross-country travel to campsites would not be allowed in these areas. These actions would maintain naturalness and opportunities for solitude and primitive, unconfined recreation in these areas.

Transportation and travel on other non-WSA lands with wilderness characteristics would be limited to designated routes and would be part of the Jarbidge Foothills TMA. The focus of the Jarbidge Foothills TMA is increasing the core habitat size for mule deer and providing opportunities for non-motorized recreation; no areas would be open to cross-country motorized vehicle use. This would be consistent with and would maintain the existing wilderness characteristics inventoried in the Black Canyon, Corral Creek, and Salmon Falls Creek areas. Game retrieval with motorized vehicles within 300 feet and motorized cross-country travel to primitive campsites within 25 feet of a designated route would be allowed in these areas. This would result in a decrease in naturalness due to alteration of vegetation and soil resources and a decrease in opportunities for solitude due to the presence of motorized vehicles, people, and camping equipment.

Impacts from Management Specific to Alternative II

Under Alternative II, transportation and travel within all seven non-WSA lands with wilderness characteristics would be limited to designated routes and would be part of the Bruneau Desert and Canyonlands TMAs; no areas would be open to cross-country motorized vehicle use. The Bruneau Desert and Canyonlands TMAs call for mitigation of impacts to resources, with the focus on facilitating resource uses; an increase in route density is expected in the Bruneau Desert TMA. This would potentially conflict with some existing wilderness characteristics, resulting in a decrease of naturalness and opportunities for solitude and primitive, unconfined recreation.

Game retrieval with motorized vehicles off designated routes and motorized cross-country travel to campsites within 100 feet of designated routes would be allowed in the seven inventoried non-WSA lands with wilderness characteristics. This would result in a decrease in naturalness due to alteration of vegetation and soil resources and a decrease in opportunities for solitude due to the presence of motorized vehicles, people, and camping equipment.

Impacts from Management Specific to Alternative III

Under Alternative III, transportation and travel within all seven non-WSA lands with wilderness characteristics would be limited to designated routes and would be part of the Jarbidge Foothills and West Side TMAs; no areas would be open to cross-country motorized vehicle use. The West Jarbidge Foothills and West Side TMAs call for mitigation of impacts to resources, with the focus on improving access and facilitating fire suppression operations and wildland fire prevention. Overall route density is not expected to change, although route locations may change and some existing routes may be improved. Designation of routes for access or suppression purposes may conflict with some existing wilderness characteristics, potentially resulting in a decrease of naturalness, and opportunities for solitude due to changed route locations and increases in motorized vehicle use.

Motorized cross-country travel to primitive campsites within 25 feet of a designated route would be allowed in all inventoried non-WSA lands with wilderness characteristics. Game retrieval with motorized vehicles would not be allowed. Impacts to the existing wilderness characteristics from these actions are not anticipated.

Impacts from Management Specific to Alternatives IV and V

Under Alternatives IV and V, the seven inventoried non-WSA lands with wilderness characteristics would be closed to motorized transportation. In addition, game retrieval with motorized vehicles and motorized cross-country travel to campsites would not be allowed in these areas. These actions would maintain the degree of naturalness and opportunities for solitude and primitive, unconfined recreation within these areas.

Impacts from Land Use Authorizations Actions

Land use authorizations include designation of ROWs and other authorizations. These designations can impact wilderness characteristics through surface-disturbing activities and the development of infrastructure and have impacts similar to those described under *Impacts from Minerals Actions*. Impacts to non-WSA lands with wilderness characteristics from land use authorizations would occur in proportion to available areas with the potential to be developed. Wilderness characteristics are expected to be maintained in areas designated for ROW avoidance or exclusion. Table 4- 275 displays available areas within non-WSA lands with wilderness characteristics that have potential to be developed for wind energy or utility lines.

Table 4- 275. Potential Utility and Wind Development Areas in Non-WSA Lands with Wilderness Characteristics (Acres)

Type of Authorization	Alternative					
	No Action	I	II	III	IV	V
Potential Wind Development Areas	14,000	1,000	17,000	1,000	0	0
Potential Utility Corridors	3,000	1,000	3,000	1,000	0	0
Potential Development Acres [A]	16,000	2,000	18,000	2,000	0	0
No Development [B]	37,000	51,000	34,000	51,000	53,000	53,000

[A] Represents area occupied by wind energy, utility lines, and both wind energy and utility lines combined.
[B] This category includes areas within ROW exclusion areas, areas within ROW avoidance areas where commercial-scale wind or utility development would not be likely to meet avoidance criteria, and areas with low potential for these types of developments based on wind resources or planned transmission lines.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative would manage the majority of the planning area as available for land use authorizations, including non-WSA lands with wilderness characteristics. The surface-disturbing activities and infrastructure associated with land use authorization developments could impact wilderness characteristics on 14,000 acres of the Corral Creek, Black Canyon, and Hole in the Ground areas. Utility development would impact 3,000 acres of the East Fork Jarbidge, Corral Creek, and Salmon Falls Creek areas. The naturalness of the areas would be impacted by the placement of transportation routes, removal or disturbance of surface vegetation, and development of man-made visual components such as wind turbines, substations, and powerlines. Opportunities for solitude would be impacted to varying degrees by the type of development. For example, due to the mechanical systems and necessity for regular operations and maintenance, a concentration of wind turbines would require more frequent human presence than a utility line. Opportunities for primitive, unconfined recreation would be impacted similar to opportunities for solitude, but may also be influenced by increases in transportation routes that might be used by motorized vehicles. Protection fences or restricted access areas associated with land use authorizations would also decrease the opportunity for these types of recreational experiences.

Overall, wilderness character may decrease on 16,000 acres, or 30%, of non-WSA lands with wilderness characteristics due to wind energy and utility development.

Impacts from Management Specific to Alternatives I and III

The surface-disturbing activities and infrastructure associated with wind energy developments could impact wilderness characteristics in 1,000 acres of the Corral Creek and Black Canyon areas. Utility development would impact 1,000 acres of the East Fork Jarbidge area. The specific impacts associated with these developments would be similar to those described in the No Action Alternative, with the much smaller spatial extent of 4% of the non-WSA lands with wilderness characteristics.

Impacts from Management Specific to Alternative II

The impacts of Alternative II on non-WSA lands with wilderness characteristics would be similar to those described for the No Action Alternative; however, with 17,000 acres potentially affected by wind energy development and 3,000 acres by utility line development, the impact footprint would be larger. Overall, wilderness character may decrease on 18,000 acres, or 37%, of non-WSA lands with wilderness characteristics due to wind energy and utility development.

Impacts from Management Specific to Alternatives IV and V

No developments or associated impacts from land use authorizations are expected in the non-WSA lands with wilderness characteristics in Alternatives IV and V because they would be managed as ROW exclusion areas.

Impacts from Minerals Actions

Exploration and development resulting from mineral leasing can impact wilderness characteristics through surface-disturbing activities, site operations, presence of noise and people, and the creation of infrastructure. Mineral development requires the use of existing roads or the creation of new routes to access mining areas as well as surface-disturbing activities and facility development to locate and extract the minerals. Impacts to wilderness characteristics would include decreases in the degree of naturalness through disturbance of vegetation communities, soil resources, and landform; decreases in the opportunities for solitude by increased operations-related activities, noise, and personnel; and decreases in opportunities for primitive, unconfined recreation through increased surface developments and access restrictions or closures. Mineral development restrictions and withdrawals would maintain or preserve wilderness characteristics. The degree of impact related to minerals is relative to the acreage available for developments.

Leasable Minerals

Surface occupancy for leasable mineral extraction would include some or all of the following developments and activities: removal of surface vegetation, alteration of landforms, construction of new or use of existing transportation routes, heavy equipment operations, presence of personnel, overhead power lines, surface piping, access restrictions and permanent structures. Impacts to naturalness, opportunities for solitude and primitive, unconfined recreation would be relative to the proportion of land that is available for surface occupancy.

The potential oil and gas areas include three non-WSA lands with wilderness characteristics: Black Canyon, Corral Creek, and Salmon Falls Creek (19,000 acres). Restrictions regarding surface occupancy vary by alternative and have different impacts accordingly. Degrees of impact are measured by the proportion of the potentially affected non-WSA lands with wilderness characteristics available for any surface occupancy (Table 4- 276). Where oil or gas leasing and development occurs, any surface occupancy would result in a decrease in the wilderness characteristics of that area. Conversely, areas that are closed or open with NSO restrictions are not anticipated to have a measurable impact to wilderness characteristics.

Table 4- 276. Impacts from Leasing Restrictions for Non-WSA Lands with Wilderness Characteristics within the Potential Oil and Gas Areas (Acres)

Impacts from Leasing Allocations for Oil and Gas	Alternative					
	No Action	I	II	III	IV	V
Impacted [A]	19,000[C]	18,000	18,000	18,000	0	0
Not Impacted [B]	34,000[C]	35,000	35,000	35,000	53,000	53,000

[A] Acres that are impacted by oil and gas allocations are those that are open or open with controlled surface use or seasonal restrictions.
[B] Acres that are not impacted by oil and gas allocations are those that are closed or open with no surface occupancy.
[C] The 1987 Jarbidge RMP had recommended mineral restrictions that were never defined spatially. Without this information, lands that would not be available for development are not clearly identifiable. Therefore, this analysis assumes that all of the non-WSA lands with wilderness characteristics in the potential oil and gas areas could have oil and gas leasing in the No Action Alternative.

None of the non-WSA lands with wilderness characteristics are located within the potential geothermal areas; therefore, wilderness characteristics in those areas are not anticipated to be affected by geothermal exploration and development.

Salable and Locatable Minerals

Salable and locatable mineral development would include some or all of the following activities: removal of surface vegetation, alteration of landforms, construction of new or use of existing transportation routes, heavy equipment operations, presence of personnel, overhead power lines, access restrictions, and permanent structures. Where these developments occur, naturalness and opportunities for solitude and primitive, unconfined recreation would be decreased. Impacts of salable and locatable mineral management are relative to the proportion of non-WSA lands with wilderness characteristics that would be available for salable and locatable mineral development (Table 4- 277).

Table 4- 277. Salable and Locatable Mineral Allocations in Non-WSA Lands with Wilderness Characteristics by Alternative (Acres)

Salable and Locatable Mineral Allocations	Alternative					
	No Action	I	II	III	IV	V
Salable Minerals						
Open	53,000 [A]	19,000	53,000	47,000	0	0
Closed	0 [A]	34,000	0	5,000	53,000	53,000
Locatable Minerals						
Open [B]	53,000 [A]	36,000	48,000	48,000	34,000	48,000
Withdrawn [B]	0 [A]	17,000	5,000	5,000	19,000	5,000

[A] The 1987 Jarbidge RMP had some recommended mineral restrictions that were never defined spatially. Without this information, lands that would not be available for salable or locatable mineral development are not clearly identifiable. Therefore, this analysis assumes that all of the non-WSA lands with wilderness characteristics could have salable or locatable mineral development.
[B] This assumes that all areas recommended for withdrawal from locatable mineral development will be withdrawn.

Impacts from Management Specific to the No Action Alternative

Management proposed in the No Action Alternative does not specify any of the non-WSA lands with wilderness characteristics for restrictions or closure to leasable mineral surface occupancy or to salable or locatable mineral development. There are some restrictions related to other resource concerns that may overlap into these areas, which potentially could reduce impacts to wilderness characteristics. However, these areas were never spatially defined. Therefore, it is assumed that 100% of non-WSA lands with wilderness characteristics would be available for leasable development within the potential oil and gas areas and 100% would be available for locatable and salable mineral development. If these areas were developed for these uses, activities resulting from leasable, locatable, or salable mineral development would result in a decrease in naturalness and opportunities for solitude and primitive, unconfined recreation.

However, according to the RFDS for oil and gas development (Appendix U), approximately 90 acres of surface disturbance are expected to occur in the planning area as a result of oil and gas exploration and development over the life of the plan. This is less than 0.1% of the potential oil and gas areas that would be available for oil and gas leasing. The acreage on which salable mineral development occurs is expected to increase from approximately 1,300 acres to approximately 2,300 acres over the life of the plan. This is approximately 0.2% of the area available for salable mineral development. Finally, demand for locatable minerals in the planning area is not expected to change from present levels; thus, the potential for impacts to occur in the life of the plan is low.

Impacts from Management Specific to Alternative I

The Black Canyon, Corral Creek, and Salmon Falls Creek areas intersect the potential oil and gas area. Impacts to naturalness and opportunities for solitude and primitive, unconfined recreation would occur on up to 93% of these three areas, as surface occupancy for oil and gas leasing would be allowed. Overall, wilderness characteristics would potentially decrease on 18,000 acres of non-WSA lands with wilderness characteristics (34%) due to oil and gas leasing. However, as in the No Action Alternative, approximately 90 acres of surface disturbance are expected to occur as a result of oil and gas exploration and development, less than 0.1% of the area available within potential oil and gas areas.

The Long Draw, Hole-in-the-Ground, Columbet Table, and East Fork Jarbidge areas would be closed to salable mineral development, while the Black Canyon, Corral Creek, and Salmon Falls Creek areas would be available for salable mineral development. This allows for a potential decrease of naturalness or opportunities for solitude on 36% of the non-WSA lands with wilderness characteristics. However, as in the No Action Alternative, salable mineral development is expected to increase from 1,300 to 2,300 acres in the life of the plan, 0.2% of the area available.

In Alternative I, 68% of non-WSA lands with wilderness characteristics would be available for locatable mineral exploration and extraction. This would decrease naturalness and opportunities for solitude and primitive, unconfined recreation where locatable mineral entry occurred. However as in the No Action

Alternative, demand for locatable minerals in the planning area is not expected to change from present levels; thus, the potential for impacts to occur in the life of the plan is low.

Impacts from Management Specific to Alternative II

Decreases in naturalness and opportunities for solitude and primitive, unconfined recreation would occur on 95% of the Black Canyon, Corral Creek, and Salmon Falls Creek areas, as surface occupancy for oil and gas leasing would be allowed. Overall, wilderness characteristics would potentially decrease on 18,000 acres of non-WSA lands with wilderness characteristics (35%) due to oil and gas leasing. However, as in the No Action Alternative, approximately 90 acres of surface disturbance are expected to occur as a result of oil and gas exploration and development, less than 0.1% of the area available within potential oil and gas areas.

All seven non-WSA lands with wilderness characteristics would be available for salable mineral development allowing for potential decreases of naturalness and opportunities for solitude on 100% of these areas. However, salable mineral development is expected to increase from 1,300 to 3,300 acres in the life of the plan, 0.2% of the area available.

Locatable mineral exploration and/or extraction would be allowed on 91% of the non-WSA lands with wilderness characteristics. Decreases in naturalness and opportunities for solitude would be expected where locatable mineral entry occurred. However as in the No Action Alternative, demand for locatable minerals in the planning area is not expected to change from present levels; thus, the potential for impacts to occur in the life of the plan is low.

Impacts from Management Specific to Alternative III

The impacts from leasable mineral management on non-WSA lands with wilderness characteristics in Alternative III would be identical to those described for Alternative II.

All seven non-WSA lands with wilderness characteristics would be available for salable mineral development, except for 5,000 acres specified for closure for reasons unrelated to wilderness characteristics. This would allow for potential decreases of naturalness and opportunities for solitude on 89% of these areas. However, as in Alternative II, salable mineral development is expected to increase from 1,300 to 3,300 acres in the life of the plan, 0.2% of the area available.

The impacts from locatable mineral management on non-WSA lands with wilderness characteristics in Alternative III would be identical to those described for Alternative II.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

All seven areas with wilderness characteristics outside WSAs would be closed to mineral leasing. As a result, oil and gas leasing could not occur on these areas, which would maintain the naturalness and opportunities for solitude, and primitive, unconfined recreation that exist in these areas.

All non-WSA lands with wilderness characteristics would be closed to salable mineral development in Alternative IV. This would maintain or enhance the naturalness, or opportunities for solitude, and primitive, unconfined recreation that exist in these areas.

Locatable mineral exploration and extraction would be allowed on 64% of the non-WSA lands with wilderness characteristics. Decreases in naturalness, and opportunities for solitude would be expected where locatable mineral entry occurred. However as in the No Action Alternative, demand for locatable minerals in the planning area is not expected to change from present levels; thus, the potential for impacts to occur in the life of the plan is low.

Impacts from Management Specific to Alternative V

The impacts from leasable and salable mineral management on non-WSA lands with wilderness characteristics in Alternative V would be identical to those described for Alternative IV. The impacts from locatable mineral management would be identical to those described for Alternative II.

Summary of Direct and Indirect Impacts

Table 4- 278 contains a summary of proposed management by alternative. Throughout this summary discussion, the referenced wilderness characteristics are only those occurring in the seven identified areas outside of WSAs on the seven identified areas, with a sum of 53,000 acres.

Table 4- 278. Non-WSA Lands with Wilderness Characteristics with Management Affecting Wilderness Characteristics by Alternative (Percent)

		Alternative					
		No Action	I	II	III	IV	V
Management for Wilderness Characteristics							
Yes		0	64	0	0	100	100
No		100	36	100	100	0	0
VRM Classes							
VRM Class I		21	32	5	5	35	5
VRM Class II		27	66	0	0	63	93
VRM Class III		29	2	1	95	2	2
VRM Class IV		23	0	94	0	0	0
Livestock Grazing Management							
Unavailable		13	14	13	13	14	40
Available		87	86	87	87	86	60
Recreation Management							
SRMA Managed for Primitive Recreation		0	100	0	0	60	0
ERMA		100	0	100	100	40	100
Transportation							
Closed to Motorized Vehicle Use		0	64	0	0	100	100
Open to Cross-Country Motorized Vehicle Use		24	0	0	0	0	0
Limited to Designated Routes		76	36	100	100	0	0
Allowed Land Use Authorizations							
Without Wind and Utility Development		70	96	65	96	100	100
Potential Wind or Utility Development		30	4	35	4	0	0
Mineral Development							
Leasable	No impacts	64	66	65	65	100	100
	Impacts	36	34	35	35	0	0
Salable	Closed	0	64	0	11	100	100
	Open	100	36	100	89	0	0
Locatable	Withdrawn	0	32	9	9	36	9
	Open	100	68	91	91	64	91
Note: Management that is anticipated to decrease naturalness and opportunities for solitude and primitive, unconfined recreation to some degree is displayed with crosshatching, while management that is anticipated to maintain or enhance these wilderness characteristics is displayed without crosshatching.							

Impacts from the No Action Alternative

The No Action Alternative ranks fifth for management that maintains wilderness characteristics on non-WSA lands. The most notable decreases in wilderness characteristics would be expected from the lack of specific management for these values, absence of transportation closures, and few or no restrictions related to land use authorizations or mineral development. The No Action Alternative would maintain some wilderness characteristics through management specified for visual resources. Management under No Action would result in major adverse impacts to non-WSA lands with wilderness characteristics.

Impacts from Alternative I

Alternative I ranks third for management that maintains wilderness characteristics on non-WSA lands. Decreases in wilderness characteristics would be expected from the lack of specific management for some of the areas inventoried to contain these values. In addition, these unmanaged non-WSA lands with wilderness characteristics would be subject to mineral development, land use authorizations, and transportation route designation that would contribute to a decline in wilderness character. However, the recreation management prescribed for this alternative would manage all of the inventoried areas for primitive recreation. This would aid in maintaining wilderness characteristics in these areas. Management under Alternative I would result in moderate adverse impacts to non-WSA lands with wilderness characteristics.

Impacts from Alternative II

Alternative II ranks sixth for management that maintains wilderness characteristics on non-WSA lands. The most notable decreases in wilderness characteristics would be expected from the lack of specific management for these values, absence of transportation closures, and few or no restrictions related to land use authorizations or mineral development. Alternative II contains no management that would indirectly maintain wilderness characteristics. Management under Alternative II would result in major adverse impacts to non-WSA lands with wilderness characteristics.

Impacts from Alternative III

Alternative III ranks fourth for management that maintains wilderness characteristics on non-WSA lands. The most notable decreases in wilderness characteristics would be expected from the lack of specific management for these values, absence of transportation closures, and few or no restrictions related to mineral development. Management actions contained in Alternative III that would aid in maintaining wilderness characteristics are the wind and utility development restrictions. Management under Alternative III would result in major adverse impacts to non-WSA lands with wilderness characteristics.

Impacts from Alternative IV (the Preferred Alternative)

Alternative IV ranks first for management that maintains wilderness characteristics on non-WSA lands. This alternative would manage for all inventoried wilderness characteristics on non-WSA lands. Decreases in wilderness characteristics would be minimal. Management under Alternative IV would result in no impact to non-WSA lands with wilderness characteristics.

Impacts from Alternative V

Alternative V ranks second for management that maintains wilderness characteristics on non-WSA lands. This alternative would for all inventoried wilderness characteristics on non-WSA lands and is similar to Alternative IV. Decreases in wilderness characteristics would be expected by the lack of management for primitive recreation and the size of the allowable area for locatable mineral development. Management specific to this alternative that would aid in the maintenance of wilderness characteristics is the increase in land unavailable for livestock grazing. Management under Alternative V would result in no impact to non-WSA lands with wilderness characteristics.

Cumulative Impacts

Past, Present, and Reasonably Foreseeable Actions

The cumulative impact analysis includes WSA lands and non-WSA lands with wilderness characteristics within and adjacent to the planning area, Forest Service inventoried roadless areas adjacent to and near the planning area, and the designated Jarbidge Wilderness in the Humboldt-Toiyabe National Forest (Table 4- 279). This is a general representation of the current regional area inventoried to have wilderness characteristics from the perspective of the users that would typically benefit from other resources or uses within the planning area.

Past, present, and reasonably foreseeable actions for the following resource cumulatively affects wilderness characteristics:

- Wilderness Characteristics

These actions are described in detail in the *Introduction* to this chapter. Of the 406,000 acres with wilderness characteristics within this region, 353,000 acres (87%) currently are managed to maintain or enhance their wilderness characteristics.

Table 4- 279. Lands Inventoried to have Wilderness Characteristics in the Region

Agency	Designation	Name	Acres	% of regional lands managed for wilderness characteristics
BLM – Bruneau, Burley, and Jarbidge Field Office	Wilderness Study Areas [A]	Jarbidge River WSA	71,000[B]	18
		Bruneau River-Sheep Creek WSA	101,000[C]	25
		Lower Salmon Falls Creek WSA	3,000[D]	<1
	Non-WSA lands with wilderness characteristics	Black Canyon	8,000	2
		Columbet Table	4,000	1
		Corral Creek	6,000	1
		East Fork Jarbidge	6,000	2
		Hole in the Ground	7,000	2
		Long Draw	17,000	4
		Salmon Falls Creek	5,000	1
USFS – Humboldt Toiyabe National Forest	Designated Wilderness [A]	Jarbidge Wilderness	160,000	39
	Inventoried Roadless Areas	Biroth Ridge	5,000	1
		Elk Mountain	9,000	2
		Wilson Creek	5,000	1
Regional acres inventoried to have wilderness character			**407,000**	**100**

[A] These lands are currently being managed specifically to maintain the wilderness characteristics.
[B] 7,000 acres of the Jarbidge River WSA are part of the BLM Bruneau Field Office.
[C] 73,000 acres of the Bruneau River-Sheep Creek WSA are part of the BLM Bruneau Field Office.
[D] 2,000 acres of the Lower Salmon Falls Creek WSA are part of the BLM Burley Field Office.

Decisions that would continue to maintain or enhance wilderness characteristics would not increase overall wilderness acreage, but would rather maintain these lands and associated character as they currently exist. Decisions that would place resource use management actions over the management of existing wilderness characteristics would lead to a decrease in overall regional acreage that support wilderness character.

Summary of Cumulative Impacts

Table 4- 280 displays the cumulative impacts on wilderness characteristics of the management proposed within the alternatives for non-WSA lands with wilderness characteristics.

Cumulative Impacts from the No Action Alternative and Alternatives II and III

Not managing the seven inventoried non-WSA lands with wilderness characteristics for those characteristics would allow activities and to occur in these areas that could result in the reduction of acres with wilderness character. Increased use of motorized vehicles due to both a continuing growth in population and a continuing popularity and developing technology in motorized recreational off-road vehicles will continue. A decrease in opportunities for solitude would occur with increases in noise and human encounters. A decrease in naturalness would also occur with establishment or designation of roads and trails in Alternatives II and III and with disturbances to vegetation and soil resources by cross-country travel in the No Action Alternative. These actions would result in an overall reduction in the regional acres with wilderness characteristics.

Table 4- 280. Areas with Direct Management for Wilderness Characteristics in the Region (Acres)

Name	Alternative					
	No Action	I	II	III	IV	V
Jarbidge River WSA	71,000	71,000	71,000	71,000	71,000	71,000
Bruneau River-Sheep Creek WSA	101,000	101,000	101,000	101,000	101,000	101,000
Lower Salmon Falls Creek WSA	3,000	3,000	3,000	3,000	3,000	3,000
Black Canyon	N/A	N/A	N/A	N/A	8,000	8,000
Columbet Table	N/A	4,000	N/A	N/A	4,000	4,000
Corral Creek	N/A	N/A	N/A	N/A	6,000	6,000
East Fork Jarbidge	N/A	6,000	N/A	N/A	6,000	6,000
Hole in the Ground	N/A	7,000	N/A	N/A	7,000	7,000
Long Draw	N/A	17,000	N/A	N/A	17,000	17,000
Salmon Falls Creek	N/A	N/A	N/A	N/A	5,000	5,000
Jarbidge Wilderness (FS)	160,000	160,000	160,000	160,000	160,000	160,000
Biroth Ridge IRA (FS)	5,000	5,000	5,000	5,000	5,000	5,000
Elk Mountain IRA (FS)	9,000	9,000	9,000	9,000	9,000	9,000
Wilson Creek IRA (FS)	5,000	5,000	5,000	5,000	5,000	5,000
Total	**354,000**	**388,000**	**354,000**	**354,000**	**407,000**	**407,000**

Overall, selection of one of these three alternatives would result in 87% of the areas with wilderness characteristics within this region being managed to maintain those characteristics. As a result, naturalness and opportunities for solitude and primitive, unconfined recreation in the remaining 13% would likely decrease.

Cumulative Impacts from Alternative I

Alternative I would manage four of the seven inventoried non-WSA lands with wilderness characteristics to maintain those characteristics. This would add a level of protective management to 39,000 acres determined to have naturalness and opportunities for solitude and primitive, unconfined recreation that are not currently managed for those values.

Overall, selection of Alternative I would result in 95% of the areas with wilderness characteristics within this region being managed to maintain those characteristics, 8% more than in the No Action Alternative or in Alternatives II or III. Naturalness and opportunities for solitude and primitive, unconfined recreation in the remaining 5% would likely decrease.

Cumulative Impacts from Alternative IV (the Preferred Alternative) and V

Alternatives IV and V would manage the seven inventoried non-WSA lands with wilderness characteristics to maintain those characteristics. This would add a level of protective management to 53,000 acres determined to have a high degree of naturalness and opportunities for solitude and primitive, unconfined recreation that are not currently managed for those values.

Overall, selection of either of these alternatives would result in 100% of the areas with wilderness characteristics within this region being managed to maintain those characteristics, 13% more than in the No Action Alternative and Alternatives II and III and 5% more than in Alternative I.

4.4. RESOURCE USES

4.4.1. Livestock Grazing

Analysis Methods

Indicators

The following indicators were used for the analysis of impacts to livestock grazing:

- **Availability of forage for livestock grazing** – FLPMA identifies one of the outcomes of public lands management as providing food for domestic animals (Section 102(8)) and recognizes domestic livestock grazing as a principal or major use of public lands (Section 103(l)). There are multiple aspects of availability of forage (i.e., food) for livestock that can be affected by management contained within the alternatives. For example, the amount of vegetation allocated for use by livestock affects *how much* forage is available for livestock; allocation of areas available or unavailable for livestock grazing affects *where* forage is available; and restrictions on season of use or rest following wildland fire or vegetation treatments affect *when* forage is available. In this analysis, the assessment of impacts addresses all of these aspects of forage availability.

- **Restrictions on infrastructure for livestock management** – Range infrastructure includes fences, water developments, and other associated infrastructure. Typically, range infrastructure is installed to enhance or improve livestock grazing management and reduce conflicts with resources by controlling livestock movement and the timing and duration of grazing periods. Restrictions on infrastructure would make managing livestock to meet the terms and conditions of a permit more difficult and potentially more costly.

- **Effort needed to reduce resource and use conflicts** – Administering grazing within a grazing permit can require additional effort if conflicts arise between grazing and other resources or uses. For example, livestock grazing in special status species habitat may require additional measures in order to mitigate impacts to that habitat.

Methods and Assumptions

Impacts to livestock grazing from management in the following sections of Chapter 2 were analyzed in detail: *Livestock Grazing*, *Vegetation Communities* (including *Upland Vegetation* and *Riparian Areas and Wetlands*), *Special Status Species*, *Wildland Fire Ecology and Management*, *Wild Horses*, *Transportation and Travel*, *Land Use Authorizations*, *Leasable Minerals*, and *Areas of Critical Environmental Concern*. Impacts from management in the *Noxious Weeds and Invasive Plants* section were not analyzed in detail because the impacts were captured in the analysis of upland vegetation actions. Impacts from management in the remaining sections were not analyzed in detail because the management did not impact livestock grazing. **Impacts from management for livestock grazing** can be found under *Impacts from Livestock Grazing Management* in the *Climate Change*, *Soil Resources*, *Water Resources*, *Upland Vegetation*, *Riparian Areas and Wetlands*, *Fish*, *Wildlife*, *Special Status Plants*, *Special Status Fish and Aquatic Invertebrates*, *Special Status Wildlife*, *Noxious Weeds and Invasive Plants*, *Wildland Fire Ecology and Management*, *Wild Horses*, *Cultural Resources*, *Non-WSA Lands with Wilderness Characteristics*, *National Historic Trails*, *Social Conditions*, and *Economic Conditions* sections.

The amount of forage available for livestock grazing is given in animal unit months (AUMs). An AUM is the amount of forage that a cow and her calf would consume during a 30-day period and is defined as 800 pounds of air-dried forage. Each action alternative would allocate areas available for livestock grazing and a percent of vegetation production in the planning area for livestock. Vegetation allocations prescribed in Chapter 2 are allocated for the life of the plan. AUMs available for livestock at initial implementation of the plan were calculated for each action alternative based on the vegetation allocation, areas available for livestock grazing for that alternative, and the 2006 vegetation production data, the most recent year for which production data are available. Calculations of AUMs available at full implementation of the plan for each action alternative were based on the vegetation composition of the planning area if the alternative's vegetation treatment objectives are achieved. These AUM calculations are provided solely for analysis purposes. The actual number of AUMs allowed will be determined for each allotment during the permit renewal process (Appendix L) and may vary from year to year depending on weather patterns and forage conditions (Appendix F). The availability of Temporary Non-Renewable Authorizations (TNR) of AUMs is determined on a yearly basis depending upon production of grasses and would be analyzed in an allotment-level analysis.

The following assumptions were made when analyzing impacts to livestock grazing:

- Livestock grazing is and would continue to be managed in accordance with *Standards for Rangeland Health* (43 CFR Subpart 4180.1).
- Changes in resource condition would be identified through monitoring according to current BLM protocols.
- Livestock management changes would be made on an allotment- or pasture-specific basis to achieve resource objectives.
- Construction, use, and maintenance of range infrastructure (e.g., fences, pipelines, wells, troughs, and reservoirs) would result in localized loss of vegetation cover throughout the life of the infrastructure.
- Range infrastructure would continue to be used as a tool to meet or make progress toward meeting *Standards for Rangeland Health*.
- Cattle and sheep are the primary livestock considered under livestock grazing. Although some areas are more suitable for different kinds and classes of livestock, impacts of livestock use are considered to be similar regardless of kind or class and will not be discussed separately in this analysis.
- Areas where domestic sheep grazing conflicts with bighorn sheep are discussed separately in the *Special Status Wildlife* section.
- Seasonal and yearly fluctuations in forage can result in adjusting authorized livestock AUMs on a yearly basis.
- Fire is an episodic event and can result in short-term reduction in available AUMs. On average through the life of the plan, locations identified as Critical Suppression Areas would be less likely to burn and fire size and intensity/severity would be smaller than for Conditional Suppression Areas.
- All vegetation treatments prescribed to meet resource (e.g., upland vegetation, special status species, and wildland fire ecology and management) objectives would be successful.
- Permitted AUMs allocated to livestock grazing would be determined on an allotment-specific basis and reflect the impacts of the following:
  - Acres available or unavailable for grazing (e.g., reference areas, ACEC),
  - Percent of vegetation production types allocated for livestock, and
  - Acres of VSGs (e.g., perennial vs. annual, native vs. non-native, shrub over-story).

Direct and Indirect Impacts

Impacts from Livestock Grazing Actions

Forage availability can be influenced by the acres available to livestock grazing, allocation of vegetation production, the type of vegetation, and season of use. When allocating forage, priority is given to watershed, wildlife, wild horses, and livestock, in that order. For the action alternatives, the AUMs available for livestock grazing at the planning area scale depend on three factors: how much area is available for livestock grazing, the percent of each vegetation type allocated for livestock, and the amount of each vegetation type available on the ground. AUMs would typically increase if more areas are allocated for grazing, a higher percent of a vegetation type is allocated for livestock, or the amount of more productive vegetation types increases. Table 4- 281 display the acres available and AUMs available for livestock grazing for each alternative.

Table 4- 281. Acres and Forage Available for Livestock Grazing by Alternative

	Alternative						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
Acres Available [A]	1,414,000	1,381,000	1,406,000	1,404,000	1,320,000	1,352,000	1,156,000
AUMs at Initial Implementation of the Plan [B]	200,000	194,000-267,000	352,000-427,000	279,000-352,000	100,000-156,000	103,000-161,000	50,000-100,000

[A] Acres include the portions of the Saylor Creek Range managed by BLM for livestock grazing.
[B] For Alternatives I through V, AUMs at initial implementation of the plan reflect the number of AUMs that would be available for livestock based on the vegetation allocation and the areas available for livestock grazing, combined with the 2006 vegetation production data, the most recent year for which production data are available. The AUMs used in the analysis for Alternatives I through V are provided solely to assist the reader in comparing the effects of the alternatives and should not be construed to confine or redefine the management contained within those alternatives.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative would make 1,414,000 acres available for livestock grazing, more acres than any other alternative (Table 4- 281). The majority of the acres unavailable for grazing in the No Action Alternative are not in an allotment. The No Action Alternative would initially allocate approximately 200,000 AUMs to livestock grazing (Table 4- 281). This alternative would allocate more vegetation than Alternatives IV and V, but fewer AUMs than Alternatives I, II, and III.

Reserve Common Allotments would not be established in the No Action Alternative. This would not affect forage availability on a regular basis, compared with alternatives that provide for Reserve Common Allotments; however, in times of need, forage from the creation of these allotments would not be available.

The No Action Alternative does not place restrictions on livestock grazing on the 615,000 acres of winter range available to livestock grazing. This would maintain forage availability in those areas.

The following actions could result in a reduction in forage availability because they would involve allotment-specific adjustments of the timing and amount of forage availability:

- Incorporating of forage or cover requirements specific to areas of primary wildlife use.
- Adjusting livestock season of use in MUAs 10, 15, and 16 to resolve conflicts on mule deer, pronghorn, and bighorn sheep ranges.

The following actions could result in restrictions on infrastructure for livestock grazing:

- Fencing reservoirs and proving water for livestock away from reservoirs where possible and needed by wildlife.
- Considering wildlife habitat needs when determining reservoir size.
- Designing new spring developments and modifying selected existing spring developments to protect wetted areas.
- Modifying fences to allow for pronghorn and mule deer passage in areas where their needs are not being met in MUAs 7, 11, 12, 13, and 16.
- Modifying other fences where specific wildlife needs are not being met.
- Building new fences to allow for wildlife passage.

The following actions could result in an increase in effort required to reduce resource and use conflicts with livestock grazing:

- Not allowing livestock-related activities to occur within the riparian area of a stream drainage system.

Impacts from Management Common to All Action Alternatives

Allowing spring and early summer livestock grazing in big game winter range periodically could increase forage availability in the action alternatives. Drought measurement guidelines in the action alternatives could result in a reduction of forage availability during times of drought compared to the No Action Alternative.

Restrictions would be placed on infrastructure for livestock grazing with regard to the IMP, ARMS, and the application of BLM-approved design features and construction and maintenance practices.

The following actions could result in an increase in effort required to reduce resource and use conflicts with livestock grazing:

- Identifying and implementing measures to prevent livestock from entering areas closed to livestock grazing.
- Managing livestock stream crossing so the crossing is perpendicular to the riparian area and ensuring livestock do not remain in the riparian area before or after the crossing.
- Minimizing disturbance at developed springs and improve wildlife habitat around reservoirs.

Impacts from Management Specific to Alternative I

Under Alternative I, the acres available for livestock grazing would decrease compared to the No Action Alternative to 1,381,000 acres (Table 4- 281). The majority of the acres unavailable for grazing in Alternative I are not in allotments or would be Wildlife Tracts. Alternative I would initially allocate between 194,000 and 267,000 AUMs to livestock grazing, an amount similar to the No Action Alternative (Table 4-281).

Reserve Common Allotments would not be established, with impacts similar to those described for the No Action Alternative.

The use of TNR in Alternative I would increase forage availability. Along with Alternative III, Alternative I would allow TNR on fewer acres initially than Alternative II, but more acres than Alternatives IV and V. As Alternative I vegetation treatments are implemented, the pastures available for TNR may change, and the overall number of pastures available may decrease.

Livestock grazing may be allowed in the winter on the 604,000 acres of big game winter range available to livestock grazing in Alternative I. When allowed, this would maintain forage availability.

Decreases in the availability of forage could result from the following actions. The degree of decrease would be allotment-specific and determined during plan implementation.

- Providing a variety of residual cover heights to meet the needs of ground-nesting birds.
- Providing adequate cover for big game species during calving, fawning, and lambing.
- Adjusting seasons of use in the Bruneau-Jarbidge ACEC so they do not overlap bighorn sheep breeding and winter periods.

Alternative I would contain restrictions on new and existing spring developments, locations of livestock watering facilities and salting/supplements in upland game bird habitat, and new water developments in sage-grouse habitat. This would result in an increase in infrastructure restrictions compared to the No Action Alternative.

Impacts from Management Specific to Alternative II

Under Alternative II, 1,406,000 acres would be available for livestock grazing, slightly fewer than in the No Action Alternative (Table 4- 281). The majority of the acres unavailable for grazing in Alternative II are not in allotments. Alternative II would initially allocate between 352,000 and 427,000 AUMs to livestock grazing (Table 4- 281). These two actions would likely lead to higher forage availability than in the other alternatives. Relative to the other alternatives, a large portion of the annual grass production would be allocated for livestock grazing. Because of the unpredictable nature of production of annual grasses (Vallentine & Stevens, 1994), an allocation of annual grasses at this level may result in wide fluctuations in yearly authorizations, making it difficult to manage stable livestock operations.

Reserve Common Allotments would be established in Alternative II to facilitate vegetation treatment projects and provide increased livestock grazing flexibility. Reserve Common Allotments would be established in allotments where permits are relinquished, sold, or cancelled, which would not result in a decrease of forage availability for allotments with active permits. If permits were acquired for Reserve Common Allotments, overall forage availability in the planning area may be lower on a yearly basis because use of the Reserve Common Allotments may vary; however, this decrease would not affect active permits. The effects of loss of forage due to wildland fire, vegetation treatment projects, or insect outbreaks would be mitigated by providing forage in Reserve Common Allotments.

The use of TNR in Alternative II would increase forage availability. Alternative II would allow TNR on more acres than the other action alternatives. The pastures available for TNR would not change as Alternative II vegetation treatments are implemented since vegetation composition would not be a criterion for TNR.

There would be no date restrictions for livestock grazing on the 610,000 acres of big game winter range available to livestock grazing in Alternative II. This would maintain forage availability in those areas.

Decreases in the availability of forage could result from managing grazing to provide a variety of residual cover heights to meet the needs of ground-nesting birds. The degree of decrease would be allotment-specific and determined during plan implementation.

Alternative II would contain restrictions on new and existing spring developments; locations of livestock watering facilities, salting/supplements, and holding facilities in areas with cultural resources conflicts; and new water developments in sage-grouse habitat. This would result in an increase in infrastructure restrictions compared to the No Action Alternative.

Impacts from Management Specific to Alternative III

Under Alternative III, 1,404,000 acres would be available for livestock grazing, slightly fewer than in the No Action Alternative and Alternative II (Table 4- 281). The majority of the acres unavailable for grazing in Alternative III are not in allotments. Alternative III would initially allocate between 279,000 and 352,000 AUMs to livestock grazing (Table 4- 281). With the exception of Alternative II, these management actions in Alternative III would likely lead to higher forage availability than the other alternatives. Similar to Alternative II, a large portion of the production of annual grasses would be allocated for livestock grazing. Because of the unpredictable nature of annual grass production, an allocation of annual grasses at this level may result in wide fluctuations in yearly authorizations, making it difficult to manage stable livestock operations.

This increase in forage availability in Alternative III would be a part of fuels reduction efforts. The short-term increase in forage availability is captured in the initial allocation. This action may also increase forage availability in the long term by reducing the risk of fire.

Reserve Common Allotments would be established in Alternative III to facilitate vegetation treatment projects and provide increased livestock grazing flexibility. Impacts would be the same as described for Alternative II.

The use of TNR in Alternative I would increase forage availability. Along with Alternative I, Alternative III would allow TNR on fewer acres than Alternative II, but more acres than Alternatives IV and V. As Alternative III vegetation treatments are implemented, the pastures available for TNR may change, but the overall number of pastures available would likely remain constant.

Livestock grazing may be allowed in the winter on the 609,000 acres of big game winter range available to livestock grazing in Alternative III. When allowed, this would maintain forage availability.

Decreases in the availability of forage could result from the following actions. The degree of decrease would be allotment-specific and determined during plan implementation.

- Managing grazing to provide a variety of residual cover heights to meet the needs of ground-nesting birds.
- Adjusting livestock grazing south of Sheep Creek so seasons of use would not overlap bighorn sheep breeding and winter periods in pastures that contain bighorn sheep habitat.

In order to meet resource objectives or aid in fire suppression, new pipelines could be installed and existing reservoirs and wells could be maintained. By using this infrastructure to aid in fire suppression, restrictions on location and other restrictions may be reduced.

Pasture and allotment boundaries may be modified to facilitate the use of permitted livestock grazing to achieve fuels reduction objectives; these modifications may be inefficient for livestock management. Alternative III would contain restrictions on new and existing spring developments; the location of new livestock watering facilities, salting/supplements, and holding facilities with regard to canyon rims, playas, protective trail corridors, and areas with cultural resource conflicts; and new and existing watering facilities and salting/supplements in sage-grouse habitat.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Under Alternatives IV-A and IV-B (the Preferred Alternative), 1,320,000 and 1,352,000 acres would be available for livestock grazing, respectively (Table 4- 281). This is fewer acres than in the other alternatives, with the exception of Alternative V. The majority of the acres unavailable for grazing in Alternative IV are in the Inside Desert ACEC or not in allotments. In Alternative IV-A, between 100,000 and 156,000 AUMs would be initially allocated to livestock grazing. In Alternative IV-B, between 103,000 and 161,000 AUMs would be initially allocated to livestock grazing (Table 4- 281). This is the lowest allocation of the alternatives, with the exception of Alternative V.

Reserve Common Allotments would be established in Alternative IV to facilitate vegetation treatment projects and provide increased livestock grazing flexibility. Impacts would be the same as described for Alternative II.

The use of TNR in Alternative I would increase forage availability; however TNR would be allowed in fewer acres than in the other alternatives, with the exception of Alternative V which does not allow TNR. As Alternative IV vegetation treatments are implemented, the pastures available for TNR would likely change, and the overall number of pastures available would likely decrease.

Livestock grazing may be allowed in the winter on the 590,000 acres of big game winter range available to livestock grazing in Alternative IV. When allowed, this would maintain forage availability.

Decreases in the availability of forage could result from the following actions. The degree of decrease would be allotment-specific and determined during plan implementation.

- Providing a variety of residual cover heights to meet the needs of ground-nesting birds.
- Providing adequate cover for big game species during calving, fawning, and lambing.

Alternative IV would contain restrictions on new pipelines; new and existing spring developments; the location of new livestock watering facilities, salting/supplements, and holding facilities with regard to canyon rims, playas, protective trail corridors, and areas with cultural resource conflicts; existing watering facilities and salting/supplements in sage-grouse and upland game bird habitat; and new water developments in sage-grouse habitat.

Impacts from Management Specific to Alternative V

Under Alternative V, 1,156,000 acres would be available for livestock grazing (Table 4- 281). This is the fewest acres available to livestock grazing of any of the alternatives. The majority of the acres unavailable for grazing in Alternative V are in reference areas, in the Brown’s Bench/China Mountain area, or not in allotments. Alternative V would initially allocate between 50,000 and 100,000 AUMS to livestock grazing (Table 4- 281), less than in the other alternatives.

Reserve Common Allotments would not be established, with impacts similar to those described for the No Action Alternative. Additionally, relinquished, sold, or cancelled permits would be held for the life of the plan for wildlife habitat and watershed protection, reducing forage availability over the long term.

TNR would not be available, reducing forage availability.

Livestock grazing would not be allowed in the winter on the 500,000 acres of big game winter range available to livestock grazing in Alternative V. This would reduce forage availability for livestock in the winter.

Decreases in the availability of forage could result from the following actions. The degree of decrease would be allotment-specific and determined during plan implementation.

- Providing a variety of residual cover heights to meet the needs of ground-nesting birds.
- Adjusting livestock grazing so seasons of use do not overland bighorn sheep breeding and winter periods in pastures that contain bighorn sheep habitat.

Restrictions on infrastructure in Alternative V would be more than in any of the other alternatives as new pipelines and spring developments would not be authorized. Restrictions would apply to existing spring developments; the location of new livestock water facilities, salting/supplements, and holding facilities with regard to canyon rims, playas, protective trail corridors, and areas with cultural resource conflicts; existing watering facilities and salting/supplements in sage-grouse and upland game bird habitat; and new water developments in sage-grouse habitat.

Impacts from Vegetation Communities Actions

The success of management actions in maintaining healthy vegetation communities affects productivity and the ability of the plant community to resist invasive plants. This directly influences the amount of vegetation available to be allocated for livestock grazing. Management actions prescribed by alternatives would result in changes in the relative composition of VSGs within VMAs. Changes in plant communities from grasslands to shrub-dominated communities (e.g., from Non-Native Perennial to Non-Native Understory VSGs or from Native Grassland to Native Shrubland VSGs) would reduce the amount of grass production through competition for limited resources between shrubs and herbaceous species, while production from shrubs would increase. Changes from non-native perennial grasslands to native grasslands may also reduce total vegetation production, which would affect the availability of forage for livestock. Non-native and native perennial grasses provide a stable vegetation base because their yearly productivity is less likely to fluctuate with precipitation. In contrast, forage availability in areas dominated by annual grasslands is largely dependent upon the amount and timing of precipitation, resulting in wide ranges of production from year to year and making the availability of the forage unpredictable. As a result, management that reduces the amount of Annual VSG would tend to stabilize forage available for livestock.

As of 2006, all VSGs in the planning area contained at least some of each type of vegetation (e.g., the Native Shrubland VSG also contained small amounts of annual and non-native perennial grasses). Shifts in VSGs will result in shifts in the amount of each vegetation type and, therefore, shifts in the total amount of vegetation produced in that area; these changes would result in changes to the amount of vegetation available for allocation and therefore the AUMs available for livestock grazing (Table 4- 282).

Management actions for vegetation communities interact with management actions for livestock grazing with regard to utilization. Changes from non-native to native plant communities affect forage availability by decreasing allocation of vegetation to livestock and changing seasons of use and grazing use criteria. For example, an area that shifts from a community dominated by non-native species to a community dominated by native species would be subject to any management specific to native communities and vice versa (e.g., seasons of use and utilization).

Other vegetation management actions, such as management for biological soil crusts, reference areas, or riparian areas and wetlands, also affect components of livestock grazing. The effects of these actions on the indicators are discussed below.

Table 4- 282. Change in Forage Available for Livestock Grazing Due to Vegetation Treatments by Alternative (AUMs)

Timeframe	Alternative						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
At Initial Plan Implementation [A]	200,000	194,000-267,000	352,000-427,000	279,000-352,000	100,000-156,000	103,000-161,000	50,000-100,000
Following Vegetation Treatments [B]	160,000-260,000	196,000-269,000	394,000-479,000	302,000-382,000	89,000-141,000	92,000-145,000	49,000-98,000
Change in AUMs at Full Plan Implementation	**-40,000 to +60,000**	**+2,000**	**+42,000 to +52,000**	**+23,000 to +30,000**	**-11,000 to -15,000**	**-11,000 to -16,000**	**-1,000 to -2,000**

[A] For Alternatives I through V, AUMs at initial implementation of the plan reflect the number of AUMs that would be available for livestock based on the vegetation allocation and the areas available for livestock grazing, combined with the 2006 vegetation production data, the most recent year for which production data are available. The AUMs used in the analysis for Alternatives I through V are provided solely to assist the reader in comparing the effects of the alternatives and should not be construed to confine or redefine the management contained within those alternatives.
[B] For Alternatives I through V, AUMs following vegetation treatments reflect the number of AUMs that would be available for livestock if the alternative's vegetation treatment objectives are achieved. For the No Action Alternative, this number reflects the total range within which AUMs can vary in the No Action Alternative.

Impacts from Management Specific to the No Action Alternative

Vegetation treatment actions described in the No Action Alternative were primarily designed to stabilize soils and increase livestock forage. Actions included in the No Action Alternative would maintain vegetation in the planning area in the current state. The overall effect would be an increase in the relative proportion of non-native perennial communities through conversion of annual communities and removal of shrubs in non-native understory communities. As a result, total vegetation production would increase, which may increase AUMs allocated for livestock at the allotment-specific level. However, the range of AUMs available for livestock is prescribed by the alternative.

The No Action Alternative would identify riparian and watershed function as a high priority with guidance to manage activities to achieve riparian and watershed objectives. This may include periodic rest and closure of riparian areas, which would reduce forage availability in those areas by making them unavailable for livestock grazing until objectives have been met.

Impacts from Management Common to All Action Alternatives

Management actions common to all action alternatives provide guidance for protecting existing vegetation and newly treated areas. Guidance for allocation and uses of vegetation, particularly during vulnerable periods such as growing seasons, drought, or seeding establishment, would enhance long-term sustainability of the forage base. These actions would result in temporary, short-term reductions in forage availability during and immediately after treatment until objectives have been achieved. Over the long term, vegetation actions are expected to increase the stability of the forage base.

RCAs would be created around riparian areas and wetlands containing special status species or their habitat to support the achievement of riparian and water quality objectives. Management actions to achieve RCA objectives would affect forage availability by limiting areas available to grazing and increasing restrictions on season of use; restrictions on placement of infrastructure would also be increased within RCAs (Appendix D). The type and intensity of these effects would be site-specific, but are expected to be spatially limited to RCAs within pastures and allotments. Exclusion of livestock from riparian areas may indirectly make forage within larger portions of pastures or allotments unavailable to grazing by limiting livestock access to water.

Impacts from Management Specific to Alternative I

In Alternative I, the overall effect of vegetation treatments would be to increase the relative proportion of native shrubland as compared to post-Murphy Complex Fire conditions, primarily through treatment of annual and native grassland communities and, to a lesser extent, through treatment of non-native perennial and non-native understory communities (see *Upland Vegetation* for further details). Alternative I would result in more acres of native plant communities than the No Action Alternative and Alternatives II, III, and V, but fewer acres than Alternative IV. These areas would be subject to changes in seasons of use and grazing use criteria appropriate to native plant communities. When compared to the vegetation production present in 2006,[11] these would result in a negligible increase in AUMs available for livestock (Table 4- 282).

Seventy-five ungrazed upland reference areas (approximately 160 acres each; 12,000 acres total) and ten ungrazed riparian reference areas (3,000 acres total) would be created to evaluate vegetation response to exclusion from livestock grazing. These ungrazed acres are accounted for under *Impacts from Livestock Grazing Actions*. Where practical, reference areas would be located to take advantage of existing fences or natural barriers in order to minimize the need for additional new fences. Even so, reference areas would increase the miles of fence present across the planning area, increasing the cost of maintenance and operation and the effort needed to reduce resource conflicts. Riparian reference areas would decrease access to water and, therefore, to forage in riparian areas, shifting livestock use out of riparian areas and into uplands.

Management to maintain and enhance biological soil crusts in Native Shrubland and Native Grassland VSGs could restrict forage availability, through changes in season of use, stocking rates, and placement of infrastructure; the type and intensity of these effects would be site-specific depending upon soil and vegetation, but would be limited to areas with native shrubland or native grassland communities.

Under Alternative I, 85 miles of streams would be maintained at PFC, 60 miles would be managed to achieve PFC, and 80 miles would move toward PFC. The tools used to help achieve these objectives may result in effects to forage availability through modification or elimination of land uses (e.g., changes to season of use and utilization), closure of pastures, and exclosure fencing at the allotment and pasture scale, but would have limited effects across the planning area. In addition, the removal or modification of water developments and the use of active herding would increase the amount of effort needed to reduce these conflicts. The duration and intensity of these effects would be specific to the location and condition of particular stream reaches.

Impacts from Management Specific to Alternative II

In Alternative II, the overall effect of vegetation treatments would be to increase the relative proportion of non-native perennial communities as compared to post-Murphy Complex Fire conditions, primarily through treatment of annual communities and, to a lesser extent, through treatment of non-native understory communities (see the *Upland Vegetation* section). Alternative II would result in a similar number of acres of native plant communities as the No Action Alternative and Alternative III, but fewer acres than the Alternatives I, IV, and V. These areas would be subject to changes in season of use and grazing use criteria appropriate to native plant communities. When compared to the vegetation production present in 2006,[12] these treatments would result in a major increase in AUMs available for livestock (Table 4- 282).

Fifty-two ungrazed upland reference areas (approximately 40 acres each; 2,000 acres total) and ten ungrazed riparian reference areas (1,000 acres total) would be created to evaluate vegetation response to exclusion from livestock grazing. These ungrazed acres are accounted for under *Impacts from Livestock Grazing Actions*. Where practical, reference areas are located to take advantage of existing fences or natural barriers in order to minimize the need for additional new fences. While reference areas would increase the miles of fence present across the planning area, increasing the cost of maintenance and operation and the effort needed to reduce resource conflicts, this alternative would require a minimum amount of effort due to the small number of acres involved. The impacts from riparian reference areas would be the same as described for Alternative I.

[11] The most recent year for which vegetation production data are available.
[12] The most recent year for which vegetation production data are available.

There is no management direction related to biological soil crusts in Alternative II. Thus, this alternative would require less effort to reduce conflicts between livestock and biological soil crusts than Alternatives I, IV, and V

Under Alternative II, 85 miles of streams would be maintained at PFC and 140 miles managed to move toward PFC. The tools used to help achieve these objectives may result in effects to forage availability through modification or elimination of land uses (e.g., changes to season of use and utilization) and exclosure fencing at the allotment and pasture scale, but would have limited effects across the planning area. In addition, modification of water developments and the use of active herding would increase the amount of effort needed to reduce these conflicts. The duration and intensity of these effects would be specific to the location and condition of particular stream reaches.

Impacts from Management Specific to Alternative III

In Alternative III, the overall effect of vegetation treatments would be reduce the amount and continuity of fine fuels throughout the planning area, as compared to post-Murphy Complex Fire conditions (see the *Upland Vegetation* section). Alternative III would result in a similar number of acres of native plant communities as the No Action Alternative and Alternative II, but fewer acres than Alternatives I, IV, and V. These areas would be subject to changes in season of use and grazing use criteria appropriate to native plant communities. When compared to the vegetation production present in 2006,[13] this would result in a moderate increase in AUMs available for livestock (Table 4- 282).

Seventy-five ungrazed upland reference areas (approximately 40 acres each; 3,000 acres total) and ten ungrazed riparian reference areas (1,000 acres total) would be created to evaluate vegetation response to exclusion from livestock grazing. The impacts from these reference areas would be the same as described for Alternative II.

There is no management direction related to biological soil crusts in Alternative III. Thus, this alternative would require less effort to reduce conflicts between livestock and biological soil crusts than Alternatives I, IV, and V

Under Alternative III, 85 miles of streams would be maintained at PFC, 98 miles would be managed to achieve PFC, and 42 miles managed to move toward PFC. The tools used to help achieve these objectives may result in effects to forage availability through modification or elimination of land uses (e.g., changes to season of use and utilization), closing pastures, and exclosure fencing at the allotment and pasture scale, but would have limited effects across the planning area. In addition, modification of water developments and the use of active herding would increase the amount of effort needed to reduce these conflicts. The duration and intensity of these effects would be specific to the location and condition of particular stream reaches.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

In Alternative IV, the overall effect of vegetation treatments would be to create a landscape dominated by connected native shrubland vegetation, as compared to post-Murphy Complex Fire conditions (see the *Upland Vegetation* section). Alternative IV would result in more acres of native plant communities than any of the other alternatives. These areas would be subject to changes in season of use and grazing use criteria appropriate to native plant communities. When compared to the vegetation production present in 2006,[14] this would result in a moderate decrease in AUMs available for livestock (Table 4- 282).

Seventy-five ungrazed reference areas (approximately 160 acres each, 12,000 acres total) and ten ungrazed riparian reference areas (3,000 acres total) would be created to evaluate vegetation response to exclusion from livestock grazing. The impacts from these areas would be the same as described for Alternative I.

Impacts from management for biological soil crusts would be the same as described for Alternative I.

[13] The most recent year for which vegetation production data are available.
[14] The most recent year for which vegetation production data are available.

Under Alternative IV, 85 miles of streams would be maintained at PFC, 98 miles would be managed to achieve PFC, and 42 miles managed to move toward PFC. The tools used to help achieve these objectives may result in effects to forage availability through modification or elimination of land uses (e.g., changes to season of use and utilization), closing pastures, and exclosure fencing at the allotment and pasture scale, but would have limited effects across the planning area. In addition, the removal or modification of water developments and the use of active herding would increase the amount of effort needed to reduce these conflicts. The duration and intensity of these effects would be specific to the location and condition of particular stream reaches.

Impacts from Management Specific to Alternative V

In Alternative V, the overall effect of vegetation treatments would be to increase the amount and continuity of communities dominated by shrubs within the planning area, as compared to post-Murphy Complex Fire conditions, through conversion of annual, non-native perennial, and native grassland communities (see the *Upland Vegetation* section). Alternative V would result in more acres of native plant communities than the No Action Alternative and Alternatives II and III, but fewer acres than Alternatives I and IV. These areas would be subject to changes in season of use and grazing use criteria appropriate to native plant communities. When compared to the vegetation production present in 2006,[15] this would result in a negligible decrease in AUMs available for livestock (Table 4- 282).

Forty ungrazed upland reference areas (193,000 acres total) and six ungrazed riparian reference areas (23,000 acres total) would be created to evaluate vegetation response to exclusion from livestock grazing. The reference areas would consist of an entire pasture, requiring no additional fences, and, thus, no additional effort to minimize conflicts between livestock grazing and vegetation resources. However, this may increase the amount of fences for which BLM would have responsibility to maintain.

Impacts from management for biological soil crusts would be the same as described for Alternative I.

Under Alternative III, 85 miles of streams would be maintained at PFC, 98 miles would be managed to achieve PFC, and 42 miles managed to move toward PFC. The tools used to help achieve these objectives may result in effects to forage availability through modification or elimination of land uses (e.g., changes to season of use and utilization), closing pastures, and exclosure fencing at the allotment and pasture scale, but would have limited effects across the planning area. In addition, the removal of water developments and the use of active herding would increase the amount of effort needed to reduce these conflicts. The duration and intensity of these effects would be specific to the location and condition of particular stream reaches.

Impacts from Special Status Species Actions

Special status species habitat management would impact forage availability by affecting areas available for grazing, limiting season of use, or changing allowable use criteria. BMPs could also apply restrictions on infrastructure (Appendices D, E, and H). Site-specific effects reducing forage available to livestock are expected at the allotment and pasture levels, but negligible effects are expected across the planning area.

Impacts from Management Specific to the No Action Alternative

The following action could decrease forage availability:

- Adjusting livestock use levels, grazing seasons, season of use, or other management techniques to protect plants.

The following action would increase restrictions on infrastructure:

- Maintaining a separation of use between cattle and bighorn sheep by not developing livestock water sources within 1 mile of bighorn sheep habitat unless adverse impacts can be mitigated.

[15] The most recent year for which vegetation production data are available.

The following actions would increase the amount of effort necessary to reduce special status species conflicts with livestock grazing:

- Giving full consideration to protecting Endangered, Threatened, or Sensitive plants in proposed projects in areas with known populations of these species.
- Foregoing or redesigning an action if it is predicted to have an adverse effect on Endangered, Threatened, or Sensitive plants.
- Not allowing conversion from cattle to sheep in allotments containing bighorn sheep habitat, unless a satisfactory separation can be maintained by fences or topographic features. The separation would be agreed upon through consultation and coordination with IDFG.

Impacts from Management Common to All Action Alternatives

The following actions would increase the amount of effort necessary to reduce special status species conflicts with livestock grazing:

- Not allowing BLM management activities and authorized uses that would adversely affect Threatened or Endangered species or their habitat without consultation and mitigation and not allowing BLM activities and authorized uses that would adversely affect other special status species of their habitat without mitigation.
- Scheduling livestock grazing to avoid pastures that contain bighorn sheep habitat during breeding, wintering, and lambing periods to minimize disturbance during these important seasonal periods.
- Managing for a separation of domestic sheep and goats from bighorn sheep in both location and time to reduce the risk of disease transmission between domestic and bighorn sheep.

Impacts from Management Specific to Alternative I

The following action could decrease forage availability:

- Adjusting livestock use levels, season of use, or other management techniques to maintain or enhance special status species and their habitat.

The following actions would increase restrictions on infrastructure:

- Constructing, maintaining, modifying, or removing range infrastructure and other facilities as necessary to maintain or enhance special status species and their habitat.
- Removing existing troughs within 1 mile of the Bruneau and Jarbidge Canyon rims within bighorn sheep habitat, consistent with the IMP within WSAs, and relocating troughs more than 1 mile from the Bruneau and Jarbidge Canyon rims if the watering site is needed for livestock grazing, consistent with the IMP within WSAs.
- Removing existing fences and corrals within 1 mile of the Bruneau and Jarbidge Canyon rims within bighorn sheep habitat, consistent with the IMP within WSAs, except fences for pasture and allotment boundaries or for other resource protection.
- Locating new troughs, reservoirs, permanent fences, and corrals at least 1 mile from the Bruneau and Jarbidge Canyon rims within bighorn sheep habitat.

The following action would increase the amount of effort necessary to reduce special status species conflicts with livestock grazing:

- Not authorizing trailing of domestic sheep or goats in allotments within 9 miles of bighorn sheep habitat.

Impacts from Management Specific to Alternative II

The following actions could decrease forage availability:

- Adjusting livestock use levels, season of use, or other management techniques to maintain or enhance special status species and their habitat.

Existing troughs, reservoirs, fences, and corrals would remain in bighorn sheep habitat, consistent with the IMP and WSAs. New troughs, reservoirs, permanent fences, and corrals could be located in bighorn sheep habitat if they do not conflict with bighorn sheep. These actions would result in fewer restrictions on infrastructure than the other alternatives. The following action would increase restrictions on infrastructure:

- Constructing, maintaining, modifying, or removing range infrastructure and other facilities as necessary to maintain or enhance special status species and their habitat.

Trailing of domestic sheep or goats through bighorn sheep habitat would follow current BLM policy, which would not require any additional effort to minimize conflicts between livestock grazing and bighorn sheep.

Impacts from Management Specific to Alternative III

The impacts to livestock grazing from management for special status species in Alternative III are the same as described for Alternative II.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

The following action could decrease forage availability:

- Adjusting livestock use levels, season of use, or other management techniques to maintain or enhance special status species and their habitat.

The following actions would increase restrictions on infrastructure:

- Constructing, maintaining, modifying, or removing range infrastructure and other facilities as necessary to maintain or enhance special status species and their habitat.
- Removing existing troughs within 1 mile of the Bruneau and Jarbidge Canyon rims within bighorn sheep habitat, consistent with the IMP within WSAs, and relocating troughs more than 1 mile from the Bruneau and Jarbidge Canyon rims if the watering site is needed for livestock grazing, consistent with the IMP within WSAs.
- Removing existing fences and corrals within 1 mile of bighorn sheep habitat, consistent with the IMP within WSAs, except fences for pasture and allotment boundaries or for other resource protection.
- Locating new troughs, reservoirs, permanent fences, and corrals at least 1 mile from bighorn sheep habitat.
- Allowing fences identified to protect resources and designing them to meet the needs of bighorn sheep.

Impacts from Management Specific to Alternative V

The following action could decrease forage availability:

- Adjusting livestock use levels, season of use, or other management techniques to maintain or enhance special status species and their habitat.

The following actions would increase restrictions on infrastructure:

- Removing or modifying range infrastructure and other facilities as necessary to maintain or enhance special status species and their habitat.
- Removing existing troughs and reservoirs within 1 mile of bighorn sheep habitat, consistent with the IMP, and relocating troughs and reservoirs more than 1 mile from bighorn sheep habitat if the watering site is needed for livestock grazing, consistent with the IMP.
- Removing existing fences and corrals within 1 mile of bighorn sheep habitat, consistent with the IMP; except fences for pasture and allotment boundaries or for other resource protection.
- Locating new troughs, reservoirs, permanent fences, and corrals at least 1 mile from bighorn sheep habitat.
- Allowing fences identified to protect resources and designing them to meet the needs of bighorn sheep.

The following action would increase the amount of effort necessary to reduce special status species conflicts with livestock grazing:

- Not authorizing trailing of domestic sheep or goats in allotments within 9 miles of bighorn sheep habitat.

Impacts from Wildland Fire Ecology and Management Actions

Wildland fire ecology and management includes elements of fire suppression capabilities, fuels management, and ES&BAR. These actions would affect livestock grazing through short-term and long-term changes to vegetation and the relative composition of VSGs within VMAs (see *Upland Vegetation* section). ES&BAR and fuels management actions would affect areas available to livestock grazing during rehabilitation treatments (e.g., rest, seeding, and planting) following wildland fire and vegetation treatments to reduce fuels.

The protection of the Non-Native Perennial VSG through Critical Suppression Areas would be the most beneficial to livestock grazing because that vegetation type produces the most forage. Loss of these perennial plants decreases production and the long-term availability of forage to livestock and provides opportunity for the introduction of noxious weeds and invasive plants. Table 4- 283 describes how many acres available to livestock grazing are within Critical Suppression Areas and within that, the number of acres of Non-Native Perennial VSG.

Table 4- 283. Critical Suppression Areas and Non-Native Perennial VSG in Critical Suppression Areas in Areas Available for Livestock Grazing (Acres)

	Alternative						
	No Action	I	II	III	IV		IV
					IV-A	IV-B	
Critical Suppression Areas	0[A]	415,000	152,000	426,000	463,000	456,000	815,000
Non-Native Perennial VSG within Critical Suppression Areas	0[B]	64,000	28,000	65,000	61,000	65,000	165,000

[A] The No Action Alternative would manage the entire planning area for full suppression, which does not give any portion of the planning area priority for fire suppression; the management is similar to what would occur in Conditional Suppression Areas.
[B] Because the entire planning area is managed for full suppression, Non-Native Perennial VSGs do not have any priority and the number of acres in this VSG is not identified.

ES&BAR treatments would create short-term decreases in forage availability during temporary closures of burned areas but would return burned areas to productive livestock forage and restore AUMs. If the current trend of large and recurring fires continues, interruptions of grazing would be expected to continue. Temporary fences to protect burned areas but still allow grazing to continue in unburned portions of pastures would be allowed under certain limitations.

Impacts from Management Specific to the No Action Alternative

Under the No Action Alternative, the entire planning area would be managed for full suppression with no prioritization for wildland fire suppression efforts. Lack of prioritization reduces the potential for critical resource needs to be identified and acted on in the event of multiple fire starts. Because the Non-Native Perennial and Native Grassland VSGs would not be priorities for suppression, the No Action Alternative could result in a decrease in forage.

The No Action Alternative does not include management regarding temporary fences for ES&BAR activities or the amount of rest an area would need following wildland fire. These decisions would be made in accordance with BLM policy. Current policy allows for the construction of temporary fences, which would allow livestock grazing on unburned forage in a pasture. Current policy mandates rest of burned areas until ES&BAR objectives are met, reducing the amount of forage available for livestock grazing during that time. The duration of the impact would depend on the ES&BAR objective and the success of the treatment.

The No Action Alternative would be the least desirable in reducing fire size and the number of human-caused fires and improving FRCC (see the *Wildland Fire Ecology and Management* section). This would result in a larger decrease in forage availability through the loss of vegetation due to fire and rest following fire than any other alternative.

Impacts from Management Common to All Action Alternatives

Burned areas would be rested from livestock grazing until ES&BAR objectives are met and predicted to be sustainable or until the treatment is determined to be unsuccessful. The impact of this action on forage availability would be the same as in the No Action Alternative.

Impacts from Management Specific to Alternative I

In Alternative I, 415,000 acres available to grazing would be in Critical Suppression Areas. Of these acres, 64,000 acres would be in the Non-Native Perennial VSG. The number of acres of the Non-Native Perennial VSG in Critical Suppression Areas in Alternative I is greater than in the No Action Alternative and Alternative II, similar to Alternatives III and IV, and less than in Alternative V.

Temporary fences could be used to protect burned areas and allow for uses when there are at least 2,000 unburned acres in a pasture. This would have varying impacts to forage availability as some pastures would have portions open to continued grazing while others would not.

Alternative I would be the best alternative at reducing fire size and the number of human-caused fires and improving FRCC (see the *Wildland Fire Ecology and Management* section). This would result in the smallest decrease in forage availability through the loss of vegetation due to fire and rest following fire than any other alternative.

The use of native and non-native species in upland vegetation and ES&BAR treatments would maintain forage availability in burned areas more than Alternatives IV and V, which would focus on use of native species.

Impacts from Management Specific to Alternative II

In Alternative II, 152,000 acres available to grazing would be in Critical Suppression Areas. Of these acres, 28,000 acres would be in the Non-Native Perennial VSG. With the exception of the No Action Alternative, there are fewer of acres of the Non-Native Perennial VSG in Critical Suppression Areas in Alternative II than any other alternative.

Temporary fences could be used to protect burned areas and allow for commercial uses. This would help maintain the amount of forage available to livestock grazing by allowing unburned portions of pastures to be grazed.

Alternative II would decrease fire size and the number of human-caused fires over the short term through suppression and grazing actions, but, with no change to FRCC, fire size would continue an upward trend over the long term. Overall, this alternative would be third along with Alternative V in reducing fire size and the number of human-caused fires and improving FRCC (see the *Wildland Fire Ecology and Management* section), resulting in decreases in forage availability through the loss of vegetation due to fire and rest following fire.

Wildland fire ecology and management actions would focus more on maintaining forage availability than all other alternatives, using strategic short-term management of fuels and conversion of annuals to perennial grassland.

Impacts from Management Specific to Alternative III

In Alternative III, 426,000 acres available to grazing would be in Critical Suppression Areas. Of these acres, 65,000 acres would be in the Non-Native Perennial VSG. The number of acres of the Non-Native Perennial VSG in Critical Suppression Areas in Alternative III is greater than in the No Action Alternative and Alternative II, similar to Alternatives I and IV, and less than in Alternative V.

Temporary fences would be used to protect burned areas, with similar impacts to those discussed for Alternative II.

Alternative III would decrease fire size over the short term through suppression and grazing actions, but the number of human-caused fires would increase due to impacts from recreation and land use actions.

Over the long term, fire size would continue an upward trend due to marginal improvement to FRCC. Overall, this alternative would rank second, along with Alternative IV, in reducing fire size and the number of human-caused fires and improving FRCC (see *Wildland Fire Ecology and Management* section), resulting in smaller decreases in forage availability through the loss of vegetation due to fire and rest following fire.

Wildland fire ecology and management actions would be similar to Alternative II, using strategic fuels management and increased forage allocation to reduce fire size across the planning area. The use of native and non-native species in ES&BAR actions would restore forage and assist suppression efforts (e.g., strategic placement of fire-resistant species) similar to Alternative II, but more than Alternatives IV and V which emphasize use of native species.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

In Alternatives IV-A and IV-B (the Preferred Alternative), 463,000 and 456,000 acres available to grazing would be in Critical Suppression Areas, respectively. Of these acres, 61,000 acres would be in the Non-Native Perennial VSG in Alternative IV-A and 65,000 acres would be in that VSG in Alternative IV-B. The number of acres of the Non-Native Perennial VSG in Critical Suppression Areas in Alternative IV is greater than in the No Action Alternative and Alternative II, similar to Alternatives I and III, and less than in Alternative V.

The impacts from the use of temporary fences in Alternative IV would be similar to those discussed for Alternative I; however, temporary fences would not be allowed in pastures with native plant communities. These pastures would be closed to grazing until ES&BAR objectives are met, decreasing forage availability during that time.

Alternative IV would decrease fire size over the long term due to improved FRCC and reduction in rate of spread, but fire size would continue an upward trend in the short term until FRCC improved. The number of human-caused fires would increase, but to a lesser degree than every alternative except for Alternative V. Overall, this alternative would rank second, along with Alternative III, in reducing fire size and the number of human-caused fires and improving FRCC (see the *Wildland Fire Ecology and Management* section), resulting in smaller decreases in forage availability through the loss of vegetation due to fire and rest following fire.

Wildland fire ecology and management actions would use some short-term actions (i.e., create fuel breaks) but would focus more on using long-term actions (conversion from annual to native shrubland) to bring the planning area into FRCC 1. ES&BAR actions would use more native species than the No Action Alternative and Alternatives I through III to move vegetation communities from perennial grassland to native shrubland. Conversion to native shrubland would increase restrictions on livestock management actions relative to the No Action Alternative and Alternatives I through III.

Impacts from Management Specific to Alternative V

In Alternative V, 815,000 acres available to grazing would be in Critical Suppression Areas. Of these acres, 165,000 acres would be in the Non-Native Perennial VSG. This is the largest number of acres of the Non-Native Perennial VSG in Critical Suppression Areas of all the alternatives.

Temporary fences would not be allowed, decreasing forage availability in burned pastures until ES&BAR objectives are met.

Alternative V would decrease fire size over the short term due to suppression actions. The number of human-caused fires would increase, but at a lower rate than the other alternatives due to the suppression actions, less recreation and land use authorizations, and more restrictive transportation and travel actions. Over the long term, FRCC would improve and fire size would be reduced due to vegetation treatments and the reduction of livestock grazing. This change would not be as effective as in Alternative I or IV. Overall, this alternative would rank third, along with Alternative II, in reducing fire size and the number of human-caused fires and improving FRCC (see the *Wildland Fire Ecology and Management* section), resulting in decreases in forage availability through the loss of vegetation due to fire and rest following fire.

Wildland fire ecology and management actions would use more long-term actions (conversion from annual to native) with fewer short-term actions (fuel breaks) than all other alternatives to bring the planning area into FRCC 1. Upland vegetation and ES&BAR actions would use only native species and rely more on natural succession to move vegetation communities from perennial grassland to native shrubland. Conversion to native communities would increase restrictions on livestock management actions relative to the all alternatives.

Impacts from Wild Horse Actions

Impact of wild horse allocations and management actions on livestock grazing would be negligible at the planning area scale; however, impacts to allotments within the wild horse HMA would vary by alternative. The allocation for wild horses is less than 1% of total allocation in every alternative; however, changes to allocation due to the number of wild horses can impact livestock grazing in allotments in the HMA by reducing forage availability for livestock in those allotments. Social interaction between wild horses and livestock result in less forage availability for livestock as wild horses can displace livestock from foraging areas.

The reduction or relocation of fences to facilitate wild horse use of the HMA may reduce the ability to properly manage livestock within allotments.

Conflicts between livestock grazing and wild horses can occur because wild horses damage water systems and fences. BLM participates in cost-sharing with livestock permittees in order to address maintenance and operation conflicts regarding water and fences in the HMA. Wild horse gathers would typically be coordinated with grazing schedules.

Impacts from Management Specific to the No Action Alternative

The No Action alternative would allocate 600 AUMs[16] for 50 wild horses. Maintaining a breeding herd of 50 wild horses would have negligible effects on forage availability to livestock grazing within the HMA.

Some effort would be required to minimize conflicts between livestock grazing and wild horses; however, there would be fewer conflicts in the No Action Alternative than Alternatives I, III, IV, and V due to the small herd size. Conflicts would be localized spatially and associated with social displacement of cattle by horses at grazing areas.

Impacts from Management Specific to Alternative I

Alternative I would allocate up to 2,400 AUMs for a breeding herd of 100 to 200 wild horses. A breeding herd of that size would reduce forage availability for livestock grazing within HMA.

A larger breeding herd would require more effort than in the No Action Alternative to reduce conflicts between livestock grazing and wild horses. The amount of time and expense to maintain water systems and fences would increase due to damage caused by wild horses. Reconfiguration of fences would occur if it facilitated genetic exchange, wild horse social interactions, or free-roaming characteristics. The reconfiguration may not be useful for livestock management. Coordination with permittees during gather operations would be more important with larger wild horse herds as the gather operations would be more complex.

Impacts from Management Specific to Alternative II

Under Alternative II, wild horses would be removed from the HMA. After meeting needs for watershed and wildlife, forage in the HMA would be available for livestock grazing.

[16] Assumes wild horses require 1 AUMs of forage per month for 12 months of the year.

Some effort would be required to reduce conflicts between livestock grazing and wild horses in the short term as coordination with permittees would be necessary during the gather and permanent removal of wild horses. However, no additional effort would be required once the wild horses were removed.

Impacts from Management Specific to Alternative III

Alternative III would allocate up to 7,200 AUMs for a breeding herd of 200 to 600 wild horses. This is the highest allocation of all alternatives and would result in the largest decrease in forage availability for livestock grazing in allotments in the HMA of any alternative. Heavy, year-round use of favored grazing, watering, and loafing areas by wild horses would decrease the long-term sustainability of forage production, unless the herd could be split between multiple allotments.

More effort would be required to reduce conflicts between livestock grazing and wild horses than in any other alternative. Damage to water systems and other infrastructure would increase maintenance and operating expenses. Fences would be removed if it facilitated genetic exchange, wild horse social interactions, or free-roaming characteristics, which would make managing livestock more difficult.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV would allocate up to 2,400 AUMs for a non-breeding herd of up to 200 wild horses. A breeding herd of that size would reduce forage availability for livestock grazing within HMA.

Some effort would be required to reduce conflicts between livestock grazing and wild horses in the short term as coordination with permittees would be necessary during the gather and removal of breeding wild horses. Reconfiguration of fences would occur if it facilitated wild horse social interactions and free-roaming characteristics. Effects would be similar to Alternative I.

Impacts from Management Specific to Alternative V

Alternative V would allocate up to 6,000 AUMs for a non-breeding herd of up to 500 wild horses, the second highest allocation of all alternatives, resulting in the largest decrease in forage availability of any alternative except Alternative III. Heavy, year-round use of favored grazing, watering, and loafing areas by wild horses would decrease the long-term sustainability of forage production, unless the herd could be split between multiple allotments.

Some effort would be required to reduce conflicts between livestock grazing and wild horses in the short term as coordination with permittees would be necessary during the gather and removal of breeding wild horses. Reconfiguration of fences would occur if it facilitated wild horse social interactions and free-roaming characteristics. Effects would be similar to Alternative III.

Impacts from Transportation and Travel Actions

Potential impacts from transportation and travel management on livestock grazing include reduction of forage availability through soil compaction, vegetation damage, conversion to annual grasslands, and wildland fire. Transportation and travel can also displace livestock from foraging areas. Conversely, areas that are closed to motorized vehicle use may require increased effort to minimize conflicts between livestock grazing and resources or uses because permittees may have to access conflict areas on foot or horse unless otherwise authorized. This could result in further difficultly if range infrastructure is necessary to reduce the conflict, as motorized vehicles could not be used for construction or maintenance.

Transportation and travel is related to recreation in that SRMAs can be developed to accommodate recreational cross-country motorized vehicle use activities and settings. Because that recreational activity is dependent on a travel designation of open to cross-country motorized vehicle use, the impacts to livestock grazing are discussed in this section.

Table 4- 284 describes transportation and travel designations as well as SRMAs with a motorized recreation emphasis for the planning area.

Table 4- 284. Travel Designations in Areas Available for Livestock Grazing by Alternative (Acres)

Travel Designation	Alternative						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
Open to Cross-Country Motorized Vehicle Use	1,045,000	0	0	4,000	4,000		700
Limited to Designated Routes or Ways	273,000	1,262,000	1,314,000	1,308,000	1,179,000	1,211,000	966,000
Closed to Motorized Vehicle Use	5,000	28,000	0	0	46,000		100,000
SRMA with Motorized Recreation Emphasis [A]	3,000	31,000	0	34,000	33,000		3,000

[A] This SRMA is the Hagerman-Owsley Bridge, Deadman/Yahoo, or Yahoo SRMA, depending on the alternative.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative would designate 1,045,000 acres available for livestock grazing as open to cross-country motorized vehicle use. Due to increasing demand for cross-country motorized vehicle recreation, route density and use of the planning area is expected to increase. This would increase the potential for livestock displacement. The No Action Alternative would have the largest number of acres vulnerable to reduced forage availability from transportation and travel impacts of all the alternatives.

With the exception of Alternative II, the No Action Alternative has the smallest number of acres available for grazing included in an SRMA for motorized recreation. While this alternative would result in less displacement to livestock through human activity than Alternatives I, III, IV, and V, it does not include direction for the installation of gates and cattleguards to reduce conflicts. Effort would be required over the long term to reduce conflicts between livestock grazing and motorized recreation.

The No Action Alternative has few travel and transportation restrictions that would limit opportunities for livestock grazing. Localized effects would occur to protect crucial wildlife habitat and riparian areas but would not affect livestock grazing across the planning area.

The No Action Alternative would have more acres available for livestock grazing closed to motorized vehicle use than Alternatives II and III, but less than Alternatives I, IV, and V. This would result in minimal additional effort to reduce livestock grazing conflicts with resources and uses.

Impacts from Management Specific to Alternative I

Alternative I would not designate any acres available for livestock grazing and open to cross-country motorized vehicle use. This would reduce the number of acres vulnerable to transportation and travel impacts.

While 31,000 acres available to grazing would be included in an SRMA for motorized recreation, none of those acres would be open to cross-country motorized vehicle use, limiting impacts to forage availability. Livestock displacement could still occur through increased human activity on those acres. Additional gates and cattleguards would be installed to minimize conflicts between motorized recreation activities and livestock grazing operations. This would require increased effort in the short term, but could reduce the amount of effort needed to reduce conflicts in the long term.

Alternative I would designate 28,000 acres available for livestock grazing as closed to motorized vehicle use, more acres than in the No Action Alternative and Alternatives II and III, but less than in Alternatives IV and V. This would increase the amount of effort needed to reduce livestock grazing conflicts with resources and uses. Further restrictions on travel could be applied within the HMA during foaling season and during fire restrictions. Site-specific exceptions to motorized vehicle restrictions could be authorized in permits, potentially mitigating impacts to efforts to reduce conflicts.

Impacts from Management Specific to Alternative II

Alternative II would not designate any acres available for livestock grazing and open to cross-country motorized vehicle use. This would reduce the number of acres vulnerable to transportation and travel impacts.

Alternative II does not allocate an SRMA for motorized recreation. Additional gates and cattleguards would be installed to minimize conflicts between motorized recreation activities on designated routes and livestock grazing operations. This would require increased effort in the short term, but could reduce the amount of effort needed to reduce conflicts in the long term.

No acres available to livestock grazing would be closed to motorized vehicle use. This travel designation would not impact livestock grazing, particularly because site-specific exceptions to motorized vehicle restrictions could be authorized in the permit.

Impacts from Management Specific to Alternative III

Alternative III would designate 4,000 acres open to cross-country motorized vehicle use. This would result in a minimal increase in the potential for livestock displacement at the planning area scale, although site-specific impacts would result. Alternative III would close the same number of acres to motorized vehicle use as Alternative II and have the same site-specific exceptions, resulting in the same impacts.

Under Alternative II, 34,000 acres available to grazing would be included in an SRMA for motorized recreation, more acres than any other alternative. Livestock displacement could occur through increased human activity on those acres. Additional gates and cattleguards would be installed to minimize conflicts between motorized recreation activities and livestock grazing operations. This would require increased effort in the short term, but could reduce the amount of effort needed to reduce conflicts in the long term.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV would designate the same number of acres open to cross-country motorized vehicle use as Alternative III, resulting in the same impacts.

Under Alternative IV, 33,000 acres available to grazing would be included in an SRMA for motorized recreation. The impacts would be similar to Alternative III.

Alternative IV would designate 46,000 acres as closed to motorized vehicle use, more acres than in any alternative except Alternative V. This would increase the amount of effort needed to reduce livestock grazing conflicts with resources and uses. Further restrictions on travel could be applied during fire restrictions. Site-specific exceptions to motorized vehicle restrictions could be authorized in permits, potentially mitigating impacts to efforts to reduce conflicts.

Impacts from Management Specific to Alternative V

Only 700 acres available for grazing would be open to cross-country motorized vehicle use. These acres could experience livestock displacement due to increased activity. Due to the location of these acres, major impacts to vegetation are not anticipated. These acres would be included in the 700-acre SRMA. Livestock displacement could still occur through increased human activity on those acres; however, the impacts would be smaller than in Alternatives III and IV due to the decreased acreage. Additional gates and cattleguards would be installed to minimize conflicts between motorized recreation activities and livestock grazing operations. This would require increased effort in the short term, but could reduce the amount of effort needed to reduce conflicts in the long term.

Alternative V would close the most acres available for livestock grazing to motorized vehicle use. While this would reduce the potential for impacts to forage availability on those acres, the amount of effort needed to reduce livestock grazing conflicts with resources or uses would increase. Exceptions to this restriction would not be made.

Impacts from Land Use Authorizations Actions

The construction of transportation routes and associated infrastructure for land use authorizations would affect the availability of forage within the project area by displacing or removing vegetation. The potential decrease in forage from land use authorizations would not change the forage availability in Table 4- 282; however, it could result in an allocation at the lower end of the identified range.

Construction and structures can displace livestock and result in more concentrated grazing in unaffected parts of allotment. This would require more effort to minimize livestock grazing and vegetation conflicts in affected allotments. Effects would be short-term and associated with the implementation phase. Livestock would be temporarily displaced from the immediate vicinity of construction due to increased human activity but would quickly become acclimated to the new infrastructure and resume utilization of the area. Long-term effects to forage availability would be the permanent removal and altering of vegetation during construction and maintenance of new roads and infrastructure (e.g., communication towers, wind turbines, substations).

While projects may be proposed anywhere in the planning area other than exclusion areas, projects are mostly likely to occur in areas set aside for those uses in Chapter 2, and, in the case of wind energy, in areas with adequate wind resources. Table 4- 285 contains the number of acres in potential utility development areas and potential wind development areas available to grazing in each alternative. Potential wind development areas are more likely to contain a higher concentration of structures than potential utility development areas, resulting in more impacts to forage availability and effort needed to reduce conflicts with livestock grazing and vegetation.

Table 4- 285. Potential Utility and Wind Development Areas in Areas Available for Grazing by VSG by Alternative (Acres)

VSG	Alternative					
	No Action	I	II	III	IV	V
Potential Utility Development Areas						
Native Grassland VSG	25,000	24,000	25,000	24,000	24,000	23,000
Native Shrubland VSG	11,000	10,000	10,000	10,000	10,000	9,000
Other VSGs	36,000	29,000	38,000	33,000	33,000	14,000
Total	**72,000**	**63,000**	**73,000**	**67,000**	**67,000**	**46,000**
Potential Wind Development Areas						
Native Grassland VSG	23,000	100	26,000	100	100	100
Native Shrubland VSG	67,000	0	68,000	0	0	0
Other VSGs	61,000	52,000	61,000	56,000	54,000	31,000
Total	**151,000**	**52,100**	**155,000**	**56,100**	**54,100**	**31,100**

Impacts from authorized land use activities constructed in special species habitat could have an effect on livestock grazing. Special status species habitat is most often found in Native Grassland and Native Shrubland VSGs. Projects that decrease the amount or quality of this habitat would likely require implementation of mitigating actions in allotments within the project area as well as adjoining allotments containing habitat for the affected species. More emphasis would be placed on restoration of marginal habitat to replace lost or diminished habitat within the project area. These actions could decrease forage available to livestock during treatments and through additional restrictions on allocation, season of use, grazing use criteria, and placement and management of infrastructure. The intensity and size of mitigating measures would be dependent upon the type and scale of the project.

Impacts from access routes for land use authorizations are analyzed under *Impacts from Transportation and Travel Actions*.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative would result in 72,000 acres available for livestock grazing in potential utility development areas and 151,000 acres in potential wind development areas (Table 4- 285). Along with Alternative II, this is the most acres allocated to these authorizations in areas available for livestock grazing, resulting in the second largest potential for impacts to forage availability and effort needed to reduce conflicts.

With the exception of Alternative II, the No Action Alternative contains the largest number of acres of Native Grassland and Native Shrubland VSGs in potential utility and wind development areas (Table 4-285). The No Action Alternative would have the second highest risk that these projects will result in mitigation affecting forage availability and effort needed to reduce conflicts.

Impacts from Management Specific to Alternative I

Alternative I would result in 63,000 acres available for livestock grazing in potential utility development areas and 52,000 acres in potential wind development areas (Table 4- 285). With the exception of Alternative V, this is the fewest number of acres allocated to these authorizations in areas available for livestock grazing, resulting in the second lowest potential for impacts to forage availability and effort needed to reduce conflicts.

Alternatives I, III, and V contain similar acres of Native Grassland and Native Shrubland VSGs in potential utility and wind development areas (Table 4- 285). This would result in more risk than Alternative V that these projects will result in mitigation affecting forage availability and effort needed to reduce conflicts, but less risk than in the No Action Alternative and Alternative II.

Impacts from Management Specific to Alternative II

Alternative II would result in 73,000 acres available for livestock grazing in potential utility development areas and 156,000 acres in potential wind development areas (Table 4- 285). This is the most acres allocated to these authorizations in areas available for livestock grazing, resulting in the largest potential for impacts to forage availability and effort needed to reduce conflicts.

Alternative II contains the largest number of acres of Native Grassland and Native Shrubland VSGs in potential utility and wind development areas (Table 4- 285) and would have the highest risk that these projects would result in mitigation affecting forage availability and effort needed to reduce conflicts.

Impacts from Management Specific to Alternative III

Alternative III would result in 67,000 acres available for livestock grazing in potential utility development areas and 67,000 acres in potential wind development areas (Table 4- 285). This alternative would result in more potential for impacts to forage availability and effort needed to reduce conflicts than Alternatives I, IV, and V, but less potential than the No Action Alternative and Alternative II.

The impacts from potential utility and wind development areas in Native Grassland and Native Shrubland VSGs (Table 4- 285) would be the same as described for Alternative I.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV would result in 67,000 acres available for livestock grazing in potential utility development areas and 54,000 acres as potential wind development areas (Table 4- 285). This alternative would result in more potential for impacts to forage availability and effort needed to reduce conflicts than Alternatives I and V, but less potential than the No Action Alternative and Alternatives II and III.

The impacts from potential utility and wind development areas in Native Grassland and Native Shrubland VSGs (Table 4- 285) would be the same as described for Alternative I.

Impacts from Management Specific to Alternative V

Alternative V would result in 45,000 acres available for livestock grazing in potential utility development areas and 31,000 acres as potential wind development areas (Table 4- 285). This is the fewest acres allocated to these authorizations in areas available for livestock grazing, resulting in the smallest potential for impacts to forage availability and effort needed to reduce conflicts.

Alternative V contains the fewest number of acres of Native Grassland and Native Shrubland VSGs in potential utility and wind development areas (Table 4- 285) and would have the lowest risk that these projects would result in mitigation affecting forage availability and effort needed to reduce conflicts.

Impacts from Leasable Mineral Actions

Surface occupancy for leasable mineral exploration and extraction would affect livestock grazing, altering forage availability by changing the acres available to grazing and increasing human activity. Forage could be directly removed through alteration of the vegetation or indirectly removed as livestock avoid areas with increased human activities or new structures. Increasing human activity could also increase the opportunity for human-caused wildland fires and the introduction of noxious weeds and invasive plants.

Oil and gas exploration activity is expected to be relatively short, over several weeks or months, but intense, requiring 10 to 15 people and five to seven vehicles (Appendix U). Seismic reflection, the use of explosives, is the preferred method and would pose the most disturbances to livestock in the immediate area. Displacement of livestock from the immediate area of exploration activity would occur, but is expected to be short-term with cattle returning to the area soon after testing is concluded.

Development is anticipated to be limited to two wells (approximately ten acres) during exploration, with one well producing oil. Five additional wells would be drilled at the producing well, increasing surface occupancy to 30 acres. Increased route density in the vicinity of the six wells (approximately 10 acres per well) would improve access and increase human activity and ground disturbance, thereby increasing the potential for introduction and spread of noxious weeds and invasive plants, reducing the stability of the forage base. Increased human activity would temporarily displace livestock from the immediate vicinity of construction; however, livestock would quickly become acclimated to the new permanent infrastructure and resume use of the area. Construction and maintenance of new roads and infrastructure (e.g., pump stations, pipelines) would permanently remove and alter vegetation, affecting long-term forage availability.

A typical oil or gas well utilizes 5,000 to 15,000 gallons of water per day, requiring acquisition of water rights. Depending upon the location of and number of oil and supporting water wells, there is potential to affect the water table and production of existing wells and springs supplying water to livestock watering systems. This would result in increased effort in order to water livestock adequately.

For geothermal development, increased human activity would increase disturbance to livestock, but effects would be short term and associated with project implementation and construction. In contrast to oil and gas exploration, seismic surveys are not widely used in geothermal exploration; instead, less-disturbing geophysical and geochemical surveying methods would be used for initial exploration, which would typically require two to four people walking or moving through a large area for several days (Appendix V). Exploration would also likely include drilling 20 temperature gradient wells over the life of the plan, creating approximately 85 acres of surface disturbance. Those localized areas would have increased potential for introduction and spread of noxious weeds and invasive plants; however, disruption to livestock would be negligible as drilling would be completed within a few weeks.

Development is anticipated to be limited to five production wells and five injection wells (approximately 35 acres), with approximately two acres of new roads being constructed for each well. In addition, a power plant (ten acres), pipelines (30 acres), and transmission lines (50 acres) would be constructed for commercial operations; however, no additional access roads are expected to be necessary for these. A typical geothermal production well produces 1 million to 6 million gallons of geothermal fluids per day, requiring acquisition of water rights; these fluids are returned to the geothermal reservoir through the injection wells. Impacts from these geothermal development structures and activities on livestock grazing would be similar to the impacts described above for oil and gas development.

On- and off-site mitigation for the impacts of leasable mineral development on special status species habitat could affect forage availability. Increased emphasis would be placed on restoration of marginal habitat to replace lost or diminished habitat within the project area. These actions would decrease forage available to livestock during restoration treatments and through additional long-term restrictions on allocation, season of use, and placement and management of infrastructure. The intensity and extent of mitigating measures (e.g., acres available to livestock, adjustment to allocation, and utilization limits) would be dependent upon the project, but are expected to be minor to moderate due to the limited potential for discovery and the relative small impact of the development footprint (90 acres for oil and gas, 185 to 230 acres for geothermal).

Areas open to leasable mineral development with NSO restrictions are not expected to impact livestock grazing because there would be no change to forage availability or increase in human activity.

Table 4- 286 identifies the number of acres open, open with NSO restrictions, or closed to mineral leasing in areas with potential for oil and gas development and areas with medium to high potential for geothermal development.

Table 4- 286. Leasable Mineral Allocation in Areas Available for Livestock Grazing with Leasable Mineral Potential by Alternative (Acres)

Leasable Mineral Allocation	Alternative					
	No Action	I	II	III	IV	V
Oil and Gas						
Open [A]	317,000	253,000	278,000	277,000	249,000	180,000
Open with NSO	41,000	17,000	11,000	11,000	17,000	12,000
Closed	22,000	5,000	0	800	21,000	4,000
Total	**380,000**	**275,000**	**289,000**	**288,800**	**287,000**	**196,000**
Geothermal [B]						
Open [A]	387,000	308,000	334,000	331,000	322,000	284,000
Open with NSO	24,000	15,000	11,000	11,000	15,000	13,000
Closed	124,000	8,000	3,000	4,000	5,000	2,000
Total	**535,000**	**331,000**	**348,000**	**346,000**	**342,000**	**299,000**

[A] Includes acres open, open with seasonal restrictions, and open with controlled surface use restrictions.
[B] Includes areas with medium to high potential for geothermal resources.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative contains the most acres available for livestock grazing with potential for oil and gas development. Of these acres, 317,000 are open to oil and gas development, more than any other alternative. While this acreage is larger than in the action alternatives, increasing the number of acres on which oil or gas could be discovered, development is only anticipated on 90 acres throughout the life of the plan, less than 0.1% of the potential oil and gas areas that would be available for leasing.

The No Action Alternative contains the most acres available for livestock grazing with medium to high potential for geothermal development. Of these acres, 387,000 acres are open to geothermal development. While this acreage is larger than in the action alternatives, increasing the number of acres on which a geothermal resource could be discovered, development is only anticipated on 185 to 230 acres throughout the life of the plan, less than 0.1% of the potential geothermal areas that would be available for leasing.

Impacts from Management Specific to Alternative I

With the exception of Alternative V, Alternative I contains the fewest acres available for livestock grazing with potential for oil and gas development. Of these acres, 253,000 are open to oil and gas development, less than the No Action Alternative and Alternatives II and III, but more than Alternatives IV and V. Development is only anticipated on 90 acres throughout the life of the plan, less than 0.1% of the potential oil and gas areas that would be available for leasing.

With the exception of Alternative V, Alternative I contains the fewest acres available for livestock grazing with medium to high potential for geothermal development. Of these acres, 308,000 acres are open to geothermal development, the fewest number of acres with the exception of Alternative V. Development is only anticipated on 185 to 230 acres throughout the life of the plan, less than 0.1% of the potential geothermal areas that would be available for leasing.

Impacts from Management Specific to Alternative II

Alternative II contains more acres available for livestock grazing with potential for oil and gas development than Alternatives I, IV, and V, but fewer than the No Action Alternative and Alternative III. Of these acres, 278,000 acres are open to oil and gas development, more than any other alternative with the exception of the No Action Alternative. Development is only anticipated on 90 acres throughout the life of the plan, less than 0.1% of the potential oil and gas areas that would be available for leasing.

With the exception of the No Action Alternative, Alternative II contains the most acres available for livestock grazing with medium to high potential for geothermal development. Of these acres, 334,000 acres are open to geothermal development, more than any other alternative with the exception of the No Action Alternative. Development is only anticipated on 185 to 230 acres throughout the life of the plan, less than 0.1% of the potential geothermal areas that would be available for leasing.

Impacts from Management Specific to Alternative III

With the exception of the No Action Alternative, Alternative III contains most acres available for livestock grazing with potential for oil and gas development. Of these acres, 277,000 acres are open to oil and gas development, more than Alternatives I, IV, and V, but fewer than the No Action Alternative and Alternative II. Development is only anticipated on 90 acres throughout the life of the plan, less than 0.1% of the potential oil and gas areas that would be available for leasing.

Alternative III contains more acres available for livestock grazing with medium to high potential for geothermal development than Alternatives I, IV, and V, but fewer acres than the No Action Alternative and Alternative II. Of these acres, 331,000 acres are open to geothermal development, more than in than Alternatives I, IV, and V, but fewer acres than the No Action Alternative and Alternative II. Development is only anticipated on 185 to 230 acres throughout the life of the plan, less than 0.1% of the potential geothermal areas that would be available for leasing.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV contains more acres available for livestock grazing with potential for oil and gas development than Alternatives I and V, but fewer than the No Action Alternative and Alternatives II and III. Of these acres, 249,000 acres are open to oil and gas development, fewer than the other alternatives with the exception of Alternative V. Development is only anticipated on 90 acres throughout the life of the plan, less than 0.1% of the potential oil and gas areas that would be available for leasing.

With the exception of Alternative V, Alternative IV contains the fewest acres available for livestock grazing with medium to high potential for geothermal development. Of these acres, 249,000 acres are open to geothermal development, fewer than any alternative except Alternative V. Development is only anticipated on 185 to 230 acres throughout the life of the plan, less than 0.1% of the potential geothermal areas that would be available for leasing.

Impacts from Management Specific to Alternative V

Alternative IV contains the fewest acres available for livestock grazing with potential for oil and gas development. Of these acres, 180,000 acres are open to oil and gas development, fewer than the other alternatives. Development is only anticipated on 90 acres throughout the life of the plan, less than 0.1% of the potential oil and gas areas that would be available for leasing.

Alternative V contains the fewest acres available for livestock grazing with medium to high potential for geothermal development. Of these acres, 284,000 acres are open to geothermal development. Development is only anticipated on 185 to 230 acres throughout the life of the plan, less than 0.1% of the potential geothermal areas that would be available for leasing.

Impacts from Areas of Critical Environmental Concern Actions

ACEC management can affect forage availability through acres available to grazing, season of use, stocking rates, and utilization. ACEC management can also place restrictions on the placement of infrastructure, salting, and supplements placement. This can require more effort to minimize conflicts between livestock grazing and relevant and important values.

Impacts from Management Specific to the No Action Alternative

Under the No Action Alternative, the Bruneau-Jarbidge ACEC would be available for grazing; however, livestock are prevented from accessing canyons through fencing and topography. Due to relevant and important wildlife values, restrictions would be placed on infrastructure limiting its placement. Livestock grazing would be analyzed to determine compatibility with the ACEC designation.

Under the No Action Alternative, the Salmon Falls Creek ACEC is closed to livestock grazing. These acres were accounted for under *Impacts from Livestock Grazing Actions*. Closing 3,000 acres to livestock grazing would have no effects as the majority of the ACEC has limited value for livestock grazing due to topography and the area is not currently used for livestock grazing.

There are no management actions specific to the Sand Point ACEC that would affect livestock.

Impacts from Management Specific to Alternative I

Under Alternative I, adjustments to seasons of use in the Bruneau-Jarbidge ACEC to minimize conflicts with bighorn sheep could limit forage availability. Salting and supplements would be prohibited in the ACEC.

The Lower Bruneau Canyon ACEC includes 1,000 acres, a small portion of one allotment. Under Alternative I, the Lower Bruneau Canyon ACEC would be available to livestock grazing. New infrastructure would be allowed, with restrictions if it is not compatible with recovery of the area.

Of the 7,000 acres of the Middle Snake ACEC, 4,000 would be available to livestock grazing. Areas unavailable to livestock grazing generally have steeper slopes, severely erodible soils, and numerous areas with special status plants. Livestock trailing would be allowed through a designated trailing corridor in the area unavailable to grazing; however, additional effort would be required to ensure livestock did not remain in the ACEC overnight. Restrictions in areas available for livestock grazing would have negligible effects on grazing.

The impacts from the Salmon Falls Creek ACEC would be similar to those described for the No Action Alternative.

Alternative I would place restrictions on salt and supplements in the Sand Point ACEC.

Impacts from Management Specific to Alternative II

No ACECs would be designated in Alternative II. As a result, any impacts to forage availability, restrictions on infrastructure, and effort needed to reduce resource and use conflicts with livestock grazing in this alternative would not be due to ACEC management.

Impacts from Management Specific to Alternative III

Salting and supplements would be prohibited in the Bruneau-Jarbidge ACEC; however, the ACEC boundary would be smaller in Alternative III than in the No Action Alternative and Alternative IV. As a result, impacts from this restriction would be less.

The impacts from the Salmon Falls Creek ACEC would be similar to those described for the No Action Alternative. The impacts from the Sand Point ACEC would be similar to those described for Alternative I.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Under Alternative IV, adjustments to season of use and stocking rates in the Bruneau-Jarbidge ACEC to minimize conflicts with bighorn sheep and bull trout could limit forage availability. The Bruneau-Jarbidge ACEC contains bighorn sheep and bull trout habitat. In order to minimize conflict with these species, livestock grazing would be restricted in at least one pasture in the ACEC except during July and late November. Range infrastructure would be allowed where it protects relevant and important values. The modification or removal of infrastructure would increase the amount of effort needed to reduce conflicts between livestock grazing and relevant and important values. Salting and supplements would not be allowed, further increasing the amount of effort needed to manage livestock grazing in the ACEC.

Under Alternatives IV-A and IV-B (the Preferred Alternative), the Inside Desert ACEC would be unavailable for livestock grazing. This would affect 73,000 acres and 41,000 acres, respectively. These acres were accounted for under *Impacts from Livestock Grazing Actions*. Restrictions on infrastructure would increase as no new infrastructure would be allowed and existing infrastructure would be removed from the ACEC. Removing all infrastructure from this ACEC would require considerable effort.

Adjustments would be made to season of use and stocking rates in the Jarbidge Foothills ACEC to minimize conflicts with special status species and restoration projects. These adjustments would decrease forage availability and would take place on 136,000 acres in Alternative IV-A and 66,000 acres in Alternative IV-B.

The impacts from the Lower Bruneau Canyon ACEC and the Sand Point ACEC would be similar to those described for Alternative I.

Impacts from Management Specific to Alternative V

Under Alternative V, the 1,000 acres in the Lower Bruneau Canyon ACEC would be unavailable for grazing. These acres were accounted for under *Impacts from Livestock Grazing Actions*.

Under Alternative V, the 7,000 acres in the Middle Snake ACEC would be unavailable for grazing. These acres were accounted for under *Impacts from Livestock Grazing Actions*. Livestock trailing would be allowed through a designated trailing corridor; however, additional effort would be required to ensure livestock did not remain in the ACEC overnight.

The Sagebrush Sea ACEC would be available to grazing; however, it would be at a reduced utilization level with additional reductions through major adjustments to seasons of use and stocking rates. Effort would be required to remove infrastructure and associate routes in response to the reduction in grazing. Further effort would be required to remove livestock infrastructure from within reference areas.

Under Alternative V, the 950 acres in the Sand Point ACEC would be unavailable to livestock grazing. These acres were accounted for under *Impacts from Livestock Grazing Actions*.

Summary of Direct and Indirect Impacts

Table 4- 287 summarizes the direct and indirect impacts to livestock grazing.

Impacts from the No Action Alternative

Under the No Action Alternative, the opportunity for livestock grazing would continue at its current level with opportunity for allotment-specific increases or decreases in allocation. Upland vegetation would generally be maintained in its current state with some increase in non-native perennial and native grasslands through conversion of annual grasses and ES&R treatments. Relative to the action alternatives, the most acres would be available to livestock grazing and have the fourth largest allocation of AUMs when comparing the upper limits of the allocation.

Restrictions on management practices (e.g., season of use, grazing use criteria) and infrastructure are generally less prescriptive than Alternatives I, III, IV, and V, providing more options and management flexibility to achieve resource objectives through adaptive management.

The No Action Alternative does the least to ensure forage availability through wildland fire ecology and management actions, but also requires the least amount of effort to reduce conflicts between livestock grazing and wildland fire ecology and management actions.

Table 4- 287. Summary of Impacts to Livestock Grazing

<table>
<tr><th rowspan="3">Indicator [A]</th><th colspan="7">Alternative</th></tr>
<tr><th rowspan="2">No Action</th><th rowspan="2">I</th><th rowspan="2">II</th><th rowspan="2">III</th><th colspan="2">IV</th><th rowspan="2">V</th></tr>
<tr><th>IV-A</th><th>IV-B</th></tr>
<tr><td colspan="8">Livestock Grazing</td></tr>
<tr><td>Forage Available due to Acres Available (1=most, 7=least)</td><td>1</td><td>4</td><td>2</td><td>3</td><td>6</td><td>5</td><td>7</td></tr>
<tr><td>Forage Available due to Vegetation Allocation (1=most, 7=least)</td><td>4</td><td>3</td><td>1</td><td>2</td><td>6</td><td>5</td><td>7</td></tr>
<tr><td>Forage Available due to Other Factors (1=most, 6=least)</td><td>5</td><td>4</td><td>2</td><td>1</td><td colspan="2">3</td><td>6</td></tr>
<tr><td>Restrictions on Infrastructure (1=least, 5=most)</td><td>1</td><td>2</td><td>1</td><td>3</td><td colspan="2">4</td><td>5</td></tr>
<tr><td colspan="8">Vegetation Communities</td></tr>
<tr><td>Forage Available due to Vegetation Treatments (1=most, 7=least)</td><td>4</td><td>3</td><td>1</td><td>2</td><td>6</td><td>5</td><td>7</td></tr>
<tr><td colspan="8">Special Status Species</td></tr>
<tr><td>Restrictions on Infrastructure (1=least, 4=most)</td><td>2</td><td>3</td><td>1</td><td>1</td><td colspan="2">4</td><td>4</td></tr>
<tr><td>Effort (1=least, 2=most)</td><td>1</td><td>2</td><td>1</td><td>1</td><td colspan="2">1</td><td>2</td></tr>
<tr><td colspan="8">Wildland Fire Ecology and Management</td></tr>
<tr><td>Forage Available due to Other Factors (1=most, 7=least)</td><td>7</td><td>4</td><td>6</td><td>3</td><td>5</td><td>2</td><td>1</td></tr>
<tr><td>Effort (1=least, 4=most)</td><td>1</td><td>2</td><td>1</td><td>1</td><td colspan="2">3</td><td>4</td></tr>
<tr><td colspan="8">Wild Horses</td></tr>
<tr><td>Forage Available due to Other Factors (1=most, 5=least)</td><td>2</td><td>3</td><td>1</td><td>4</td><td colspan="2">3</td><td>4</td></tr>
<tr><td>Effort (1=least, 5=most)</td><td>2</td><td>3</td><td>1</td><td>4</td><td colspan="2">3</td><td>4</td></tr>
<tr><td colspan="8">Transportation and Travel</td></tr>
<tr><td>Effort (1=least, 4=most)</td><td>3</td><td>2</td><td>1</td><td>2</td><td colspan="2">2</td><td>4</td></tr>
<tr><td colspan="8">Land Use Authorizations</td></tr>
<tr><td>Effort (1=least, 6=most)</td><td>5</td><td>2</td><td>6</td><td>4</td><td colspan="2">3</td><td>1</td></tr>
<tr><td colspan="8">Leasable Minerals</td></tr>
<tr><td colspan="8">Oil and Gas</td></tr>
<tr><td>Effort (1=least, 6=most)</td><td>6</td><td>3</td><td>5</td><td>4</td><td colspan="2">2</td><td>1</td></tr>
<tr><td colspan="8">Geothermal</td></tr>
<tr><td>Effort (1=least, 6=most)</td><td>6</td><td>2</td><td>5</td><td>4</td><td colspan="2">3</td><td>1</td></tr>
<tr><td colspan="8">ACECs</td></tr>
<tr><td>Effort (1=least, 7=most)</td><td>3</td><td>4</td><td>2</td><td>1</td><td>6</td><td>5</td><td>7</td></tr>
<tr><td colspan="8">[A] Ranks indicate the order in which the alternatives would affect each indicator; they do not, however, depict the degree of difference between ranks. Ranks can only be compared within rows; a “1” in one row does not necessarily reflect the same degree of impact as a “1” in another row. Within a row, an alternative with a rank of “1” would impact that indicator less than alternatives with higher ranks.</td></tr>
</table>

The No Action Alternative provides a moderate level of forage availability for livestock and has a low level of limitations on infrastructure for livestock management. The level of effort required to minimize conflicts with livestock grazing would be low with regard to resources and high with regard to other uses. Overall, there would be moderate beneficial impacts to livestock grazing under the No Action Alternative.

Impacts from Alternative I

Alternative I would provide the fourth most acres available for livestock grazing and third highest allocation of forage. Restrictions on livestock management actions (e.g., utilization, season of use, and infrastructure) to achieve special status species objectives and comply with ACEC designations would decrease management flexibility and the scope of options available to achieve resource objectives relative to the No Action Alternative and Alternatives II and III. The size of the wild horse herd would increase adjustments to allocation and management of allotments in the HMA relative to the No Action Alternative and Alternative II, but would be less than required for Alternatives III and IV. Impacts from wild horses would be similar to Alternative IV, except the herd would be breeding so would require an increased number of gathers.

Alternative I would fall in the middle of the alternatives with regards to ensuring forage availability through wildland fire ecology and management actions and would require the second least amount of effort to minimize conflicts between livestock grazing and wildland fire ecology and management actions. Wildland fire ecology and management actions would provide a more balanced use of short-term and long-term actions to bring the planning area into FRCC 1. The use of native and non-native species in upland vegetation and ES&BAR treatments would maintain forage availability in burned and treated areas more than Alternatives IV and V, which would focus on use of native species.

Impacts from travel planning and development of motorized recreational opportunities in the Deadman/Yahoo SRMA would be similar or slightly more than Alternatives III and IV because of the inclusion of the Pasadena open play area, but would be less than the No Action Alternative.

Alternative I provides a moderate level of forage availability and limitation on infrastructure for livestock management. The level of effort required to minimize conflicts with livestock grazing would be low with regard to resources and other uses. Overall, there would be moderate beneficial impacts to livestock grazing under Alternative I.

Impacts from Alternative II

Alternative II would provide the second highest acres available for livestock grazing and the highest allocation of forage. The wild horse herd would be reduced to zero, eliminating competition for forage and water within the HMA. Restrictions on livestock management actions (e.g., utilization, season of use, and infrastructure) to achieve resource and objectives would be similar to the No Action Alternative but less restrictive than Alternatives I, III, IV, and V.

With the exception of the No Action Alternative, Alternative II does the least to ensuring forage availability through wildland fire ecology and management actions. Along with the No Action Alternative and Alternative III, Alternative II would require the least amount of effort to minimize conflicts between livestock grazing and wildland fire ecology and management actions. Wildland fire ecology and management actions would focus more on maintaining forage availability than all other alternatives, using strategic short-term management of fuels and conversion of annuals to perennial grassland. The use of forage allocation as a landscape-scale fuels management tool would be similar to Alternative III. The use of native and non-native species in ES&BAR actions would maintain forage availability in burned and treated areas, and assist suppression efforts (strategic placement of fire-resistant species) similar to Alternative II but more than Alternatives IV and V, which would focus on use of native species. The development and use of Reserve Common Allotments would provide increased options to temporarily relocate permittees whose allotments are being treated or have recently experienced wildland fire relative to the No Action and Alternative I, but similar to Alternatives II, IV and V.

Travel planning would decrease conflicts with recreation while maintaining or improving access for commercial activities relative to all alternatives. Alternative II would not designate motorized SRMAs so motorized impacts would be lower than in the No Action Alternative and Alternatives I, III, IV, and V.

Alternative II provides a high level of forage availability and low level of limitations on infrastructure for livestock management. The level of effort required to minimize conflicts with livestock grazing would be low with regard to resources and high with regard to other uses. Overall, there would be major beneficial impacts to livestock grazing under Alternative II.

Impacts from Alternative III

Alternative III would provide the third most acres available for livestock grazing and second highest allocation of forage. Restrictions on management actions (e.g., utilization, season of use, and infrastructure) to achieve special status species objectives would decrease management flexibility and the scope of options available to achieve resource objectives more than the No Action Alternative and Alternatives I and II, but less than Alternatives IV and V. ACEC management in Alternative III would require less effort to reduce conflicts with livestock grazing than any other alternative. The size of the wild horse herd would increase the adjustments to allocation and management of allotments in the HMA relative to the No Action Alternative and Alternatives I, II, and IV. Impacts from wild horses would be similar to Alternative V except the herd would have breeding animals and require more gathers.

Alternative III would fall in the middle of the alternatives with regards to ensuring forage availability through wildland fire ecology and management actions. Along with the No Action Alternative and Alternative II, Alternative III would require the least amount of effort to minimize conflicts between livestock grazing and wildland fire ecology and management actions. Wildland fire ecology and management actions would be similar to Alternative II, using strategic fuels management and increased forage allocation to reduce fire size across the planning area. The use of native and non-native species in ES&BAR actions would restore forage and assist suppression efforts (e.g., strategic placement of fire-resistant species) similar to Alternative II but more than Alternatives IV and V, which would emphasize use of native species.

Impacts from travel planning and development of motorized recreational opportunities in the Deadman/Yahoo SRMA would be similar to Alternatives I and IV, more than Alternative II, and less than the No Action Alternative and Alternative V.

Alternative III provides a high level of forage availability and low level of limitations on infrastructure for livestock management. A moderate amount of effort would be required to minimize conflicts with livestock grazing with regard to resources and other uses. Overall, there would be moderate to major beneficial impacts to livestock grazing under Alternative III.

Impacts from Alternative IV (the Preferred Alternative)

To achieve special status species and ACEC objectives Alternative IV would allocate the second (Alternative IV-B; the Preferred Alternative) and third (Alternative IV-A) fewest acres and forage to livestock grazing. Restrictions on livestock management actions (e.g., utilization, season of use, and infrastructure) would increase more than the No Action and Alternatives I through III, but less than Alternative V. The size of the wild horse herd would increase the adjustments to allocation and management of allotments in the HMA relative to No Action and Alternative II, but would be less than Alternatives III and V.

While Alternative IV-A would rank fifth with regard to ensuring forage availability through wildland fire ecology and management actions; Alternative IV-B would rank second. Alternative IV would require the second most effort to reduce conflicts between livestock grazing and wildland fire ecology and management actions. Wildland fire ecology and management actions would use some short-term actions (i.e., create fuel breaks) but would focus more on using long-term actions (conversion from annual to native shrubland) to bring the planning area into FRCC 1. ES&BAR actions would use more native species than the No Action Alternative and Alternatives I through III to move vegetation communities from perennial grassland to native shrubland. Conversion to native shrubland would increase restrictions on livestock management actions relative to the No Action Alternative and Alternatives I through III.

Impacts from travel planning and development of motorized recreational opportunities in the Deadman/Yahoo SRMA would be similar to Alternatives I and IV, more than Alternative II, and less than the No Action Alternative and Alternative V.

Alternative IV provides a low level of forage availability and high level of limitations on infrastructure for livestock management. A moderate amount of effort would be required to minimize conflicts with livestock grazing with regard to resources and other uses. Overall, there would be major adverse impacts to livestock grazing under Alternative IV.

Impacts from Alternative V

Alternative V would designate the most acres to ACEC of all alternatives. To achieve special status species objectives and to provide for pasture-sized reference areas, this alternative allocates the fewest acres available for livestock grazing and the lowest allocation of forage. Special status species and ACEC actions would restrict allocation and livestock management actions (e.g., utilization, season of use, and infrastructure) more than the other alternatives. The wild horse AML is the second highest of all alternatives increasing the adjustments to allocation and management of allotments in the HMA.

Alternative V does the most to ensure forage availability through wildland fire ecology and management actions, but requires the most effort to reduce conflicts between livestock grazing and wildland fire ecology and management actions. Wildland fire ecology and management actions would use more long-term actions (e.g., conversion from annual to native) with fewer short-term actions (e.g., fuel breaks) than all other alternatives to bring the planning area into FRCC 1. Upland vegetation and ES&BAR actions would use only native species and rely more on natural succession to move vegetation communities from perennial grassland to native shrubland. Conversion to native communities would increase restrictions on livestock management actions relative to the all alternatives.

Impacts from travel planning and development of motorized recreational opportunities would be higher than in any other alternative.

Alternative V provides the lowest level of forage availability and highest level of limitations on infrastructure for livestock management. The level of effort required to minimize conflicts with livestock grazing would be high with regard to resources and low with regard to other uses. Overall, there would be major negative impacts to livestock grazing under Alternative V.

Cumulative Impacts

Past, Present, and Reasonably Foreseeable Actions

Livestock operations depending on forage produced within the planning area also depend on forage produced on other Federal, State, and private lands within the region. Therefore, the analysis boundary includes the planning area and adjacent portions of the BLM Bruneau, Burley, Shoshone, and Wells FOs; Humboldt-Toiyabe National Forest; Sawtooth National Forest; State lands; and private lands intermingled with and adjacent to the planning area. Actions taken by other Federal and State land management agencies would not have a direct influence on the availability of forage within the planning area as their rules, regulations, and policy would be applicable only to lands under their jurisdiction. However, decisions affecting forage availability on those lands would influence the importance of access to available forage within the planning area. Similarly, restrictions to construction and maintenance of infrastructure on other lands could affect the ability to make forage available and properly manage grazing within the planning area.

Past, present, and reasonably foreseeable actions for the following resource and resource use cumulatively affect livestock grazing:

- Wildland Fire Ecology and Management
- Land Use Authorizations

These actions are described in detail in the *Introduction* to this chapter.

With regard to wildland fire ecology and management, and in addition to the discussion in the *Introduction*, wildland fire and fuels management has and is expected to continue to play a major role in forage availability within the planning area and will have similar effects on intermingled and adjoining landownership. Loss of forage on Federal lands during periods of recovery following wildland fire, drought, or restoration treatments will place additional burden on limited forage produced on other land ownership. Recent history has demonstrated sources of forage on private and State lands are affected by the same natural events influencing forage availability on Federal lands. Typically, these sources of forage are not excess, but when fenced off from BLM-managed lands, are being stored and used during periods of the year when forage on Federal lands is not available. Use of these forage sources to replace forage no longer available within the planning area creates another void that must be filled, often resulting in shortages or elevated prices of private pasture or hay. The larger the wildland fire or the more intense and widespread the drought, the wider the demand and search for alternative forage.

With regard to land use authorizations, and in addition to the discussion in the *Introduction*, energy development on private and State lands could affect traditional forage sources on developed lands as well as livestock grazing management within the planning area. Cumulative impacts of development on special status species habitat on all ownership within and immediately adjacent to the planning area would be considered in determining mitigation actions that would affect forage and lands available to livestock grazing. Proposed wind energy projects in the Brown’s Bench/China Mountain, such as the proposed China Mountain Wind Energy Project, have the highest potential to affect forage availability and management options. Relative to potential oil and gas development in the same area, wind energy projects have a higher potential for development, would have a larger footprint (actual acres disturbed during project development and operation) and would cover a more extensive area. Additionally, the entire project is in crucial habitat for several special status fish and wildlife species. Generally, forage availability within the project areas would remain similar to current levels because the projected footprint of permanent infrastructure is small (200 acres). However, the off-site mitigation that would likely occur on neighboring allotments to offset habitat degradation and loss within the project area would decrease forage availability and management options on those allotments.

Restrictions on infrastructure related to livestock management considered in this analysis would not apply to other land ownership as policy, rules, and regulations considered in this analysis only apply to BLM-managed lands. However, limitations on infrastructure constructed or managed on BLM-managed lands could affect intermingled private and state lands by limiting delivery or conveyance of water across Federal lands. Limiting access to forage available on BLM-managed lands could also limit access to forage on other lands intermingled within Federal allotments. BLM regulations (43 CFR 4140.1(b)(1)(i)) prohibits allowing livestock or other privately owned or controlled animals to graze on or be driven across BLM-managed lands without a permit or lease. This may require adjacent landowners to fence their land or otherwise restrict livestock on those lands from entering BLM-managed lands. Expense or logistics of construction may render fencing isolated tracts of land impractical, thereby indirectly denying access to forage on lands with other ownership.

Summary of Cumulative Impacts

Cumulative Impacts from the No Action Alternative

The No Action Alternative would maintain forage allocation at current levels with some opportunity for allotment-specific increases or decreases. Relative to the action alternatives, allocation would be the third highest and have the most acres available to livestock grazing. Restrictions on management practices (e.g., season of use, grazing use criteria) and infrastructure are generally less prescriptive than Alternatives I, III, IV, and V, providing more options and management flexibility to properly manage resources at the landscape scale, regardless of land ownership. The availability of forage on State and private lands would be maintained at current levels and potentially increased with additional livestock management infrastructure. More acres are available and guidelines are less restrictive for energy and ROW development than all other alternatives except Alternative II. As a result, energy development that decreases special status species habitat quality may result in mitigating actions, decreasing forage availability and increasing restrictions on infrastructure.

Cumulative Impacts from Alternative I

Alternative I would provide the fourth highest acreage available for livestock grazing and third highest allocation of forage, similar to the No Action Alternative. Restrictions on livestock management actions (e.g., utilization, season of use, and infrastructure) would decrease management flexibility relative to the No Action Alternative and Alternatives II and III. These restrictions would have localized effects on adjoining or intermingled land ownership. However, forage availability and management options would generally be maintained. Wind energy development on BLM–managed lands would not be allowed in native vegetation, which would limit effects of that activity on special status species habitat. However, energy development on State and private lands with special status species habitat may result in mitigating actions that would decrease forage availability and increase restrictions on infrastructure on

BLM-managed lands. Mitigating actions resulting from wind energy development in non-native vegetation types would have negligible effects on forage available to livestock grazing.

Cumulative Impacts from Alternative II

Alternative II would provide the second highest acreage available, the highest allocation of forage to livestock grazing, and the fewest restrictions on infrastructure relative to the other alternatives. These actions would also provide the most opportunity to increase forage availability on intermingled State and private lands. Increased allocation on BLM-managed lands would decrease the build-up of fine fuels; potentially decrease risk of wildland fire, thereby stabilizing forage availability on all land ownership. Alternative II would provide the most opportunity for commercial development of all the alternatives, potentially creating conflict and competition for limited resources between users. Effects would increase if intense development occurs in high-value special status species habitat. Effects to livestock grazing from mitigating actions for energy development would be similar to the No Action alternative.

Cumulative Impacts from Alternative III

Alternative III would provide the third highest acreage available and the third highest allocation to livestock grazing. The emphasis of this alternative is to reduce fire size and intensity by decreasing suppression response time and fuels management. Wildland fire size would be reduced thereby increasing the availability of forage. Impacts from wildland fire (e.g., decreased forage availability, loss of infrastructure and livestock) on State and private lands would be decreased, stabilizing forage bases and decreasing operational costs. Improvement of suppression infrastructure (e.g., water availability, access) may increase forage and water availability to livestock within the planning area. Wind energy development would not be allowed in native vegetation. Effects on forage availability would be similar to Alternative I.

Cumulative Impacts from Alternative IV (the Preferred Alternative)

Acres available and forage allocated for livestock grazing in Alternatives IV-A and IV-B (the Preferred Alternative) would be the sixth and fifth highest, respectively, directly related to resource objectives established in ACEC designation. Restrictions on new and existing infrastructure are relatively high; second only to Alternative V. Decreased acres available and the removal of infrastructure in areas unavailable for grazing would decrease available forage on intermingled State and private lands. Decreased allocation would result in accumulation of fine fuels, potentially increasing risk of larger wildland fire. Wildland fire would temporarily decrease forage availability and increase operational cost due to loss of infrastructure on all land ownership. More restrictive guidelines for temporary fences used to protect recovering burned areas and rehabilitation treatments would decrease forage availability on unburned areas within burned allotments. Wind energy development on BLM-managed lands would not be allowed in native vegetation, which would limit effects of that activity on special status species habitat. Energy development on State and private lands with special status species habitat may result inmitigating actions that would decrease forage availability and increase restrictions on infrastructure on BLM-managed lands. Mitigating actions resulting from wind energy development in non-native vegetation types would have negligible effects on forage available to livestock grazing.

Cumulative Impacts from Alternative V

Alternative V makes the fewest acres and least amount of forage available to livestock grazing of all alternatives. High-value special status species habitat and establishment of pasture-sized reference areas account for the majority of acres made unavailable to grazing. Restrictions on new and existing infrastructure are the highest of all alternatives. Decreased acres available and the removal of infrastructure in areas unavailable for grazing would decrease available forage on intermingled State and private lands. Decreased acres available and lower allocation of forage would result in the accumulation of fine fuels in ungrazed areas increasing the risk of larger wildland fires. Wildland fire would temporarily decrease forage availability and increase operational cost due to loss of infrastructure on all land ownership. Temporary fences used to protect recovering burned areas and rehabilitation treatments would not be allowed, decreasing forage availability on unburned areas within allotments affected by fire. Wind energy development on BLM-managed lands would not be allowed in native vegetation, which would limit effects of that activity on special status species habitat. Energy development on private and State lands with special status species habitat may result in mitigating actions that would decrease forage availability and increase restrictions on infrastructure on BLM-managed lands. Mitigating actions resulting from wind energy development in non-native vegetation types would have negligible effects on forage available to livestock grazing.

4.4.2. Recreation

Analysis Methods

Indicators

The following indicators were used for the analysis of impacts to recreation:

- **Acres with focused recreation management** – Special Recreation Management Areas (SRMAs) provide focused recreation management to specific locations. This management can provide and enhance recreational experiences.

- **Type** – Changes in the types of recreation opportunities (e.g., hunting, nature study, OHV riding)

- **Number** – Changes in the number of recreation opportunities (e.g., the number of targeted recreation activities emphasized in SRMAs)

- **Setting** – Changes in recreation opportunity setting (e.g., physical, social, or administrative setting)

Methods and Assumptions

Impacts to recreation from management in the following sections of Chapter 2 were analyzed in detail: *Recreation*, *Wildland Fire Ecology and Management*, *Non-WSA Lands with Wilderness Characteristics*, *Transportation and Travel*, *Land Use Authorizations*, and *Areas of Critical Environmental Concern*. Impacts from management in the *Land Tenure* section was not analyzed in detail as acquisitions or disposals of BLM-managed lands would provide for continued public access and recreation through mechanisms such as reserving public ROWs. The only identified potential disposal of BLM-managed lands with concentrated recreation use is in Alternative II. In that alternative, the Deadman and Yahoo areas could be transferred by exchange or R&PP leases to the State, counties, or local communities for development of motorized recreation areas, which is the primary recreation use on these lands. In this case, the lands would still be available for public recreation as approved by BLM, and the impact of the transfer on recreation use would be minimal. Impacts from management in the *Minerals* section were not analyzed in detail because development would occur at specific locations that are not known at this time. Management from the remaining sections was not analyzed in detail because the management did not vary measurably between alternatives or impact the indicator for recreation. **Impacts from management for recreation** can be found under *Impacts from Recreation Actions* in the *Water Resources*, *Riparian Areas and Wetlands*, *Fish*, *Wildlife*, *Special Status Fish and Aquatic Invertebrates*, *Special Status Wildlife*, *Wildland Fire Ecology and Management*, *Cultural Resources*, *Non-WSA Lands with Wilderness Characteristics*, *Transportation and Travel*, *Social Conditions*, and *Economic Conditions* sections.

Impacts to recreation are characterized by assessing changes in recreation opportunities, activities, and experiences associated with the management of resources and uses described below. Because recreators participate in a diverse set of activities for a variety of reasons, specific management actions may simultaneously negatively and positively impact recreation opportunities depending on an individual's desired experience. The type and degree of change are measured using the impact indicators listed above. The analysis and conclusions are based on ID Team knowledge of resources in the planning area, review of existing literature, information provided by other agencies, and best professional judgment.

Effects are quantified where possible, using numbers of acres to quantify particular changes. Where impacts are focused on or specific to certain recreation activities, the affected activities are listed. In the absence of quantitative data, impacts are described using ranges of potential impacts or in qualitative terms. Changes are compared to the existing situation using terms such as "change," "no change," "increase," and "decrease."

The following assumptions were used when analyzing impacts to recreation:

- Designation and management of an SRMA would provide the setting for the identified recreation opportunities.
- Some recreation opportunities are at least partially incompatible with others in the same area (e.g., intense OHV use and hiking).
- Continuing population growth in the surrounding region will increase future demand for recreation opportunities in the planning area, ultimately increasing visitor use numbers.
- New forms of recreation that are not an issue today may evolve into recreation issues during the life of the plan.
- Special Recreation Permits (SRPs) provide a tool to manage commercial, competitive, and organized events as well as concessions and special use areas. Terms and conditions would be included in all SRPs that would reduce impacts from these activities, in comparison to allowing these activities to take place with no restrictions.
- The entire potential utility development and potential wind development areas would be developed for those purposes.

Direct and Indirect Impacts

Impacts from Recreation Actions

For recreation management, areas are allocated to SRMAs and Extensive Recreation Management Areas (ERMAs). An SRMA is an area that is, for the most part, managed for recreation opportunities while meeting resource objectives. Other resource uses will occur in the area, but the recreation goals and objectives are of high consideration when management actions and proposals are being considered. SRMAs are where BLM:

- Focuses time, funding, and other resources to achieve specific recreation goals and objectives, and
- Preserves or enhances desired settings for specific types of recreation opportunities.

The vast majority of BLM managed-lands are ERMAs, which generally provide dispersed recreation opportunities. Recreation is not the predominant management emphasis in ERMAs, but is part of the balance of management considerations. Recreation management in ERMAs is custodial in nature and takes place to provide for health and safety and resource protection.

Management actions for recreation or other resources or uses may affect the recreation opportunity setting. Recreation opportunity settings are based upon a variety of physical, social, or administrative attributes such as remoteness, the amount of human modification in the natural environment, evidence of other users, and restrictions and controls.

Table 4- 288 displays the number of acres allocated to SRMAs and the remaining ERMA acres by alternative.

Table 4- 289 lists the primary activities identified for focused management in the SRMA management matrices (Appendix M) and the number of acres with management provided for that activity. These acres are identified for each alternative to display changes in managed recreation opportunities. The acres depicted for each activity do not mean that the activity will transpire over all the acres displayed or that those activities would not be allowed elsewhere, but is used to display relative increases or decreases in areas managed for that specific opportunity.

Table 4- 290 summarizes the anticipated changes to recreation opportunity setting within SRMAs as prescribed in the SRMA matrices in Appendix M. These changes to setting would occur in each alternative in which the specific SRMA would be designated.

Table 4- 288. SRMAs and ERMAs by Alternative (Acres)

SRMA	Alternative					
	No Action	I	II	III	IV	V
Balanced Rock	0	500	0	500	0	0
Bruneau-Jarbidge	57,000	14,000	14,000	14,000	14,000	14,000
Canyonlands	0	149,000	0	0	149,000	0
Deadman/Yahoo	0	36,000	0	34,000	34,000	0
Jarbidge Foothills	0	135,000	0	0	0	0
Jarbidge Forks	4,000	2,000	2,000	2,000	2,000	2,000
Little Pilgrim	0	300	300	300	0	0
Oregon Trail	16,000	0	0	0	0	0
Salmon Falls Creek	6,000	0	0	0	0	0
Salmon Falls Reservoir	0	5,000	5,000	5,000	5,000	0
Yahoo (Hagerman-Owsley Bridge)[A]	2,700	0	0	0	0	3,000
SRMA Total Acres	**85,700**	**341,800**	**21,300**	**55,800**	**204,000**	**19,000**
ERMA Total Acres	**1,288,000[B]**	**1,032,000**	**1,352,000**	**1,318,000**	**1,169,000**	**1,354,000**

[A] Hagerman-Owsley Bridge is the name used in the 1987 RMP; the same area would be called Yahoo in the action alternatives.
[B] ERMA lands were not specifically identified in the No Action Alternative; however, the intent of the 1987 RMP was to have recreation management as a component of the overall management of resource uses.

Table 4- 289. Areas with Focused Management for Specific Recreation Opportunities by Alternative (Acres)

SRMA Primary Activities	Alternative					
	No Action	I	II	III	IV	V
4X4 Driving	0	18,000	0	18,000	18,000	0
Bird Hunting	0	300	300	300	0	0
Boat Launching and Take-Out	0	3,000	3,000	3,000	3,000	0
Camping	4,000	5,000	5,000	5,000	5,000	2,000
Equestrian	0	285,000	0	0	149,000	0
Fishing	63,000	169,000	19,000	19,000	169,000	14,000
Hiking	13,000	285,000	0	500	149,000	0
Historical Interpretation, Non-Motorized	7,000	0	0	0	0	0
Hunting	63,000	303,000	18,000	18,000	168,000	14,000
Mountain Biking	0	135,000	0	0	0	0
Nature Study	5,600	0	0	0	0	0
Non-Motorized Boating	0	454	0	454	0	0
OHV Riding (ATV, Motorcycle, UTV)[A]	2,680	35,675	0	34,217	34,217	3,031
Picnicking	4,000	2,000	2,000	2,000	2,000	2,000
Primitive Camping	57,000	14,000	14,000	14,000	14,000	14,000
Primitive, Boat-In Camping	0	2,000	2,000	2,000	2,000	0
Viewing Wildlife and Natural Scenery	61,000	303,000	18,000	19,000	168,000	16,000
Water Sports	0	2,000	2,000	2,000	2,000	0
Whitewater Boating	61,000	16,000	16,000	16,000	16,000	16,000
Wild Horse Viewing	0	18,000	0	18,000	18,000	0
Number of Primary Activities	**11**	**18**	**11**	**16**	**15**	**8**

[A]ATV, Motorcycle, and Utility Terrain Vehicle (UTV) riding has been combined into OHV Riding because of the recognition and management of use as similar in nature.

Table 4- 290. Anticipated Changes to Recreation Opportunity Settings in SRMAs

SRMA	Alternative	Expected Changes in Physical, Social, and Administrative Settings
Balanced Rock	I, III	An increase of developed trails, signs, and visitor services would be prescribed to accommodate hiking and interpretation within the canyon. Contacts with groups and group size would be expected to increase. Maps, brochures, and informational signing would be provided. On-site management presence would be increased.
Bruneau-Jarbidge	I, II, III, IV, V	An increase in on-site management presence would be prescribed to protect resource values.
Canyonlands	I, IV	An increase in contacts with other visitors or small groups would be anticipated. Maps and regulatory signing would be available. Use restrictions would be implemented to maintain and protect natural and cultural resource values
Deadman/Yahoo		
Deadman RMZ	I, III, IV	Development of facilities such as parking, toilets, and informational/regulatory signage would be provided. The evidence of use, group encounters, and group size would increase. On-site management and law enforcement presence would increase. Area-specific maps and brochures would be provided.
Pasadena RMZ	I	
Yahoo RMZ	I, III, IV	
Rosevear Gulch RMZ	I, III, IV	Designated trails and regulatory/directional signage would be provided. The evidence of use, group encounters, and group size would increase. On-site management and law enforcement presence would increase. Area-specific maps and brochures would be provided.
Little Pilgrim	I, II, III	Parking and toilets would be installed. Access on designated roads would be improved. An increase in contacts with other visitors or small groups would be anticipated. On site management and law enforcement presence would increase. Area specific maps and brochures would be provided. Use restrictions would be implemented to maintain and protect natural and cultural resource values.
Jarbidge Foothills	I	An increase in contacts with other visitors or small groups would be anticipated. Maps and regulatory signing would be available. Use restrictions would be implemented to maintain and protect natural and cultural resource values.
Jarbidge Forks	I, II, III, IV, V	Administrative and maintenance personnel presence would increase.
Salmon Falls Reservoir		
Antelope Bay RMZ	I, II, III, IV	Facilities such as parking, toilets, boat ramps, and camping areas would be installed. Directional, interpretive, and regulatory signage would be provided. Access on and condition of designated roads would be improved. The evidence of use, group encounters, and group size would increase. On-site management and law enforcement presence would increase. Area-specific maps and brochures would be provided.
Cedar Creek RMZ	I, II, III, IV	An increase in contacts with other visitors or small groups would be anticipated. On-site management and law enforcement presence would increase. Area-specific maps and brochures would be provided.
Lud's Point RMZ	I, II, III, IV	Access on designated roads would be created or improved. Parking and toilets would be installed. The evidence of use, group encounters, and group size would increase. Directional and regulatory signage would be provided On-site management and law enforcement presence would increase. Area-specific maps and brochures would be provided.
Yahoo	V	Development of facilities such as parking, toilets, and informational/regulatory signage would be provided. The evidence of use, group encounters, and group size would increase. On-site management and law enforcement presence would increase. Area-specific maps and brochures would be provided.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative would continue to manage 85,700 acres as five separate SRMAs (Table 4- 288). This would be the third most SRMA acres of the alternatives, with 11 identified primary recreation opportunities (Table 4- 289). This alternative would continue existing management, and there would be no additional impact to the acres allocated for focused recreation management.

The SRMAs in this alternative were not clearly delineated or mapped in the 1987 Jarbidge RMP, even though acres were allocated for each SRMA and the SRMA names provide a rough indication of where focused recreation management was intended. Development of Recreation Activity Management Plants may help provide some focus and guidance for these areas; however, managing SRMAs without clearly established boundaries would not allow for accommodation of demand for recreational resources as stated. The recreation opportunity type and number would remain unchanged because new and increasing recreation demand could not be accommodated without defined areas. Without clearly defined boundaries, recreation opportunity settings in these areas could change due to resource uses or resource protections.

Portions of the planning area receive high levels of recreation use outside these SRMAs. Because special recreation management would not be provided for this use and the affected areas would continue to be managed as part of the 1,288,000-acre ERMA, the recreation demand and use may not be adequately accommodated. This would increase user and resource conflicts throughout these areas. Without focused recreation management in these high-use areas, altered natural resources may result in a change to recreation opportunity settings.

Impacts from Management Common to All Action Alternatives

Recreation management common to the action alternatives would maintain or enhance recreation opportunities. These management decisions would have impacts related to specified natural resource protection, while providing for recreation use and visitor safety.

- Through monitoring and management actions, the type, number, and settings of recreation opportunities may be changed depending on specific needs.
- Resource protection management methods could alter the type, decrease the number, and maintain or improve the natural setting of recreation opportunities.
- Opportunity type may be restricted, number may decrease, and setting may be maintained or improved to meet riparian objectives as outlined in the ARMS.
- Opportunity type may change and opportunity number may decrease within areas specified for closures or limitations on dispersed camping.
- Recreation opportunity type, number, and setting may be supported by fees, but would not be anticipated to be changed if a fee structure were to be implemented.
- SRPs may provide equipment and skilled guides through an outfitter for a particular experience, thus increasing the number of available opportunities. The opportunity setting may change in a social contact aspect with increased group size.
- A permit system for whitewater use would limit the number of users on sections of rivers, potentially affecting setting by reducing visitor contact and reducing the effects of concentrated use on the resources.

Impacts from Management Specific to Alternative I

Alternative I would manage 341,800 acres as eight separate SRMAs (Table 4- 288). This would be the most SRMA acres of the alternatives, with 18 identified primary recreation opportunities (Table 4- 289). This alternative would also have the broadest range of activity type among all alternatives. Some existing uses without focused recreation management under the No Action Alternative would have designated management provided in Alternative I. These uses include OHV riding in the Pasadena, Deadman, and Rosevear areas and the fishing and boating activities at Cedar Creek Reservoir, Little Pilgrim Gulch, and Salmon Falls Reservoir. Changes to recreation opportunity settings would be specific to individual SRMAs (Table 4- 290).

This alternative would provide for 1,032,000 acres managed as ERMA lands. The ERMA management objectives would provide basic public information, access, and minimal facilities, while ensuring public health and safety, reducing user conflicts, and protecting natural resources. This would be similar to current management of these lands and would therefore have only minor impacts on recreation when compared to existing conditions.

The issuance and management of SRPs would have no impact to the acres allocated for focused recreation management. Recreation opportunity type may change based upon available commercial services that are provided through the SRP. SRPs may provide equipment and skilled guides through an outfitter for that particular experience, thus increasing the number of available opportunities. The opportunity setting may change in a social contact aspect with increased group size.

Impacts from Management Specific to Alternative II

Alternative II would manage 21,300 acres as four separate SRMAs (Table 4- 288). This would be the second fewest SRMA acres of the alternatives, with 11 identified primary recreation opportunities (Table 4- 289). The SRMAs proposed in this alternative would maintain or enhance some existing opportunities, while minimizing conflict with resource uses. Some existing uses without focused recreation management under the No Action Alternative would have designated management provided in Alternative II. These uses include the fishing and boating activities at Cedar Creek Reservoir, Little Pilgrim Gulch, and Salmon Falls Reservoir. There would be no SRMAs managed for motorized recreation use. Changes to recreation opportunity settings would be specific to individual SRMAs (Table 4- 290).

Partnerships with the State, counties, or local communities for the creation of OHV parks at the Deadman and Yahoo areas would provide areas available to the public with focused management for this opportunity. This would not affect SRMA acreage for this alternative, because these areas would no longer be managed by BLM. The recreation opportunity type and number would remain the same as in the No Action Alternative. The setting prescribed for these particular areas would change due to increased users, surface disturbance, and associated facilities.

This alternative would provide for custodial recreational management of 1,352,000 acres as ERMA lands. Impacts from ERMA management are the same as described for Alternative I.

The impacts to the type, number, and setting of recreation opportunities resulting from SRP management would be the same as those described for Alternative I.

Impacts from Management Specific to Alternative III

Alternative III would manage 55,800 acres as six separate SRMAs (Table 4- 288). This would be the third fewest SRMA acres of the alternatives, with 16 identified primary recreation opportunities (Table 4- 289). The SRMAs proposed in this alternative would maintain or enhance existing opportunities. Some existing uses without focused recreation management under the No Action Alternative would have designated management provided in Alternative III. These uses include OHV riding in the Deadman and Rosevear areas and the fishing and boating activities at Cedar Creek Reservoir, Little Pilgrim Gulch, and Salmon Falls Reservoir. Changes to recreation opportunity settings would be specific to individual SRMAs (Table 4- 290).

This alternative would provide for custodial recreational management of 1,318,000 acres allocated as ERMA lands. Impacts from ERMA allocation are the same as described for Alternative I.

In an attempt to limit recreation-related fire starts, issuance priority would be granted to SRPs for activities occurring outside the fire season. The issuance and management of SRPs would have no impact to the acres with focused recreation management. Seasonal and overnight limitations on recreation permits would decrease the number and types of opportunities available during those times. SRPs may provide equipment and skilled guides through an outfitter for a particular experience, thus increasing the overall number or type of available opportunities. The opportunity setting may change in a social contact aspect with increased group size.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV would manage 204,000 acres as six separate SRMAs (Table 4- 288). This would be the second most SRMA acres of the alternatives, with 15 identified primary recreation opportunities (Table 4- 289). The SRMAs proposed in this alternative would maintain or enhance existing opportunities, including providing focused recreation management for OHV riding in the Deadman and Rosevear areas and fishing and boating at Cedar Creek and Salmon Falls Reservoirs; however, existing fishing and boating activities at Little Pilgrim Gulch would not have designated management provided. Changes to recreation opportunity settings would be specific to individual SRMAs (Table 4- 290).

This alternative would provide for custodial recreational management of 1,169,000 acres as ERMA lands. Impacts from ERMA allocation are the same as described for Alternative I.

The issuance and management of SRPs would have no impact to the acres allocated for focused recreation management. Recreation opportunity type may be limited through an SRP in order to support conservation of natural and cultural resource values. The opportunity setting may change in a social contact aspect with increased group size.

Impacts from Management Specific to Alternative V

Alternative V would manage 19,000 acres as three separate SRMAs (Table 4- 288). This would be the fewest SRMA acres of the alternatives, with six identified primary recreation opportunities (Table 4- 289). The SRMAs proposed in this alternative would maintain portions of existing opportunities, while allowing for restoration of resources. As a result, some existing uses would not have designated management provided, such as OHV riding in the Deadman and Rosevear areas and the fishing and boating activities at Cedar Creek Reservoir, Little Pilgrim Gulch, and Salmon Falls Reservoir. Changes to recreation opportunity settings would be specific to individual SRMAs (Table 4- 290).

This alternative would provide for custodial recreational management of 1,354,000 acres as ERMA lands. Impacts from ERMA allocation are the same as described for Alternative I.

The impacts to the acres with focused recreation management and type, number, and setting of recreation opportunities resulting from SRP management would be the same as those described for Alternative IV.

Impacts from Wildland Fire Ecology and Management Actions

Reducing or preventing fires would protect recreational settings and available opportunities. Temporary restrictions due to fire, fuels, or ES&BAR could limit number and type of recreation opportunities. Wildland fire can temporarily remove or change the vegetation component of areas, affecting the physical setting. Table 4- 291 summarizes the impacts to recreation indicators from management for wildland fire ecology and management described in Chapter 2.

Impacts from Management Specific to the No Action Alternative

Wildland fire management described for the No Action Alternative would not affect the type, number, or setting of recreation opportunities as the entire planning area would be managed for full suppression.

The entire planning area would be managed for full suppression in the No Action Alternative; however, identifying all areas for full suppression does not result in the prioritization of any areas for fire suppression activities. As a result, SRMAs would be susceptible to changes in physical setting due to wildland fire.

Table 4- 291. SRMAs by Fire Suppression Areas by Alternative (Acres)

SRMA	Suppression Area	Alternative [A]					
		I	II	III	IV		V
					IV-A	IV-B	
Balanced Rock	Critical	500		500			
Bruneau-Jarbidge	Conditional	0	14,000	2,000	100	<100	1,000
	Critical	14,000	900	12,000	14,000	14,000	13,000
Canyonlands	Conditional	82,000			65,000	95,000	
	Critical	68,000			85,000	85,000	
Deadman/Yahoo	Conditional	32,000		32,000	32,000		32,000
	Critical	3,700		2,200	2,200		2,200
Jarbidge Foothills	Conditional	33,000					
	Critical	102,000					
Jarbidge Forks	Conditional	100	1,000	800	<100		<100
	Critical	2,000	900	1,000	2,000		2,000
Little Pilgrim	Conditional	<100	<100	<100			
	Critical	300	300	300			
Salmon Falls Reservoir	Conditional	1,000	4,000	1,000	800		
	Critical	3,000	1,000	3,000	4,000		
Yahoo	Conditional						2,000
	Critical						1,000
Conditional Total		**148,100**	**19,000**	**35,800**	**97,900**	**99,000**	**35,000**
Critical Total		**193,500**	**3,100**	**19,000**	**107,200**	**107,200**	**18,200**

Note: Shaded cells indicate the SRMA would not be designated in that alternative
[A] The No Action Alternative does not identify Critical or Conditional Suppression Areas.

Impacts from Management Specific to Alternative I

The Canyonlands and Deadman/Yahoo SRMAs and the Cedar Creek RMZ within the Salmon Falls Reservoir SRMA would be located primarily in Conditional Suppression Areas in Alternative I. Conditional Suppression Areas would be more likely than Critical Suppression Areas to experience a change in recreation opportunity setting due to the possibility of increased wildland fire severity. SRMAs in Conditional Suppression Areas would be more susceptible to changes in physical setting due to wildland fire than SRMAs located in Critical Suppression Areas (Balanced Rock, Bruneau-Jarbidge, Jarbidge Foothills, Jarbidge Forks, Little Pilgrim, and the remainder of Salmon Falls Reservoir). This impact would be of short duration (five years or less) depending on the pre-fire vegetation community; re-growth or restoration of vegetation would eventually allow the setting to recover.

Improving water availability for fire suppression in areas of high recreation use would help maintain the existing recreation opportunities and settings. Short-term closures of recreation areas and facilities could occur in areas with active fires to support suppression activities or in recently burned areas to support ES&BAR activities, temporarily affecting recreation opportunity type and number. Recreation opportunity setting would remain unchanged.

A fuel break located around an SRMA would be intended to protect the recreation opportunities and settings from a fire originating outside the SRMA, or could protect ERMA opportunities and settings from fires originating within an SRMA. Fuel breaks would minimize the potential for change to recreation settings. This would have no effect on recreation opportunity type and number.

Impacts from Management Specific to Alternatives II

The Bruneau-Jarbidge and Salmon Falls Reservoir SRMAs would be located primarily in Conditional Suppression Areas identified for Alternative II. These areas would be more susceptible to temporary changes in physical setting due to wildland fire as described for Alternative I than SRMAs primarily located in Critical Suppression Areas (Jarbidge Forks and Little Pilgrim).

Impacts from Management Specific to Alternatives III

The Deadman/Yahoo SRMA and the Cedar Creek Recreation Management Zone (RMZ) within the Salmon Falls Reservoir SRMA would be located primarily in Conditional Suppression Areas. These areas would be more susceptible to temporary changes in physical setting due to wildland fire as described for Alternative I than SRMAs primarily located in Critical Suppression Areas (Bruneau-Jarbidge, Balanced Rock, Jarbidge Forks, Little Pilgrim, and the remainder of Salmon Falls Reservoir).

Short-term closures of recreation areas and facilities could occur in areas with active fires to support suppression activities or in recently burned areas to support ES&BAR activities, temporarily reducing recreation opportunity type and number.

Impacts from Management Specific to Alternatives IV

The Canyonlands and Deadman/Yahoo SRMAs and the Cedar Creek RMZ within the Salmon Falls SRMA would be located primarily in Conditional Suppression Areas. These areas would be more susceptible to temporary changes in physical setting due to wildland fire as described for Alternative I than SRMAs primarily located in Critical Suppression Areas (Bruneau-Jarbidge, Jarbidge Forks, and the remainder of Salmon Falls Reservoir).

Short-term closures of recreation areas and facilities could occur in areas with active fires to support suppression activities or in recently burned areas to support ES&BAR activities, temporarily reducing recreation opportunity type and number.

Impacts from Management Specific to Alternatives V

The Yahoo SRMA would be located primarily in a Conditional Suppression Area. This area would be more susceptible to temporary changes in physical setting due to wildland fire as described for Alternative I than SRMAs primarily located in Critical Suppression Areas (Bruneau-Jarbidge and Jarbidge Forks).

Short-term closures of recreation areas and facilities could occur in areas with active fires to support suppression activities or in recently burned areas to support ES&BAR activities, temporarily reducing recreation opportunity type and number.

Impacts from Non-WSA Lands with Wilderness Characteristics Actions

Managing non-WSA lands with wilderness characteristics for their undeveloped character and to provide opportunities for unconfined recreation activities and solitude would ensure continued protection of related recreation opportunities such as primitive camping and hiking. Table 4- 292 summarizes the impacts to recreation indicators from management for non-WSA lands with wilderness characteristics described in Chapter 2.

Table 4- 292. Impacts to Recreation from Management for Non-WSA Lands with Wilderness Characteristics

Indicator	Alternative					
	No Action	I	II	III	IV	V
Type	Change	No change	Change	Change	No change	No change
Number	Change	No change	Change	Change	No change	No change
Setting	Change	No change	Change	Change	No change	No change

Impacts from Management Specific to the No Action Alternative and Alternatives II and III

Actions to maintain wilderness characteristics on lands outside WSAs are not proposed under these alternatives. Alterations to the existing wilderness character (i.e., naturalness, opportunity for solitude, or opportunity for primitive and/or unconfined recreation) would allow for changes to the recreation opportunity type, number, and setting within those areas.

Impacts from Management Specific to Alternative I

Actions proposed in Alternative I to maintain wilderness characteristics on 39,000 acres outside WSAs would maintain the existing backcountry and/or primitive recreation opportunity type, number, and setting within those areas.

Impacts from Management Specific to Alternatives IV and V

Actions proposed in Alternatives IV and V to maintain wilderness characteristics on 53,000 acres outside WSAs would maintain the existing backcountry and/or primitive recreation opportunity type, number, and setting within those areas.

Impacts from Transportation and Travel Actions

Transportation and travel management may redistribute or modify land available for some types of recreation activities by changing the amount and type of access. The areas allocated as open to motorized vehicle use, limited to designated routes or ways, or closed to motorized vehicle use may affect recreation opportunity type and setting. Table 4- 293 summarizes the impacts to recreation indicators from transportation and travel management described in Chapter 2.

Table 4- 293. Impacts to Recreation from Transportation and Travel Management

Recreation Opportunity Indicator	Alternative					
	No Action	I	II	III	IV	V
Type	No change	Change	Change	No change	Change	Change
Number	No change	Change	Change	No change	Change	Change
Setting	Change	Change	Change	Change	Change	Change

Impacts from Management Specific to the No Action Alternative

In the No Action Alternative, existing management would continue to allow cross-country motorized vehicle use in designated areas (77% of the planning area), providing the largest portion of land available for this recreation opportunity among the alternatives. This may diminish the setting for some non-motorized recreation opportunities such as primitive camping, hiking, horseback riding, and some types of hunting, fishing, and wildlife viewing, due to potential for disturbances related to motorized recreation. The type, and number of recreation opportunities would remain unchanged. The closures in the Bruneau and Jarbidge Canyons and Salmon Falls Creek ACEC would continue; this would not affect recreation type, number, or setting in those areas as they are accessible only through non-motorized means.

Impacts from Management Common to All Action Alternatives

All types of recreation opportunities would be a consideration for route designation, restrictions, or modification. Route designation would define the allowable routes for travel and access and would affect the type, number, and setting of opportunities (i.e., motorized, non-motorized).

Impacts from Management Specific to Alternative I

Alternative I would allow cross-country motorized vehicle use in designated areas (less than 1% of the planning area). While this would reduce the overall amount of land available for this recreation opportunity, a portion of area currently utilized for cross-country motorized vehicle use would be retained for this use. Recreation opportunity type and number would not change, as these activities would still be available.

Reducing the number of acres open to cross-country motorized vehicle use would improve physical settings by protecting resources and provide for larger areas for non-motorized recreation opportunities. The social setting would be expected to change, as cross-country motorized users would be limited to defined areas, increasing their contact occurrences. While the existing closures in the Bruneau and Jarbidge Canyons and Salmon Falls Creek ACEC would continue, Alternative I would also include closures in some non-WSA lands with wilderness characteristics. Even though these areas do not have existing routes within them, these new closures may change the type and number of recreation opportunities by eliminating cross-country motorized use within those areas.

Allowing cross-country motorized travel to campsites within 25 feet of designated routes would not affect recreation opportunity type, number, or setting. Restricting motorized game retrieval to within 300 feet of a designated route would minimize damage to natural resources and could subsequently enhance recreation opportunity settings.

Impacts from Management Specific to Alternative II

Alternative II would not allow cross-country motorized vehicle use anywhere within the planning area. This would close all land available for this recreation opportunity. Recreation opportunity type and number would change, as these activities would no longer be available.

Elimination of all open areas would improve physical settings by protecting resources and provide for larger areas for non-motorized recreation opportunities.

Allowing cross country motorized travel to campsites within 100 feet of designated routes would not affect recreation opportunity type, number, or setting. Allowing motorized game retrieval off any designated route could damage natural resources and subsequently diminish recreation opportunity settings.

Impacts from Management Specific to Alternative III

Alternative III would allow cross-country motorized vehicle use in designated areas (less than 1% of the planning area). While this would reduce the overall amount of land available for this opportunity, a portion of area currently utilized for cross-country travel would be retained for this use. Recreation opportunity type and number would not change, as these activities would still be available.

Similar to Alternative I, reducing the number of acres open to cross-country motorized vehicle use would improve physical settings by protecting resources and provide for larger areas for non-motorized recreation opportunities. The social setting would be expected to change, as cross-country motorized users would be limited to defined areas, increasing their contact occurrences.

Allowing cross-country travel to campsites within 25 feet of designated routes would not affect recreation opportunity type, number, or setting. Not allowing motorized game retrieval off designated routes would minimize damage to natural resources and could subsequently enhance recreation opportunity settings.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV would allow cross-country motorized vehicle use in designated areas (less than 1% of the planning area). While this would reduce the overall amount of land available for this opportunity, a portion of area currently utilized for cross-country travel would be retained for this use. Recreation opportunity type and number would not change, as these activities would still be available.

Similar to Alternative I, reducing the number of acres open to cross-country motorized vehicle use would improve physical settings by protecting resources and provide for larger areas for non-motorized recreation opportunities. The social setting would also be expected to change, as cross-country motorized users would be limited to defined areas, increasing their contact occurrences. While the existing closures in the Bruneau and Jarbidge Canyons would continue, Alternative IV would also include closures in non-WSA lands with wilderness characteristics. Even though these areas do not have existing routes within them, these new closures may change the type and number of recreation opportunities by eliminating cross-country motorized vehicle use within those areas.

Allowing cross-country travel to campsites within 25 feet of designated routes would not affect recreation opportunity type, number, or setting. Not allowing motorized game retrieval off designated routes would minimize damage to natural resources and could subsequently enhance recreation opportunity settings.

Impacts from Management Specific to Alternative V

Alternative V would allow cross-country motorized vehicle use in designated areas (less than 1% of the planning area). This alternative would have the smallest area available for this opportunity; however, a portion of area currently utilized for cross-country motorized vehicle use would be retained. Recreation opportunity type and number would not change, as these activities would still be available.

Similar to Alternative I, reducing the number of acres open to cross-country motorized vehicle use would improve physical settings by protecting resources and provide for larger areas for non-motorized recreation opportunities. The social setting would also be expected to change, as cross-country motorized users would be limited to defined areas, increasing their contact occurrences. Alternative V would also close WSAs and non-WSA lands with wilderness characteristics to motorized vehicle use. Closing WSAs may change the type and number of recreation opportunities by eliminating motorized travel on inventoried ways, prohibiting motorized access within WSAs. Even though non-WSA lands with wilderness characteristics do not have existing routes within them, these new closures may change the type and number of recreation opportunities by eliminating cross-country motorized vehicle use within those areas.

Allowing cross-country travel to campsites within 25 feet of designated routes would not recreation opportunity type, number, or setting. Not allowing motorized game retrieval off designated routes would minimize damage to natural resources and could subsequently enhance recreation opportunity settings.

Impacts from Land Use Authorizations Actions

Land use authorizations have the potential to affect the setting of recreation opportunities. Development and ancillary structures associated with wind energy development and other ROWs could displace recreational visitors or limit some available opportunities. The actual impact would be relative to the extent of development within available areas.

Impacts from Management Specific to the No Action Alternative

In the No Action Alternative, 76,000 acres throughout the planning area have potential for utility development, and 156,000 acres have potential for wind energy development, primarily in the northeast and southeast portions of the planning area. Recreation opportunities such as natural scenery viewing would be impacted, and settings for other opportunities such as primitive camping or hiking would be changed. The visual and natural components of recreation physical settings would be most affected by these actions relative to the extent and location of development; for example, primitive recreation in the Jarbidge Foothills may be affected due to a change in naturalness.

Impacts from Management Specific to Alternative I

Under Alternative I, 71,000 acres throughout the planning area have potential for utility development, and 59,000 acres have potential for wind energy development, primarily in the northeast portion of the planning area. Recreation opportunities such as natural scenery viewing would be impacted, and settings for other opportunities such as primitive camping or hiking would be changed. The visual and natural components of recreation physical settings would be most affected by these actions relative to the extent and location of development.

Impacts from Management Specific to Alternative II

Under Alternative II, 77,000 acres throughout the planning area have potential for utility development, and 162,000 acres have potential for wind energy development, primarily in the northeast and southeast portions of the planning area. The impacts on these acres would be the same as described for the No Action Alternative.

Impacts from Management Specific to Alternative III

Under Alternative III, 71,000 acres throughout the planning area have potential for utility development, and 60,000 acres have potential for wind energy development, primarily in the northeast portion of the planning area. The impacts of these acres would be the same as described for Alternative I.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Under Alternative IV, 70,000 acres throughout the planning area have potential for utility development, and 59,000 acres have potential for wind energy development, primarily in the northeast portion of the planning area. The impacts of these acres would be the same as described for Alternative I.

Impacts from Management Specific to Alternative V

Under Alternative V, 60,000 acres throughout the planning area have potential for utility development, and 42,000 acres have potential for wind energy development, primarily in the northeast portion of the planning area. The impacts of these acres would be the same as described for Alternative I.

Impacts from Areas of Critical Environmental Concern Actions

ACECs are designated and managed to protect the identified relevant and important values. Protective management may prescribe measures to mitigate impacts from certain activities within the ACEC boundaries, which may affect recreation opportunities in those areas. Table 4- 294 summarizes the impacts to recreation indicators from ACEC management described in Chapter 2.

Table 4- 294. Impacts to Recreation from ACEC Management by Alternative

Recreation Opportunity Indicator	Alternative					
	No Action	I	II	III	IV	V
Type	No change	Change	No change	Change	Change	Change
Number	No change	Change	No change	Change	Change	Change
Setting	No change	Change	No change	No change	No change	Change

Impacts from Management Specific to the No Action Alternative

Managing ACECs to protect or enhance the relevant and important values and addressing OHV riding on a case-by-case basis would not affect the area, type, number, and setting of recreation opportunities within ACECs designated in the No Action Alternative.

Impacts from Management Specific to Alternative I

In Alternative I, management specific to the Bruneau-Jarbidge, Lower Bruneau Canyon, Middle Snake, Salmon Falls Creek, and Sand Point ACECs may implement protective measures (e.g., permit systems, designated campsites outside ACEC, road improvements, travel barriers, toilets) to mitigate impacts of recreation uses if they are impairing relevant and important values. Restrictions or modifications for this purpose may change opportunity type, number, and setting within those ACECs. Restrictions may include seasonal or spatial closures, and modifications such as toilets or travel barriers may alter the evidence of use or naturalness of the setting. SRPs would be allowed within ACECs with mitigation to offset the impacts to the relevant and important values, which may increase the number of opportunities available.

Impacts from Management Specific to Alternative II

Under Alternative II, no ACECs would be designated, and no management specific to recreation mitigation is specified. This would not affect the type, number, or setting of recreation opportunities.

Impacts from Management Specific to Alternative III

In Alternative III, management specific to the Bruneau-Jarbidge, Salmon Falls Creek, and Sand Point ACECs may implement protective measures (e.g., permit systems, designated campsites outside ACEC) to mitigate impacts of recreation uses if they are impairing relevant and important values. Restrictions for this purpose may decrease opportunity type and number within those ACECs. SRPs would be allowed within ACECs with mitigation to offset the impacts to the relevant and important values, which may increase the number of opportunities available. This would not affect the setting of recreation opportunities.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

In Alternative IV, management specific to the Bruneau-Jarbidge, Inside Desert, Jarbidge Foothills, Lower Bruneau Canyon, and Sand Point ACECs may implement protective measures (e.g., permit systems, designated campsites outside ACEC boundaries) to mitigate impacts of recreation uses if they are impairing relevant and important values. Restrictions for this purpose may decrease opportunity type and number within those ACECs. SRPs would be allowed within ACECs with mitigation to offset the impacts to the relevant and important values, which may increase the number of opportunities available. This would not affect the setting of recreation opportunities.

Impacts from Management Specific to Alternative V

In Alternative V, management specific to the Lower Bruneau Canyon, Middle Snake, Sagebrush Sea, and Sand Point ACECs may implement protective measures (e.g., permit systems, designated campsites outside ACEC, road improvements, travel barriers, toilets) to mitigate impacts of recreation uses if they are impairing relevant and important values. Restrictions or modifications for this purpose may change opportunity type, number, and setting within those areas.

Summary of Direct and Indirect Impacts

The decision to allocate acreage for SRMAs varies across alternatives (Table 4- 288). Alternative I would allocate the largest acreage for special recreation management, followed by Alternatives IV, the No Action Alternative, and Alternatives III, II, and V. Acres not designated as SRMA would be managed as ERMAs.

The types of recreation opportunities available would be affected by various management actions throughout all of the alternatives. Primary activities displayed in Table 4- 289 represent targeted recreation opportunities identified in the SRMA matrices (Appendix M). Other types of recreation opportunities may exist in SRMAs and ERMAs, but are not distinctly identified. The types of available opportunities would mostly be affected by two factors: 1) the acres with focused recreation management, and 2) acres designated for cross-country motorized vehicle use. Preferred types of opportunities are unique to each recreator, and a loss or restriction of one type may create or expand a different type. A relative comparison of types of available opportunities across alternatives is best represented by the number of activities identified for the SRMAs. Therefore, Alternative I (18) offers the highest number of opportunities, followed by Alternatives III (16), IV (15), the No Action Alternative (11), II (11), and V (6).

Recreation opportunity setting considers physical, social, and administrative factors. SRMAs have prescribed setting character to maintain or enhance recreation opportunities and experiences. ERMAs also have a variety of setting character, but the setting character is not prescribed specifically for recreation purposes. Impacts to settings are best represented by the variance in SRMA designations across alternatives (Table 4- 288 and Table 4- 290).

The tables below summarize the impacts to recreation by alternative. Where the impacts are quantifiable, such as changes in SRMA acres, it is described as an “increase”, “decrease”, or “no change.” Impacts that are mostly qualitative, such as changes to opportunity settings, are displayed in these summary tables only as “change” or “no change.”

Impacts from the No Action Alternative

The No Action Alternative would continue to manage 85,700 acres as five separate SRMAs. The SRMAs in this alternative have not been clearly delineated or mapped, but acreage has been referenced in the allocations. Managing the SRMAs without clearly established boundaries does not address the existing or anticipated increase in demand of the recreational resources. In order to manage these as actual SRMAs if this alternative were selected, a plan amendment would be necessary to specify boundaries for these SRMAs.

Recreation opportunity type, number, and settings may vary to accommodate resources and resource uses. Currently, there are portions of the planning area receiving high levels of recreation use not included in these SRMAs. Without focused recreation management for these areas, opportunity settings may change due to alterations to natural resources. Absence of management to protect non-WSA lands with wilderness characteristics would allow activities to occur that may degrade the wilderness character in those areas limiting opportunities for solitude or primitive, unconfined recreation. Allowing a majority of the planning area to remain open to cross-country motorized vehicle use would provide an opportunity on a large acreage for this type of recreational use, but would also limit non-motorized recreation opportunities and settings. Wind energy developments and utility corridors would limit the type and number of recreation opportunities by altering the visual setting. The total area with potential for these projects under the No Action Alternative is 232,000 acres. Table 4- 295 summarizes the impacts to recreation from the No Action Alternative.

Table 4- 295. Summary of Impacts to Recreation under the No Action Alternative

Section	Acres	Type	Number	Setting
Recreation	No change	No change	No change	Change
Wildland Fire Ecology and Management	No change	No change	No change	No change
Non-WSA Lands with Wilderness Characteristics	No change	Change	Change	Change
Transportation and Travel	No change	No change	No change	Change
Land Use Authorizations	No change	Change	Change	Change
ACECs	No change	No change	No change	No change

Overall, the No Action Alternative would result in a minor increase in recreational opportunities in the long term.

Impacts from Alternative I

Alternative I would designate 341,800 acres as eight separate SRMAs. This would be an increase in SRMA acreage over the No Action Alternative and would be the largest SRMA acreage designated among the action alternatives with a total of 18 identified primary recreation opportunities.

Designation of these SRMAs would provide the broadest range of activity type among all alternatives. Wildland fire ecology and management actions would place restrictions or closures on recreation areas and activities during fire suppression or rehabilitation activities. This would temporarily affect the type and number of available recreation opportunities. This alternative also would also provide for fuel breaks around SRMAs. Management to protect some non-WSA lands with wilderness characteristics would not allow activities to occur that may degrade the wilderness character in those areas, protecting opportunities for solitude or primitive, unconfined recreation in those areas. A substantial decrease in the acres open to cross-country motorized vehicle use would decrease the opportunity for this type of recreational use, but may also enhance recreation settings and opportunities for other types of recreational use. Consideration of specific recreation activities as criteria for route designation would affect the type, number, and setting of recreation opportunities by allowing or restricting motorized access to specific destinations. Wind energy developments and utility corridors would limit the type and number of recreation opportunities by altering the visual setting. The total area with potential for these projects under Alternative I is 130,000 acres. ACEC management may implement protective measures to mitigate recreation uses that are impairing relevant and important criteria, affecting type, number, and settings of recreation opportunities. Table 4- 296 summarizes the impacts to recreation from Alternative I.

Table 4- 296. Summary of Impacts to Recreation under Alternative I

Section	Acres	Type	Number	Setting
Recreation	Increase	Change	Change	Change
Wildland Fire Ecology and Management	No change	Change	Change	No change
Non-WSA Lands with Wilderness Characteristics	No change	No change	No change	No change
Transportation and Travel	No change	Change	Change	Change
Land Use Authorizations	No change	Change	Change	Change
ACECs	No change	Change	Change	Change

Overall, Alternative II would result in a major increase in recreational opportunities in the long term.

Impacts from Alternative II

Alternative II would designate 21,300 acres as four separate SRMAs. This would be the second lowest SRMA acreage designated among the alternatives, with 11 identified primary recreation opportunities.

The SRMAs proposed in this alternative would maintain or enhance some existing opportunities, while minimizing conflict with resource uses. There would be no SRMAs managed for motorized recreation use. Wildland fire ecology and management actions would place restrictions or closures on recreation areas and activities during fire suppression or rehabilitation activities. This would temporarily affect the type and number of available recreation opportunities. Absence of management to protect non-WSA lands with wilderness characteristics would allow activities to occur that may degrade the wilderness character in those areas, limiting opportunities for solitude or primitive, unconfined recreation. The lack of areas open to cross-country motorized vehicle use would eliminate the opportunity for this type of recreational use, but may also enhance recreation settings and opportunities for other types of recreational use; however, cross-country motorized use may continue if R&PP leases for OHV play areas were pursued. Consideration of specific recreation activities as criteria for route designation would affect the type, number, and setting of recreation opportunities by allowing or restricting motorized access to specific destinations. Wind energy developments and utility development areas would limit the type and number of recreation opportunities by altering the visual setting. The total area with potential to be developed for these projects under Alternative II is 239,000 acres, the highest acreage of all alternatives. Table 4- 297 summarizes the impacts to recreation from Alternative II.

Table 4- 297. Summary of Impacts to Recreation under Alternative II

Section	Acres	Type	Number	Setting
Recreation	Decrease	Change	Change	Change
Wildland Fire Ecology and Management	No change	Change	Change	No change
Non-WSA Lands with Wilderness Characteristics	No change	Change	Change	Change
Transportation and Travel	No change	Change	Change	Change
Land Use Authorizations	No change	Change	Change	Change
ACECs	No change	No change	No change	No change

Overall, Alternative II would result in a minor increase in recreational opportunities in the long term.

Impacts from Alternative III

Alternative III would designate 55,800 acres as six separate SRMAs. This would be a decrease in SRMA acreage from the No Action Alternative and would be the third lowest SRMA acreage designated among the alternatives, with 16 identified primary recreation opportunities.

The SRMAs proposed in this alternative would maintain or enhance existing opportunities. Wildland fire ecology and management actions would place restrictions or closures on recreation areas and activities during fire suppression or rehabilitation activities. This would temporarily affect the type and number of available recreation opportunities. Absence of management to protect non-WSA lands with wilderness characteristics would allow activities to occur that may degrade the wilderness character in those areas, limiting opportunities for solitude or primitive, unconfined recreation. A substantial decrease in the acres open to cross-country motorized vehicle use would decrease the opportunity for this type of recreational use, but may also enhance recreation settings and opportunities for other types of recreational use. Consideration of specific recreation activities as criteria for route designation would affect the type, number, and setting of recreation opportunities by allowing or restricting motorized access to specific destinations. Wind energy developments and utility corridors would limit the type and number of recreation opportunities by altering the visual setting. The total area with potential to be developed for these projects under Alternative III is 131,000 acres. ACEC management may implement protective measures to mitigate recreation uses that are impairing relevant and important criteria, affecting type and number of recreation opportunities. Recreation settings would be unaffected because no new facilities are needed for resource mitigation in these ACECs. Table 4- 298 summarizes the impacts to recreation from Alternative III.

Table 4- 298. Summary of Impacts to Recreation under Alternative III

Section	Acres	Type	Number	Setting
Recreation	Decrease	Change	Change	Change
Wildland Fire Ecology and Management	No change	Change	Change	No change
Non-WSA Lands with Wilderness Characteristics	No change	Change	Change	Change
Transportation and Travel	No change	Change	Change	Change
Land Use Authorizations	No change	Change	Change	Change
ACECs	No change	Change	Change	No change

Overall, Alternative III would result in a major increase in recreational opportunities in the long term.

Impacts from Alternative IV (the Preferred Alternative)

Alternative IV would designate 204,000 acres as six separate SRMAs. This would be an increase in SRMA acreage over the No Action Alternative, and the second highest SRMA acreage designated among the alternatives, with 15 identified primary recreation opportunities.

The SRMAs proposed in this alternative would maintain or enhance existing opportunities. Wildland fire ecology and management actions would place restrictions or closures on recreation areas and activities during fire suppression or rehabilitation activities. This would temporarily affect the type and number of available recreation opportunities. A substantial decrease in the acres open to cross-country motorized vehicle use would decrease the opportunity for this type of recreational use, but may also enhance recreation settings and opportunities for other types of recreational use. Consideration of specific recreation activities as criteria for route designation would affect the type, number, and setting of recreation opportunities by allowing or restricting motorized access to specific destinations. Wind energy developments and utility corridors would limit the type and number of recreation opportunities by altering the visual setting. The total area with potential to be developed for these projects under Alternative IV is 129,000 acres. ACEC management may implement protective measures to mitigate recreation uses that are impairing relevant and important criteria, affecting type and number of recreation opportunities. Recreation settings would be unaffected because no new facilities are needed for resource mitigation in these ACECs. Table 4- 299 summarizes the impacts to recreation from Alternative IV.

Table 4- 299. Summary of Impacts to Recreation under Alternative IV (the Preferred Alternative)

Section	Acres	Type	Number	Setting
Recreation	Increase	Change	Change	Change
Wildland Fire Ecology and Management	No change	Change	Change	No change
Non-WSA Lands with Wilderness Characteristics	No change	No change	No change	No change
Transportation and Travel	No change	Change	Change	Change
Land Use Authorizations	No change	Change	Change	Change
ACECs	No change	Change	Change	No change

Overall, Alternative IV would result in a moderate decrease in recreational opportunities in the long term.

Impacts from Alternative V

Alternative would designate 19,000 acres as three separate SRMAs. This would be a decrease in SRMA acreage from the No Action Alternative, and the lowest SRMA acreage designated among the action alternatives, with six identified primary recreation opportunities.

The SRMAs proposed in this alternative would maintain portions of existing opportunities, while allowing for restoration of resources. This alternative would not provide designated management for some of the existing uses, such as OHV riding in the Deadman and Rosevear areas and the fishing and boating activities at Little Pilgrim Gulch, Cedar Creek Reservoir and Salmon Falls Reservoir. Wildland fire ecology and management actions would place restrictions or closures on recreation areas and activities during fire suppression or rehabilitation activities. This would temporarily affect the type and number of available recreation opportunities. A substantial decrease in the acres open to cross-country motorized vehicle use would decrease the opportunity for this type of recreational use, but may also enhance recreation settings and opportunities for other types of recreational use. In addition, motorized travel on inventoried ways within WSAs would no longer be allowed, potentially affecting the type, number, and setting of recreation opportunities. Consideration of specific recreation activities as criteria for route designation would affect the type, number, and setting of recreation opportunities by allowing or restricting motorized access to specific destinations. Wind energy developments and utility corridors would limit the type and number of recreation opportunities by altering the visual setting. The total area with potential to be developed for these projects under Alternative V is 102,000 acres. ACEC management may implement protective measures to mitigate recreation uses that are impairing relevant and important criteria, affecting type, number, and settings of recreation opportunities. Table 4- 300 summarizes the impacts to recreation from Alternative V.

Overall, Alternative V would result in a moderate decrease in recreational opportunities in the long term.

Table 4- 300. Summary of Impacts to Recreation under Alternative V

Section	Acres	Type	Number	Setting
Recreation	Decrease	Change	Change	Change
Wildland Fire Ecology and Management	No change	Change	Change	No change
Non-WSA Lands with Wilderness Characteristics	No change	No change	No change	No change
Transportation and Travel	No change	Change	Change	Change
Land Use Authorizations	No change	Change	Change	Change
ACECs	No change	Change	Change	Change

Cumulative Impacts

Past, Present, and Reasonably Foreseeable Actions

Cumulative impacts on recreation include other past, present, and reasonably foreseeable actions that may affect recreation associated with the planning area. The cumulative impact analysis region includes all lands within and around the planning area with similar recreation opportunities, such as the adjacent portions of the Wells and Burley FOs, the Jarbidge Ranger District and Jarbidge Wilderness of the Humboldt-Toiyabe National Forest, and the Minidoka Ranger District of the Sawtooth National Forest.

Past, present, and reasonably foreseeable actions for the following resource uses cumulatively affect recreation:

- Recreation
- Transportation and Travel
- Land Use Authorizations

These actions are described in detail in the *Introduction* to this chapter.

Summary of Cumulative Impacts

Cumulative Impacts from the No Action Alternative

The SRMAs designated in the No Action Alternative would not sufficiently address all of the expected increase in regional demand and new recreation technology that is expected to occur throughout the life of the plan. The combination of the allowable area for cross-country motorized vehicle use and continued motorized recreation expansion into areas not currently or historically used would result in changes to the existing recreational setting where these activities occur. Areas of concentrated use, such as the popular Deadman and Rosevear OHV areas and Little Pilgrim Gulch and Salmon Falls Reservoir for fishing and camping, would continue to see degradation of natural resources altering the recreational settings, and an increase in conflicts with other users and adjacent private landowners.

The transportation and travel management actions specific to the No Action Alternative would allow cross-country motorized travel on 77% of the planning area. This allowable use, in combination with increased travel restriction and demand throughout the region, would be expected to result in an increased participation in cross-country recreation in this area. This would also result in an increase in resource, resources use, and other recreation use conflicts. Damage to vegetation, increased soil erosion, and habitat fragmentation would contribute to a change in recreational settings for non-motorized opportunities such as wildlife viewing, hunting, and hiking.

The No Action Alternative would designate a large portion of the planning area as available for energy production and transmission line projects, ROWs, and other land use authorizations. In combination with proposed energy projects, this would change recreational settings and opportunities available on public lands in a significant portion of the region. These developments may include substations, structures, transmission lines, new travel routes, and wind turbines, which would alter the natural and visual values associated with certain recreation activities.

Cumulative Impacts from Alternative I

The SRMAs designated in Alternative I would accommodate all the expected increase in regional demand and foreseeable new recreation technology that is expected to occur throughout the life of the plan. This increased recreation demand, combined with the prescribed individual SRMA management, would maintain or enhance recreation settings as needed for resource integrity and resource use requirements.

The transportation and travel management specific to Alternative I would allow cross-country motorized travel on less than 1% of the planning area. This reduction in available area, in combination with increased travel restriction and demand throughout the region, would be expected to result in an overall decrease in lands available for this activity throughout the region. This would also result in a decrease in motorized recreation conflicts with resource, resources use, and other recreation uses. This would reduce damage to vegetation, soil erosion, and habitat fragmentation contributing to stability and enhancement of recreational settings for non-motorized opportunities such as wildlife viewing, hunting, and hiking.

Under Alternative I, the portion of the planning area available for energy production and transmission projects, ROWs, and other land use authorizations in combination with proposed energy projects would change recreational settings and opportunities available on public lands in a smaller area than the No Action Alternative. These developments may include substations, structures, transmission lines, new travel routes, and wind turbines, which would alter the natural and visual values associated with certain recreation activities.

Cumulative Impacts from Alternative II

The SRMAs designated in Alternative II would accommodate some existing uses, but would not address motorized recreation in the current use areas or accommodate the expected increase demand of all recreation. These SRMAs would not be sufficient to meet the demands of increased regional recreational use resulting in diminished recreation opportunity type, number and settings.

The transportation and travel management actions specific to Alternatives II would eliminate cross-country motorized travel entirely. This reduction in available area, in combination with increased travel restriction and demand throughout the region, would be expected to result in an overall decrease in lands available for this activity throughout the region. This would also result in a decrease in motorized recreation conflicts with resource, resources use, and other recreation uses. This would reduce damage to vegetation, soil erosion, and habitat fragmentation contributing to stability and enhancement of recreational settings for non-motorized opportunities such as wildlife viewing, hunting, and hiking.

Similar to the No Action Alternative, Alternative II would designate a large portion of the planning area as available for energy production and transmission projects, ROWs, and other land use authorizations. In combination with proposed energy projects, this would change recreational settings and opportunities available on public lands in a significant portion of the region. These developments may include substations, structures, transmission lines, new travel routes, and wind turbines, which would alter the natural and visual values associated with certain recreation activities.

Cumulative Impacts from Alternative III

The SRMAs designated in Alternative III would accommodate all the expected increase in regional demand and foreseeable new recreation technology that is expected to occur throughout the life of the plan. This increased recreation demand combined with the prescribed individual SRMA management would maintain or enhance recreation settings as needed for resource integrity and resource use requirements.

The transportation and travel management actions specific to Alternative III would allow cross-country motorized travel on less than 1% of the planning area with cumulative impacts similar to Alternative I.

Under Alternative III, the portion of the planning area available for energy production and transmission projects, ROWs, and other land use authorizations in combination with proposed energy projects would change recreational settings and opportunities available on public lands in a smaller area than the No Action Alternative. These developments may include substations, structures, transmission lines, new travel routes, and wind turbines, which would alter the natural and visual values associated with certain recreation activities.

Cumulative Impacts from Alternative IV (the Preferred Alternative)

The SRMAs designated in Alternative IV would accommodate some of the expected increase in regional demand and new recreation technology. This alternative would not provide focused management for improvement of the Little Pilgrim and Balanced Rock areas, which is not expected to have a cumulative impact on recreation.

The transportation and travel management action specific to Alternative IV would allow cross-country motorized travel on less than 1% of the planning area with cumulative impacts similar to Alternative I.

Under Alternative IV, the portion of the planning area available for energy production and transmission projects, ROWs, and other land use authorizations in combination with proposed energy projects would change recreational settings and opportunities available on public lands in a smaller area than the No Action Alternative. These developments may include substations, structures, transmission lines, new travel routes, and wind turbines, which would alter the natural and visual values associated with certain recreation activities.

Cumulative Impacts from Alternative V

Similar to the No Action Alternative, the SRMAs designated in Alternative V provide minimal focused management for recreation and would not accommodate the expected increase in regional demand and new recreation technology. An SRMA would be provided for motorized recreation, but would only comprise a portion of the area currently being used and would not be sufficient to accommodate increased regional demand. This alternative would provide for most non-motorized recreation opportunity demand.

The transportation and travel management actions specific to Alternative V would allow cross-country motorized travel on less than 1% of the planning area with cumulative impacts similar to Alternative I.

Under Alternative V, the portion of the planning area available for energy production and transmission projects, right-of-ways, and other land use authorizations in combination with proposed energy projects would change recreational settings and opportunities available on public lands in a smaller area than the No Action Alternative. These developments may include substations, structures, transmission lines, new travel routes, and wind turbines, which would alter the natural and visual values associated with certain recreation activities.

4.4.3. Transportation and Travel

OPLMA contains transportation management that affects the planning area. Management described in the Draft RMP/EIS for transportation and travel in the No Action Alternative is not consistent with the Act; however, transportation and travel management for the action alternatives would be consistent. The implications of this to the impact analysis are described in the errata sheet at the front of Volume 1. The Proposed RMP/Final EIS will incorporate the management direction contained in the Act.

Analysis Methods

Indicators

The following indicators were used for the analysis of impacts to transportation and travel:

- **Route density** – The linear length of routes per area (i.e., miles of route per square mile).
- **Route location** – The placement of the route relative to resources or resource uses. This could include alterations to width, alignment, or grade.
- **Route condition** – Route condition is a result of the maintenance intensity applied to roads, primitive roads, and trails. Maintenance intensity provides guidance on the appropriate frequency and type of maintenance (e.g., gravel or pavement surfaces) that keeps routes in an acceptable condition.

Methods and Assumptions

Impacts to transportation and travel from management in the following sections of Chapter 2 were analyzed in detail: *Transportation and Travel*, *Fish*, *Wildlife*, *Special Status Species*, *Wildland Fire Ecology and Management, Recreation*, *Land Use Authorizations*, and *Areas of Critical Environmental Concern*. Impacts from management in the *Water Resources* and *Riparian Areas and Wetlands* sections were not analyzed in detail because the impacts were captured in sections that were analyzed. Management from the remaining sections was not analyzed in detail because the management did not vary measurably between alternatives or impact the indicator for transportation and travel. **Impacts from management for transportation and travel** can be found under *Impacts from Transportation and Travel Actions* in the *Air Quality*, *Soil Resources*, *Water Resources*, *Upland Vegetation*, *Riparian Areas and Wetlands*, *Fish*, *Wildlife*, *Special Status Plants*, *Special Status Fish and Aquatic Invertebrates*, *Special Status Wildlife*, *Noxious Weeds and Invasive Plants*, *Wildland Fire Ecology and Management*, *Wild Horses*, *Paleontological Resources*, *Cultural Resources*, *Non-WSA Lands with Wilderness Characteristics*, *Livestock Grazing*, *Recreation*, *Land Use Authorizations*, *Wilderness Study Areas*, *Social Conditions*, and *Economic Conditions* sections.

Impact analyses and conclusions are based on ID Team knowledge of resources in the planning area, review of existing literature, and information provided by other agencies. Effects are quantified where possible. In the absence of quantitative data, best professional judgment was used. Impacts are described using ranges (e.g., route density – increase, decrease, or unchanged) of potential impacts or in qualitative terms, if appropriate.

The following assumptions were used when analyzing impacts to transportation and travel:

- Based on existing and historic trends and increases in population, motorized vehicle use would continue to increase within the planning area; however, the future rate of increase may be influenced by other factors.
- BLM would continue to recognize valid existing rights of access to State and private lands.
- BLM would continue to recognize and authorize necessary access for permitted uses such as livestock grazing and land use authorizations.
- Developments considered as components of range infrastructure do not include transportation routes unless specified.
- BLM objectives for management of motorized vehicle use are intended to protect resources, promote the safety of all users of those lands, and minimize conflicts among the various uses of those lands (BLM, 2001).
- The absence of roads is an inventory criteria when identifying non-WSA lands with wilderness characteristics. Because there has not been a demand for routes through these areas to date, it is assumed that no new routes would be created, even in alternatives where non-WSA lands with wilderness characteristics are not managed for those characteristics.

Direct and Indirect Impacts

Impacts from Transportation and Travel Actions

All public lands are required to be designated open, limited, or closed to motorized vehicle use (43 CFR 8342.1). These designations determine where and how motorized vehicle use occurs. Open areas allow any type of vehicle, anywhere, anytime (commonly known as cross-country travel). Limited areas can restrict season of use, type of use, number of users, or limit use to designated or existing roads, trails, or ways. Motorized vehicle use is prohibited in closed areas. The management decision regarding travel designations has the greatest direct effect on both transportation routes and travel conditions.

Table 4- 301 displays the number of acres open to cross-country motorized vehicle use, limited to designated or inventoried routes or ways, or closed to motorized vehicle use. The acreages of limited areas within WSAs are shown in separate rows of the table because certain inventoried routes that met specific criteria (ways) in the WSAs are subject to requirements under IMP guidelines. Until the WSAs are released by Congress, the BLM cannot establish or designate new routes in these areas.

Table 4- 301. Travel Designations by Alternative (Acres)

Management Category	Alternative					
	No Action	I	II	III	IV	V
Open	1,062,000	4,000	0	4,000	4,000	700
Limited to Designated Routes	216,000	1,241,000	1,279,000	1,275,000	1,223,000	1,226,000
Limited to Designated Ways	0	72,000	73,000	72,000	73,000	0
Limited to Inventoried Ways	70,000	0	0	0	0	0
Closed	25,000	57,000	21,000	24,000	74,000	147,000

Travel Management Areas (TMAs) delineate areas with similar transportation management characteristics, resource concerns, and focus for transportation planning. Each TMA has a unique focus that considers program goals and objectives, primary travelers, travel objectives, maintenance of setting characteristics, and primary means of travel. Management actions from other resources and uses include direction to achieve the focus of the TMA.

Each TMA in the action alternatives contains a focus that may affect route density. Table 4- 302 identifies the number of acres that may experience an increase or decreases in route density as well as the number of acres that are expected to experience little or no change in route density over the life of the plan. The No Action Alternative does not identify TMAs; therefore, density impacts for this alternative are not reflected in this table.

Table 4- 302. Route Density Change Based on TMA Focus by Alternative (Acres)

Route Density Change	Alternative [A]				
	I	II	III	IV	V
Increase	41,000	1,161,000	34,000	34,000	3,000
Static	667,000	213,000	1,339,000	0	0
Decrease	666,000	0	0	1,339,000	1,370,000

[A] The No Action Alternative does not identify TMAs.

Impacts from Management Specific to the No Action Alternative

Cross-country motorized vehicle use would continue on 77% of the planning area. Based on current trends, motorized vehicle use would continue to increase over the long term and additional unplanned routes would continue to be established by repeated use. While not all of these acres are used for cross-country travel, there are certain activities that take users off established routes (e.g., motorized dispersed camping, some motorized hunting, and motorized recreation). Under this allocation, route density would increase. Route location and condition would remain mostly unchanged unless resource or resource use management actions prescribe otherwise.

Future road construction could be restricted in crucial wildlife habitat, riparian areas, and within 1 mile of bighorn sheep habitat, thereby minimizing any increase in route density. Route location and condition would remain unchanged unless resource or resource use management actions prescribe otherwise.

Route density is not expected to change under the following allocations:
- 25,000 acres (2% of the planning area) where motorized vehicle use would be prohibited, including the Bruneau, Jarbidge, and Salmon Falls Creek Canyons;
- 216,000 acres (16% of the planning area) where motorized vehicle use would be limited to designated routes, including the Sand Point ACEC, Oregon NHT, certain cultural areas, and identified bighorn sheep habitat; and
- 70,000 acres (5% of the planning area) in portions of WSAs that are not closed where motorized vehicle use would be limited to inventoried ways.

Route location and condition are not expected to change unless resource or resource use management actions prescribe otherwise.

Minor seasonal restrictions on travel by snow vehicles within identified crucial mule deer and pronghorn winter range, if the IDFG determines harassment, could periodically be implemented.

Impacts from Management Common to All Action Alternatives

Route density, location, and condition may be changed based upon the decisions made in the Comprehensive Transportation and Travel Management Plan (CTTMP). In addition, temporary and localized restrictions on travel could result in short-term limitations to access routes if the authorized officer determines that a particular type of use is causing undue impacts to resources. Under this action, route density would remain unchanged. Route location and condition would remain unchanged unless resource management actions prescribe otherwise.

Minimizing construction and maintenance of roads within or adjacent to special status wildlife and fish habitat and big game winter range during important seasonal periods would minimize increases in route density and limit the disturbance these activities would have during sensitive timeframes. Route location and condition would remain unchanged unless resource actions prescribe otherwise.

Special designation proposals for routes (i.e., Back Country Byways and National Recreation Trails) may lead to the potential improvement in condition; however, route density and location would remain unchanged.

Valid agreements and Memoranda of Understanding (MOUs) with local highway districts for road maintenance may have an effect on route location, and condition may improve based on applied maintenance. Route density would remain unchanged.

Impacts from Management Specific to Alternative I

In Alternative I, route density in areas open to cross-country motorized vehicle use (less than 1% of the planning area) is expected to increase based on trends and demand for motorized open areas. Route location may change and condition may improve due to increased intensity and diversity of use.

Limiting motorized vehicle use on 90% of the planning area to designated routes would limit the creation of user-created routes. Seasonal restrictions on specific routes in approximately 82,000 acres of the HMA would decrease localized travel during these periods. Changes in route density, location, and condition in areas limited to designated routes would depend on the focus of each TMA for the CTTMP:

- Route density in the Canyonlands, Jarbidge Foothills, and Snake River TMAs is expected to decrease. Route location and condition may be altered to maintain or improve resource integrity while continuing to provide public access.
- Route density in the Devil Creek TMA is expected to remain unchanged to balance access and resource uses with resource objectives. Route location and condition may be altered to maintain or improve resource integrity while continuing to provide access.
- Route density in the Deadman/Yahoo TMA is expected to increase to facilitate motorized recreational opportunities. Route location and condition may change based on intensity and diversity of use.

Overall, 48% of the planning area is within a TMA expected to experience a decrease in route density, and 49% is within a TMA expected to retain the same route density. Compared to the current situation, overall density would decrease in areas limited to designated routes. Route location and condition would remain unchanged.

Travel would be limited to designated ways within WSAs. Route density would decrease in WSAs and route location and condition would remain unchanged.

Overall route density, location, and condition are not expected to change in areas closed to motorized vehicle use; the Salmon Falls Creek ACEC and the Bruneau-Jarbidge Canyon area are currently closed and are physically inaccessible to motorized vehicle travel.

Other transportation and travel management actions may affect route density, location, and condition in localized areas or on a short-term basis:

- This alternative would maintain the option for hunters to retrieve big game using motorized vehicles within 300 feet of a designated route, but not within areas closed to motorized vehicle use. While this is not likely to take place across the entire planning area since big game hunting does not occur

across the entire area, certain areas may show an increase in routes due to localized game retrieval. Game retrieval may increase route density and may affect route location if the disturbance created during retrieval is subsequently used for unauthorized general travel. Route condition would remain unchanged.
- Special authorization for access for permitted uses such as livestock grazing and land use authorizations would continue. Written permission by the authorized officer would be required for special activities, which may include cross-country motorized vehicle use in limited or closed areas.
- Travel may be limited when the danger of fire is high by temporarily closing or restricting access to identified areas. This would be a temporary spatial restriction on access, with no long term impacts on travel and transportation.
- Allowing motorized cross-country travel to a camp site within 25 feet of a designated route, excluding areas closed to motorized vehicle use, riparian areas, and WSAs, would not affect overall route density, location, and condition.

Impacts from Management Specific to Alternative II

Under Alternative II, no designated open areas to motorized vehicles would be allocated.

Motorized transportation and travel would be limited to designated or existing routes in 93% of the planning area. Changes in route density, location, and condition in areas limited to designated routes would depend on the focus of each TMA:
- Route density in the Canyonlands TMA is expected to remain unchanged to balance access and resource uses with resource objectives. Route location and condition may be prescribed to maintain or improve resource integrity while continuing to provide access.
- Route density in the Bruneau Desert TMA is expected to increase due to the focus on facilitation of commercial uses while mitigating impacts to resources. Route location and condition may be prescribed to maintain or improve resource integrity while continuing to provide access.

Based on the focus of Alternative II, and as displayed in Table 4- 302, route density is expected to increase in 85% of the planning area. Route location may stay the same, or change on a case-by-case basis to meet resource objectives or facilitate resource use. Route condition may change in order to facilitate resource use.

Travel would be limited to designated ways within the WSAs. Route density would decrease in WSAs and route location and condition would remain unchanged.

Route density, location, and condition are not expected to change in areas closed to motorized vehicle use; the Bruneau-Jarbidge Canyon area is currently closed and is physically inaccessible to motorized vehicle travel.

Other transportation and travel management actions may affect route density, location, and condition in localized areas or on a short-term basis:
- This alternative would maintain the option for hunters to retrieve big game using motorized vehicles within 300 feet of a designated route, but not within areas closed to motorized vehicle use. Certain areas may show an increase in routes due to localized game retrieval. Game retrieval may increase route density and may affect location if the disturbance created during retrieval is subsequently used for unauthorized general travel. Route condition would remain unchanged.
- Special authorization for access for permitted uses such as livestock grazing and land use authorizations would continue. Written permission by the authorized officer would be required for special activities, which may include cross-country motorized vehicle use in limited or closed areas.
- Motorized cross-country vehicle travel to a camp site within 100 feet of a designated route, excluding areas closed to motorized vehicle use, riparian areas, and WSAs, would not affect overall route density, location, and condition.

Impacts from Management Specific to Alternative III

Under Alternative III, route density in the designated open area (less than 1% of the planning area) would increase based on trends and demand for areas open to cross-country motorized vehicle use. Route location and condition may change due to increased intensity and diversity of use.

Limiting motorized vehicle use in 93% of the planning area to designated routes or existing routes would limit new user-created routes. Seasonal restrictions on specific routes in approximately 82,000 acres of the HMA would decrease localized travel during these periods. Changes in route density, location, and condition in areas limited to designated routes would depend on the focus of each TMA:

- Route density in the Devil Creek, Jarbidge Foothills, Snake River, and West Side TMAs is expected to remain unchanged to balance access and resource uses with resource objectives and facilitate fire suppression and prevention. Route location and condition may be altered to maintain or improve access for wildland fire suppression and/or prevention.
- Route density in the Deadman/Yahoo TMA is expected to increase to facilitate motorized recreational opportunities. Route location and condition may change based on intensity and diversity of use.

Two percent of the planning area is expected to experience a decrease in route density. Ninety-eight percent of the planning area is expected to retain the same route density. Compared to the current situation, overall density would be similar. Route location may change and condition may improve based on the needs of fire suppression planning and management.

Travel would be limited to designated ways within WSAs. Route density would decrease in WSAs and route location and condition would remain unchanged.

Overall route density, location, and condition are not expected to change in areas closed to motorized vehicle use; the Salmon Falls Creek ACEC and the Bruneau-Jarbidge Canyon area are currently closed and are physically inaccessible to motorized vehicle travel.

Other transportation and travel management actions may affect route density, location, and condition in localized areas or on a short-term basis:

- Special authorization for access for permitted uses such as livestock grazing and land use authorizations would continue. Written permission by the authorized officer would be required for special activities, which may include cross-country motorized vehicle use in limited or closed areas.
- Travel may be limited when the danger of fire is high by temporarily closing or restricting access to specific areas. This would be a temporary spatial restriction on access, with no long term impacts on travel and transportation.
- The use of motorized vehicles to retrieve big game would not be allowed.
- Motorized cross-country travel to a camp site within 25 feet of a designated route, excluding areas closed to motorized vehicle use, riparian areas, and WSAs, would not affect overall route density, location, and condition.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Under Alternative V, route density in the designated open area (less than 1% of the planning area) would increase based on trends and demand for motorized open areas. Route location and condition may change due to increased intensity and diversity of use.

Limiting motorized vehicle use in 89% of the planning area to designated routes or existing routes would limit the creation of user-created routes. Changes in route density, location, and condition in areas limited to designated routes would depend on the focus of each TMA:

- Route density in the Canyonlands, Devil Creek, Jarbidge Foothills, Snake River TMAs is expected to decrease for protection of wildlife habitat and restoration activities. Public access would still be provided. Route location and condition may be prescribed to maintain or improve resource integrity while continuing to provide public access.
- Route density in the Deadman/Yahoo TMA is expected to increase to facilitate motorized recreational opportunities. Route location and condition may change based on intensity and diversity of use.

Ninety-eight percent of the planning area is expected to experience a decrease in route density. Two percent of the planning area is expected to experience an increase in route density. Compared to the current situation, overall density would decrease. Route location and condition would remain generally unchanged.

Travel would be limited to designated ways within WSAs. Route density would decrease in WSAs and route location and condition would remain unchanged.

Overall route density, location, and condition are not expected to change in areas closed to motorized vehicle use; the Bruneau-Jarbidge Canyon area are currently closed and are physically inaccessible to motorized vehicle travel and non-WSA lands managed for their wilderness characteristics are roadless at the present time.

Other transportation and travel management actions may affect route density, location, and condition in localized areas or on a short-term basis:

- Special authorization for access for permitted uses such as livestock grazing and land use authorizations would continue. Written permission by the authorized officer would be required for special activities, which may include cross-country motorized vehicle use in limited or closed areas.
- Travel may be limited when the danger of fire is high by temporarily closing or restricting access to identified areas. This would be a temporary spatial restriction on access, with no long term impacts on travel and transportation.
- The use of motorized vehicles to retrieve big game would not be allowed.
- Motorized cross-country travel to a camp site within 25 feet of a designated route, excluding areas closed to motorized vehicle use, riparian areas, and WSAs, would not affect overall route density, location, and condition.

Impacts from Management Specific to Alternative V

Under this allocation, the designation of open motorized areas in the Yahoo SRMA (700 acres) would not affect route density. Route location and condition may change due to increased intensity and diversity of use.

Limiting motorized vehicle use in 89% of the planning area to designated routes, or existing routes would limit the creation of user-created routes. Changes in route density, location, and condition in areas limited to designated routes would depend on the focus of each TMA:

- Route density in the Devil Creek, Jarbidge Foothills, Snake River, and West Side TMAs is expected to decrease to accommodate habitat restoration and for preservation of core habitat size for sage-grouse and other special status species. Route location and condition may be prescribed to maintain or improve resource integrity while continuing to provide public access.
- Route density in the Yahoo TMA is expected to increase to facilitate motorized recreational opportunities. Route location and condition may change based on intensity and diversity of use.

Ninety-nine percent of the planning area is expected to experience a decrease in route density. Less than 1% of the planning area is expected to experience an increase in route density. Compared to the current situation, overall density would decrease. Route location and condition would remain generally unchanged.

Inventoried ways in the WSAs and non-WSA lands managed for their wilderness characteristics would be closed to motorized vehicle use. Route density would decrease slightly due to the closure of inventoried ways in the WSAs. Route location and condition would remain unchanged.

Other transportation and travel management actions may affect route density, location, and condition in localized areas or on a short-term basis:

- Motorized travel by lessees, BLM permit holders, and ROW holders would be restricted by allowing no exceptions to the use of designated routes in limited areas.
- Written permission by the authorized officer would be required for special activities, which may include cross-country motorized vehicle use in limited or closed areas.

- Travel may be limited when the danger of fire is high by temporarily closing or restricting access to identified areas. This would be a temporary spatial restriction on access, with no long term impacts on travel and transportation.
- The use of motorized vehicles to retrieve big game off designated routes would not be allowed.
- Motorized cross-country travel to a camp site within 25 feet of a designated route, excluding areas closed to motorized vehicle use, riparian areas, and WSAs, would not affect overall route density, location, and condition.

Impacts from Fish and Wildlife Actions

Management actions (e.g., implementation of the ARMS) may restrict, relocate, upgrade condition, or close routes through riparian areas. Actions to protect upland wildlife habitat and reduce habitat fragmentation may change the density, location, and availability of routes, including spatial and temporal use restrictions (New Mexico Department of Game and Fish, 2005).

Impacts from Management Specific to the No Action Alternative

Route location and condition may be changed to facilitate improvement of fisheries habitat. Route density would remain unchanged.

Impacts from Management Common to All Action Alternatives

Route density would decrease and route location may change to improve the integrity of priority species habitat. Route condition would remain unchanged.

Based on standards and guidelines set forth in the ARMS and other BMPs, route density is not expected to change under the following actions. Route location and condition may change to facilitate improvement of fisheries habitat:

- Eliminating, modifying, or relocating transportation routes or restricting current travel practices as required within or near native fish habitat.
- Eliminating, modifying, or relocating transportation routes or restricting current travel practices in response to inventory, monitoring, and adaptive management within or near native fish habitat
- Eliminating, modifying, or relocating transportation routes or restricting current travel practices within or near RCAs.

Impacts from Management Specific to Alternative I

Route location and condition may be changed to facilitate protection or improvement of streams. Route density would remain unchanged.

Route density would decrease and route location may change to improve the integrity of big game habitat. Route condition would remain unchanged.

Impacts from Management Specific to Alternative II

Route location and condition may be changed to facilitate protection or improvement of streams. Route density would remain unchanged.

Impacts from Management Specific to Alternative III

Route location and condition may be changed to facilitate protection or improvement of streams. Under this objective, route density would remain unchanged.

Route location and condition may change to provide wildland fire suppression while maintaining habitat in native communities. Route density would remain unchanged.

Impacts from Management Specific to Alternatives IV (the Preferred Alternative) and V

Route location and condition may be changed to facilitate protection or improvement of streams. Route density would remain unchanged.

Route density would decrease and route location may change to maintain or improve the integrity of wildlife habitat. Route condition would remain unchanged.

Impacts from Special Status Species Actions

Management of special status species may restrict access and activities that would interfere with their protection. Management actions to protect special status species habitat may change the density, location, and availability of routes, including spatial and temporal use restrictions.

Impacts from Management Specific to the No Action Alternative

Route density may be maintained or decreased to protect or enhance Endangered, Threatened, and other special status species habitats. Individual route location may also be changed in special status species habitat. Route condition would remain mostly unchanged.

Under this alternative, some actions relate to the allowable level of development or disturbance within special status species habitat and to the alteration of special status species habitat. Route density would remain unchanged. Route location may be restricted through construction to avoid sensitive habitat. Route condition may also be changed by allowable maintenance schedule.

Impacts from Management Common to All Action Alternatives

Although none of the management actions identified to implement the goal to contribute to the conservation and recovery of sage-grouse and special status species specifically mention transportation and travel activities, the actions addressed below could affect transportation and travel. All authorized activities and uses that would affect special status species, including transportation and travel components, would be addressed through project-specific consultation or mitigation.

- Route construction and maintenance may be impacted in order to avoid direct disturbance of special status species habitat. Route density may not be affected. Route location and condition may be affected based on efforts to avoid disturbance.
- Elimination, modification, or relocation of transportation routes or restrictions to current travel practices within or near habitat as required by the ARMS guidelines may be implemented. Based on standards and guidelines set forth in the ARMS, route density may decrease. Route location and condition may be changed to facilitate improvement of aquatic species habitat and riparian areas.
- Elimination, modification or relocation of transportation routes or restrictions to current travel practices within or near special status species habitat may be implemented as required by the BMPs. Based on standards and guidelines set forth by BMPs, route density may remain the same or decrease. Route location and condition may be changed to facilitate improvement of aquatic species habitat and riparian areas.
- Some actions would require the removal, modification, or relocation of routes to improve habitat for specific fish and aquatic special status species. Route density may remain the same or decrease. Route location and condition may be changed to reduce impacts to aquatic and special status species habitat.

Impacts from Management Specific to Alternatives I and III

The objective for Alternative I may entail restrictions on routes or access and route density may be maintained or decreased to meet the objective of maintaining or improving habitat. Individual route location may also be changed within areas of sage-grouse and other special status species concern. Route condition would remain mostly unchanged.

Transportation routes associated with range infrastructure may be impacted by constraining future construction and maintenance of those routes, and possibly requiring modification or removal of existing routes. Route density may decrease, and location and condition may be changed by enhancement of special status species habitat.

Route density, location, and condition within 1 mile of known ferruginous hawk or prairie falcon nests may be seasonally restricted to minimize impacts to the prey base and nesting material.

Impacts from Management Specific to Alternative II

The objective for Alternative II may result in the seasonal restriction of routes and access. Route density may remain unchanged to maintain or improve the quality of habitat. Individual route location may be changed within areas of sage-grouse and special status species concern. Route condition would remain mostly unchanged.

Transportation routes associated with range infrastructure may be impacted by constraining future construction and maintenance of those routes, and possibly requiring modification or removal of existing routes. Route density may not be affected. Location and condition may change to enhance special status species habitat.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

The objective for Alternative IV could entail restrictions on routes and access. Route density may be maintained or decreased to meet this objective. Individual route location may also be changed within areas of sage-grouse and other special status species concern. Route condition would remain mostly unchanged.

Transportation routes associated with range infrastructure may be impacted by constraining future construction and maintenance of those routes, and possibly requiring modification or removal of existing routes. Route density may be decreased; route location and condition may change by enhancement of special status species habitat.

Impacts from Management Specific to Alternative V

Range infrastructure usually entails a transportation route. No additional routes would be established and existing routes may be modified resulting in impacts to transportation and travel. Route density would most likely decrease, and location and condition may change by enhancement of special status species habitat.

Impacts from Wildland Fire Ecology and Management Actions

Wildland fire prevention and suppression may produce impacts to transportation and travel. Routes may be relocated or improved to support fire prevention and suppression efforts. Temporary route restrictions during periods of fire danger may include limitations on access.

Impacts from Management Specific to the No Action Alternative

No wildland fire ecology management actions specific to the No Action Alternative would have a detectable or measurable effect on travel and transportation.

Impacts from Management Common to All Action Alternatives

Management actions common to all action alternatives would restrict access during the prescribed rest period for treatment areas or until ES&BAR objectives are met. This would be a temporary spatial restriction on access, with no long-term impacts on travel and transportation. Route density, location, and condition would remain unchanged.

Impacts from Management Specific to Alternative I

Construction of new roads, or road improvements in areas of limited access, would replace or improve existing routes consistent with other resource objectives. Overall, there would be no change in route density. Location and condition may change for improvement of response time to support fire suppression activities.

When the danger of fire is high, travel could be impacted by temporarily closing or restricting access to identified areas. This would be a temporary spatial restriction on access, with no long-term impacts on travel and transportation. Route density, location, and condition would remain unchanged.

Impacts from Management Specific to Alternative II

Construction of new roads in areas of limited access may establish additional routes consistent with resource use objectives. This would increase overall route density. Route location and condition may change to improve response time to support fire suppression activities.

Route establishment and designation adjacent to permanent fencing may slightly increase density and direct route location in project areas. Route condition would remain unchanged.

Impacts from Management Specific to Alternative III

Construction of new roads in areas of limited access would intend to replace or improve existing routes. Overall, there would be no change in route density. Location and condition may change to improve response time to support fire suppression activities.

Closing of primitive roads and trails and open areas during fire restrictions would be a temporary spatial restriction on access, with no long-term impacts on travel and transportation. Route density, location, and condition would remain unchanged.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Roads in areas of limited access would be replaced or improved consistent with other resource objectives. Overall, there would be no change in route density. Location and condition may change to improve response time to support fire suppression activities.

Temporarily closing or restricting access to identified areas could impact travel when the fire danger is high. This would be a temporary spatial restriction on access, with no long-term impacts on travel and transportation. Route density, location, and condition would remain unchanged.

Impacts from Management Specific to Alternative V

Modifications or improvements to routes in areas of limited access would replace or improve existing routes consistent with other resource objectives, not affecting overall route density. Location and condition may change for improvement of response time to support fire suppression activities.

Temporarily closing or restricting access to identified areas could impact travel when the fire danger is high. This would be a temporary spatial restriction on access, with no long-term impacts on travel and transportation. Route density, location, and condition would remain unchanged.

Impacts from Recreation Actions

Focused management of SRMAs and allocation of ERMAs may result in a change of route density, location, or condition.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative would contain five SRMAs totaling 85,700 acres. Until activity plans are developed, no focused management would be initiated, and the effects of the designations would be minor. However, the primary activity in the Hagerman-Owsley Bridge SRMA (2,700 acres) would continue to be OHV riding. The amount of activity is expected to continue to increase within this SRMA. SRMA allocations would have no impact on route density, location or condition without activity plans.

The identification of road access needs as part of the Recreation Activity Management Plans for the Bruneau-Jarbidge, Hagerman-Owsley Bridge, Jarbidge Forks, Oregon Trail, and Salmon Falls Creek SRMAs may result in an adjustment in transportation routes. This action proposes no specific changes to route density, location and condition.

Under the following actions, route density, location, and condition would be addressed on a site-specific basis as needed and would not affect the overall travel and transportation network:

- A variety of means to maintain or improve recreation opportunities, including route manipulation, may affect transportation routes.

- Allowing modification of routes and restrictions of travel as needed to protect resources and reduce use conflicts may impact transportation and travel.
- Allowing development of access routes to meet existing or anticipated demand may impact transportation and travel.

Impacts from Management Common to All Action Alternatives

Under the following actions, route density, location, and condition would be addressed on a site-specific basis as needed and would not affect the overall travel and transportation network:

- Transportation and travel may be impacted by SRMA implementation plans.
- Transportation and travel may be impacted by route designation criteria and guidelines that protect identified resources and enhance recreation opportunities.

Impacts from Management Specific to Alternative I

Under Alternative I, eight SRMAs would be designated for a total of 341,800 acres. This may result in change of routes to accommodate prescribed management for the individual SMRAs. These changes would mostly affect route location and condition. Route density would likely remain unaffected or decrease to meet the objectives of the individual SRMAs. The Deadman/Yahoo SRMA would be an exception as route density may increase.

The Canyonlands SRMA (149,000 acres) would focus management on non-motorized recreation, decreasing route density. Route location and condition would be affected while continuing to allow adequate public access for anticipated recreation use.

The Deadman/Yahoo SRMA (36,000 acres) would provide opportunities for cross-country motorized vehicle use, with an expected increase in route density, potential changes in route location, and changes in route condition.

The Jarbidge Forks SRMA (2,000 acres) would focus management on river-based recreation and road-accessible developed sites. Route density, location, and condition would remain unaffected.

The Little Pilgrim SRMA (300 acres) would focus management on fishing and hunting. Route density would be decreased, and location and condition would be improved to mitigate impacts related to transportation and travel.

The Salmon Falls Reservoir SRMA (5,000 acres) would include improved access, parking, and boat-launching facilities. This would result in changes to routes to accommodate prescribed management. These changes would mostly affect route location and condition. Route density would likely remain unaffected or increase slightly to meet the objectives of the SRMA.

Access would be provided to maintain visitor health and safety, mitigate conflicts, or protect natural resource values on the 1,032,000 acres of the ERMA. This would be similar to current recreation management of these lands and would have minor impacts to transportation and travel.

Impacts from Management Specific to Alternative II

Under Alternative II, four SRMAs would be designated for a total of 21,300 acres. This could result in changes to routes to accommodate prescribed management for the individual SMRAs. These changes would mostly affect route location and condition. Route density would likely remain unaffected to meet the objectives of the individual SRMAs.

Impacts from the Jarbidge Forks, Little Pilgrim, and Salmon Falls Reservoir SRMAs would be the same as in Alternative I.

The Deadman and Yahoo areas could be developed cooperatively with the State, counties, or local communities to provide opportunities for cross-country motorized vehicle use, with an expected increase in route density, potential changes in route location, and changes in route condition.

Access would be provided to maintain visitor health and safety, mitigate conflicts, or protect natural resource values on the 1,352,000 acres of the ERMA. This provision would be similar to current recreation management of these lands and would have minor impacts to transportation and travel.

Impacts from Management Specific to Alternative III

Under Alternative III, six SRMAs would be designated for a total of 55,800 acres. This could result in changes to routes to accommodate prescribed management for the individual SMRAs. These changes would mostly affect route location and condition. Route density would likely remain unaffected or decrease to meet the objectives of the individual SRMAs. The Deadman/Yahoo SRMA would be an exception as route density may increase.

The Deadman/Yahoo SRMA (34,000 acres) would provide opportunities for cross-country motorized vehicle use, with an expected increase in route density, potential changes in route location, and changes in route condition.

Impacts from the Little Pilgrim, Jarbidge Forks, and Salmon Falls Reservoir SRMAs would be the same as in Alternative I.

Access would be provided to maintain visitor health and safety, mitigate conflicts, or protect natural resource values on the 1,318,000 acres of the ERMA. This would be similar to current recreation management of these lands and would have minor impacts to transportation and travel.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Under Alternative V, five SRMAs would be designated for a total of 204,000 acres. This could result in change to routes to accommodate prescribed management for the individual SMRAs. These changes would mostly affect route location and condition. Route density would likely remain unaffected or decrease to meet the objectives of the individual SRMAs. The Deadman/Yahoo SRMA would be an exception as route density may increase.

Impacts from the Deadman/Yahoo SRMA would be the same as in Alternative II

Impacts from the Jarbidge Forks and Salmon Falls Reservoir SRMAs would be the same as in Alternative I.

The Canyonlands SRMA (149,000 acres) would focus management on non-motorized recreation, decreasing route density. Route location and condition would be affected while continuing to allow adequate public access for anticipated recreation use.

Access would be provided to maintain visitor health and safety, mitigate conflicts, or protect natural resource values on the 1,169,000 acres of the ERMA. This would be similar to current recreation management of these lands and would have minor impacts to transportation and travel.

Impacts from Management Specific to Alternative V

Under Alternative V, three SRMAs would be allocated for total of 19,000 acres. This could result in changes to routes to accommodate prescribed management for the individual SRMAs. These changes would mostly affect route location and condition. Route density would likely remain unaffected or decrease to meet the objectives of the individual SRMAs. The Yahoo SRMA would be an exception as route density may increase.

Access would be provided to maintain visitor health and safety, mitigate conflicts, or protect natural resource values on the 1,354,000 acres of the ERMA. This would be similar to current recreation management of these lands and would have minor impacts to transportation and travel.

The Yahoo SRMA (3,000 acres) would provide opportunities for cross-country motorized vehicle use, with an expected increase in route density, potential changes in route location, and changes in route condition.

Impacts from the Jarbidge Forks SRMA would be the same as in Alternative I.

Impacts from Land Use Authorization Actions

The extent and intensity of land use authorizations may affect the density, location, and condition of transportation routes because routes are usually needed for construction, maintenance, and support of structures authorized by land use authorizations.

Impacts from Management Specific to the No Action Alternative

New ROWs requiring new or upgraded access roads would impact transportation and travel. Route density may increase, and location and condition may change. In the No Action Alternative, the potential wind energy development area would include 156,000 acres. If this acreage were developed to its entirety, route density would be increased, and location and condition would change. Impacts to transportation and travel would be project specific.

Impacts from Management Specific to Alternatives I and III

In Alternative I, the potential wind energy development area would include 60,000 acres. If this acreage were developed to its entirety, route density would be increased, and location and condition would change. Impacts to transportation and travel would be project specific.

Impacts from Management Specific to Alternative II

In Alternative II, the potential wind energy development area would include 162,000. If this acreage were developed to its entirety, route density would be increased, and location and condition would change. Impacts to transportation and travel would be project specific.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

In Alternative IV, the potential wind energy development area would include 59,000 acres. If this acreage were developed to its entirety, route density would be increased, and location and condition would change. Impacts to transportation and travel would be project specific.

Impacts from Management Specific to Alternative V

In Alternative V, the potential wind energy development area would include 42,000 acres. If this acreage were developed to its entirety, route density would be increased, and location and condition would change. Impacts to transportation and travel would be project specific.

Impacts from Areas of Critical Environmental Concern Actions

ACECs are designated and managed to protect their relevant and important values. The protective management may change route density, location, and condition within designated areas.

Impacts from Management Specific to the No Action Alternative

ACEC management in the No Action Alternative is not expected to result in changes to route density, location, or condition.

Impacts from Management Specific to Alternative I

Motorized vehicle use would be limited to designated routes in the Bruneau-Jarbidge ACEC. Impacts related to this limitation are addressed under *Impacts from Transportation and Travel Actions*.

Maintaining the current level of human disturbance and by not upgrading or constructing any new routes would have little or no impact on route density, location, or condition. On a case-by-case basis, route condition may be improved to reduce resource damage and improve public safety.

Transportation and travel could be impacted within the Middle Snake ACEC boundaries. Mitigating surface-disturbing activities and implementing restrictions to reduce soil erosion where needed may result in improving route conditions or changing route location. Route density may remain unchanged.

Improving the condition and/or modifying the location of the Wilson Grade Road may be considered for fire suppression activities or research access. Route density would remain unchanged.

Impacts from Management Specific to Alternative II

Under Alternative II**,** all ACEC designations in the planning area would be eliminated. Travel and transportation within the planning area would be directed by the focus of the TMAs. Travel designations in the former Bruneau-Jarbidge and Sand Point ACECs would be maintained due to WSA designations. Although motorized vehicle use in the Salmon Falls Creek ACEC would be changed from closed to limited, it is physically inaccessible to motorized vehicle travel. For these reasons, removal of the ACEC designations would have no expected change in route density, location, or condition.

Impacts from Management Specific to Alternative III

Motorized vehicle use in the Bruneau-Jarbidge ACEC would continue to be limited to designated routes. Impacts related to this limitation are addressed under *Impacts from Transportation and Travel Actions*. Efforts to upgrade some designated routes to reduce resource damage, improve public safety, and facilitate visitor traffic would have little or no impact on route density or location. On a case-by-case basis, route condition may be improved.

Improving the condition and/or modifying the location of the Wilson Grade Road may be considered for fire suppression activities or research access. Route density would remain unchanged.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Designation of routes through the CTTMP process would aim to increase core sage-grouse habitat. Route density and location would be impacted. Route condition would remain unchanged.

Motorized vehicle use within the Bruneau-Jarbidge ACEC would continue to be limited to designated routes. Impacts related to this limitation are addressed under *Impacts from Transportation and Travel Actions*. Maintaining the current level of human disturbance and by not upgrading or constructing new routes would have little or no impact on route density, location, or condition. On a case-by-case basis, route condition may be improved to reduce resource damage and improve public safety.

Motorized vehicle use in the Sand Point ACEC would continue to be limited to designated routes. This action would have no impact on route density, location, or condition.

Improving the condition and/or modifying the location of the Wilson Grade Road may be considered for fire suppression activities or research access. Route density would remain unchanged.

Impacts from Management Specific to Alternative V

Designation of routes through the CTTMP process would aim to increase core sage-grouse habitat. Route density and location would be impacted. Route condition would remain unchanged.

Transportation and travel could be impacted within the Middle Snake ACEC boundaries. Mitigating surface-disturbing activities and implementing restrictions to reduce soil erosion where needed may improve route conditions or change route location. Route density may remain unchanged.

Motorized vehicle use in the Sand Point ACEC would continue to be limited to designated routes. This action would have no impact on route density, location, or condition.

Improving the condition and/or modifying the location of the Wilson Grade Road may be considered for fire suppression activities or research access. Route density would remain unchanged.

Summary of Direct and Indirect Impacts

The primary sources of impacts to transportation and travel are discussed below. This section compares the effects of the No Action Alternative and the five action alternatives on transportation and travel. Where particular factors are considered a primary source of impact, they are addressed. Table 4- 301 identifies the number of acres of the planning area open, limited, or closed to motorized vehicle use. Table 4- 302 identifies the number of acres that could experience a change in route density for each action alternative.

Impacts from the No Action Alternative

In the No Action Alternative, route density is expected to increase over the life of the plan as a result of the number of acres open to cross-country motorized vehicle use and available for ROW development. Increasing population and motorized vehicle use may result in an increased number of user-created routes and overall route density. Routes associated with the construction and maintenance of land use authorizations such as wind energy development would contribute to an increase in the overall route density on 156,000 acres. Overall, the No Action Alternative would result in a moderate increase in route density in the long term.

Individual route location and condition may be changed on a case-by-case basis to meet resource objectives, including those for special status species, but no major location or condition changes are expected for the entirety of the transportation and travel network. Route location and condition could change due to the amount of transportation required by the various land use authorizations.

Impacts from Alternative I

Under Alternative I, 49% of the planning area is expected to remain at the same route density, and 48% is expected to experience a decrease in route density. The reduction in areas open to cross-country motorized vehicle use reduces the likelihood of new user-created routes, and based on the increase in area limited to designated routes and the focus of the TMAs, overall route density in the planning area is expected to decrease. Route density may also be affected by management strategies to avoid or reduce wildlife habitat fragmentation and facilitate maintenance or improvement of streams. The allocation of SRMAs with focused management would impact route density by specifying objectives for recreation uses and experiences including transportation and travel; the Deadman/Yahoo SRMA, which includes a larger area open to cross-country motorized vehicle use, is expected to increase routes and attract additional use to that area. Overall, Alternative I would results in a minor decrease in route density in the long term.

The reduction in open acreage would result in a major reduction in the area available for cross-country motorized vehicle use; however, the travel designations for Alternative I would continue to provide access within the majority of the planning area.

Individual route location and condition may change on a case-by-case basis to meet resource objectives, including objectives for wildlife, special status species, wildland fire, and ACECs; route location and condition may also change to accommodate transportation and travel within SRMAs. If wind energy development is authorized on the 60,000 acres with potential for wind energy development, route condition would likely be improved and additional routes would be constructed in new locations. However, no major location or condition changes are expected for the entirety of the transportation and travel network.

Impacts from Alternative II

Under Alternative II, 85% of the planning area is expected to experience an increase in route density, and 15% is expected to remain at the same route density. No acres would be open to cross-country motorized vehicle use. Based on the commodity and resource use emphasis and the focus of the TMAs, overall route density is expected to increase in the planning area. Overall, Alternative II would result in a moderate increase in route density in the long term.

The reduction in open acreage significantly reduces the area available for cross-country motorized vehicle use, and reduces the likelihood of new user-created routes; however, the travel designations for Alternative II would continue to provide access within the majority of the planning area.

Individual route location and condition may change on a case-by-case basis to meet resource objectives, including objectives for wildlife and special status species; route density, location, and condition may also change to accommodate wildland fire objectives. The allocation of SRMAs with focused management would not affect overall route density unless an R&PP lease arrangement was made for the Deadman/Yahoo area. Route location and condition may change to accommodate transportation and travel within SRMAs. If wind energy development is authorized on the 162,000 acres with potential for wind energy development, route condition would likely be improved and additional routes would be constructed in new locations. However, no significant location or condition changes are expected for the overall transportation and travel network.

Impacts from Alternative III

Under Alternative III, 98% of the planning area is expected to remain at the same route density, and 2% is expected to experience an increase in route density. The reduction in open acreage significantly reduces the area available for cross-country motorized vehicle use, and reduces the likelihood of new user-created routes, and based on the increase in area limited to designated routes and the focus of the TMAs, overall route density in the planning area is expected to remain mostly unchanged. These designations would continue to provide access within the majority of the planning area. The allocation of SRMAs with focused management would impact route density by specifying objectives for recreation uses and experiences including transportation and travel; increased route density due to OHV use in the Deadman/Yahoo SRMA are expected due to the larger area open to cross-country motorized vehicle use. Overall, Alternative III would result in a minor increase in route density in the long term.

Route density may increase, and route location and condition may improve to meet fire suppression and prevention activities. Individual route location may be changed on a case-by-case basis to meet objectives for wildland fire ecology and management. Overall route condition improvement is expected to facilitate fire suppression.

Individual route location and condition may change on a case-by-case basis to meet resource objectives, including objectives for wildlife, special status species, and ACECs; if wind energy development is authorized on the 60,000 acres with potential for wind energy development, route condition would likely be improved and additional routes would be constructed in new locations.

Impacts from Alternative IV (the Preferred Alternative)

Under Alternative IV, 2% of the planning area is expected to experience an increase in route density, and 98% is expected to experience a decrease in route density. The reduction in areas open to cross-country motorized vehicle use reduces the likelihood of new user-created routes, and based on the increase in area limited to designated routes and the focus of the TMAs, overall route density in the planning area is expected to decrease. These designations would continue to provide access within the majority of the planning area and no major location or condition changes are expected for the entirety of the transportation and travel network. Route density may also be affected by management strategies for maintenance and restoration of fish and wildlife habitat. The allocation of SRMAs with focused management would impact route density by specifying objectives for recreation uses and experiences including transportation and travel. Route location and condition may change to accommodate transportation and travel within SRMAs; increased route density due to OHV use in the Deadman/Yahoo SRMA are expected due to the larger area open to cross-country motorized vehicle use. Overall, Alternative IV would result in a minor decrease in route density in the long term.

Individual route location and condition may be changed on a case-by-case basis to meet resource objectives, including objectives for special status species and ACECs; route location and condition may improve to meet resource objectives for fire suppression activities. If wind energy development is authorized on the 59,000 acres with potential for wind energy development, route condition would likely be improved and additional routes would be constructed in new locations.

Impacts from Alternative V

Alternative V would have the largest expected decrease in route density within 99% of the planning area. The reduction in areas open to cross-country motorized vehicle use reduces the likelihood of new user-created routes, and based on the increase in area limited to designated routes and the focus of the TMAs, overall route density in the planning area is expected to decrease. These designations would continue to provide access within the majority of the planning area and no major location or condition changes are expected for the entirety of the transportation and travel network. Route density and location may also be affected by management strategies to maintain habitat integrity of fish and wildlife. The allocation of SRMAs with focused management may decrease route density by specifying objectives for recreation uses and experiences including transportation and travel. Route location and condition may change to accommodate transportation and travel within SRMAs. Overall, Alternative V would result in a major decrease in route density in the long term.

Individual route location and condition may be changed on a case-by-case basis to meet resource objectives, including objectives for special status species and ACECs; route location and condition may improve to meet resource objectives for fire suppression activities. If wind energy development is authorized on the 42,000 acres with potential for wind energy development, route condition would likely be improved and additional routes would be constructed in new locations.

Cumulative Impacts

Past, Present, and Reasonably Foreseeable Actions

The boundary for the cumulative impact analysis includes the planning area and immediately adjacent segments of state and local road networks including portions of the BLM Elko, Burley, and Shoshone FOs; the Humboldt-Toiyabe National Forest; and State lands.

Past, present, and reasonably foreseeable actions for the following resource and resource uses cumulatively affect transportation and travel:

- Wildland Fire Ecology and Management
- Transportation and Travel
- Land Use Authorizations

These actions are described in detail in the *Introduction* to this chapter.

Summary of Cumulative Impacts

Cumulative Impacts from the No Action Alternative

Large land masses experiencing frequent wildland fires would continue to be an issue related to cross country motorized travel. Continuing the current management would maintain 77% of the land mass open to cross-country travel. Increased cross-country motorized vehicle use would continue in popular open areas and new OHV technology may encourage expansion into new areas. Continued development of travel plans on adjacent public land may contribute to an increased use of remaining open areas within the planning area. Proposed land use authorization may increase routes for construction, operations, and maintenance. Under the No Action Alternative, cumulative impacts would result in an increase in route density. Route location would be dependent on resource and resource use objectives. Where surface maintenance is managed by highway districts or cooperatively with BLM, route condition would generally improve dependent on funding and demand.

Cumulative Impacts from Alternative I, III, IV, and V

Management actions that could affect transportation and travel management would include the construction of routes for fire and fuels management to reduce the risks of wildland fire, access to vegetation treatments to restore or maintain key habitat, new routes to service land use authorizations, management for increasing recreational demand and visitation, and other changes in travel management. Alternatives I, III, IV, and V reduce the area open to cross-country motorized vehicle use from 77% to less than 1%. These designations restrict travel within the planning area mostly to designated routes and few additional routes would be developed. The cumulative impact from past, present and reasonably foreseeable future actions would not affect route density. Route location would be dependent on resource

and resource use objectives. Where road surface maintenance is managed by highway districts, BLM, or cooperatively, route condition would generally improve dependent on funding and demand.

Cumulative Impacts from Alternative II

Alternative II eliminates the area open to cross-country motorized vehicle use. This alternative’s emphasis on resource use combined with cumulative effects from future land use authorizations could contribute to an increase in route density over a substantial portion (85%) of the planning area. Land use authorizations and resource uses may define the need for specific route location and improved condition.

4.4.4. Land Use Authorizations

Analysis Methods

Indicators

The following indicator was used for the analysis of impacts to land use authorizations:

- **Amount of constraint on land use authorizations** – The primary factor within the alternatives that would affect where and under what conditions wind energy developments, utility lines, and roads could be authorized is the amount of constraint the alternative would place on land use authorizations; this indicator reflects the availability of the planning area for projects authorized by land use authorizations. The amount of constraint within an area can vary widely. At one extreme, the development of these structures may be prohibited in an area, while in other areas, their development may be allowed. Other management prescribed by the alternatives may result in various types of restrictions between these two extremes.

Methods and Assumptions

Impacts to land use authorizations from management in the following sections of Chapter 2 were analyzed in detail: *Land Use Authorizations*, *Soil Resources*, *Wildlife*, *Special Status Species*, *Paleontological Resources*, *Cultural Resources*, *Visual Resources*, and *Transportation and Travel*. Impacts from management in the *Water Resources*, *Riparian Areas and Wetlands*, *Fish*, *Wildland Fire Ecology and Management*, *Non-WSA Lands with Wilderness Characteristics*, *Areas of Critical Environmental Concern*, *National Historic Trails*, *Wild and Scenic Rivers*, and *Wilderness Study Areas* sections were captured in the analysis of impacts from land use authorizations and transportation and travel actions and, to avoid repetition, were not discussed separately. Management from the remaining sections was not analyzed in detail because the management did not vary measurably between alternatives or impact the indicator for land use authorizations. **Impacts from management for land use authorizations** can be found under *Impacts from Land Use Authorizations Actions* in the *Soil Resources*, *Riparian Areas and Wetlands*, *Fish*, *Wildlife*, *Special Status Fish and Aquatic Invertebrates*, *Special Status Wildlife*, *Noxious Weeds and Invasive Plants*, *Wildland Fire Ecology and Management*, *Wild Horses*, *Paleontological Resources*, *Cultural Resources*, *Visual Resources*, *Non-WSA Lands with Wilderness Characteristics*, *Livestock Grazing*, *Recreation*, *Transportation and Travel*, *National Historic Trails*, *Social Conditions*, and *Economic Conditions* sections.

Land use authorizations include rights-of-way (ROWs), land use permits, and leases.[17] The most common projects authorized by ROWs in the planning area are roads, power transmission lines, and telephone lines. Interest in developing wind energy in the planning area has increased in the last 10 years as well. Other projects authorized by ROWs in the planning area include natural gas pipelines, communication sites, ditches, water facilities, and fiber optic lines. To illustrate how the alternatives would constrain land use authorizations, this analysis focuses on how the alternatives would constrain future wind energy developments, overhead utility lines, and road ROWs within the planning area.

Where possible, the amount of constraint on land use authorizations in each alternative was quantified through a GIS analysis of the relevant allocations and management actions described in Chapter 2. Through GIS, the types of constraints were determined for each acre of BLM-managed lands within the planning area. Where management could only be analyzed qualitatively, the type of constraint was identified, and impacts were characterized as increasing or decreasing the amount of that constraint on land use authorizations. Constraints on land use authorizations were grouped into several categories:

[17] This section does not consider impacts to permits for livestock grazing and range infrastructure or Special Recreation Permits; impacts to these types of authorizations are discussed in the *Livestock Grazing* and *Recreation* sections, respectively.

- **Not allowed –** Land use authorizations would not be allowed in these areas under any circumstances; these are areas that would be identified as ROW exclusion areas.
- **Allowed, with constraints on location** – Land use authorizations would be allowed in these areas as long as they are consistent with the avoidance criteria identified in Chapter 2 or with additional mitigation.
- **Allowed, with constraints on timing** – Activities associated with the land use authorization (e.g., construction and maintenance) would be scheduled to avoid certain time periods.
- **Allowed, with constraints on project design** – Management described in the alternatives would affect the design of the project authorized by the land use authorization; effects to project design could include modifications to the structure that would result from the land use authorization.
- **Allowed, with no constraints on location, timing, or project design –** Management described in the alternatives would not appreciably constrain the location, timing, or project design for the land use authorization.

Areas where land use authorizations are not allowed would have the highest level of constraint. Areas with the other three types of constraint often overlap; for the purposes of this analysis, it is assumed that the alternatives that result in more acres with any type of constraint than other alternatives have more constraint on land use authorizations.

Assumptions were developed based on ID Team knowledge of land use authorizations and the planning area. These assumptions should not be construed to confine or redefine management contained within alternatives and were used to allow a comparison of impacts to land use authorizations resulting from the alternatives.

To analyze the types and amounts of constraint on utility line development, the analysis focused on areas where interest in utility line development is likely to be the highest during the life of the plan. These areas include ROW corridors proposed under any of the alternatives as well as the corridor associated with the proposed Gateway West Transmission Line Project (77,000 acres; Map 77). These high-interest areas were intersected with the ROW exclusion areas and ROW corridors for each alternative to yield the areas that would have the highest potential to be developed in each alternative. These areas are referred to throughout Chapter 4 as "potential utility development areas." The amount of constraint that management would place on each alternative's potential utility development area is analyzed.

To analyze the types and amounts of constraint on wind energy development, the analysis focused on areas where interest in wind energy development is most likely to be highest during the life of the plan. These areas were determined through a GIS analysis of National Renewable Energy Laboratory high-resolution wind resource data, which depict the wind resource that could be used for utility-scale wind development. Wind resources are classified according to wind power classes, which are based on typical wind speeds 50 meters above the ground. The wind power classes for BLM-managed lands in the planning area can be found in Table 4- 303.

Table 4- 303. Wind Resources Within the Planning Area

Wind Power Class	Wind Resource Potential	Wind Speed at 50 Meters (mph)	Acres Within the Planning Area	Acres Within 2 Miles of Areas Rated Fair or Higher
1	Poor	Less than 12.5	550,000	18,000
2	Marginal	12.5-14.3	789,000	181,000
3	Fair	14.3-15.7	27,000	27,000
4	Good	15.7-16.8	5,000	5,000
5	Excellent	16.8-17.9	2,000	2,000
6	Outstanding	17.9-19.7	400	400
7	Superb	19.7-24.8	0	0

Generally, areas rated Good or higher can be used for generating wind power with large turbines, but many Fair areas could be suitable for utility-scale development as well (DOE, 2009). This analysis assumes that within the life of the plan, there will be more interest in developing wind energy on or within

2 miles[18] of lands rated Fair or higher than on other lands in the planning area (234,000 acres; Map 78); these lands contain the project area for the proposed China Mountain Wind Energy Project as well as the existing wind energy developments on private land in the northeast corner of the planning area. Using GIS, these high-interest areas were intersected with the areas available for wind energy development outside ROW avoidance areas[19] in each alternative to yield the areas that would have the highest potential to be developed in each alternative. These areas are referred to throughout Chapter 4 as “potential wind development areas” and are displayed in Map 79 through Map 83. The amount of constraint management in each section would place on the potential wind development area for each alternative is analyzed.

Throughout Chapter 4, it is assumed that there will likely be high levels of interest in new road ROWs within the potential wind development and potential utility development areas, as new or improved roads are usually necessary for construction, operation, and maintenance of these projects. However, even though it is likely there will be proposals for road ROWs outside these areas as well, there is no basis for predicting where other high-interest areas might be. As a result, this analysis assumes that the types and amounts of constraint on wind energy and utility development, as well as general constraint on land use authorizations in the planning area, generally affect road ROWs as well. Impacts specific to road ROWs are identified when they occur.

Other assumptions used to analyze impacts to land use authorizations include the following:

- Increased levels of constraint generally result in increased costs for constructing, operating, and maintaining structures authorized by land use authorizations.
- Constraints described for the planning area as a whole generally affect to a similar degree ROWs for projects other than wind developments, utility lines, and roads as well as other land use authorizations (e.g., Section 302 FLPMA permits and leases). Impacts specific to these other types of authorizations are identified when they occur.
- Management for areas with very high potential for paleontological resources (PFY Class 5) would place more constraint on land use authorizations than areas with lower potential for paleontological resources.
- Management for areas within VRM Classes I and II would place more constraint on land use authorizations than management for areas within VRM Classes III and IV.

Direct and Indirect Impacts

Impacts from Land Use Authorization Actions

Table 4- 304 displays constraints on various types of land use authorizations due to land use authorization actions. Overall, land use authorizations throughout the planning area would be least constrained in the No Action Alternative, followed by Alternatives II, III, I, then IV; Alternative V would have the highest level of constraint. Wind energy and utility line ROWs would be least constrained in Alternative II and the No Action Alternative, followed by Alternatives I, III, and IV, then by Alternative V.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative would prohibit land use authorizations for energy, transportation, or communication purposes in areas identified as avoidance areas in the 1987 Jarbidge RMP. As a result, land use authorizations for those purposes would not be allowed on 8% of the planning area. The potential wind development area for the No Action Alternative would consist of 67% of the lands within 2 miles of areas rated Fair or higher for wind resource potential; the potential utility development area for the No Action Alternative would consist of 98% of the high-interest areas for utility development. Wind

[18] Because lands rated Fair or higher are not contiguous, it is assumed that any utility-scale wind development would necessarily include some lands with a lower rating in the project footprint.
[19] It is assumed that utility-scale wind developments would not be able to meet any of the avoidance criteria identified in the alternatives (e.g., utility-scale developments would be taller than 100 feet and therefore would not meet avoidance criteria for the USAF Military Operations Area).

energy development would be further constrained by being restricted from wildlife habitat where effects could not be mitigated.

Table 4- 304. Areas Available for Various Types of Land Use Authorizations by Alternative (Acres)

Type of Authorization and Restriction	Alternative					
	No Action	I	II	III	IV	V
Road and Communication Site ROWs and Other Land Use Authorizations						
Not Allowed [A]	110,000	95,000	94,000	95,000	148,000	148,000
Allowed, with Constraints on Location [B]	0	803,000	786,000	786,000	768,000	1,082,000
Allowed [C]	1,263,000	476,000	493,000	493,000	457,000	144,000
Sage-Grouse Lek Restriction	N/A	151,000	151,000	695,000	916,000	916,000
Utility Line ROW						
Potential Utility Development Area [D]	75,000	71,000	77,000	71,000	70,000	60,000
Potential Utility Development Area with Sage-Grouse Lek Restriction	N/A	1,000	2,000	16,000	28,000	28,000
Wind Energy ROW						
Allowed [C]	1,263,000	177,000	492,000	177,000	175,000	103,000
Potential Wind Development Area [E]	156,000	60,000	162,000	60,000	59,000	42,000
Potential Wind Development Area with Sage-Grouse Lek Restriction	N/A	5,000	16,000	17,000	17,000	0

[A] “Not Allowed” refers to areas within ROW exclusion areas.
[B] “Allowed, with Constraints on Location” refers to areas outside ROW exclusion areas but within ROW avoidance areas; lands in this category may be available for ROWs if the proposal is consistent with ROW avoidance area stipulations.
[C] “Allowed” refers to areas outside ROW exclusion and avoidance areas.
[D] Potential utility development area includes lands identified in each alternative as ROW corridors that are outside ROW exclusion areas; the corridor associated with the proposed Gateway West Transmission Line Project is included as well. Impacts on utility development from management actions in other sections are assessed according to the proportion of the potential utility development area affected.
[E] Potential wind development area includes lands within 2 miles of areas rated Fair or higher for wind resource potential that are also available for wind energy development outside avoidance and exclusion areas for that alternative. Impacts on wind energy development from management actions in other sections are assessed according to the proportion of the potential wind development area affected.

Unlike the action alternatives, the No Action Alternative would not prohibit locating structures associated with utility lines, communication towers, and wind energy development within a pre-defined distance from an active sage-grouse lek; it would only require construction and maintenance activities to be scheduled to avoid or minimize disturbance to sage-grouse within 2 miles of leks. The location for communication sites would be constrained by requiring them to be located at existing sites to the extent possible; in addition, they could only be considered if there is a demonstrated need and resource conflicts are low or can be mitigated.

Impacts from Management Common to the No Action and All Action Alternatives

The policies and BMPs contained within Appendix N would place a variety of constraints on wind energy development, including constraints on location, timing, and project design. These would be applied on a project-specific basis; therefore, the type and degree of impact would depend on resources present at the project location.

Impacts from Management Common to All Action Alternatives

Management common to all action alternatives would constrain the location for projects authorized by land use authorizations by requiring new ROWs for linear structures to be placed in ROW corridors where practical. Other new ROWs would be located in disturbance corridors such as corridors along existing ROWs, roads, fences or pipelines where practical. The ARMS would place constraints on the design of the project to mitigate impacts to riparian areas. Communication sites would continue to be co-located with existing sites to the extent possible.

Impacts from Management Specific to Alternative I

In Alternative I, ROWs would not be allowed in 7% of the planning area; ROWs would be allowed with constraints on location in 58% of the planning area if the avoidance stipulations described in Chapter 2 could be met. Overlaying exclusion areas and considering ROW corridors identified for Alternative I, the potential utility development area for Alternative I would consist of 92% of the high-interest areas for utility development.

Wind energy developments would be further constrained by being limited to areas with annual or non-native vegetation communities. As a result, wind energy developments would be allowed in 13% of the planning area. Integrating these results with the wind resource data, the potential wind development area for Alternative I would consist of 26% of lands within 2 miles of areas rated Fair or higher.

Alternative I would prohibit locating structures associated with utility lines, communication towers, and wind energy development within 1 mile of an active sage-grouse lek, which would affect 11% of the planning area, 8% of the potential wind development area, and 2% of the potential utility development area. Alternative I would also place a constraint on location for land use authorizations for communication sites and wind energy by restricting these projects in special status species habitat unless any negative effects can be mitigated; this restriction would also apply to wind energy developments that may affect cultural resources.

Impacts from Management Specific to Alternative II

In Alternative II, ROWs would not be allowed in 7% of the planning area; ROWs would be allowed with constraints on location in 57% of the planning area if the avoidance stipulations described in Chapter 2 could be met. Overlaying exclusion areas and considering ROW corridors identified for Alternative II, the potential utility development area for Alternative II would include all high-interest areas for utility development.

Wind energy developments would be further constrained by being limited to areas with annual or non-native vegetation communities. As a result, wind energy developments would be allowed in 36% of the planning area. Integrating these results with the wind resource data, the potential wind development area for Alternative II would consist of 69% of lands within 2 miles of areas rated Fair or higher.

As in Alternative I, Alternative II would prohibit locating structures associated with utility lines, communication towers, and wind energy development within 1 mile of an active sage-grouse lek, which would affect 11% of the planning area, 10% of the potential wind development area, and 2% of the potential utility development area. Alternative II would also place a constraint on project design for land use authorizations for communication sites by requiring the site to be designed to mitigate impacts to special status species where practical. A constraint on location for land use authorizations for wind energy would restrict these projects in habitat for Endangered, Threatened, Proposed, and Candidate species unless any negative effects can be mitigated.

Impacts from Management Specific to Alternative III

In Alternative III, ROWs would not be allowed in 7% of the planning area; ROWs would be allowed with constraints on location in 57% of the planning area if the avoidance stipulations described in Chapter 2 could be met. Overlaying exclusion areas and considering ROW corridors identified for Alternative III, the potential utility development area for Alternative III would consist of 92% of the high-interest areas for utility development.

Wind energy developments would be further constrained by being limited to areas with annual or non-native vegetation communities. As a result, wind energy developments would be allowed in 13% of the planning area. Integrating these results with the wind resource data, the potential wind development area for Alternative III would consist of 26% of lands within 2 miles of areas rated Fair or higher.

Alternative III would prohibit locating structures associated with utility lines, communication towers, and wind energy development within 3 miles of an active sage-grouse lek, which would affect 51% of the planning area, 28% of the potential wind development area, and 22% of the potential utility development area. Alternative III would also place a constraint on project design for land use authorizations for communication sites by requiring the site to be designed to mitigate impacts to special status species where practical. A constraint on location for land use authorizations for wind energy would restrict these projects in special status species habitat unless any negative effects can be mitigated; this restriction would also apply to wind energy developments that may affect cultural resources.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

In Alternative IV, ROWs would not be allowed in 11% of the planning area; ROWs would be allowed with constraints on location in 56% of the planning area if the avoidance stipulations described in Chapter 2 could be met. Overlaying exclusion areas and considering ROW corridors identified for Alternative IV, the potential utility development area for Alternative IV would consist of 91% of the high-interest areas for utility development.

Wind energy developments would be further constrained by being limited to areas with annual or non-native vegetation communities. As a result, wind energy developments would be allowed in 13% of the planning area. Integrating these results with the wind resource data, the potential wind development area for Alternative IV would consist of 25% of lands within 2 miles of areas rated Fair or higher.

Alternative IV would prohibit locating structures associated with utility lines, communication towers, and wind energy development within 5 miles of an active sage-grouse lek, which would affect 67% of the planning area, 29% of the potential wind development area, and 40% of the potential utility development area. As in Alternative I, Alternative IV would also place a constraint on location for land use authorizations for communication sites and wind energy by restricting these projects in special status species habitat unless any negative effects can be mitigated; this restriction would also apply to wind energy developments that may affect cultural resources.

Impacts from Management Specific to Alternative V

In Alternative V, ROWs would not be allowed in 11% of the planning area; ROWs would be allowed with constraints on location in 79% of the planning area if the avoidance stipulations described in Chapter 2 could be met. Overlaying exclusion areas and considering ROW corridors identified for Alternative IV, the potential utility development area for Alternative V would consist of 78% of the high-interest areas for utility development.

Wind energy developments would be further constrained by being limited to areas with annual or non-native vegetation communities. As a result, wind energy developments would be allowed in 8% of the planning area. Integrating these results with the wind resource data, the potential wind development area for Alternative V would consist of 18% of lands within 2 miles of areas rated Fair or higher.

As in Alternative IV, Alternative V would prohibit locating structures associated with utility lines, communication towers, and wind energy development within 5 miles of an active sage-grouse lek, which would affect 67% of the planning area, none of the potential wind development area, and 47% of the potential utility development area. As in Alternatives I and IV, Alternative V would also place a constraint on location for land use authorizations for communication sites and wind energy by restricting these projects in special status species habitat unless any negative effects can be mitigated; this restriction would also apply to wind energy developments that may affect cultural resources.

Impacts from Soil Resources Actions

Restrictions on uses in areas with potential for soil erosion by wind or water would constrain wind energy developments, utility lines, and roads by requiring additional mitigation measures or surface occupancy restrictions to reduce impacts to those areas, which could increase project costs. Table 4- 305 summarizes the constraints on land use authorizations from soil resources actions. Overall, land use authorizations in the planning area would be least constrained due to soil resource actions in the No Action Alternative, followed by Alternatives I, II, and III, then by Alternatives IV and V. Within the potential wind development and potential utility development areas for each alternative, the No Action Alternative would have the least constraint as a smaller percent of its potential wind and utility development areas would be affected, followed by Alternative II, then by Alternatives I and III; Alternatives IV and V would have the most constraint in their potential wind development and potential utility development areas.

Table 4- 305. Areas with Soil-Related Restrictions that May Affect the Location of Projects Authorized by Land Use Authorizations (Acres)

Acres with Constraint on Location	Alternative					
	No Action	I	II	III	IV	V
By Type of Constraint						
Water Erosion	0	218,000	218,000	218,000	1,122,000	1,122,000
Wind Erosion	0	437,000	437,000	437,000	1,289,000	1,289,000
Slope	0	69,000	69,000	69,000	69,000	69,000
Footprint Acres of Constraints due to Water Erosion Potential, Wind Erosion Potential, and Slope						
Planning Area	0	703,000	703,000	703,000	1,358,000	1,358,000
Potential Utility Development Area	0	53,000	53,000	53,000	69,000	59,000
Potential Wind Development Area	0	36,000	71,000	36,000	58,000	41,000

Impacts from Management Specific to the No Action Alternative

Soil management direction for the No Action Alternative does not specifically reference land use authorizations. The general guidelines provided would result in negligible impacts to land use authorizations, as they only require soil resources be considered in project-level planning.

Impacts from Management Common to the No Action and All Action Alternatives

Minimizing soil erosion by maintaining adequate perennial vegetation cover could result in minor constraints to activities and structures associated with land use authorizations, as all disturbed areas would need to be reseeded to provide perennial vegetation cover.

Impacts from Management Common to All Action Alternatives

Modifying routes or mitigating the erosive effects of transportation and travel would affect land use authorizations as it would apply to road ROWs as well as ancillary routes developed or used for wind or utility developments.

Impacts from Management Specific to Alternatives I, II, and III

Management specific to Alternatives I, II, and III would result in more constraints to land use authorizations than the No Action Alternative. These alternatives would require mitigation on soils with severe or very severe potential for wind erosion or with high potential for water erosion. In these areas as well as areas with slopes greater than 20%, an erosion control strategy would be required. Overall, 51% of the planning area would be constrained by these soil resource actions. These actions would constrain 60%[20] of the potential wind development area and 75%[21] of the potential utility development area for Alternatives I and III, and 44% of the potential wind development area and 69% of the potential utility development area for Alternative II.

Impacts from Management Specific to Alternatives IV and V

Management specific to Alternatives IV and V would result in more constraints to land use authorizations than in the No Action Alternative and Alternatives I, II, and III due to more restrictive management applied to a larger area. Alternatives IV and V would require mitigation on soils with moderate, severe, or very severe potential for wind erosion or with medium or high potential for water erosion. In these areas as well as areas with slopes between 20% and 40% (46,000 acres), an erosion control strategy would be

[20] Impacts to wind energy ROWs in this and the remaining portions of this analysis are depicted as the percent of each alternative's potential wind development area identified in Table 4- 304 that would be affected by the constraint.
[21] Impacts to utility ROWs in this and the remaining portions of this analysis are depicted as the percent of each alternative's potential utility development area identified in Table 4- 304 that would be affected by the constraint.

required. No surface disturbance from construction, operation, and maintenance of land use authorizations would be allowed on slopes greater than 40% (22,000 acres); however, these areas could still be included within a project area (e.g., lay adjacent to a wind tower or beneath an overhead utility line). Overall, 99% of the planning area would be constrained by these soil resource actions. These actions would constrain 98% of the potential wind development and 99% of the potential utility development areas for Alternative IV.

Impacts from Wildlife Actions

Wildlife management that would modify construction and maintenance activities to avoid or minimize disturbance to wildlife during important seasonal periods would constrain activities associated with land use authorizations. While not affecting where projects can be located, this management could affect how long it would take to build the project and when maintenance could occur; both of these could increase project costs. The degree of impact would be related to the species that would be disrupted in the project area as well as the timing and length of their important seasonal periods (Appendix H). Table 4- 306 displays the acres impacted by timing restrictions contained within wildlife actions.

Table 4- 306. Areas with Timing Restrictions for Sage-Grouse, Mule Deer, and Pronghorn by Alternative (Acres)

Acres with Constraint on Timing	Alternative					
	No Action	I	II	III	IV	V
By Type of Constraint						
Sage-Grouse [A]	284,000	284,000	284,000	284,000	284,000	284,000
Mule Deer [B]	156,000[C]	415,000	0	0	415,000	0
Pronghorn [B]	84,000[C]	0	0	0	487,000	0
Footprint Acres of Constraints due to Sage-Grouse, Mule Deer, or Pronghorn by Total Months of Restriction						
Planning Area						
4-5 Months	384,000	350,000	284,000	284,000	520,000	284,000
6-7 Months	74,000	189,000	0	0	189,000	0
Potential Utility Development Area						
4-5 Months	8,000	8,000	7,000	4,000	14,000	4,000
6-7 Months	5,000	3,000	0	0	3,000	0
Potential Wind Development Area						
4-5 Months	53,000	11,000	60,000	7,000	10,000	0
6-7 Months	20,000	7,000	0	0	7,000	0

[A] Includes key sage-grouse habitat; restriction would be from mid-February through June in the No Action Alternative and through mid-June in Alternatives I-V.
[B] Restriction would be from December through April in the No Action Alternative and through March in Alternatives I-V.
[C] The No Action Alternative restrictions apply to the mule deer and pronghorn winter range identified in the 1987 RMP.

Overall, land use authorizations within the planning area would have the least constraint due to wildlife actions in Alternatives II, III, and V, followed by the No Action Alternative, then by Alternative I; Alternative IV would have the most constraint. Within the potential utility development areas for each alternative, Alternative III would have the least constraint, followed by Alternative V, Alternative II, and the No Action Alternative, and then by Alternative I; Alternative IV would have the most constraint. Within the potential wind development areas for each alternative, Alternative V would have the least constraint as a smaller percent of its potential wind development area would be affected, followed by Alternative III, I and IV, then II; the No Action Alternative would have the most constraint as its potential wind development area would have the largest percent affected.

Impacts from Management Specific to the No Action Alternative

Management specific to the No Action Alternative would place constraints on timing and project design on land use authorizations. Scheduling construction and maintenance work to avoid or minimize disturbance to wildlife would constrain timing of these types of activities for land use authorizations; these activities would be restricted in mule deer or pronghorn winter range from December through April and in key sage-grouse habitat from mid-February through June.[22] As a result, construction and maintenance activities would be restricted on 28% of the planning area for four to five months of the year (i.e., areas with either sage-grouse or mule deer and/or pronghorn), and 5% of the planning area for seven months of the year (i.e., areas with sage-grouse and mule deer and/or pronghorn). Within the potential wind development area for the No Action Alternative, 34% would be constrained for four to five months, and 13% would be constrained for seven months. Within the potential utility development area for the No Action Alternative, 11% would be constrained for four to five months, and 7% would be constrained for seven months. In addition, new and existing utility developments would need to follow electrocution-proof specifications, constraining the project design of such developments.

Impacts from Management Common to All Action Alternatives

Management common to all action alternatives would place a constraint on land use authorizations in habitat for migratory birds; special stipulations would be required to promote the maintenance and improvement of the quantity and quality of migratory bird habitat. Projects would need to avoid, reduce, or mitigate impacts to the extent feasible.

Management common to all action alternatives would also require construction and maintenance activities to avoid or minimize disturbance to priority wildlife species during their important seasonal periods. These constraints on timing for activities associated with land use authorizations have been incorporated into the discussion for management specific to each action alternative, as the priority wildlife species vary by alternative.

Impacts from Management Specific to Alternative I

Alternative I would give mule deer and special status species[23] highest priority for habitat management. The timing restriction on construction and maintenance activities would restrict those activities in mule deer winter range from December through March and in key sage-grouse habitat from mid-February through mid-June. As a result, construction and maintenance activities would be restricted on 25% of the planning area for four months of the year (i.e., areas with either mule deer or sage-grouse) and on 14% for 6.5 months (i.e., areas with both mule deer and sage-grouse). Within the potential wind development area for Alternative I, 18% would be constrained for four months, and 12% would be constrained for 6.5 months. Within the potential utility development area for Alternative I, 12% would be constrained for four months, and 4% would be constrained for 6.5 months.

Impacts from Management Specific to Alternative II

Alternative II would give sage-grouse and other special status species highest priority for habitat management. The timing restriction on construction and maintenance activities would restrict those activities in key sage-grouse habitat from mid-February through mid-June. As a result, construction and maintenance activities would be restricted on 21% of the planning area for 4 months of the year. Within the potential wind and utility development areas for Alternative II, 37% and 9% would be constrained for four months, respectively.

Impacts from Management Specific to Alternative III

The type of impacts from management specific to Alternative III would be the same as for Alternative II, but the scale would differ as 12% of the potential wind development area for Alternative III would be constrained for four months, while 6% of the potential utility development area for Alternative III would be similarly constrained.

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[22] Sage-grouse are discussed in this section to simplify comparison with the action alternatives. Timing restrictions are prescribed for other species as well; sage-grouse, mule deer, and pronghorn are used to illustrate how the timing restriction would affect activities associated with land use authorizations.

[23] To simplify comparison of alternatives, when special status species are noted as priority wildlife species, sage-grouse is the species used to illustrate how the timing restriction would affect activities associated with land use authorizations.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV would give sage-grouse, other special status species, mule deer, and pronghorn highest priority for habitat management. The timing restriction on construction and maintenance activities would restrict those activities in key sage-grouse habitat from mid-February through mid-June and in mule deer and pronghorn winter range from December through March. As a result, construction and maintenance activities would be restricted on 38% of the planning area for four months of the year (i.e., areas with either sage-grouse or mule deer and/or pronghorn) and on 14% for 6.5 months (i.e., areas with sage-grouse, mule deer, and pronghorn). Within the potential wind development area for Alternative IV, 18% would be constrained for four months, and 11% would be constrained for 6.5 months. Within the potential utility development area for Alternative IV, 20% would be constrained for four months, and 4% would be constrained for 6.5 months.

Impacts from Management Specific to Alternative V

The type of impacts from management specific to Alternative V would be the same as for Alternative II, but the scale would differ as none of the potential wind development area for Alternative V would be constrained for four months, while 7% of the potential utility development area for Alternative V would be constrained.

Impacts from Special Status Species Actions

Management for special status species would constrain land use authorizations in special status species habitat by requiring additional mitigation measures to reduce impacts to those areas. Some management may also affect the location of structures or the timing of construction and maintenance activities.

Impacts from Management Specific to the No Action Alternative

Management in the No Action Alternative would constrain land use authorizations if those projects would adversely impact special status plants throughout the planning area or any special status species in the Snake River corridor. Land use authorizations would also be constrained if the project area included areas within 0.75 miles of ferruginous hawk and prairie falcon nests. The other occupancy restrictions described in the No Action Alternative may also constrain land use authorizations; all of these would be determined on a case-by-case basis.

Impacts from Management Common to the No Action and All Action Alternatives

If biological opinions or letters of concurrence contain conservation measures that relate to land use authorizations, projects in habitats for the relevant special status species would be constrained. The degree of constraint would be relative to the specific species and conservation measure involved.

Impacts from Management Common to All Action Alternatives

Special status species management common to all action alternatives would constrain land use authorizations if the project would adversely affect special status species, as these activities would not be allowed without mitigation. The degree of constraint would be relative to the specific mitigation required. Other constraints on location include not locating new communication sites in special status species habitat unless impacts can be mitigated and avoiding locating utility lines in native shrubland and native grassland communities. Where avoiding native communities would not be possible, additional mitigation would be required. Restricting ROW construction and maintenance activities during important seasonal periods for special status species introduces a constraint on timing; the magnitude of these timing constraints for land use authorizations in sage-grouse habitat has been discussed above under *Impacts from Wildlife Actions*.

Impacts from Management Specific to Alternatives I, III, IV, and V

Alternatives I, III, IV, and V would all result in restrictions on land use authorizations if the project area included areas within 1 mile of ferruginous hawk or prairie falcon nests by requiring leasing activities to be designed to minimize impacts to their prey base and availability of nesting material from March through July. The level of constraint would be greater than in the No Action Alternative.

Impacts from Management Specific to Alternative II

Alternative II would result in restrictions on land use authorizations if the project area included areas within 0.25 miles of ferruginous hawk or prairie falcon nests; this would be less constraining than the No Action Alternative and Alternatives I, III, IV, and V.

Impacts from Paleontological Resources Actions

Many projects authorized by land use authorizations typically disturb both surface and subsurface sediments. Major transmission lines, buried gas pipelines, road construction, and wind energy developments, in particular, require substantial subsurface excavations that may impact buried fossil deposits. As a result, management for paleontological resources would likely constrain land use authorizations. This management constraint would only apply where paleontological resources were present. The areas most likely to be affected by management for paleontological resources are those with high or very high potential for paleontological resources (PFY Classes 4 and 5, respectively). However, because the planning area does not contain any PFY Class 4 areas, this analysis considers only those areas in PFY Class 5. Table 4- 307 displays acres rated as PFY Class 5 that may constrain land use authorizations.

Table 4- 307. PFY Class 5 Areas in Potential Utility and Wind Development Areas by Alternative (Acres)

Area	Alternative					
	No Action	I	II	III	IV	V
Planning Area	121,000	121,000	121,000	121,000	121,000	121,000
Potential Utility Development Area	16,000	16,000	16,000	16,000	16,000	15,000
Potential Wind Development Area	23,000	17,000	23,000	17,000	17,000	17,000

The amount of constraint for paleontological resources in the context of the entire planning area would be the same for all alternatives. Within the potential wind development areas for each alternative, the No Action Alternative and Alternative II would have the least constraint as a smaller percent of their potential wind development areas would be affected, followed by Alternatives I, III, and IV; Alternative V would have the most constraint as its potential wind development area would have the largest percent affected. Within the potential utility development areas for each alternative, the No Action Alternative and Alternative II would have the least constraint, and Alternative V would have the most. However, the amount of constraint as a percent of the potential wind and utility development areas does not differ substantially between alternatives.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative would provide for managing paleontological resources to protect, maintain, or enhance sites or areas for their scientific and educational values. Any land use authorizations would be constrained to the extent the activities would impact paleontological resources; land use authorizations in areas rated as PFY Class 5 would be most likely to be affected by this management (121,000 acres). The potential utility development area for the No Action Alternative contains 16,000 acres (21% of the area) rated as PFY Class 5 that would likely be constrained by paleontological resource actions; the potential wind development area for the No Action Alternative contains 23,000 acres (15% of the area) that would be similarly constrained.

Impacts from Management Common to All Action Alternatives

Land use authorizations in paleontological resource areas would be required to implement measures to protect those resources; land use authorizations in areas rated as PFY Class 5 would be most likely to be affected by this management (121,000 acres). The degree of constraint on land use authorizations would be relative to the specific measures required. This constraint would also be likely on 23% of the potential utility development area for Alternatives I, III, and IV; 21% of the potential utility development area for Alternative II; and 25% of the potential utility development area for Alternative V. This constraint would be likely in 28% of the potential wind development areas for Alternatives I, III, and IV; 14% of the potential wind development area for Alternative II; and 40% of the potential wind development area for Alternative V.

Impacts from Management Specific to Alternatives I, II, III, IV, and V

Management specific to each action alternative pertains only to permits for paleontological research and therefore would not affect land use authorizations.

Impacts from Cultural Resources Actions

Cultural resource management may constrain land use authorizations, primarily by affecting where projects could be located or their design. While these constraints would not create additional ROW exclusion areas, they may result in modifying the location or route of certain projects or additional mitigation for impacts to those areas. To illustrate how impacts of cultural resource management differ by alternative, this section focuses on how management described for the Kelton and Toana Freight Roads and playas would affect land use authorizations; these cultural resources were selected because their locations are known and have been mapped. Table 4- 308 displays the constraints on land use authorizations resulting from management for the Kelton and Toana Road protective corridors. Overall, land use authorizations within the planning area, the potential wind development area, and the potential utility development area would be constrained by cultural resource management to a similar degree in all alternatives.

Table 4- 308. Areas with Constraints Due to the Kelton and Toana Freight Road Protective Corridors (Acres)

Area	Alternative					
	No Action	I	II	III	IV	V
Planning Area	20,000	20,000	20,000	20,000	20,000	20,000
Potential Utility Development Area	4,000	4,000	5,000	4,000	4,000	4,000
Potential Wind Development Area	7,000	4,000	8,000	4,000	4,000	2,000

Impacts from Management Specific to the No Action Alternative

Management specific to the No Action Alternative would constrain land use authorizations by requiring projects located within the Kelton and Toana Freight Road protective corridors (20,000 acres) to protect those cultural resources. This may require modifications to specific siting of the structures associated with the project or to the project design. This constraint would apply to a relatively small portion of the planning area (1%); 5% of the potential utility development and potential wind development areas for the No Action Alternative would be affected.

Impacts from Management Common to All Action Alternatives

Generally, management common to all action alternatives would require land use authorizations to comply with all cultural resource laws and regulations and include measures to minimize or prevent damage to cultural resources. The degree of constraint this would place on a specific land use authorization would depend on the type and location of the project being proposed. The Kelton and Toana Freight Road protective corridors (20,000 acres) would be managed as avoidance areas for surface-disturbing activities, which may constrain land use authorizations if they would be located outside areas where previous disturbance has occurred. This constraint would apply to a relatively small portion of the planning area (less than 1%). This constraint would also apply in 5% of the potential utility development areas for Alternatives I; III, and IV and 6% of the potential utility development areas for Alternatives II and IV. This constraint would apply in 7% of the potential wind development area for Alternatives I, III, and IV; 5% of the potential wind development area for Alternative II; and 4% of the potential wind development area for Alternative V.

Impacts from Management Specific to Alternatives I, IV, and V

In Alternatives I, IV, and V, land use authorizations that include areas within 300 feet of playas would be required to minimize or avoid ground-disturbance in those areas (1,000 acres). This constraint would apply to a negligible portion of the planning area (less than 1%); only 1 acre of the potential utility development areas and none of the potential wind development areas for Alternatives I, IV, and V would be affected.

Impacts from Management Specific to Alternatives II and III

In Alternatives II and III, land use authorizations that include areas within 150 feet of playas would be required to minimize or avoid ground-disturbance in those areas (800 acres). This constraint would apply to a negligible portion of the planning area (less than 1%). None of the potential utility development areas for either alternative would be affected; less than 1% of the potential wind development area for Alternative II and none of the potential wind development area for Alternative III would be affected.

Impacts from Visual Resources Actions

Visual resource allocations prescribe the level of change to the visual landscape that would be allowed in specific areas. Areas in VRM Class I or II are managed to preserve or retain the existing character of the landscape, which would constrain land use authorizations by requiring mitigation and modifications to the project design that would tend to increase overall project costs. Areas in VRM Class IV would have the least constraint on land use authorizations. Table 4- 309 summarizes the constraints on land use authorizations from visual resources actions.

Table 4- 309. Areas with Visual Resource Restrictions that May Affect Land Use Authorizations (Acres)

Area	Alternative					
	No Action	I	II	III	IV	V
Planning Area	241,000	311,000	114,000	114,000	198,000	372,000
Potential Utility Development Area	9,000	0	0	0	0	0
Potential Wind Development Area	36,000	12,000	900	700	9,000	700

Overall, land use authorizations in the planning area would have the least constraint due to VRM in Alternatives II and III, followed by Alternative IV, the No Action Alternative, then Alternative I; Alternative V would have the most constraint. Within the potential utility development area for each alternative, all the action alternatives would have a similar level of constraint; the No Action Alternative would have the most constraint due to VRM in its potential utility development area. Within the potential wind development area for each alternative, Alternatives II and III would have the least constraint as a smaller percent of their potential wind development areas would be affected, followed by Alternative V, then by Alternative IV; Alternative I and the No Action Alternative would have the most constraint as their potential wind development areas would have the largest percent affected.

Impacts from Management Specific to the No Action Alternative

In the No Action Alternative, 17% of the planning area would be managed to preserve or retain its existing visual character (VRM Class I and II areas); this would result in moderate to major constraints on land use authorizations within those areas. VRM Class I or II allocations would constrain 12% of the potential utility development area and 23% of the potential wind development area in the No Action Alternative.

Impacts from Management Common to All Action Alternatives

The degree to which ensuring authorized uses are designed to meet VRM objectives would affect land use authorizations would depend on where projects would be located. Those located in VRM Class I and II areas would have more constraint than those located in VRM Class III and IV areas.

Impacts from Management Specific to Alternative I

In Alternative I, 23% of the planning area would be managed to preserve or retain its existing visual character; this would result in moderate to major constraints on land use authorizations within those areas. VRMM Class I or II allocations would constrain less than 1% of the potential utility development and 21% of the potential wind development area in Alternative I.

Impacts from Management Specific to Alternative II

In Alternative II, 8% of the planning area would be managed to preserve or retain its existing visual character; this would result in moderate to major constraints on land use authorizations within those areas. VRM Class I or II allocations would constrain less than 1% of the potential utility development area and 1% of the potential wind development area in Alternative II.

Impacts from Management Specific to Alternative III

In Alternative III, 8% of the planning area would be managed to preserve or retain its existing visual character; this would result in moderate to major constraints on land use authorizations within those areas. VRM Class I or II allocations would constrain less than 1% of the potential utility development area and 1% of the potential wind development area in Alternative III.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

In Alternative IV, 14% of the planning area would be managed to preserve or retain its existing visual character; this would result in moderate to major constraints on land use authorizations within those areas. VRM Class I or II allocations would constrain less than 1% of the potential utility development area and 15% of the potential wind development area in Alternative IV.

Impacts from Management Specific to Alternative V

In Alternative V, 27% of the planning area would be managed to preserve or retain its existing visual character; this would result in moderate to major constraints on land use authorizations within those areas. VRM Class I or II allocations would constrain less than 1% of the potential utility development area and 2% of the potential wind development area in Alternative V.

Impacts from Transportation and Travel Actions

Transportation and travel designations and actions can affect where and how motorized vehicles can be used during construction and maintenance of land use authorization projects. These actions could affect whether a road ROW could be granted. Motorized vehicle use associated with land use authorizations (e.g., construction and maintenance activities), as well as road ROWs, would need to be consistent with designations for transportation and travel. Areas open to cross-country motorized vehicle use would place the least amount of constraint on vehicle use for construction and maintenance, as vehicles would not be restricted to routes in those areas. Conversely, motorized vehicles could not be used for construction and maintenance and road ROWs could not be granted in areas closed to motorized vehicle use. Motorized vehicle use and road ROWs would need to follow designated routes in areas limited to designated routes; alternately, new routes for these authorizations could be designated as well. Table 4- 310 displays constraints on land use authorizations from transportation and travel management.

Table 4- 310. Areas with Travel Designations that May Affect Land Use Authorizations (Acres)

Travel Designation	Alternative					
	No Action	I	II	III	IV	V
Planning Area						
Open to Cross-Country Motorized Vehicle Use	1,062,000	4,000	0	4,000	4,000	700
Closed to Motorized Vehicle Use	25,000	57,000	21,000	24,000	74,000	147,000
Potential Utility Development Areas						
Open to Cross-Country Motorized Vehicle Use	63,000	1,000	0	1,000	1,000	500
Closed to Motorized Vehicle Use	<100	1,000	0	100	0	0
Potential Wind Development Areas						
Open to Cross-Country Motorized Vehicle Use	102,000	900	0	800	800	0
Closed to Motorized Vehicle Use	0	0	0	0	0	0

Overall, land use authorizations in the planning area would have the least constraint from transportation and travel management in the No Action Alternative; the action alternatives would all have much more constraint, with Alternative V having the most constraint overall. Within the potential utility development and potential wind development areas for each alternative, the No Action Alternative would have the least constraint, with similar levels of constraint for the action alternatives.

Impacts from Management Specific to the No Action Alternative

In the No Action Alternative, 77% of the planning area would have the lowest level of constraint due to transportation and travel allocations, while 2% would have the highest level of constraint. Within the potential utility development area for the No Action Alternative, 84% would have the lowest level of constraint, while less than 1% would have the highest. Within the potential wind development area for the No Action Alternative, 65% would have the lowest level of constraint, while less than 1% would have the highest.

Impacts from Management Common to All Action Alternatives

Most transportation and travel management actions common to all action alternatives would not affect land use authorizations. Whether a route is necessary for authorized activities including land use authorizations would be part of the criteria for determining whether a specific route would be designated, modified, or closed.

Impacts from Management Specific to Alternative I

In Alternative I, less than 1% of the planning area would have the lowest level of constraint due to transportation and travel allocations, while 4% would have the highest level of constraint. Site-specific exceptions to motorized vehicle restrictions could be authorized in the lease, permit, or ROW. Within the potential utility development area for Alternative I, 2% would have the lowest level of constraint, and 2% would have the highest. Access and use restrictions during fire restrictions could also constrain activities associated with land use authorizations if they are scheduled to occur during that time. Within the potential wind development area for Alternative I, 1% would have the lowest level of constraint, while no acres would have the highest.

Impacts from Management Specific to Alternative II

In Alternative II, none of the planning area would have the lowest level of constraint due to transportation and travel allocations, while 2% would have the highest level of constraint. Site-specific exceptions to motorized vehicle restrictions could be authorized in the lease, permit, or ROW. None of the potential utility development and potential wind development areas for Alternative II would have the highest level of constraint. There would be no access or use restrictions during fire restrictions in Alternative II; as a result, activities associated with land use authorizations would not be affected.

Impacts from Management Specific to Alternative III

In Alternative III, less than 1% of the planning area would have the lowest level of constraint due to transportation and travel allocations, while 2% would have the highest level of constraint. Site-specific exceptions to motorized vehicle restrictions could be authorized in the lease, permit, or ROW. Within the potential utility development area for Alternative III, 2% would have the lowest level of constraint, while less than 1% would have the highest. Within the potential wind development area for Alternative III, 1% would have the lowest level of constraint, while none would have the highest. Primitive roads, trails, and areas open to cross-country motorized vehicle use would be closed during fire restrictions, which would affect activities associated with land use authorizations if they are scheduled to occur during that time.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

In Alternative IV, less than 1% of the planning area would have the lowest level of constraint due to transportation and travel allocations, while 5% would have the highest level of constraint. Site-specific exceptions to motorized vehicle restrictions could be authorized in the lease, permit, or ROW. Within the potential utility development area for Alternative IV, 2% would have the lowest level of constraint, while none would have the highest. Within the potential wind development area for Alternative IV, 1% would have the lowest level of constraint, while none would have the highest. Access and use restrictions during fire restrictions could also constrain activities associated with land use authorizations if they are scheduled to occur during that time.

Impacts from Management Specific to Alternative V

In Alternative V, less than 1% of the planning area would have the lowest level of constraint due to transportation and travel allocations, while 11% would have the highest level of constraint. No exceptions to motorized vehicle restrictions would be made. Within the potential utility development area for Alternative V, 1% would have the lowest level of constraint, while none would have the highest. None of the potential wind development area for Alternative V would have the lowest or highest level of constraint. Access and use restrictions during fire restrictions could also constrain activities associated with land use authorizations if they are scheduled to occur during that time.

Summary of Direct and Indirect Impacts

Table 4- 311, Table 4- 313, and Table 4- 312 summarize the constraints on road ROWs and other land use authorizations throughout the planning area, on utility line ROWs within potential utility development areas, and wind energy ROWs within potential wind development areas. GIS analysis was used to overlay the various types of constraints to determine the acres with at least one constraint on land use authorizations.

Table 4- 311. Constraints on Road ROWs and Other Land Use Authorizations in the Planning Area by Alternative (Percent)

Constraint	Alternative					
	No Action	I	II	III	IV	V
Exclusion	8	7	7	7	11	11
Avoidance	0	58	57	57	56	79
Within Sage-Grouse Lek Radius	0	11	11	51	67	67
Soil Constraints	0	51	51	51	99	99
Wildlife Seasonal Constraints	33	39	21	21	52	21
Paleontological Constraints	9	9	9	9	9	9
Kelton & Toana Road Protective Corridors	1	2	1	1	2	2
Visual Resource Constraints	17	23	8	8	14	27
Highest Transportation Constraint	2	4	2	2	5	11
Acres Available with at Least One Constraint [A]	**683,000**	**1,007,000**	**900,000**	**1,099,000**	**1,222,000**	**1,224,000**
Percent of Planning Area with at Least One Constraint	**50%**	**73%**	**66%**	**80%**	**89%**	**89%**

[A] Footprint acres of constraints described in direct and indirect impacts analysis; many of these constraints overlap. These do not include acres within ROW exclusion areas.

Impacts from the No Action Alternative

Overall, the No Action Alternative would place the least amount of constraint on land use authorizations of all the alternatives, including on road, wind energy, and utility line ROWs and other land use authorizations. The No Action Alternative would have the second lowest amount of ROW exclusion areas and no ROW avoidance areas, making the largest area available for land use authorizations in the planning area. In areas where land use authorizations would be allowed, there would be few additional constraints, with no specific constraints for soils or exclusion within a pre-defined distance from sage-grouse leks identified. Transportation and travel management would give projects great flexibility in where routes could be located and how construction and maintenance activities could be implemented. Overall, there would be few constraints on location, timing, or project design compared to the action alternatives.

The No Action Alternative would have the second highest acreages available for utility line development in the high-interest areas for utility development and for wind energy development within 2 miles of land rated Fair or higher for wind resources. Within these potential utility and wind development areas, there would be comparatively few constraints. However, proportionally more of both areas would be VRM Class I or II than in the action alternatives, which may affect the visual aspects of project design more than the action alternatives.

Overall, there would be no change in the level of constraint on land use authorizations.

Table 4- 312. Constraints on Utility Line ROWs in the Potential Utility Development Area by Alternative

	Alternative					
	No Action	I	II	III	IV	V
Potential Utility Development Area						
Acres	75,000	71,000	77,000	71,000	70,000	60,000
Percent of High-Interest Areas for Utility Development [A]	98	92	100	92	91	78
Potential Utility Development Area with Constraints (Percent)						
Within Sage-Grouse Lek Radius	0	2	2	22	40	47
Soil Constraints	1	75	69	75	99	99
Wildlife Seasonal Constraints	18	16	9	6	24	7
Paleontological Constraints	21	23	21	23	23	25
Kelton & Toana Road Protective Corridors	5	5	6	5	5	6
Visual Resource Constraints	12	<1	<1	<1	<1	<1
Highest Transportation Constraint	<1	2	0	<1	0	0
Acres of Potential Utility Development Area with at Least One Constraint [B]	**35,010**	**59,532**	**61,297**	**59,709**	**69,668**	**59,375**
Percent of Potential Utility Development Area with at Least One Constraint	**46%**	**84%**	**80%**	**84%**	**99%**	**99%**

[A] 77,000 acres are within high-interest areas for utility development.
[B] Footprint acres of constraints described in direct and indirect impacts analysis; many of these constraints overlap.

Table 4- 313. Constraints on Wind Energy ROWs within the Potential Wind Development Area by Alternative

	Alternative					
	No Action	I	II	III	IV	V
Potential Wind Development Area						
Acres	155,771	60,002	162,110	60,002	59,038	41,776
Percent of Area Within 2 Miles of Lands Rated Fair or Higher for Wind Resources [A]	67	26	69	26	25	18
% of potential wind development area with constraints						
Within Sage-Grouse Lek Radius	0	8	10	28	29	0
Soil Constraints	0	60	44	60	98	98
Wildlife Seasonal Constraints	47	30	37	12	29	0
Paleontological Constraints	15	28	14	28	28	40
Kelton & Toana Road Protective Corridors	5	7	5	7	7	4
Visual Resource Constraints	23	21	1	1	15	2
Highest Transportation Constraint	<1	0	0	0	0	0
Acres of Potential Wind Development Area with at Least One Constraint [B]	**116,000**	**55,000**	**129,000**	**55,000**	**59,000**	**41,000**
Percent of Potential Wind Development Area with at Least One Constraint	**75%**	**92%**	**80%**	**91%**	**99%**	**99%**

[A] 234,000 acres are within 2 miles of lands rated fair or higher for wind resources.
[B] Footprint acres of constraints described in direct and indirect impacts analysis; many of these constraints overlap.

Impacts from Alternative I

Overall, Alternative I would have the third lowest amount of constraint on land use authorizations in the planning area, similar to Alternative III. Alternative I would have the lowest amount of ROW exclusion areas, similar to Alternatives II and III, while having the second highest amount of ROW avoidance areas, similar to Alternatives II, III, and IV. There would be several additional constraints, including specific constraints for wildlife seasonal periods, soils, and distance from sage-grouse leks. Alternative I would also have the second highest acreage with visual resource constraints. Transportation and travel management would give projects much less flexibility than the No Action Alternative in where routes could be located and how construction and maintenance could be implemented; however, there would be more flexibility than in Alternative V. Overall, this would increase constraint on location, timing, and project design compared to the No Action Alternative.

Alternative I would have the second lowest acreages available for utility line development in the high-interest areas for utility development and for wind energy development within 2 miles of land rated Fair of higher for wind resources, similar to Alternatives III and IV. The potential utility and wind development areas for Alternative I would have the third highest amount of constraints. In the potential utility development area, management for soils and wildlife seasonal periods result in constraints on location and timing. In the potential wind development area, management for soils, wildlife seasonal periods, and paleontological and visual resources result in constraints on location, timing, and project design.

Overall, there would be a moderate increase in the level of constraint on land use authorizations

Impacts from Alternative II

Overall, Alternative II would have the second lowest amount of constraint on land use authorizations in the planning area. Alternative II would have the lowest amount of ROW exclusion areas, similar to Alternatives I and III, while having the second lowest amount of ROW avoidance areas, similar to Alternatives I, III, and IV. Alternative II would have similar types of constraints as in Alternative I, but with fewer areas affected by wildlife seasonal restrictions and visual resource management. As a result, there would be fewer constraints on timing and project design compared to Alternative I.

Alternative II would have the highest acreages available for utility line development in the high-interest areas for utility development and for wind energy development within 2 miles of lands rated Fair or higher for wind resources. The potential wind and utility development areas for Alternative II would have the second lowest level of constraint. In the potential utility development area, there would be fewer constraints on soils and wildlife seasonal periods than in Alternative I. In the potential wind development area, management for soils, special status species, and paleontological and visual resources result in fewer constraints on location, timing, and project design for wind energy developments than in Alternative I.

Overall, there would be a minor increase in the level of constraint on land use authorizations

Impacts from Alternative III

Overall, Alternative III would have the third lowest amount of constraint on land use authorizations in the planning area, similar to Alternative I. Alternative III would have the lowest amount of ROW exclusion areas, similar to Alternatives I and II, while having the second highest amount of ROW avoidance areas, similar to Alternatives I, II, and IV. Alternative III would have more constraints on land use authorizations near sage-grouse leks than in Alternative I, but with fewer restrictions related to wildlife seasonal periods and visual resources. This would increase the constraint on location but reduce the constraint on timing as compared to Alternative I.

Alternative III would have the second lowest acreages available for utility line development in the high-interest areas for utility development and for wind energy development within 2 miles of land rated Fair of higher for wind resources, similar to Alternatives I and IV. However, the potential utility development area for Alternative III would have the third highest amount of constraints, similar to Alternative I, with more constraints on distance from sage-grouse leks but fewer constraints on wildlife seasonal periods. This would increase the constraint on location but reduce the constraint on timing for utility line development as compared to Alternative I. The potential wind development area for Alternative III would have the third highest amount of constraints, similar to Alternative I. Management for wildlife seasonal periods and visual resources would result in fewer constraints on timing and project design than in Alternative I, but Alternative III would have more constraints of distance from sage-grouse leks.

Overall, there would be a moderate increase in the level of constraint on land use authorizations

Impacts from Alternative IV (the Preferred Alternative)

Overall, Alternative IV would have the second highest amount of constraint on land use authorizations in the planning area. Alternative IV would have the highest amount of ROW exclusion areas, similar to Alternative V, while having the second highest amount of ROW avoidance areas, similar to Alternatives I, II, and III. Alternative IV would have the highest amount of constraint on distance from sage-grouse leks, soil resources, and wildlife seasonal periods, with the second highest amount of constraint on transportation and the second lowest constraint on visual resources. This would result in more constraint on location and timing, but less constraint on project design, than Alternative I.

Alternative IV would have the second lowest acreages available for utility line development in the high-interest areas for utility development and for wind energy development within 2 miles of land rated Fair or higher for wind resources, similar to Alternatives I and III. However, the potential utility and wind development areas for Alternative IV would have the highest level of constraint of all the alternatives. In the potential utility development area, management for sage-grouse leks, soil resources, and wildlife seasonal periods results in more constraint on location and timing than in the other alternatives. In the potential wind development area, management for soil resources, wildlife seasonal periods, distance from sage-grouse leks, and paleontological resources results in more constraint on location and timing than in the other alternatives.

Overall, there would be a major increase in the level of constraint on land use authorizations

Impacts from Alternative V

Overall, Alternative V would have the highest amount of constraint on land use authorizations in the planning area. Alternative V would have the highest amount of ROW exclusion areas, similar to Alternative IV, while also having the highest amount of ROW avoidance areas. Alternative V would have the highest amount of constraint on distance from sage-grouse leks, soil resources, visual resources, and transportation and travel. This would result in more constraint on location and project design than Alternative I.

Alternative V would have the lowest acreages available for utility line development in the high-interest areas for utility development and for wind energy development within 2 miles of land rated Fair or higher for wind resources. However, the potential utility and wind development areas for Alternative V would have the second highest level of constraint. In the potential utility development area, fewer constraints on wildlife seasonal periods would result in fewer constraints on timing than in Alternative IV. Even though Alternative V would have similar acres of constraint as Alternative IV and higher constraint on paleontological resources, the potential wind development area does not contain any sage-grouse habitat; this lack of constraint on sage-grouse leks and wildlife seasonal periods results in fewer constraints on location and timing than in Alternative IV.

Overall, there would be a major increase in the level of constraint on land use authorizations

Cumulative Impacts

Past, Present, and Reasonably Foreseeable Actions

The region within which cumulative impacts to land use authorizations were considered includes all lands within the planning area. The cumulative impacts analysis considers past, present, and reasonably foreseeable actions within the planning area that would increase or decrease the amount of constraint on land use authorizations.

Past, present, and reasonably foreseeable actions for the following resource use cumulatively affects land use authorizations:

- Land Use Authorizations

In addition to the description of these actions in the *Introduction* to this chapter, future land use authorizations in the planning area would be somewhat constrained by existing projects. For example, there are already over 4,000 miles of various types of routes within the planning area; 10% of these miles are part of over 50 ROWs for roads or roads to communication sites. As a result, new road ROWs in these areas would only be granted if they would be compatible with the existing ROWs. Also, several of the ROW corridors identified in the alternatives already contain phone lines, powerlines, or gas pipelines (e.g., Williams and Chevron natural gas pipelines); these would constrain the location of future ROWs in the ROW corridors, depending on the degree to which the existing and future ROWs are compatible. Other existing powerlines and several small, privately owned wind farms in the analysis area, as well as the proposed Gateway West Transmission Line Project and the proposed China Mountain Wind Energy Project, would also constrain the location of future ROWs.

The 2009 *Approved Resource Management Plan Amendments/Record of Decision (ROD) for Designation of Energy Corridors on Bureau of Land Management-Administered Lands in the 11 Western States* (referred to as the “Energy Corridor EIS”) (BLM, 2009)[24] created four energy corridors that cross the planning area and continue across other adjacent Federal lands; these corridors coincide with the Balanced Rock, Pilgrim Gulch, Saylor Creek, and Shoestring ROW corridors identified in some of the alternatives. The designated corridors would be 3,500 feet wide and could be used for overhead utility lines as well as underground pipelines for oil, gas, and hydrogen. The Energy Corridor EIS also identifies Interagency Operating Procedures to expedite applications for construction or modification of oil, gas, and hydrogen pipelines and electricity transmission and distribution facilities within the energy corridors. The Interagency Operating Procedures also identify mandatory requirements that will help ensure future projects developed in these corridors are implemented in a manner that protects and enhances environmental resources and long-term sustainability. For the purposes of this analysis, it is assumed that the Interagency Operating Procedures decrease the amount of constraint on land use authorizations within the ROW corridors by specifying standardized procedures and identifying requirements up front.

There are 116,000 acres of lands managed by the Department of Defense in the planning area; 4,000 acres are within 2 miles of lands rated Fair or higher for wind resource potential, while none are within the high-interest areas for utility line development. For the purposes of analysis, it is assumed that wind energy and utility projects would be incompatible with the purposes for which these lands are managed and that these lands are unavailable for land use authorizations.

There are 4,000 acres of lands managed by the National Park Service in the planning area as the Hagerman Fossil Beds National Monument; 4,000 acres are within 2 miles of lands rated Fair or higher for wind resource potential, while fewer than 100 acres are within the high-interest areas for utility line development. Law, regulation, and policy would make it unlikely that new ROWs for roads, utility lines, and wind energy could occur within the National Monument (Wissenbach, 2009). Therefore, for the purposes of analysis, it is assumed that these lands are unavailable for land use authorizations.

There are 77,000 acres of State lands managed by IDL in the planning area; 13,000 acres are within 2 miles of lands rated Fair or higher for wind resource potential, while 3,000 acres are within the high-interest areas for utility line development. State lands are managed to generate revenue for nine endowment beneficiaries; the endowment beneficiary for the majority of State lands in the planning area is public schools (Kriwox, 2009). IDL is developing a wind lease template and a request for proposal for wind energy development to facilitate the leasing of State lands for wind energy (IDL, 2009a); State lands are also available for other types of developments as well, either through lease or sale of easements (Kriwox, 2009). Based on this, for the purposes of this analysis, it is assumed that State lands would generally be available for wind energy development, utility line development, and other types of land use authorizations and would generally present few constraints for such projects.

[24] This ROD amended the 1987 Jarbidge RMP. However, this amendment occurred after it could be incorporated into Chapter 2 of the Draft RMP/EIS. The No Action Alternative and Alternative V will be updated in the Proposed RMP/Final EIS to include all four corridors designated by the ROD. Alternatives I through IV already contain these corridors. Here, it will be analyzed as a past action for cumulative impacts.

There are 244,000 acres of private lands in the planning area; 96,000 acres are within 2 miles of lands rated Fair or higher for wind resource potential, while 26,000 acres are within the high-interest areas for utility line development. Private landowners may place some type of restriction or constraint on land use authorizations on their lands; however, the type and extent of those restrictions are unknown. For the purposes of analysis, it is assumed that private landowners are likely to impose at least some level of restriction on land use authorizations and therefore, that private lands are available for land use authorizations with constraints.

Table 4- 314 describes the overall constraints on land use authorizations on non-BLM lands within the planning area, lands in the high-interest areas for utility line development, and areas within 2 miles of lands rated Fair or higher for wind resource potential. Overall, 18% of non-BLM lands in the planning area are available for land use authorizations, 55% are available with constraints, and 27% are unavailable. On lands in the high-interest areas for utility line development, 10% of non-BLM lands are available for utility line ROWs, 90% are available with constraints, and less than 1% are unavailable. In areas within 2 miles of lands rated Fair or higher for wind resource potential, 11% of non-BLM lands are available for wind energy ROWs, 82% are available with constraints, and 7% are unavailable.

Table 4- 314. Constraints on Land Use Authorizations on Non-BLM Lands in the Planning Area (Acres)

Ownership	Acres	Available	Available with Constraints	Unavailable
On Lands in the Entire Planning Area				
Military	116,000	0	0	116,000
National Park Service	4,000	0	0	4,000
State of Idaho	77,000	77,000	0	0
Private	244,000	0	244,000	0
Total	**441,000**	**77,000**	**244,000**	**120,000**
On Lands in the High-Interest Areas for Utility Line Development				
Military	0	0	0	0
National Park Service	<100	0	0	<100
State of Idaho	3,000	3,000	0	0
Private	26,000	0	26,000	0
Total	**29,000**	**3,000**	**26,000**	**<100**
In Areas Within 2 Miles of Lands Rated Fair or Higher for Wind Resource Potential				
Military	4,000	0	0	4,000
National Park Service	4,000	0	0	4,000
State of Idaho	13,000	13,000	0	0
Private	96,000	0	96,000	0
Total	**117,000**	**13,000**	**96,000**	**8,000**

Summary of Cumulative Impacts

For the purpose of the cumulative impacts analysis in the planning area as a whole (Table 4- 315), acres available with constraints are the overall footprint acres identified in Table 4- 311. Acres unavailable in the planning area reflect ROW exclusion areas. Areas available in the planning area are the difference between the total planning area acres and the sum of acres available with constraints and acres unavailable.

To assess cumulative impacts in areas most suitable for utility line development (Table 4- 316), acres available with constraints are the acres of potential utility development area with at least one constraint, identified in Table 4- 312. To obtain acres unavailable, acres of potential utility development area for each alternative were subtracted from acres in the high-interest areas for utility line development. To obtain acres available, acres available with constraints were subtracted from the acres of potential utility development area.

Table 4- 315. Areas Available in the Region for Land Use Authorizations (Acres)

Amount of Constraint	Alternative					
	No Action	I	II	III	IV	V
Available						
BLM	580,000	271,000	379,000	179,000	4,000	2,000
Other	77,000	77,000	77,000	77,000	77,000	77,000
Total	**657,000**	**348,000**	**456,000**	**256,000**	**81,000**	**79,000**
Available with Constraints						
BLM	683,000	1,007,000	900,000	1,099,000	1,222,000	1,224,000
Other	244,000	244,000	244,000	244,000	244,000	244,000
Total	**927,000**	**1,251,000**	**1,144,000**	**1,343,000**	**1,466,000**	**1,468,000**
Unavailable						
BLM	110,000	95,000	94,000	95,000	148,000	148,000
Other	120,000	120,000	120,000	120,000	120,000	120,000
Total	**230,000**	**215,000**	**214,000**	**215,000**	**268,000**	**268,000**

Table 4- 316. Areas Available in the Region for Utility Line ROWs in the High-Interest Areas for Utility Line Development (Acres)

Amount of Constraint	Alternative					
	No Action	I	II	III	IV	V
Available						
BLM	40,000	11,000	16,000	11,000	400	400
Other	3,000	3,000	3,000	3,000	3,000	3,000
Total	**43,000**	**14,000**	**19,000**	**14,000**	**3,400**	**3,400**
Available with Constraints						
BLM	35,000	60,000	61,000	60,000	70,000	59,000
Other	26,000	26,000	26,000	26,000	26,000	26,000
Total	**61,000**	**86,000**	**87,000**	**86,000**	**96,000**	**85,000**
Unavailable						
BLM	1,000	6,000	0	6,000	7,000	17,000
Other	<100	<100	<100	<100	<100	<100
Total	**1,000**	**6,000**	**<100**	**6,000**	**7,000**	**17,000**

To assess cumulative impacts in areas most suitable for wind energy development (Table 4- 317), acres available with constraints are the acres of potential wind development area with at least one constraint, identified in Table 4- 313. To obtain acres unavailable, acres of potential wind development area for each alternative were subtracted from acres within 2 miles of lands rated Fair or higher for wind energy. To obtain acres available, acres available with constraints were subtracted from the acres of potential wind development area.

The proposed China Mountain Wind Energy Project area encompasses 31,000 acres, including 16,000 acres of public lands managed by the BLM Jarbidge FO, 4,000 acres of public lands managed by the BLM Wells FO, 9,000 acres of private land, and 2,000 acres of State land. Constraints based on management direction in the *Land Use Authorizations* section of Chapter 2 for wind energy development on the 16,000 acres of public land in the planning area are displayed for each alternative.

Cumulative Impacts from the No Action Alternative

In the No Action Alternative, 37% of the region would be available for land use authorizations, 50% would be available with constraints, and 13% would be unavailable; this would decrease the overall level of constraint on land use authorizations in the region.

Table 4- 317. Areas Available in the Region for Wind Energy ROWs within 2 Miles of Lands Rated Fair or Higher for Wind Resource Potential (Acres)

Amount of Constraint	Alternative					
	No Action	I	II	III	IV	V
Available						
BLM	39,000	5,000	33,000	5,000	400	400
Other	13,000	13,000	13,000	13,000	13,000	13,000
Total	**52,000**	**18,000**	**46,000**	**18,000**	**13,400**	**13,400**
Available with Constraints						
BLM	116,000	55,000	129,000	55,000	59,000	41,000
Other	96,000	96,000	96,000	96,000	96,000	96,000
Total	**212,000**	**151,000**	**225,000**	**151,000**	**155,000**	**137,000**
Unavailable						
BLM	78,000	174,000	72,000	174,000	175,000	192,000
Other	8,000	8,000	8,000	8,000	8,000	8,000
Total	**86,000**	**182,000**	**80,000**	**182,000**	**183,000**	**200,000**

In the No Action Alternative, 41% of the lands in the high-interest areas for utility line development would be available for utility line ROWs, 58% would be available with constraints, and 1% would be unavailable; this would decrease the overall level of constraint on land use authorizations for utility line development in the region by decreasing the acres available with constraints. The implementation of the management in the Energy Corridor ROD would also decrease the amount of constraint on utility line development.

In the No Action Alternative, 15% of the areas within 2 miles of lands rated Fair or higher for wind resource potential would be available for wind energy ROWs, 60% would be available with constraints, and 25% would be unavailable. The proportions available without constraints and unavailable would both increase, with a larger increase in unavailable areas. As a result, the overall level of constraint on land use authorizations for wind energy development would increase; the increase in unavailable areas on public lands may effectively make adjacent State or private lands unavailable, as it may become uneconomical to develop wind energy on those State or private lands. The extent of this impact would depend on the specific location and project proposed. For example, based on management direction in the *Land Use Authorizations* section of Chapter 2, wind energy development would be allowed on 100% of the project area for the proposed China Mountain Wind Energy Project.

Cumulative Impacts from Alternative I

In Alternative I, 19% of the region would be available for land use authorizations, 69% would be available with constraints, and 12% would be unavailable; this would decrease the overall level of constraint on land use authorizations in the region, but not as much as the No Action Alternative.

In Alternative I, 14% of the lands in the high-interest areas for utility line development would be available for utility line ROWs, 81% would be available with constraints, and 5% would be unavailable. This would not substantially change the overall level of constraint on land use authorizations for utility line development in the region. However, Alternative I would reduce constraints on corridors designated by the Energy Corridor ROD by being 1 mile wide, rather than the 3,500-foot width designated in the Energy Corridor ROD.

In Alternative I, 5% of the areas within 2 miles of lands rated Fair or higher for wind resource potential would be available for wind energy ROWs, 43% would be available with constraints, and 52% would be unavailable. This would increase the overall level of constraint on land use authorizations for wind energy development in the region by increasing the proportion of unavailable lands and decreasing the proportion available without constraints. The increase in unavailable areas on public lands may effectively make unavailable adjacent State or private lands, as it may become uneconomical to develop wind energy on those State or private lands. The extent of this impact would depend on the specific location and project proposed. For example, based on management direction in the *Land Use Authorizations* section of Chapter 2, wind energy development would be allowed on 2% of the project area for the proposed China Mountain Wind Energy Project; wind energy development would not be allowed on the remaining 98% of the project area.

Cumulative Impacts from Alternative II

In Alternative II, 25% of the region would be available for land use authorizations, 63% would be available with constraints, and 12% would be unavailable; this would decrease the overall level of constraint on land use authorizations in the region more than Alternative I, but not as much as the No Action Alternative.

In Alternative II, 18% of the lands in the high-interest areas for utility line development would be available for utility line ROWs, 82% would be available with constraints, and less than 1% would be unavailable. This would decrease the overall level of constraint on land use authorizations for utility line development in the region, although to a lesser degree than the No Action Alternative. This decrease could be larger as Alternative II would reduce constraints on corridors designated by the Energy Corridor ROD by being 1 mile wide, rather than the 3,500-foot width designated in the Energy Corridor ROD.

In Alternative II, 13% of the areas within 2 miles of lands rated Fair or higher for wind resource potential would be available for wind energy ROWs, 64% would be available with constraints, and 23% would be unavailable. This would increase the overall level of constraint on land use authorizations for wind energy development in the region by increasing the proportion of unavailable lands; however, the increase would be lower than in Alternative I. The increase in unavailable areas on public lands may effectively make adjacent State or private lands unavailable, as it may become uneconomical to develop wind energy on those State or private lands. The extent of this impact would depend on the specific location and project proposed. For example, based on management direction in the *Land Use Authorizations* section of Chapter 2, wind energy development would be allowed on 99% of the project area for the proposed China Mountain Wind Energy Project; wind energy development would be allowed consistent with ROW avoidance stipulations on the remaining 1% of the project area.

Cumulative Impacts from Alternative III

In Alternative III, 14% of the region would be available for land use authorizations, 74% would be available with constraints, and 12% would be unavailable; this would decrease the overall level of constraint on land use authorizations in the region, but not as much as the No Action Alternative and Alternatives I and II.

In Alternative III, 14% of the lands in the high-interest areas for utility line development would be available for utility line ROWs, 81% would be available with constraints, and 5% would be unavailable. This would not substantially change the overall level of constraint on land use authorizations for utility line development in the region, as in Alternative I. However, Alternative III would reduce constraints on corridors designated by the Energy Corridor ROD by being 1 mile wide, rather than the 3,500-foot width designated in the Energy Corridor ROD.

In Alternative III, 5% of the areas within 2 miles of lands rated Fair or higher for wind resource potential would be available for wind energy ROWs, 43% would be available with constraints, and 52% would be unavailable. This would increase the overall level of constraint on land use authorizations for wind energy development in the region to a similar level as in Alternative I. The increase in unavailable areas on public lands may effectively make adjacent State or private lands unavailable, as it may become uneconomical to develop wind energy on those State or private lands. The extent of this impact would depend on the specific location and project proposed. For example, based on management direction in the *Land Use Authorizations* section of Chapter 2, wind energy development would be allowed on 2% of the project area for the proposed China Mountain Wind Energy Project; wind energy development would not be allowed on the remaining 98% of the project area.

Cumulative Impacts from Alternative IV (the Preferred Alternative)

In Alternative IV, 4% of the region would be available for land use authorizations, 81% would be available with constraints, and 15% would be unavailable. Even though there would be fewer areas unavailable, Alternative IV as a whole would increase the overall level of constraint on land use authorizations in the region.

In Alternative IV, 3% of the lands in the high-interest areas for utility line development would be available for utility line ROWs, 90% would be available with constraints, and 7% would be unavailable. This would increase the overall level of constraint on land use authorizations for utility line development in the region by decreasing the proportion of lands available without constraints and increasing the proportion of unavailable lands. However, Alternative IV would reduce constraints on corridors designated by the Energy Corridor ROD by being 1 mile wide, rather than the 3,500-foot width designated in the Energy Corridor ROD.

In Alternative IV, 4% of the areas within 2 miles of lands rated Fair or higher for wind resource potential would be available for wind energy ROWs, 44% would be available with constraints, and 52% would be unavailable. This would increase the overall level of constraint on land use authorizations for wind energy development in the region to a similar level as in Alternatives I and III. The increase in unavailable areas on public lands may effectively make adjacent State or private lands unavailable, as it may become uneconomical to develop wind energy on those State or private lands. The extent of this impact would depend on the specific location and project proposed. For example, based on management direction in the *Land Use Authorizations* section of Chapter 2, wind energy development would be allowed on 2% of the project area for the proposed China Mountain Wind Energy Project; wind energy development would not be allowed on the remaining 98% of the project area.

Cumulative Impacts from Alternative V

In Alternative V, 4% of the region would be available for land use authorizations, 81% would be available with constraints, and 15% would be unavailable. Even though there would be fewer areas unavailable, Alternative V as a whole would increase the overall level of constraint on land use authorizations in the region, to a similar degree as Alternative IV.

In Alternative V, 3% of the lands in the high-interest areas for utility line development would be available for utility line ROWs, 81% would be available with constraints, and 16% would be unavailable. This would increase the overall level of constraint on land use authorizations for utility line development in the region the most of all alternatives by having the highest proportion of unavailable lands. Three of the four corridors designated by the Energy Corridor ROD would already be designated in Alternative V; Alternative V would reduce constraints on these corridors by being 1 mile wide, rather than the 3,500-foot width designated in the Energy Corridor ROD. The management in the Energy Corridor ROD, meanwhile, would decrease constraints by including the Saylor Creek Corridor in Alternative V.

In Alternative V, 4% of the areas within 2 miles of lands rated Fair or higher for wind resource potential would be available for wind energy ROWs, 39% would be available with constraints, and 57% would be unavailable. This would increase the overall level of constraint on land use authorizations for wind energy development in the region the most of all alternatives by having the highest proportion of unavailable lands. The increase in unavailable areas on public lands may effectively make adjacent State or private lands unavailable, as it may become uneconomical to develop wind energy on those State or private lands. The extent of this impact would depend on the specific location and project proposed. For example, based on management direction in the *Land Use Authorizations* section of Chapter 2, wind energy development would be allowed consistent with ROW avoidance stipulations on 2% of the project area for the proposed China Mountain Wind Energy Project; wind energy development would not be allowed on the remaining 98% of the project area.

4.4.5. Land Tenure

Analysis Methods

Indicators

The following indicator was used for the analysis of impacts to land tenure transactions:

- **The public's[25] ability to engage in land tenure transactions (e.g., sales, exchanges, agricultural entry, DLE/CA development).**

Methods and Assumptions

Impacts to land tenure from management in the *Land Tenure* section of Chapter 2 was analyzed in detail. Management from the remaining sections was not analyzed in detail because the management did not vary measurably between alternatives or impact the indicator for land tenure. **Impacts from management for land tenure** can be found under *Impacts from Land Tenure Actions* in the *Tribal Rights and Interests* and *Paleontological Resources* sections.

The public's ability to engage in land tenure transactions was evaluated by determining the number of acres available for four transaction types: sale, exchange, Desert Land Entry Act of 1877 (DLE) and Carey Act of 1894 (CA) transactions, and R&PP lease. The more acres available, the greater the public's ability to engage in that particular land tenure transaction.

The number of acres in each Land Tenure Zone was examined to determine whether acres within that zone could leave BLM management. Acres in Land Tenure Zone 1 cannot leave BLM management. Acres in Land Tenure Zone 2 can be exchanged, but only for acres within the planning area, or offered as Recreation and Public Purposes Act of 1954 (R&PP) leases, resulting in little to not net loss of BLM-managed acres within the planning area. Acres in Land Tenure Zone 3 can be sold, exchanged for acres outside the planning area, or offered as R&PP leases resulting in a net loss of BLM-managed acres within the planning area.

Lands can be acquired by BLM anywhere in the planning area. This does not vary by alternative and was not analyzed.

Direct and Indirect Impacts

Impacts from Land Tenure Actions

Table 4- 318 contains the number of acres available for each transaction types in each alternative. The total acreage available for land tenure transactions is not a sum of the acres as a particular acre may be available for more than one transaction type.

Table 4- 318. Areas Available by Type of Land Tenure Transaction by Alternative (Acres)

Land Tenure Transaction	Alternative					
	No Action	I	II	III	IV	V
Sale	2,000	20,000	46,000	20,000	16,000	0
Exchange	4,000	264,000	420,000	264,000	245,000	95,000
DLE/CA	67,000	960	960	960	960	960
R&PP Lease	1,368,000	264,000	420,000	264,000	245,000	95,000
Total Acres Available for Land Tenure Transactions [A]	**1,368,000**	**264,000**	**420,000**	**264,000**	**245,000**	**95,000**

[A] This total reflects the footprint for acres available for at least one type of land tenure transaction.

Table 4- 319 contains the number of acres in each Land Tenure Zone for the action alternatives. The Land Tenure Zone determines whether a land tenure transaction can take place, and, if so, whether it would result in a loss of BLM-managed acreage in the planning area. The No Action Alternative does not identify Land Tenure Zones.

[25] For the purposes of this analysis, the term "public" includes any tribe, individual, organization, or government agency interested in engaging in a land tenure transaction.

Table 4- 319. Land Tenure Zone by Alternative (Acres)

Land Tenure Zone	Alternative				
	I	II	III	IV	V
1	1,104,000	947,000	1,104,000	1,123,000	1,273,000
2	244,000	374,000	244,000	229,000	95,000
3	20,000	46,000	31,000	16,000	0

Impacts from Management Specific to the No Action Alternative

The No Action Alternative allows for at least one type of land tenure transaction in more than 99% of the planning area. While this is more acreage than any of the action alternatives, most of this is available for DLE/CA or R&PP leases. With the exception of Alternative V, the No Action has the fewest acres available for sale or exchange, less than 1% of the planning area. Nearly the entire planning area is available for DLE/CA or R&PP leases.

In the No Action Alternative, 2,000 acres are available for sale or exchange. This management is equivalent to that of Land Tenure Zone 3, resulting in the fewest number of acres with the potential to leave BLM-management in the planning area than any other alternative.

Impacts from Management Specific to All Action Alternatives

No new DLE/CAs would be processed in the action alternatives; however, current applications regarding 960 acres would be recognized. This would limit the ability of the public to engage in DLE/CA transactions compared to the No Action Alternative by reducing the number of acres available for DLE/CA by approximately 99%.

Impacts from Management Specific to Alternative I and III

Alternatives I and III allow for at least one type of land tenure transaction in 19% of the planning area. Approximately 1% of the planning area is available for sale, potentially resulting in a net loss of BLM-managed acres. Approximately 19% is available for exchange, DLE/CA applications submitted prior to 2009, or R&PP lease, with little to no potential for net loss of BLM-managed acres.

Impacts from Management Specific to Alternative II

Alternative II allows for at least one type of land tenure transaction in 31% of the planning area. Approximately 3% of the planning area is available for sale, potentially resulting in a net loss of BLM-managed acres. Approximately 31% is available for exchange, DLE/CA applications submitted prior to 2009, or R&PP lease, with little to no potential for net loss of BLM-managed acres.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV allows for at least one type of land tenure transaction in 18% of the planning area. Less than 1% of the planning area is available for sale, potentially resulting in a net loss of BLM-managed acres. Approximately 18% is available for exchange, DLE/CA applications submitted prior to 2009, or R&PP lease, with little to no potential for net loss of BLM-managed acres.

Impacts from Management Specific to Alternative V

Alternative V allows for at least one type of land tenure transaction in 7% of the planning area. None of the planning area is available for sale, while approximately 7% is available for exchange, DLE/CA applications submitted prior to 2009, or R&PP lease.

Summary of Direct and Indirect Impacts

Currently, 75% of the lands within the planning area boundary are managed by the BLM (1,368,000 acres) and 25% are managed by other Federal agencies, State agencies, or private individuals (447,000 acres).

Impacts from the No Action Alternative

Under the No Action Alternative, only 2,000 acres could leave BLM management, resulting in no change in the percentage of acreage in the planning area owned by the Federal agencies, State agencies, or private individuals. While this would be the largest change of any of the alternatives, due to the lack of public interest in acquiring land in the planning area over the past 20 years, this is not expected to occur. Overall, there would be a negligible impact to the ability of the public to engage in a land tenure transaction.

Impacts from Alternative I and III

Under Alternatives I and III, an additional 20,000 acres could leave BLM management, resulting in 74% of the lands within the planning area managed by BLM (1,348,000 acres) and 26% management by other Federal agencies, State agencies, or private individuals (467,000 acres). Due to the lack of public interest in acquiring land in the planning area over the past 20 years, this is not expected to occur. While some acres in Zone 2 could leave BLM management through R&PP lease or DLE/CA applications submitted prior to 2009, based on past interest in these transactions, the number of acres that could be affected by these transactions over the life of the plan is negligible. Overall, there would be a minor beneficial impact to the public’s ability to engage in land tenure transactions.

Impacts from Alternative II

Under Alternative II, an additional 46,000 acres could leave BLM management, resulting in 73% of the lands within the planning area managed by BLM (1,322,000 acres) and 27% management by other Federal agencies, State agencies, or private individuals (493,000 acres). Due to the lack of public interest in acquiring land in the planning area over the past 20 years, this is not expected to occur. While some acres in Zone 2 could leave BLM management through R&PP lease or DLE/CA applications submitted prior to 2009, based on past interest in these transactions, the number of acres that could be affected by these transactions over the life of the plan is negligible. Overall, there would be a minor beneficial impact to the public’s ability to engage in land tenure transactions.

Impacts from Alternative IV (the Preferred Alternative)

Under Alternative IV, an additional 16,000 acres could leave BLM management, resulting in 75% of the lands within the planning area managed by BLM (1,352,000 acres) and 25% management by other Federal agencies, State agencies, or private individuals (462,000 acres). Due to the lack of public interest in acquiring land in the planning area over the past 20 years, this is not expected to occur. While some acres in Zone 2 could leave BLM management through R&PP lease or DLE/CA applications submitted prior to 2009, based on past interest in these transactions, the number of acres that could be affected by these transactions over the life of the plan is negligible. Overall, there would be a negligible impact to the ability of the public to engage in a land tenure transaction.

Impacts from Alternative V

Under Alternative V, no additional acres could leave BLM management, resulting no change from the current condition. While some acres in Zone 2 could leave BLM management through R&PP lease or DLE/CA applications submitted prior to 2009, based on past interest in these transactions, the number of acres that could be affected by these transactions over the life of the plan is negligible. Overall, there would be a negligible impact to the ability of the public to engage in a land tenure transaction.

Cumulative Impacts

Past, Present, and Reasonably Foreseeable Actions

The region for analysis of past, present, and reasonably foreseeable actions includes the BLM Bruneau, Burley, Elko, and Shoshone FOs. These FOs were chosen because it was assumed that someone interested in conducting a land tenure transaction in southern Idaho or northern Nevada would consider land in any of the FOs adjacent to the planning area.

Past, present, and reasonably foreseeable actions for the following resource use cumulatively affects land tenure:

- Land Tenure

These actions are described in the *Introduction* to this chapter. While it is difficult to know how many acres would leave BLM management under the different alternatives, it can be assumed that demand for land tenure transactions would continue.

Summary of Cumulative Impacts

To assess cumulative impacts, the acres available in the region for each type of land tenure transaction in under each alternative are identified. The number of acres available for land tenure transactions in adjacent BLM field offices are displayed is Table 4- 320.

Table 4- 320. Areas Available for Land Tenure Transactions in Adjacent BLM Field Offices (Acres)

Field Office	BLM- Managed Acres	Acres Available for Land Tenure Transactions			
		Sale	Exchange	DLE/CA	R&PP Lease
Bruneau	1,400,000	55,000	55,000	0	55,000
Burley	854,000	61,000	61,000	0	0
Elko	3,134,000	14,000	243,000	0	0
Shoshone	1,440,000	355,000	544,000	0	355,000
Total	**6,828,000**	**485,000**	**903,000**	**0**	**410,000**

Table 4- 321 displays the number of acres of BLM-managed lands available for each type of land tenure transaction in the adjacent FOs and under each alternative.

Table 4- 321. Areas Available in the Region for Land Tenure Transactions by Alternative (Acres)

Land Tenure Transaction	Adjacent Field Offices	Alternative					
		No Action	I	II	III	IV	V
Sale	485,000	2,000	20,000	46,000	20,000	16,000	0
Exchange	903,000	4,000	264,000	420,000	264,000	245,000	95,000
DLE/CA	0	67,000	960	960	960	960	960
R&PP Lease	410,000	1,368,000	264,000	420,000	264,000	245,000	95,000

Cumulative Impacts from the No Action Alternative

Under the No Action Alternative, 488,000 acres of BLM-managed lands would be available for sale in the region. This is similar to the action alternatives with 7% of BLM-managed lands available for sale. The No Action Alternative has the fewest BLM-managed lands in the region available for exchange; 908,000 acres are available in the region, resulting in 13% of BLM-managed lands in the region available for exchange. While the No Action Alternative allows for the largest number of acres for DLE/CA, regionally, it still results in less than 1% of BLM-managed lands available under DLE/CA. The No Action Alternative has the largest number of acres of BLM-managed lands in the region available for R&PP lease; 1,777,000 acres or 22% would be available for R&PP lease.

Cumulative Impacts from Alternatives I and III

Under Alternatives I and III, 505,000 acres of BLM-managed lands would be available for sale in the region. This is similar to the No Action Alternative and the other action alternatives with 6% of BLM-managed lands available for sale. With 1,168,000 acres of BLM-managed lands in the region available for exchange (14%), Alternatives I and III have similar number of acres of BLM-managed lands in the region

available for exchange as Alternative IV, more acres available than the No Action Alternative and Alternative V, and fewer acres available than Alternative II. While Alternatives I and III allow for a fewer number of acres for DLE/CA than the No Action Alternative, regionally, they result in the same percentage of BLM-managed lands available DLE/CA (less than 1%) than the No Action and the other action alternatives. Alternatives I and III have a similar number of acres of BLM-managed lands in the region available for R&PP lease as Alternative IV, fewer acres than the No Action Alternative and Alternative II, and more acres available than Alternative V; 674,000 acres, or 8%, of BLM-managed lands in the region would be available for R&PP lease in Alternatives I and III.

Cumulative Impacts from Alternative II

Under Alternative II, 531,000 acres of BLM-managed lands would be available for sale in the region. This is similar to the No Action Alternative and other action alternatives with 6% of BLM-managed lands available for sale. With 1,324,000 acres of BLM-managed lands in the region available for exchange (16%), Alternative II has more acres of BLM-managed lands in the region available for exchange than the other alternatives. While Alternative II allows for a fewer number of acres for DLE/CA than the No Action Alternative, regionally, it results in the same percentage of BLM-managed lands available DLE/CA (less than 1%) than the No Action and the other action alternatives. Alternative II has fewer acres of BLM-managed lands in the region available for R&PP lease than the No Action Alternative, but more acres available then the other action alternatives; 830,000 acres, or 10%, of BLM-managed lands in the region would be available for R&PP lease in Alternative II.

Cumulative Impacts from Alternative IV (the Preferred Alternative)

Under Alternative IV, 501,000 acres of BLM-managed lands would be available for sale in the region. This is similar to the No Action Alternative and the other action alternatives with 6% of BLM-managed lands available for sale. With 1,148,000 acres of BLM-managed lands in the region available for exchange (14%), Alternative IV has a similar number of acres of BLM-managed lands in the region available for exchange as Alternatives I and III, more acres available than the No Action Alternative and Alternative V, and fewer acres available than Alternative II. While Alternative IV allows for a fewer number of acres for DLE/CA than the No Action Alternative, regionally, it results in the same percentage of BLM-managed lands available DLE/CA (less than 1%) than the No Action and the other action alternatives. Alternative IV has a similar number of acres of BLM-managed lands in the region available for R&PP lease as Alternatives I and III, fewer acres than the No Action Alternative and Alternative II, and more acres available than Alternative V.

Cumulative Impacts from Alternative V

Under Alternative V, 485,000 acres of BLM-managed lands would be available for sale in the region. This is similar to the No Action Alternative and the other action alternatives with 6% of BLM-managed lands available for sale. With 998,000 acres of BLM-managed lands in the region available for exchange (12%), Alternative V has more acres available than the No Action Alternative, but fewer acres available than the other action alternatives. While Alternative V allows for a fewer number of acres for DLE/CA than the No Action Alternative, regionally, it results in the same percentage of BLM-managed lands available DLE/CA (less than 1%) than the No Action and the other action alternatives. Alternative V has a fewer number of acres of BLM-managed lands in the region available for R&PP lease than the other alternatives; 505,000 acres, or 6%, of BLM-managed lands in the region would be available for R&PP lease in Alternative V.

4.4.6. Minerals

4.4.6.1. Leasable Minerals

Analysis Methods

Indicators

The following indicator was used for the analysis of impacts to mineral leasing:

- **Amount of constraint on mineral leasing** – The primary factor within the alternatives that would affect mineral leasing is the amount of constraint the alternative would place on this use. This indicator reflects the availability of Federal mineral estate for leasable mineral exploration and development.

The amount of constraint on mineral leasing in a particular area can vary widely, depending on the need to mitigate impacts to other resources or uses in that area. An area may be closed to mineral leasing entirely if other resources or uses cannot be adequately protected from leasable mineral development with even the most restrictive lease stipulations; this would render any mineral deposit in that area inaccessible for the life of the plan. In contrast, an area with few resource or use conflicts may be open to mineral leasing subject to existing laws, regulations, and formal orders; the terms and conditions of the standard lease form; and stipulations for ESA Section 7. Between these lay various degrees of other constraints including no surface occupancy (NSO) and seasonal and controlled surface use restrictions for areas where such restrictions may be required to mitigate impacts to other resource values. Management for other resources within the planning area can also affect leasable mineral exploration and development. In general, management direction that restricts leasable mineral exploration and development would tend to add cost and delay while also increasing the complexity of permitting and the logistical operation of these activities.

Methods and Assumptions

Impacts to mineral leasing from management in the following sections of Chapter 2 were analyzed in detail: *Leasable Minerals*, *Soil Resources*, *Special Status Species*, *Paleontological Resources*, and *Visual Resources*. Impacts from management in the *Water Resources*, *Riparian Areas and Wetlands*, *Fish*, *Wildlife*, *Cultural Resources*, *Non-WSA Lands with Wilderness Characteristics*, *Areas of Critical Environmental Concern*, *National Historic Trails*, *Wild and Scenic Rivers*, and *Wilderness Study Areas* sections were not analyzed in detail because the impacts were captured in the analysis of leasable minerals actions. Impacts from management in the remaining sections were not analyzed in detail because the management would not noticeably affect mineral leasing. **Impacts from management for leasable minerals** can be found under *Impacts from Minerals Actions* in the *Climate Change*, *Soil Resources*, *Water Resources*, *Riparian Areas and Wetlands*, *Fish*, *Wildlife*, *Special Status Fish and Aquatic Invertebrates*, *Special Status Wildlife*, *Noxious Weeds and Invasive Plants*, *Wild Horses*, *Paleontological Resources*, *Cultural Resources*, *Non-WSA Lands with Wilderness Characteristics*, *Livestock Grazing*, and *Wild and Scenic Rivers* sections.

The amount of constraint on mineral leasing in each alternative was quantified through a GIS analysis of the various leasable mineral allocations described in Chapter 2. Through GIS, the number and types of constraints were determined for each acre of Federal mineral estate within the planning area, including split-estate lands (1,613,000 acres total). The number and types of constraints were also determined for the areas with potential for oil and gas leasing (380,000 acres; Map 90) identified in the Reasonably Foreseeable Development Scenario (RFDS) for Oil and Gas Resources (Appendix U) and the areas with high (10,000 acres) and medium (526,000 acres) potential for geothermal leasing (Map 91) identified in the RFDS for Geothermal Development in the Jarbidge Field Office (Appendix V).[26]

The resulting combinations of constraints were arranged into a hierarchy that represents varying levels of constraint. The hierarchy was based on the availability of lands for leasing and, for areas where leasing is permitted, the relative difficulty and cost of conducting exploration and development operations. The hierarchy is ordered from “No Leasing” (most constrained) to “Leasing with Standard Lease Terms” (least constrained) as follows:

- **Category 1: No Leasing, Statutory/PLO** – Lands that cannot be leased due to statute or PLO, such as the Juniper Butte Range, Saylor Creek Range, and Hagerman Fossil Beds National Monument.
- **Category 2: No Leasing, Administrative** – Lands that are withheld from leasing based on discretionary decisions made by BLM; this category includes lands described in Chapter 2 as being closed to mineral leasing.
- **Category 3: Leasing, NSO** – Lands that can be leased, but surface-disturbing exploration and development activities are prohibited. These stipulations protect identified resources such as the Oregon NHT, the Kelton and Toana Freight Roads, and eligible, suitable, and designated WSRs as described in Chapter 2.
- **Category 4: Leasing, Cumulative Timing Limitations >9 months** – Lands that can be leased, but stipulations limit the time of the year when exploration, construction, and drilling can take place during more than nine months of the year. Timing limitations prohibit surface use during specified time intervals to protect identified resources, including sage-grouse, big game, redband trout, and bull trout. Some Category 4 lands may have the controlled surface use stipulation for RCAs in addition to the timing limitation.

[26] Areas with high and medium potential for geothermal leasing are analyzed together due to the relatively small acreage with high potential.

- **Category 5: Leasing, Cumulative Timing Limitations >6 to ≤9 months** – Lands that can be leased, but stipulations limit the time of the year when exploration, construction, and drilling can take place between six and nine months of the year. Some Category 5 lands may have the controlled surface use stipulation for RCAs in addition to the timing limitation.
- **Category 6: Leasing, Cumulative Timing Limitations >3 to ≤6 months** – Lands that can be leased, but stipulations limit the time of the year when exploration, construction, and drilling can take place between three and six months of the year. Some Category 6 lands may have the controlled surface use stipulation for RCAs in addition to the timing limitation.
- **Category 7: Leasing, Cumulative Timing Limitations ≤3 months** – Lands that can be leased, but stipulations limit the time of the year when exploration, construction, and drilling can take place during less than three months of the year. Some Category 7 lands may have the controlled surface use stipulation for RCAs in addition to the timing limitation.
- **Category 8: Leasing, Controlled Surface Use** – Lands where stipulations control implementation of specific exploration and development activities; in this RMP, the controlled surface use stipulation applies to RCAs. Category 8 is comprised of areas with a controlled surface use stipulation that do not also have a timing limitation.
- **Category 9: Leasing, Standard Lease Terms** – Lands that can be leased subject to existing laws, regulations, and formal orders; the terms and conditions of the standard lease form; and stipulations for ESA Section 7 Consultation and Cultural Resource Protection.

The leasable mineral allocations in the No Action Alternative are not comparable to those in the action alternatives because the acres within some categories overlap and the constrained areas were not mapped. As a result, additional steps were necessary to analyze impacts of the leasable minerals actions in the No Action Alternative. The acres allocated as open, NSO, and closed for each Multiple Use Area (MUA) exceeded the total acres of each MUA; to obtain numbers for analysis, the most restrictive interpretation of these allocations was taken. For instance, where limited and closed acres in an MUA were identical, those acres were assumed to be closed; where the limited acres were clearly accounted for as part of open, those acres were assumed to be limited and were subtracted from open. Acres within 500 feet of perennial and intermittent streams were subtracted from open areas and added to NSO areas. To obtain acres with seasonal restrictions, the acres of crucial mule deer and pronghorn winter range (Map 19) and acres within 2 miles of sage-grouse leks were subtracted from open areas. Acres identified in the 1987 Jarbidge RMP were adjusted proportionally to reflect the acres of Federal mineral estate in each MUA. This process was repeated to obtain acres under each level of constraint within the potential oil and gas and potential geothermal areas. The figures obtained from these calculations are intended only to assist with the analysis and comparison of the No Action Alternative with the action alternatives.

Where possible, the impacts of management identified for soils, special status species, paleontological resources, and visual resources were quantified through a GIS analysis; however, some management could only be analyzed qualitatively. In these cases, impacts are characterized as increasing or decreasing the amount of constraint on mineral leasing.

Assumptions were developed based on ID Team knowledge of mineral leasing and the planning area. These assumptions should not be construed to confine or redefine management contained within alternatives and were used to allow a comparison of impacts to mineral leasing resulting from the alternatives. Assumptions used to analyze impacts to mineral leasing include the following:

- Leasable minerals management applies to mineral leasing on Federal mineral estate, including split-estate lands. Management identified for soils, special status species, paleontological resources, and visual resources only applies to mineral leasing on lands with BLM surface management.
- Leasable minerals on lands in Categories 1 and 2 are generally inaccessible; leasable minerals on lands in Categories 3 through 8 are accessible with restrictions beyond standard lease terms; and leasable minerals on lands in Category 9 are accessible under standard lease terms.
- A given interval of timing limitation reflects a similar level of constraint on mineral leasing with or without the controlled surface use stipulation for RCAs.
- Because exception, waiver, and modification criteria can only be analyzed on a site-specific basis, these criteria were assumed to not apply. However, any exceptions, waivers, and modifications to

lease stipulations authorized would tend to reduce the impacts to development and the value of a lease.

- According to the RFDS for Oil and Gas Development in the Jarbidge Field Office (Appendix U):
  - The most likely locations for oil and gas exploration and development are the northeast corner of the planning area and the Cedar Creek/China Mountain area (Map 90); these areas are referred to as the potential oil and gas areas.
  - Two or three geophysical exploration programs would be conducted to help identify potential exploration drilling targets. These would likely be conducted along existing roads or trails or by overland travel, thereby causing minor impacts to surface resources.
  - Approximately 10 to 20 oil and gas leases would be offered between now and 2029. Most of these would not progress to exploration or development operations, but one or two exploration wells may be drilled on some of those leases. On average, each well site would disturb approximately 15 acres due to construction of a drill pad and access roads, for a total of approximately 30 acres of temporary disturbance. It is anticipated that all of those acres would be reclaimed. Each drilling site could be active for approximately one year, from the start of drill pad and access road construction; through drilling and well testing; to completion of plugging the hole and reclamation.
  - One oil and gas well would encounter hydrocarbons in sufficient quantities to warrant field development. Based on this discovery, a five-well field would be developed; it may take one to three years to fully develop the field. Disturbance for additional roads, drill pads, pipelines, and storage tanks would total approximately 60 acres. It is anticipated that all of those acres would be reclaimed in the long term, after production activities are completed, which may take one to ten years depending on field characteristics.
  - The probability of full oil and gas field development and production occurring in the planning area during the next 20 years is considered low. Other oil and gas resources exist in Nevada, Utah, and Wyoming. Pipelines and other transportation infrastructure are in place in other locations, but not in the planning area; it is likely that most oil and gas production would occur from the known areas where infrastructure exists for oil and gas production.
- According to the RFDS for Geothermal Development in the Jaribdge Field Office (Appendix V):
  - The most likely location for geothermal exploration and development is the area near Bruneau Hot Springs, determined to have high potential for geothermal resources, but the area designated as having medium potential (northern third of the planning area) may encounter exploration activities and possible development as well (Map 91); these areas with high and medium potential are referred to as potential geothermal areas.
  - Several geothermal exploration proposals would be processed between now and 2029 to explore for evidence of geothermal resources; a geothermal lease is not required for these activities. Geophysical surveying would likely be conducted along existing roads or trails, thereby causing negligible impacts to surface resources. Exploration would also likely include drilling of 20 temperature gradient wells. Temperature gradient well drilling takes from several days to several weeks per well. On average, each well site would disturb approximately 4.25 acres due to site preparation and access roads, for a total of approximately 85 acres of temporary disturbance. It is anticipated that all of those acres would be reclaimed.
  - One of the geothermal exploration activities would encounter geothermal resources in sufficient quantities to transition to a development/production phase; a typical development generally requires several leases. Based on the geothermal potential in the planning area, a 20-MW power plant would be developed with five production wells and five injection wells concentrated within a 9 to 15 square mile area. It takes approximately one month to drill one well. Disturbance for additional roads, drill pads, pipelines, transmission lines, and the power plant would total approximately 100 to 145 acres. It is anticipated that all of those acres would be reclaimed in the long term, after production activities are completed, which may take 10 to 50 years depending on field characteristics.
  - The probability of full geothermal resource development and production occurring in the planning area during the next 20 years is higher than for oil and gas development but still considered low.

- Management for areas with very high potential for paleontological resources (PFY Class 5) would place more constraint on mineral leasing than areas with lower potential for paleontological resources.
- Management for areas within VRM Classes I and II would place more constraint on mineral leasing than management for areas within VRM Classes III and IV.
- Mitigation measures could increase costs and reduce the profitability of operations. In many cases, these would be considered typical costs of doing business on public lands. However, any increase in cost would potentially impact leasable mineral development. Higher costs may increase the sales prices that operators charge purchasers, may limit mineral development to only the more profitable portions of a mineral deposit, or may reduce the overall amount of exploration and development. In some cases, increased costs could cause a particular proposal to not be economically feasible; and development actions may be dropped.

Direct and Indirect Impacts

Impacts from Leasable Minerals Actions

Table 4- 322 through Table 4- 328 summarizes the impacts of the leasable minerals actions on mineral leasing. Overall, mineral leasing in the planning area would be most constrained in Alternatives IV-A, IV-B, and I and the No Action Alternative, followed by Alternative V. Within the potential oil and gas areas, Alternatives I and IV would have the most constraint on mineral leasing, followed by the No Action Alternative and Alternative V. Within the potential geothermal areas, the No Action Alternative would have the most constraint on mineral leasing, followed by Alternatives I and V, then Alternative IV. Within all three geographic areas (i.e., planning area, potential oil and gas areas, and potential geothermal areas), Alternatives II and III would have the least constraint on mineral leasing.

Leasable minerals on Category 1 and 2 lands are considered inaccessible, but these two categories potentially differ in the duration for which those minerals are inaccessible. Leasable minerals on Category 1 lands would become accessible only if a new statute or PLO reversed the current closure or withdrawal. Leasable minerals on Category 2 lands would be inaccessible through the life of the plan.

In the rare instance that Category 3 lands are targeted for exploration, it is likely that directional drilling and geophysical testing from adjacent lands would allow for adequate exploration and development to occur. Therefore, the underlying resource on Category 3 lands is considered accessible even though the surface above it cannot be occupied by drilling equipment. However, directional drilling is more expensive and has a lower success rate than conventional drilling. Forcing a lessee to use directional drilling by applying an NSO stipulation could result in less-than-optimal utilization of the leasable mineral resource. NSO stipulations would decrease the lease value and, to a lesser extent, require the relocation of well sites and the modification of field development. NSO stipulations would tend to have the effect of adding to existing risk of finding and developing leasable minerals. This would tend to reduce interest in leasing minerals where an NSO stipulation is applied. Less leasing would tend to reduce leasable mineral exploration and development.

Leases issued with less major constraints, such as timing or controlled surface use restrictions, would result in similar impacts as leases issued with an NSO stipulation. Increased timing limitations generally result in increased delays for exploration, construction, and drilling, which increase costs and reduce profitability. The window for conducting mineral exploration could be quite short in some areas due to a combination of multiple timing restrictions and the heavy snows and intense winters sometimes experienced in southern Idaho. These restrictions applied to leasable mineral exploration activities may limit ability of lessees or permittees to obtain geologic information in a single season and could result in minerals and energy exploration programs being extended to two or more years. This could extend the length of time required to evaluate feasibility and prepare a development proposal. Timing restrictions could render some production proposals impractical.

The leasing stipulations proposed in Chapter 2 are programmatic for the planning area. They address basic requirements that apply to conducting surface disturbance such as exploring and developing the lease. They do not address the many necessary site-specific protection and mitigation measures needed for approval of an environmentally sound operations plan. Mitigation measures appropriate for a specific site and operations plan would be developed and applied during a future BLM review and approval of individual plans of development, ROWs, sundry notices, and operating plans. The measures would be developed and assessed in a site-specific NEPA document that would be provided for public review at that time.

Impacts from Management Specific to the No Action Alternative

The mineral leasing allocations specific to the No Action Alternative would result in 13% of the Federal mineral estate within the planning area being inaccessible for leasable mineral exploration and development (Table 4- 322). Approximately 45% of the Federal mineral estate would be accessible with restrictions such as NSO and seasonal restrictions in sage-grouse habitat and big game winter range. The remaining 43% of the mineral estate would be accessible under standard lease terms.

Within the potential oil and gas areas, 6% would be inaccessible for leasable mineral exploration and development, 27% would be accessible with restrictions beyond standard lease terms, and the remaining 67% would be accessible under standard lease terms (Table 4- 322). Within the potential geothermal areas, 23% would be inaccessible for leasable mineral exploration and development, 10% would be accessible with restrictions beyond standard lease terms, and the remaining 67% would be accessible under standard lease terms (Table 4- 322).

Table 4- 322. Constraints on Leasable Mineral Development the No Action Alternative (Acres)

Category [A]	Planning Area	Potential Oil and Gas Areas	Potential Geothermal Areas
1. No Leasing, Statutory/PLO	118,000	4,000	100,000
2. No Leasing, Administrative	86,000	18,000	24,000
3. Leasing, No Surface Occupancy	139,000	41,000	25,000
4. Leasing, Cumulative Timing Limitations >9 Months	0	0	0
5. Leasing, Cumulative Timing Limitations >6 to ≤9 Months	115,000	35,000	0
6. Leasing, Cumulative Timing Limitations >3 to ≤6 Months	55,000	7,000	0
7. Leasing, Cumulative Timing Limitations ≤3 Months	411,000	18,000	28,000
8. Leasing, Controlled Surface Use Only	0	0	0
9. Leasing, Standard Lease Terms	689,000	257,000	358,000
[A] Categories are arranged in decreasing levels of constraint.			

Mineral leases may be further constrained by site-specific lease stipulations to protect resources, which would be identified on a case-by-case basis.

Impacts from Management Common to All Action Alternatives

Due to existing statutes and PLOs as well as the closure of WSAs, approximately 13% of the planning area would be inaccessible for leasable mineral exploration and development under management common to all action alternatives (Table 4- 323). Within the potential oil and gas areas, approximately 1% would be inaccessible for leasable mineral exploration and development under management common to all action alternatives; approximately 19% of the potential geothermal areas would be inaccessible.

Under all action alternatives, the standard lease terms and the stipulations for ESA Section 7 would apply, resulting in a baseline level of constraint that would apply to any future mineral leases. In addition, mineral leases may be further constrained by site-specific resource condition objectives, lease stipulations, conditions of approval, and actions to achieve those objectives, which would be identified on a case-by-case basis.

Table 4- 323. Constraints on Leasable Mineral Development Common to All Action Alternatives (Acres)

Category [A]	Planning Area	Potential Oil and Gas Areas	Potential Geothermal Areas
1. No Leasing, Statutory/PLO	118,000	4,000	100,000
2. No Leasing, Administrative	94,000	100	4,000
3. Leasing, No Surface Occupancy	0	0	0
4. Leasing, Cumulative Timing Limitations >9 Months [B]	0	0	0
5. Leasing, Cumulative Timing Limitations >6 to ≤9 Months [B]	0	0	0
6. Leasing, Cumulative Timing Limitations >3 to ≤6 Months [B]	0	0	0
7. Leasing, Cumulative Timing Limitations ≤3 Months [B]	0	0	0
8. Leasing, Controlled Surface Use Only	0	0	0
9. Leasing, Standard Lease Terms	0	0	0

[A] Categories are arranged in decreasing levels of constraint.
[B] Some acres in Categories 4 through 7 may also have a controlled surface use stipulation for RCAs.

Impacts from Management Specific to Alternative I

The mineral leasing allocations specific to Alternative I would result in 4% of the planning area being inaccessible for leasable mineral exploration and development (Table 4- 324). Approximately 41% of the planning area would be accessible with constraints such as NSO; seasonal restrictions in key sage-grouse habitat, big game winter range, and spawning habitat for bull trout and redband trout; and controlled surface use restrictions for RCAs; 42% of the planning area would be accessible under standard lease terms.

Within the potential oil and gas areas, approximately 3% would be inaccessible for leasable mineral exploration and development, approximately 33% would be accessible with restrictions beyond standard lease terms, and the remaining 63% would be accessible under standard lease terms (Table 4- 324). Within the potential geothermal areas, approximately 2% would be inaccessible for leasable mineral exploration and development, approximately 7% would be accessible with restrictions beyond standard lease terms, and the remaining 72% would be accessible under standard lease terms (Table 4- 324).

Table 4- 324. Constraints on Leasable Mineral Development in Alternative I (Acres)

Category [A]	Planning Area	Potential Oil and Gas Areas	Potential Geothermal Areas
1. No Leasing, Statutory/PLO	0	0	0
2. No Leasing, Administrative	66,000	11,000	11,000
3. Leasing, No Surface Occupancy	32,000	25,000	23,000
4. Leasing, Cumulative Timing Limitations >9 Months [B]	0	0	0
5. Leasing, Cumulative Timing Limitations >6 to ≤9 Months [B]	171,000	52,000	400
6. Leasing, Cumulative Timing Limitations >3 to ≤6 Months [B]	460,000	48,000	12,000
7. Leasing, Cumulative Timing Limitations ≤3 Months [B]	400	400	400
8. Leasing, Controlled Surface Use Only	2,000	900	900
9. Leasing, Standard Lease Terms	670,000	239,000	385,000

[A] Categories are arranged in decreasing levels of constraint.
[B] Some acres in Categories 4 through 7 may also have a controlled surface use stipulation for RCAs.

Impacts from Management Specific to Alternative II

The mineral leasing allocations specific to Alternative II would not result in any additional acres of the planning area being inaccessible for leasable mineral exploration and development aside from those common to all action alternatives (Table 4- 325). Approximately 3% of the planning area would be accessible with NSO restrictions and controlled surface use restrictions for RCAs; 84% of the planning area would be accessible under standard lease terms.

Within the potential oil and gas areas, no additional areas would be inaccessible for leasable mineral exploration and development, approximately 6% would be accessible with restrictions beyond standard lease terms, and the remaining 93% would be accessible under standard lease terms (Table 4- 325). Within the potential geothermal areas, no additional areas would be inaccessible for leasable mineral exploration and development, approximately 4% would be accessible with restrictions beyond standard lease terms, and the remaining 77% would be accessible under standard lease terms (Table 4- 325).

Table 4- 325. Constraints on Leasable Mineral Development in Alternative II (Acres)

Category [A]	Planning Area	Potential Oil and Gas Areas	Potential Geothermal Areas
1. No Leasing, Statutory/PLO	0	0	0
2. No Leasing, Administrative	0	0	0
3. Leasing, No Surface Occupancy	29,000	17,000	16,000
4. Leasing, Cumulative Timing Limitations >9 Months [B]	0	0	0
5. Leasing, Cumulative Timing Limitations >6 to ≤9 Months [B]	0	0	0
6. Leasing, Cumulative Timing Limitations >3 to ≤6 Months [B]	0	0	0
7. Leasing, Cumulative Timing Limitations ≤3 Months [B]	0	0	0
8. Leasing, Controlled Surface Use Only	17,000	7,000	4,000
9. Leasing, Standard Lease Terms	1,355,000	353,000	412,000

[A] Categories are arranged in decreasing levels of constraint.
[B] Some acres in Categories 4 through 7 may also have a controlled surface use stipulation for RCAs.

Impacts from Management Specific to Alternative III

The mineral leasing allocations specific to Alternative III would result in less than 1% of the planning area being inaccessible for leasable mineral exploration and development (Table 4- 326). Approximately 3% of the planning area would be accessible with NSO restrictions and controlled surface use restrictions for RCAs; 84% of the planning area would be accessible under standard lease terms.

Within the potential oil and gas areas, less than 1% would be inaccessible for leasable mineral exploration and development, approximately 6% would be accessible with restrictions beyond standard lease terms, and the remaining 93% would be accessible under standard lease terms (Table 4- 326). Within the potential geothermal areas, less than 1% would be inaccessible for leasable mineral exploration and development, approximately 4% would be accessible with restrictions beyond standard lease terms, and the remaining 77% would be accessible under standard lease terms (Table 4- 326).

Table 4- 326. Constraints on Leasable Mineral Development in Alternative III (Acres)

Category [A]	Planning Area	Potential Oil and Gas Areas	Potential Geothermal Areas
1. No Leasing, Statutory/PLO	0	0	0
2. No Leasing, Administrative	2,000	4,000	1,000
3. Leasing, No Surface Occupancy	28,000	17,000	17,000
4. Leasing, Cumulative Timing Limitations >9 Months [B]	0	0	0
5. Leasing, Cumulative Timing Limitations >6 to ≤9 Months [B]	0	0	0
6. Leasing, Cumulative Timing Limitations >3 to ≤6 Months [B]	0	0	0
7. Leasing, Cumulative Timing Limitations ≤3 Months [B]	0	0	0
8. Leasing, Controlled Surface Use Only	17,000	7,000	7,000
9. Leasing, Standard Lease Terms	1,355,000	352,000	352,000

[A] Categories are arranged in decreasing levels of constraint.
[B] Some acres in Categories 4 through 7 may also have a controlled surface use stipulation for RCAs.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

The mineral leasing allocations specific to Alternative IV-A would result in 9% of the planning area being inaccessible for leasable mineral exploration and development (Table 4- 327); 7% would be inaccessible in Alternative IV-B (the Preferred Alternative). Approximately 38% of the planning area in Alternative IV-A and 39% in Alternative IV-B would be accessible with constraints such as NSO; seasonal restrictions in key sage-grouse habitat, big game winter range, and spawning habitat for bull trout and redband trout; and controlled surface use restrictions for RCAs. Even though Alternatives I, IV-A, and IV-B have timing limitations for the same species, more of these species' habitat would already be closed to mineral leasing in Alternatives IV-A and IV-B; therefore, there would be fewer available with timing limitations than in Alternative I. In Alternative IV-A, 39% of the planning area would be accessible under standard lease terms; in Alternative IV-B, 40% would be accessible under standard lease terms.

Within the potential oil and gas areas, approximately 6% would be inaccessible for leasable mineral exploration and development, approximately 29% would be accessible with restrictions beyond standard lease terms, and the remaining 64% would be accessible under standard lease terms (Table 4- 327). Within the potential geothermal areas, less than 1% would be inaccessible for leasable mineral exploration and development, approximately 8% would be accessible with restrictions beyond standard lease terms, and the remaining 72% would be accessible under standard lease terms (Table 4- 327).

Table 4- 327. Constraints on Leasable Mineral Development in Alternative IV (the Preferred Alternative; Acres)

Category [A]	Planning area		Potential Oil and Gas Areas [B]	Potential Geothermal Areas [B]
	IV-A	IV-B		
1. No Leasing, Statutory/PLO	0		0	0
2. No Leasing, Administrative	149,000	117,000	23,000	4,000
3. Leasing, No Surface Occupancy	32,000		25,000	23,000
4. Leasing, Cumulative Timing Limitations >9 Months [C]	0		0	0
5. Leasing, Cumulative Timing Limitations >6 to ≤9 Months [C]	149,000	158,000	40,000	800
6. Leasing, Cumulative Timing Limitations >3 to ≤6 Months [C]	433,000	441,000	42,000	12,000
7. Leasing, Cumulative Timing Limitations ≤3 Months [C]	400		400	400
8. Leasing, Controlled Surface Use Only	4,000		3,000	3,000
9. Leasing, Standard Lease Terms	634,000	648,000	242,000	388,000

[A] Categories are arranged in decreasing levels of constraint.
[B] Management in the potential oil and gas and potential geothermal areas does not differ between Alternatives IV-A and IV-B.
[C] Some acres in Categories 4 through 7 may also have a controlled surface use stipulation for RCAs.

Impacts from Management Specific to Alternative V

The mineral leasing allocations specific to Alternative V would result in 4% of the planning area being inaccessible for leasable mineral exploration and development (Table 4- 328). Approximately 18% of the planning area would be accessible with constraints such as NSO; seasonal restrictions in key sage-grouse habitat, and spawning habitat for bull trout and redband trout; and controlled surface use restrictions for RCAs; 64% of the planning area would be accessible under standard lease terms.

Within the potential oil and gas areas, approximately 8% would be inaccessible for leasable mineral exploration and development, approximately 21% would be accessible with restrictions beyond standard lease terms, and the remaining 70% would be accessible under standard lease terms (Table 4- 328). Within the potential geothermal areas, approximately 2% would be inaccessible for leasable mineral exploration and development, approximately 7% would be accessible with restrictions beyond standard lease terms, and the remaining 72% would be accessible under standard lease terms (Table 4- 328).

Table 4- 328. Constraints on Leasable Mineral Development in Alternative V (Acres)

Category [A]	Planning Area	Potential Oil and Gas Areas	Potential Geothermal Areas
1. No Leasing, Statutory/PLO	0	0	0
2. No Leasing, Administrative	71,000	30,000	10,000
3. Leasing, No Surface Occupancy	32,000	24,000	23,000
4. Leasing, Cumulative Timing Limitations >9 Months [B]	0	0	0
5. Leasing, Cumulative Timing Limitations >6 to ≤9 Months [B]	0	0	0
6. Leasing, Cumulative Timing Limitations >3 to ≤6 Months [B]	256,000	55,000	13,000
7. Leasing, Cumulative Timing Limitations ≤3 Months [B]	4,000	800	400
8. Leasing, Controlled Surface Use Only	5,000	1,000	900
9. Leasing, Standard Lease Terms	1,034,000	266,000	385,000

[A] Categories are arranged in decreasing levels of constraint.
[B] Some acres in Categories 4 through 7 may also have a controlled surface use stipulation for RCAs.

Impacts from Soil Resources Actions

Restrictions on uses in areas with potential for wind or water erosion would constrain leasable mineral exploration and development by requiring exploration and development operations to employ erosion control, timely and effective reclamation, and other mitigation measures at all sites to reduce impacts to those areas. Mitigation measures could increase costs and reduce the profitability of operations. In many cases, these would be considered typical costs of doing business on public lands, but any increase in cost would potentially impact leasable mineral development. Table 4- 305 summarizes the impacts to mineral leasing from soil resources actions.

Table 4- 329. Areas with Soil-Related Restrictions that May Affect Mineral Leasing by Alternative (Acres)

	Alternative					
	No Action	I	II	III	IV	V
By Type of Constraint						
Water Erosion	0	437,000	437,000	437,000	1,289,000	1,289,000
Wind Erosion	0	218,000	218,000	218,000	1,122,000	1,122,000
Slope	0	69,000	69,000	69,000	69,000	69,000
Footprint Acres of Constraints Due to Water and Wind Erosion Potential and Slope						
Planning Area	0	703,000	703,000	703,000	1,358,000	1,358,000
Potential Oil and Gas Area	0	180,000	180,000	180,000	302,000	302,000
Potential Geothermal Area	0	212,000	212,000	212,000	361,000	361,000

Impacts from Management Specific to the No Action Alternative

Soil management direction for the No Action Alternative does not specifically reference mineral leasing. The general guidelines provided would result in negligible impacts to mineral leasing, as they only require soil resources be considered in project-level planning.

Impacts from Management Common to the No Action and All Action Alternatives

Minimizing soil erosion by maintaining adequate perennial vegetation cover could result in minor constraints to mineral leasing, exploration, and development, as all disturbed areas would need to be reseeded to provide perennial vegetation cover.

Impacts from Management Common to All Action Alternatives

Modifying routes or mitigating the erosive effects of transportation and travel would indirectly affect mineral leasing as it would apply to any ancillary routes developed or used for exploration and development.

Impacts from Management Specific to Alternatives I, II, and III

Management specific to Alternatives I, II, and III would result in more constraints to mineral leasing than the No Action Alternative. These alternatives would require mitigation on soils with severe or very severe potential for wind erosion or with high potential for water erosion. In these areas, as well as areas with slopes greater than 20%, an erosion control strategy for mineral exploration and development would be required. These constraints would be similar to a controlled surface use stipulation. Overall, these soil resource actions would constrain 51% of the planning area, 47% of the potential oil and gas areas, and 56% of the potential geothermal areas.

Impacts from Management Specific to Alternatives IV and V

Management specific to Alternatives IV and V would result in more constraints to mineral leasing than the No Action Alternative and Alternatives I, II, and III due to more restrictive management applied to a larger area. Alternatives IV and V would require mitigation on soils with moderate, severe, or very severe potential for wind erosion or with medium or high potential for water erosion. In these areas, as well as areas with slopes between 20% and 40% (46,000 acres), an erosion control strategy for mineral exploration and development would be required as well. These constraints would be similar to a controlled surface use stipulation. No surface disturbance from mineral exploration and development would be allowed on slopes greater than 40% (22,000 acres); this would be similar to a NSO stipulation in these areas. Overall, these soil resource actions would constrain 99% of the planning area, 79% of the potential oil and gas areas, and 67% of the potential geothermal areas.

Impacts from Special Status Species Actions

The ESA Section 7 Consultation Stipulation is part of the management for leasable minerals. However, other management for special status species would also constrain leasable mineral exploration and development in special status species habitat by requiring additional mitigation measures to reduce impacts to those areas. There would be some instances where the avoidance of an ESA-listed species or its habitat and the application of mitigation measures would cause great impacts on a particular operation. These measures could result in added cost, delays, and in some cases, would preclude development.

Development projects could face additional mitigation costs and increased operational logistics if the project would impact a non-listed special status species in a manner that would contribute to the species becoming listed under ESA. However, in most cases, mitigation for those species would not result in high costs that would prevent development, as protection and mitigation measures would typically be less rigorous or stringent than those for listed species. Costs or delays from applying mitigation for non-listed special status species would add to other mitigation costs and delays, which could contribute to an overall effect of reducing mineral recovery or preventing a proposed operation from being implemented.

Impacts from Management Specific to the No Action Alternative

Mineral leasing would be constrained if the project area included areas within 0.75 miles of ferruginous hawk and prairie falcon nests by restricting occupancy from mid March through June. Other occupancy restrictions described in the No Action Alternative are analyzed under *Impacts from Leasable Minerals Actions*. Other management in the No Action Alternative would constrain mineral leasing, exploration, and development if those activities would adversely impact special status plants throughout the planning area or any special status species in the Snake River corridor.

Impacts from Management Common to the No Action and All Action Alternatives

If biological opinions or letters of concurrence contain conservation measures that relate to leasable minerals, mineral leasing in habitats for the relevant special status species would be constrained. The degree of constraint would be relative to the specific conservation measure. For instance, the current conservation measure to protect groundwater sources that contribute to Bruneau hot springsnail habitat would likely preclude geothermal leasing in areas in or near Bruneau hot springsnail habitat; these areas are within the areas with high potential for geothermal leasing.

Impacts from Management Common to All Action Alternatives

Special status species management common to all action alternatives would constrain mineral leasing if the lease or subsequent exploration and development would adversely affect special status species, as these activities would not be allowed without mitigation. The type and degree of constraint would be relative to the specific mitigation required. In addition to constraints contained in current BLM guidelines for sage-grouse, constraints on mineral leasing would also include avoiding special status species and their habitats; where this would not be possible, additional mitigation would be required.

Impacts from Management Specific to Alternatives I, III, IV, and V

Alternatives I, III, IV, and V would all result in restrictions on mineral leasing if the lease included areas within 1 mile of ferruginous hawk or prairie falcon nests by requiring leasing activities to be designed to minimize impacts to their prey base and availability of nesting material from March through July. The level of constraint would be greater than in the No Action Alternative.

Impacts from Management Specific to Alternative II

Alternative II would result in restrictions on mineral leasing if the lease included areas within 0.25 miles of ferruginous hawk or prairie falcon nests by requiring leasing activities to be designed to minimize impacts to their prey base and availability of nesting material from March through July; this would be less constraining than the No Action Alternative and Alternatives I, III, IV, and V.

Impacts from Paleontological Resources Actions

Management identified for paleontological resources may constrain mineral leasing, as activities related to exploration and development, including seismic exploration, can affect those resources. This management constraint would only apply where paleontological resources were present. Authorized operations would be required to immediately bring to the attention of the authorized officer any discovery of paleontological resources. Activities affecting the discovery would be suspended immediately with the discovery left intact until the authorized officer is able to evaluate the discovery and take appropriate action to protect or remove the resource. In most cases, activities would not be suspended for an extended amount of time and impacts to development would not be great. In some rare cases involving major paleontological finds, a pit might be closed or moved. The areas most likely to be affected are those with high or very high potential for paleontological resources (PFY Classes 4 and 5, respectively). However, because the planning area does not contain any PFY Class 4 areas, this analysis considers only those areas in PFY Class 5.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative would provide for managing paleontological resources to protect, maintain, or enhance sites or areas for their scientific and education values. Any mineral leasing in paleontological resource areas would be constrained to the extent the activities would impact paleontological resources; mineral leasing in areas with very high potential for paleontological resources (PFY Class 5) would be most likely to be affected by this management (121,000 acres). The potential oil and gas areas contain 91,000 acres (24% of the area) rated as PFY Class 5 that would likely be constrained by paleontological resource actions; the potential geothermal areas contains 121,000 acres (23% of the area) rated as PFY Class 5 that would likely be constrained by these actions.

Impacts from Management Common to All Action Alternatives

Leasable mineral exploration and development in paleontological resource areas would be required to implement measures to protect those resources; mineral leasing in areas rated as PFY Class 5 would be most likely to be affected by this management (121,000 acres). The type and degree of constraint on mineral leasing would be relative to the specific measures required. The potential oil and gas areas contain 91,000 acres (24% of the area) rated as PFY Class 5 that would likely be constrained by paleontological resource actions; the potential geothermal areas contains 121,000 acres (23% of the area) rated as PFY Class 5 that would likely be constrained by these actions. This management would have a similar level of constraint as the No Action Alternative.

Impacts from Visual Resources Actions

VRM Class allocations prescribe the level of change to the visual landscape that would be allowed in those areas. Surface disturbance related to leasable mineral exploration, development, and production facilities would need to meet objectives for the particular VRM Class for the area. Areas in VRM Class I or II are managed to preserve or retain the existing character of the landscape, which would constrain leasable mineral exploration and development activities by requiring mitigation and special project considerations. This could involve relocation or elimination of certain facilities and measures to mitigate alterations to line, form, color, and texture, which could result in additional time and costs to project development. The costs could be substantial in VRM Class I areas and somewhat less substantial in VRM Class II areas. Areas in VRM Class IV would have the least constraint on mineral leasing and, therefore, the least impact to project costs. Table 4- 330 summarizes the impacts to mineral leasing from visual resources actions; areas allocated to VRM Class I or II are assumed to result in the most constraint to mineral leasing.

Table 4- 330. Areas with Visual Resource Restrictions that May Affect Mineral Leasing by Alternative (Acres)

VRM Class I and II Areas	Alternative					
	No Action	I	II	III	IV	V
Planning Area	241,000	311,000	114,000	114,000	198,000	372,000
Potential Oil and Gas Areas	50,000	95,000	12,000	12,000	53,000	94,000
Potential Geothermal Areas	37,000	15,000	14,000	14,000	14,000	14,000

Impacts from Management Specific to the No Action Alternative

In the No Action Alternative, 17% of the planning area would be managed to preserve or retain its existing visual character (VRM Class I and II areas); this would result in moderate to major constraints on mineral leasing within those areas. VRM Class I or II allocations would constrain 13% of the potential oil and gas areas and 7% of the potential geothermal areas.

Impacts from Management Specific to Alternative I

In Alternative I, 23% of the planning area would be managed to preserve or retain its existing visual character; this would result in moderate to major constraints on mineral leasing within those areas. VRM Class I or II allocations would constrain 25% of the potential oil and gas areas and 3% of the potential geothermal areas.

Impacts from Management Specific to Alternative II

In Alternative II, 8% of the planning area would be managed to preserve or retain its existing visual character; this would result in moderate to major constraints on mineral leasing within those areas. VRM Class I or II allocations would constrain 3% of the potential oil and gas areas and 3% of the potential geothermal areas.

Impacts from Management Specific to Alternative III

In Alternative III, 8% of the planning area would be managed to preserve or retain its existing visual character; this would result in moderate to major constraints on mineral leasing within those areas. VRM Class I or II allocations would constrain 3% of the potential oil and gas areas and 3% of the potential geothermal areas.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

In Alternative IV, 14% of the planning area would be managed to preserve or retain its existing visual character; this would result in moderate to major constraints on mineral leasing within those areas. VRM Class I or II allocations would constrain 14% of the potential oil and gas areas and 3% of the potential geothermal areas.

Impacts from Management Specific to Alternative V

In Alternative V, 27% of the planning area would be managed to preserve or retain its existing visual character; this would result in moderate to major constraints on mineral leasing within those areas. VRM Class I or II allocations would constrain 25% of the potential oil and gas areas and 3% of the potential geothermal areas.

Summary of Direct and Indirect Impacts

Overall impacts to mineral leasing in the planning area and the potential oil and gas and potential geothermal areas are displayed in Table 4- 331, Table 4- 332, and Table 4- 333, respectively. For analysis purposes, to display the overall impact to mineral leasing resulting from the alternatives, the planning area acres were identified under three subheadings: *Accessibility Determined through Minerals Actions; Constraints Identified from Soil, Paleontological, and Visual Resource Actions*; and *Overall Accessibility*. Under *Accessibility Determined through Minerals Actions*, acres were identified as accessible under standard lease terms, accessible with restrictions, or inaccessible to leasable mineral development. Under *Constraints Identified from Soil, Paleontological, and Visual Resource Actions*, acres with constraints from these sections were identified as to whether they occurred within areas accessible to leasable mineral development under standard lease terms or areas accessible with restrictions. To determine overall accessibility, acres within accessible areas that had constraints from management actions for soil, paleontological, and visual resources were moved from the accessible category to accessible with restrictions. Acres with constraints from soil, paleontological, and visual resource actions within areas accessible with restrictions are captured in the overall accessible with restrictions category, while inaccessible acres remain the same. This process was repeated for the potential oil and gas areas and the potential geothermal areas to display the overall impact to mineral leasing in these areas.

Table 4- 331. Summary of Impacts to Mineral Leasing in the Planning Area (Acres)

Constraints	Alternative						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
Accessibility Determined through Minerals Actions							
Accessible under Standard Lease Terms	689,000	670,000	1,355,000	1,355,000	634,000	648,000	1,034,000
Accessible with Restrictions	720,000	665,000	46,000	44,000	618,000	636,000	296,000
Inaccessible	204,000	278,000	212,000	213,000	360,000	329,000	283,000
Constraints Identified from Soil, Paleontological, and Visual Resource Actions [A]							
In Areas Accessible under Standard Lease Terms	150,000[B]	348,000	651,000	650,000	559,000	573,000	938,000
In Areas Accessible with Restrictions	156,000[B]	419,000	31,000	30,000	565,000	582,000	260,000
Overall Accessibility							
Accessible Under Standard Lease Terms	540,000	322,000	705,000	705,000	76,000	76,000	96,000
Accessible with Restrictions	869,000	1,013,000	696,000	694,000	1,176,000	1,208,000	1,234,000
Inaccessible	204,000	278,000	212,000	213,000	360,000	328,000	283,000
Overall Acres with Constraints [C]	**1,073,000**	**1,291,000**	**908,000**	**908,000**	**1,537,000**	**1,537,000**	**1,517,000**

[A] Footprint acres
[B] Because the areas with the various mineral restriction categories cannot be mapped for the No Action Alternative, acres with paleontological or visual resource constraints were distributed proportionally across the three categories for the purposes of analysis. This method assumes that the paleontological and visual resource constraints are not correlated with any particular restriction category.
[C] Sum of acres accessible with restrictions beyond standard lease terms and acres inaccessible to leasing.

Table 4- 332. Summary of Impacts to Mineral Leasing in the Potential Oil and Gas Areas (Acres)

Constraints	Alternative					
	No Action	I	II	III	IV	V
Accessibility Determined through Minerals Actions						
Accessible under Standard Lease Terms	257,000	239,000	353,000	352,000	242,000	266,000
Accessible with Restrictions	102,000	126,000	24,000	23,000	111,000	81,000
Inaccessible	22,000	15,000	4,000	5,000	27,000	34,000
Constraints Identified from Soil, Paleontological, and Visual Resource Actions [A]						
In Areas Accessible under Standard Lease Terms	88,000[B]	159,000	194,000	193,000	189,000	209,000
In Areas Accessible with Restrictions	35,000[B]	102,000	17,000	17,000	92,000	67,000
Overall Accessibility						
Accessible under Standard Lease Terms	169,000	80,000	159,000	159,000	53,000	57,000
Accessible with restrictions	189,000	285,000	217,000	216,000	300,000	290,000
Inaccessible	22,000	15,000	4,000	5,000	27,000	34,000
Overall Acres with Constraints [C]	**212,000**	**301,000**	**221,000**	**221,000**	**327,000**	**323,000**

[A] Footprint acres
[B] Because the areas with the various mineral restriction categories cannot be mapped for the No Action Alternative, acres with paleontological or visual resource constraints were distributed proportionally across the three categories for the purposes of analysis. This method assumes that the paleontological and visual resource constraints are not correlated with any particular restriction category.
[C] Sum of acres accessible with restrictions beyond standard lease terms and acres inaccessible to leasing.

Impacts from the No Action Alternative

From the leasable mineral allocations alone, 13% of the planning area would be inaccessible, 45% would be accessible with restrictions beyond standard lease terms, and 43% would be accessible with standard lease terms in the No Action Alternative. Within the area accessible under standard lease terms, 149,000 acres are assumed to contain areas rated as PFY Class 5 or would be allocated as VRM Class I or II, making these areas accessible with restrictions beyond standard lease terms. Integrating constraints from each section, 13% of the planning area would be inaccessible, 54% would be accessible with restrictions, and 33% would be accessible with standard lease terms (Table 4- 331). All of these areas could be further constrained if leasable mineral exploration or development could impact soil resources or special status species.

After integrating constraints due to paleontological and visual resources in the potential oil and gas areas, 6% would be inaccessible, 50% would be accessible with restrictions, and 44% would be accessible with standard lease terms (Table 4- 332). After integrating constraints in the potential geothermal areas, 23% would be inaccessible, 28% would be accessible with restrictions, and 49% would be accessible with standard lease terms (Table 4- 333).

Overall, there would be no change in the level of constraint on oil and gas and geothermal leasing.

Impacts from Alternative I

From the leasable mineral allocations alone, 17% of the planning area would be inaccessible, 41% would be accessible with restrictions beyond standard lease terms, and 42% would be accessible with standard lease terms in Alternative I. Within the area accessible under standard lease terms, 348,000 acres have soils with severe or very severe potential for wind erosion or with high potential for water erosion, are on slopes greater than 20%, contain areas rated as PFY Class 5, or would be allocated as VRM Class I or II, making these areas accessible with restrictions beyond standard lease terms.

Table 4- 333. Summary of Impacts to Mineral Leasing in the Potential Geothermal Area (Acres)

	Alternative					
	No Action	I	II	III	IV	V
Accessibility Determined through Minerals Actions						
Accessible under Standard Lease Terms	358,000	385,000	412,000	412,000	388,000	388,000
Accessible with Restrictions	53,000	37,000	20,000	19,000	40,000	40,000
Inaccessible	124,000	115,000	104,000	105,000	108,000	108,000
Constraints Identified from Soil, Paleontological, and Visual Resource Actions [A]						
In Areas Accessible under Standard Lease Terms	98,000[B]	219,000	233,000	232,000	323,000	323,000
In Areas Accessible with Restrictions	15,000[B]	19,000	15,000	14,000	32,000	32,000
Overall Accessibility						
Accessible under Standard Lease Terms	260,000	165,000	179,000	179,000	65,000	65,000
Accessible with Restrictions	152,000	256,000	253,000	252,000	363,000	363,000
Inaccessible	124,000	115,000	104,000	105,000	108,000	108,000
Overall Acres with Constraints [C]	**276,000**	**371,000**	**357,000**	**357,000**	**471,000**	**471,000**

[A] Footprint acres
[B] Because the areas with the various mineral restriction categories cannot be mapped for the No Action Alternative, acres with paleontological or visual resource constraints were distributed proportionally across the three categories for the purposes of analysis. This method assumes that the paleontological and visual resource constraints are not correlated with any particular restriction category.
[C] Sum of acres accessible with restrictions beyond standard lease terms and acres inaccessible to leasing.

Integrating constraints from each section, 17% of the planning area would be inaccessible, 63% would be accessible with restrictions, and 20% would be accessible with standard lease terms (Table 4- 331). All of these areas could be further constrained if leasable mineral exploration or development could impact special status species. Overall, Alternative I would constrain mineral leasing more than the No Action Alternative in the planning area as a whole, due to more areas being inaccessible to leasing or accessible with restrictions beyond standard lease terms.

After integrating constraints due to soil, paleontological, and visual resources in the potential oil and gas areas, 4% of the those areas would be inaccessible, 75% would be accessible with restrictions, and 21% would be accessible with standard lease terms (Table 4- 332). Overall, the potential oil and gas areas would have a higher level of constraint than the No Action Alternative, due to more acres being accessible with restrictions beyond standard lease terms.

After integrating constraints in the potential geothermal areas, 21% of those areas would be inaccessible, 48% would be accessible with restrictions, and 31% would be accessible with standard lease terms (Table 4- 333). Overall, Alternative I would constrain mineral leasing in the potential geothermal areas more than the No Action Alternative, due to more acres being accessible with restrictions beyond standard lease terms.

Overall, there would be a moderate increase in the level of constraint on oil and gas and geothermal leasing.

Impacts from Alternative II

From the leasable mineral allocations alone, 13% of the planning area would be inaccessible, 3% would be accessible with restrictions beyond standard lease terms, and 84% would be accessible with standard lease terms in Alternative II. Within the area accessible under standard lease terms, 651,000 acres have soils with severe or very severe potential for wind erosion or with high potential for water erosion, are on slopes greater than 20%, contain areas rated as PFY Class 5, or would be allocated as VRM Class I or II, making these areas accessible with restrictions beyond standard lease terms.

Integrating constraints from each section, 13% of the planning area would be inaccessible, 43% would be accessible with restrictions, and 44% would be accessible with standard lease terms (Table 4- 331). All of these areas could be further constrained if leasable mineral exploration or development could impact special status species. Overall, Alternative II would constrain mineral leasing less than the No Action Alternative and Alternative I in the planning area as a whole. Compared to the No Action Alternative, this would be due to fewer areas being accessible with restrictions beyond standard lease terms. Compared to Alternative I, this would be due to fewer areas being inaccessible to leasing or accessible with restrictions beyond standard lease terms.

After integrating constraints due to soil, paleontological, and visual resources in the potential oil and gas areas, 1% of those areas would be inaccessible, 57% would be accessible with restrictions, and 42% would be accessible with standard lease terms (Table 4- 332). Overall, the potential oil and gas areas would have a similar level of constraint as the No Action Alternative; however, fewer acres would be inaccessible but more areas would be accessible with restrictions beyond standard lease terms. Alternative II would have a lower level of constraint than Alternative I, due to fewer areas accessible with restrictions.

After integrating constraints in the potential geothermal areas, 20% of those areas would be inaccessible, 47% would be accessible with restrictions, and 33% would be accessible with standard lease terms (Table 4- 333). Overall, the potential geothermal areas would have a similar level of constraint as Alternative I.

Overall, there would be no change in the level of constraint on oil and gas leasing, but a moderate increase in the level of constraint on geothermal leasing.

Impacts from Alternative III

From the leasable mineral allocations alone, 13% of the planning would be inaccessible, 3% would be accessible with restrictions beyond standard lease terms, and 84% would be accessible with standard lease terms in Alternative III. Within the area accessible under standard lease terms, 650,000 acres have soils with severe or very severe potential for wind erosion or with high potential for water erosion, are on slopes greater than 20%, contain areas rated as PFY Class 5, or would be allocated as VRM Class I or II, making these areas accessible with restrictions beyond standard lease terms.

Integrating constraints from each section, 13% of the planning area would be inaccessible, 43% would be accessible with restrictions, and 44% would be accessible with standard lease terms (Table 4- 331). All of these areas could be further constrained if leasable mineral exploration or development could impact special status species. Overall, Alternative III would constrain mineral leasing to the same degree as Alternative II, but less than the No Action Alternative and Alternative I in the planning area as a whole. Compared to the No Action Alternative, this would be due to fewer areas being accessible with restrictions beyond standard lease terms. Compared to Alternative I, this would be due to fewer areas being inaccessible to leasing or accessible with restrictions beyond standard lease terms.

After integrating constraints due to soil, paleontological, and visual resources in the potential oil and gas areas, 1% of those areas would be inaccessible, 57% would be accessible with restrictions, and 42% would be accessible with standard lease terms (Table 4- 332). Overall, the potential oil and gas areas would have a similar level of constraint as Alternative II.

After integrating constraints in the potential geothermal areas, 20% of those areas would be inaccessible, 47% would be accessible with restrictions, and 33% would be accessible with standard lease terms (Table 4- 333). Overall, the potential geothermal areas would have a similar level of constraint as Alternatives I and II.

Overall, there would be no change in the level of constraint on oil and gas leasing, but a moderate increase in the level of constraint on geothermal leasing.

Impacts from Alternative IV (the Preferred Alternative)

In Alternative IV-A, from the leasable mineral allocations alone, 23% of the planning area would be inaccessible, 38% would be accessible with restrictions beyond standard lease terms, and 39% would be accessible with standard lease terms. Within the area accessible under standard lease terms, 559,000 acres have soils with moderate, severe or very severe potential for wind erosion or with medium or high potential for water erosion; are on slopes greater than 20%; contain areas rated as PFY Class 5; or would be allocated as VRM Class I or II, making these areas accessible with restrictions beyond standard lease terms. Integrating constraints from each section, 22% of the planning area would be inaccessible, 73% would be accessible with restrictions, and 5% would be accessible with standard lease terms (Table 4-331). All of these areas could be further constrained if leasable mineral exploration or development could impact special status species.

In Alternative IV-B (the Preferred Alternative), from the leasable mineral allocations alone, 20% of the planning area would be inaccessible, 40% would be accessible with restrictions beyond standard lease terms, and 40% would be accessible with standard lease terms. Within the area accessible under standard lease terms, 573,000 acres have soils with moderate, severe or very severe potential for wind erosion or with medium or high potential for water erosion; are on slopes greater than 20%; contain areas rated as PFY Class 5; or would be allocated as VRM Class I or II, making these areas accessible with restrictions beyond standard lease terms. Integrating constraints from each section, 20% of the planning area would be inaccessible, 75% would be accessible with restrictions, and 5% would be accessible with standard lease terms (Table 4- 331). All of these areas could be further constrained if leasable mineral exploration or development could impact special status species.

Overall, Alternative IV would constrain mineral leasing more than the No Action Alternative and Alternatives I, II, and III in the planning area as a whole, in all cases due to more areas being inaccessible to leasing or accessible with restrictions beyond standard lease terms.

In Alternative IV, after integrating constraints due to soil, paleontological, and visual resources in the potential oil and gas areas, 7% of those areas would be inaccessible, 79% would be accessible with restrictions, and 14% would be accessible with standard lease terms (Table 4- 332). Overall, the potential oil and gas areas would have a higher level of constraint than in the No Action Alternative and Alternatives I, II, and III. Even though Alternative IV has a similar acreage inaccessible as the No Action Alternative, Alternative IV has more areas accessible with restrictions beyond standard lease terms. Compared to Alternatives I, II, and III, Alternative IV has more areas inaccessible to leasing or accessible with restrictions.

In Alternative IV, after integrating constraints in the potential geothermal areas, 20% of those areas would be inaccessible, 68% would be accessible with restrictions, and 12% would be accessible with standard lease terms (Table 4- 333). Overall, the potential geothermal areas would have a higher level of constraint than in the No Action Alternative and Alternatives I, II, and III. Alternative IV would have similar amounts inaccessible as the No Action Alternative and Alternatives I, II, and III, but would have more areas accessible with restrictions.

Overall, there would be a major increase in the level of constraint on oil and gas and geothermal leasing.

Impacts from Alternative V

From the leasable mineral allocations alone, 18% of the planning area would be inaccessible, 18% would be accessible with restrictions beyond standard lease terms, and 64% would be accessible with standard lease terms in Alternative V. Within the area accessible under standard lease terms, 938,000 acres have soils with moderate, severe or very severe potential for wind erosion or with medium or high potential for water erosion; area on slopes greater than 20%; contain areas rated as PFY Class 5; or would be allocated as VRM Class I or II, making these areas accessible with restrictions beyond standard lease terms.

Integrating constraints from each section, 18% of the planning area would be inaccessible, 76% would be accessible with restrictions, and 6% would be accessible with standard lease terms (Table 4- 331). All of these areas could be further constrained if leasable mineral exploration or development could impact special status species. Overall, Alternative V would constrain mineral leasing more than the No Action Alternative and Alternatives I, II, and III in the planning area as a whole, in all cases due to more areas being inaccessible to leasing or accessible with restrictions beyond standard lease terms. Alternative V would constrain mineral leasing to a similar degree as Alternative IV.

After integrating constraints due to soil, paleontological, and visual resources in the potential oil and gas areas, 9% of those areas would be inaccessible, 76% would be accessible with restrictions, and 15% would be accessible with standard lease terms (Table 4- 332). Overall, the potential oil and gas areas would have a similar overall level of constraint as Alternative IV, with more inaccessible areas and fewer areas accessible with restrictions.

After integrating constraints in the potential geothermal areas, 21% of those areas would be inaccessible, 67% would be accessible with restrictions, and 12% would be accessible with standard lease terms (Table 4- 333). Overall, the potential geothermal areas would have a similar level of constraint as Alternative IV.

Overall, there would be a major increase in the level of constraint on oil and gas and geothermal leasing.

Cumulative Impacts

Past, Present, and Reasonably Foreseeable Actions

The region within which cumulative impacts to mineral leasing were considered includes the planning area as well as lands contained within other BLM FOs in southern Idaho, including portions of the Four Rivers, Bruneau, Burley, and Owyhee FOs, as these areas have similar leasable mineral potential as the planning area (Peterson, 1995).

Past, present, and reasonably foreseeable actions for the following resource use cumulatively affects mineral leasing:

- Minerals

These actions are described in detail in the *Introduction* to this chapter. In addition, past actions that have affected or constrained mineral leasing on Federal mineral estate within this region include the management direction contained within the Bruneau Management Framework Plan (MFP), Owyhee RMP, and the Twin Falls MFP to the extent those plans constrain or restrict mineral leasing. The Bruneau FO is currently developing a new RMP; however, as of this printing, this plan is still at the pre-draft stage. The Burley FO is scheduled to begin an RMP planning process within the next few years. These new RMPs may modify the type and location of constraints on mineral leasing and development; however, the type and extent of those changes are not known at this time.

The 1983 Bruneau MFP specifies that oil, gas, and geothermal leasing is allowed in the Bruneau FO, subject to stipulations to alleviate resource conflicts. Areas with additional NSO restrictions include the WSR suitable corridors of the Bruneau and Owyhee Rivers; the Mud Flat Oolite area; bighorn sheep habitat near the Bruneau River and Little Jacks, Big Jacks, Battle, and Deep Creeks; and areas on or nominated for the National Register of Historic Places (217,000 acres). These NSO areas also encompass several SRMAs, WSAs, and ACECs.

Past action in the Four Rivers FO that has affected mineral leasing includes the 1993 legislation to create the Snake River Birds of Prey NCA (PL 103-64). This legislation withdrew the entire NCA from the mineral and geothermal leasing laws.

The 1999 Owyhee RMP specifies several types of restrictions on mineral leasing within the Owyhee FO. 59,000 acres are closed to leasing, including the Oregon NHT, several SRMAs and ACECs, and canyons in bighorn sheep habitat. There is a NSO restriction year-round on 211,000 acres, including several recreation sites, bighorn sheep habitat outside of canyons, and the wild horse herd management area. Seasonal restrictions are in place on 365,000 acres for big game, sage-grouse, and long-billed curlew. The remainder of the Owyhee FO is available for leasing under standard lease terms.

The 1982 Twin Falls MFP provides management direction for the Twin Falls County portion of the Burley FO; this MFP specifies that the area is available for oil, gas, and geothermal leasing. Oil and gas exploration is restricted from November 15 to April 30 on critical big game winter range (57,000 acres) and from April 15 to June 15 in deer fawning areas. There is also a restriction on surface-disturbing activities on soils with severe potential for erosion. Other restrictions for cultural and paleontological resources, upland game habitat, historic trails, timber areas, and raptor nesting sites would be determined on a site-specific basis.

Mineral leasing on State of Idaho mineral estate in the cumulative impact analysis area is administered by the State Board of Land Commissioners through IDL. The State leases minerals to generate revenue for State endowment or general funds (IDL, 2009b); there are currently 7,000 acres under oil and gas lease and 3,000 acres under geothermal lease within the cumulative impact analysis area. Restrictions on mineral leasing on State lands beyond standard lease terms are determined on a case-by-case basis at the time of lease issuance if they are deemed necessary (Lomkin, 2009). Therefore, for the purposes of analysis, it is assumed that leasable minerals on State lands are accessible under standard lease terms.

Where the mineral estate is owned by private entities, those entities may place restrictions or constraints on mineral leasing; however, the type and extent of those restrictions are unknown. For the purposes of analysis, it is assumed that private entities are likely to impose at least some level of restriction on mineral leasing and therefore, that any leasable minerals contained on those lands are accessible with restrictions.

Table 4- 334 describes the overall constraints on mineral leasing on mineral estate within the region, excluding Federal mineral estate within the planning area. Because RFDS for oil and gas or geothermal development have not been prepared for the entire region, the cumulative impacts analysis considers impacts to mineral leasing as a whole. Overall, leasable minerals on 55% of the mineral estate within the region are accessible under standard lease terms, 34% are accessible with restrictions beyond standard lease terms, and 11% are inaccessible.

Table 4- 334. Summary of Constraints on Mineral Leasing in the Region (Acres)

Mineral Estate Management	Mineral Estate	Accessible under Standard Lease Terms	Accessible with Restrictions	Inaccessible
Owyhee FO	1,409,000	774,000	576,000	59,000
Bruneau FO	1,543,000	1,326,000	217,000	0
Birds of Prey NCA	514,000	0	0	514,000
Burley FO (Twin Falls County only)	368,000	311,000	57,000[A]	0
State of Idaho	391,000	391,000	0	0
Private	854,000	0	854,000	0
Total	**5,079,000**	**2,802,000**	**1,704,000**	**573,000**

[A] Only includes big game winter range. Deer fawning range has not been mapped in this area.

Summary of Cumulative Impacts

Table 4- 335 summarizes the cumulative impacts of the alternatives on leasable mineral development. Overall, Alternatives II and III would have the fewest cumulative impacts on mineral leasing in the region, followed by the No Action Alternative, and then Alternative I. Alternatives IV-A, IV-B, and V would have the most cumulative impacts on mineral leasing. However, these impacts would mostly be due to a higher proportion of areas being accessible with restrictions; the proportion of areas inaccessible for mineral leasing does not vary much between alternatives when considered at the regional scale.

Table 4- 335. Areas Available in the Region for Mineral Leasing (Acres)

	Alternative						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
Accessible under Standard Lease Terms							
Planning Area [A]	540,000	322,000	705,000	705,000	76,000	76,000	96,000
Rest of Region	2,802,000	2,802,000	2,802,000	2,802,000	2,802,000	2,802,000	2,802,000
Total	**3,342,000**	**3,124,000**	**3,507,000**	**3,507,000**	**2,878,000**	**2,878,000**	**2,898,000**
Accessible with Restrictions beyond Standard Lease Terms							
Planning Area [A]	869,000	1,013,000	696,000	694,000	1,176,000	1,208,000	1,234,000
Rest of Region	1,703,000	1,703,000	1,703,000	1,703,000	1,703,000	1,703,000	1,703,000
Total	**2,572,000**	**2,716,000**	**2,399,000**	**2,397,000**	**2,879,000**	**2,911,000**	**2,937,000**
Inaccessible							
Planning Area [A]	204,000	278,000	212,000	213,000	360,000	329,000	283,000
Rest of Region	572,000	572,000	572,000	572,000	572,000	572,000	572,000
Total	**776,000**	**850,000**	**784,000**	**785,000**	**932,000**	**901,000**	**855,000**

[A] Only includes Federal mineral estate within the planning area.

Cumulative Impacts from the No Action Alternative

If the No Action Alternative continues to be implemented, 50% of the mineral estate in the region would remain accessible under standard lease terms, while 38% would continue to be accessible with restrictions and 12% would continue to be inaccessible.

Cumulative Impacts from Alternative I

If Alternative I is implemented, 47% of the mineral estate in the region would be accessible under standard lease terms, while 41% would be accessible with restrictions and 13% would be inaccessible. This would result in slightly more constraint overall as compared to the No Action Alternative.

Cumulative Impacts from Alternative II

If Alternative II is implemented, 52% of the mineral estate in the region would be accessible under standard lease terms, while 36% would be accessible with restrictions and 12% would be inaccessible. This would be the largest proportion of the region being accessible to mineral leasing under standard lease terms.

Cumulative Impacts from Alternative III

If Alternative III is implemented, 52% of the mineral estate in the region would be accessible under standard lease terms, while 36% would be accessible with restrictions and 12% would be inaccessible. Along with Alternative II, this would be the largest proportion of the region being accessible to mineral leasing under standard lease terms.

Cumulative Impacts from Alternative IV (the Preferred Alternative)

If Alternative IV-A is implemented, 43% of the mineral estate in the region would be accessible under standard lease terms, while 43% would be accessible with restrictions and 14% would be inaccessible. In Alternative IV-B (the Preferred Alternative), 43% would be accessible, but 44% would be accessible with restrictions and 13% would be inaccessible. Alternatives IV-A would have the highest proportion of the region being inaccessible to mineral leasing, while Alternative IV-B would have the highest proportion of the region being accessible with restrictions; however, the differences between Alternatives IV-A and IV-B would be relatively minor.

Cumulative Impacts from Alternative V

If Alternative V is implemented, 43% of the mineral estate in the region would be accessible under standard lease terms, while 44% would be accessible with restrictions and 13% would be inaccessible. This alternative would have the same cumulative impacts as Alternative IV-B.

4.4.6.2. Salable Minerals

Analysis Methods

Indicators

The following indicator was used for the analysis of impacts to salable mineral development:

- **Amount of constraint on salable mineral development** – The primary factor within the alternatives that would affect the public's ability to acquire salable minerals through sale or permit is the amount of constraint the alternative would place on salable mineral development in the planning area; this indicator reflects the availability of Federal mineral estate for this type of activity. The amount of constraint on salable mineral development within an area can vary widely. Some areas may be closed to salable mineral development entirely, while other areas may be open to salable mineral development, subject to site-specific NEPA analysis, stipulations, and 43 CFR 3600 regulations. Management for other resources within the planning area can constrain salable mineral development as well. Generally, constraints on salable mineral development would reduce flexibility in where salable minerals can be acquired and increase costs in acquiring these materials.

Salable minerals include common variety minerals and building materials such as sand, gravel, and stone; these are generally widespread, of low unit value, and often used for construction or landscaping materials. Salable mineral development refers to the disposal of salable minerals through a contract of sale or a free-use permit.

Methods and Assumptions

Impacts to salable mineral development from management in the *Salable Minerals*, *Soil Resources*, and *Visual Resources* sections of Chapter 2 were analyzed in detail. Management affecting salable mineral development found in the *Water Resources*, *Riparian Areas and Wetlands*, *Fish*, *Wildlife*, *Special Status Species*, *Paleontological Resources*, *Cultural Resources*, *Non-WSA Lands with Wilderness Characteristics*, *Areas of Critical Environmental Concern*, *Wild and Scenic Rivers*, and *Wilderness Study Areas* is already incorporated in the salable mineral allocations and management actions and was not analyzed further. Management from the remaining sections was not analyzed in detail because the management did not vary measurably between alternatives or impact the indicator for salable minerals. **Impacts from management for salable minerals** can be found under *Impacts from Minerals Actions* in the *Soil Resources*, *Water Resources*, *Riparian Areas and Wetlands*, *Fish*, *Wildlife*, *Special Status Fish and Aquatic Invertebrates*, *Special Status Wildlife*, *Noxious Weeds and Invasive Plants*, *Paleontological Resources*, *Cultural Resources*, *Non-WSA Lands with Wilderness Characteristics*, and *Wild and Scenic Rivers* sections.

The amount of constraint on salable mineral development in each alternative was quantified through a GIS analysis of the salable mineral allocations and management actions and management actions for soil and visual resources as described in Chapter 2. The type of constraint was determined for each acre of Federal mineral estate within the planning area, including split-estate lands. The constraints were then arranged into a hierarchy that represents the varying types of constraint as follows:

- **Category 1: No Salable Mineral Development, Statutory/PLO** – Lands where salable minerals cannot be disposed of due to statute or PLO, such as the Juniper Butte Range, Saylor Creek Range, and Hagerman Fossil Beds National Monument.
- **Category 2: No Salable Mineral Development, Administrative** – Lands that are withheld from salable mineral disposal based on discretionary decisions made by BLM; this category includes lands described in Chapter 2 as being closed to salable mineral development.
- **Category 3: Salable Mineral Development Allowed, Cumulative Timing Limitations >6 months** – Lands where salable minerals development is allowed, but terms and conditions limit the time of the year when crushing and blasting can take place to less than six months to protect identified resources. Some Category 3 lands may have other surface use restrictions in addition to the timing limitation.

- **Category 4: Salable Mineral Development Allowed, Cumulative Timing Limitations ≤6 months** – Lands where salable minerals development is allowed, but terms and conditions limit the time of the year when crushing and blasting can take place to six months or less. Some Category 4 lands may have other surface use restrictions in addition to the timing limitation.
- **Category 5: Salable Mineral Development Allowed, Other Surface Use Restrictions** – Lands where salable mineral development is allowed subject to constraints due to management for riparian conservation areas, soils, or visual resources.
- **Category 6: Salable Mineral Development Allowed** – Lands where salable mineral development is allowed subject to site-specific NEPA analysis, stipulations, and 43 CFR 3600 regulations.

Some salable mineral management direction cannot be quantified. In these cases, impacts are characterized as increasing or decreasing the amount of constraint on salable mineral development.

Assumptions used in the analysis of impacts to salable mineral development include the following:

- Salable minerals on lands in Categories 1 and 2 are generally inaccessible; salable minerals on lands in Categories 3 through 5 are accessible with restrictions; and salable minerals on lands in Category 6 are accessible with few restrictions.
- A given interval of timing limitation reflects a similar level of constraint on salable mineral development with or without restrictions based on management for soils or visual resources.
- The demand for mineral materials is expected to increase in proportion to the increase in the population base of the communities surrounding the planning area.
- Increased levels of constraint generally result in reduced opportunity for the public to acquire salable minerals.
- Salable minerals management applies to salable mineral development on Federal mineral estate, including split-estate lands. Management identified for soils and visual resources applies only to salable mineral development on lands with BLM surface management.
- Management for areas with very high potential for paleontological resources (PFY Class 5) would place more constraint on salable mineral development than areas with lower potential for paleontological resources.
- Management for areas within VRM Classes I and II would place more constraint on salable mineral development than areas within VRM Classes III and IV.

Direct and Indirect Impacts

Impacts from Salable Minerals Actions

Table 4- 336 summarizes the impacts of the salable minerals actions on salable mineral development. Overall, salable mineral development in the planning area would be most constrained in the No Action Alternative, followed by Alternatives IV-A and IV-B, and then Alternatives I and V. Alternatives II and III would have the least constraint of all alternatives.

Impacts from Management Specific to the No Action Alternative

Due to existing statutes and PLOs, approximately 7% of the planning area is inaccessible for salable mineral development. The No Action Alternative identifies 700 acres to be managed for salable mineral development, less than 1% of the planning area. However, new sites may be established in 93% of the planning area if an existing site will not meet the applicant's needs and impacts to new sites can be sufficiently mitigated. For the purposes of this analysis and for comparison with the action alternatives, these areas are assumed to be accessible with restrictions.

Impacts from Management Common to the No Action and All Action Alternatives

Management common to the No Action Alternative and all action alternatives would result in some constraint on salable mineral development, as the use of existing sites would generally be promoted and exploration for new sites would be an applicant's responsibility. The amount of constraint would be minor to negligible.

Table 4- 336. Constraints on Salable Mineral Development by Alternative (Acres)

Category [A]	Alternative [B]						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
1. Not Allowed, Statutory/PLO	118,000	118,000	118,000	118,000	118,000	118,000	118,000
2. Not Allowed, Administrative	0	188,000	94,000	145,000	276,000	244,000	199,000
3. Allowed, Cumulative Timing Limitations >6 Months	0	0	481	0	0	0	0
4. Allowed, Cumulative Timing Limitations ≤6 Months	0	28,000	28,000	28,000	800	9,000	28,000
5. Allowed, Other Surface Use Restrictions	1,494,000	147,000	159,000	146,000	145,000	145,000	141,000
6. Allowed	700	1,132,000	1,214,000	1,176,000	1,073,000	1,096,000	1,127,000

[A] Categories are arranged in decreasing levels of constraint.
[B] Table incorporates acres from management common to all action alternatives and management specific to each action alternative.

Impacts from Management Common to All Action Alternatives

Management common to all action alternatives would result in a moderate level of constraint on salable mineral development; this constraint would primarily apply to commercial operations. Due to existing statutes and PLOs, approximately 7% of the planning area is inaccessible for salable mineral development. Restrictions on ground disturbance in areas rated as PFY Class 5 would affect 10% of the Federal mineral estate in the planning area; the extraction of sand and gravel requires extensive surface and subsurface ground disturbance that would affect paleontological resources. Similar restrictions would apply in areas with important cultural resources; however, this would be determined on a site-specific basis and cannot be quantified at the landscape scale.

Seasonal restrictions for Endangered, Threatened, Proposed, or Candidate species, along with surface use restrictions in RCAs, would affect approximately 4% of the planning area. Constraints on salable mineral development would also include avoiding special status species and their habitats; where this would not be possible, additional mitigation would be required.

Management regarding reclamation indirectly increases the amount of constraint on salable mineral development; while not directly affecting where and when salable mineral development can occur, this management does provide some specific requirements for reclamation of salable mineral developments, which may increase costs.

The restrictions on salable mineral development due to statute or PLO; paleontological resources; Endangered, Threatened, Proposed, or Candidate species; and RCAs have been incorporated into the tables for management specific to each action alternative, as their specific acreage in each alternative may vary depending on how they overlap with each other and areas that would be closed administratively.

Impacts from Management Specific to Alternative I

The salable mineral allocations in Alternative I would result in 19% of the planning area being inaccessible for salable mineral development. Approximately 11% of the planning area would be accessible with restrictions common to all action alternatives or on salable mineral development in the Middle Snake ACEC; 70% of the planning area would be accessible.

Impacts from Management Specific to Alternative II

The salable mineral allocations in Alternative II would result in 13% of the planning area being inaccessible for salable mineral development. Approximately 12% of the planning area would be accessible with constraints common to all action alternatives; 75% of the planning area would be

Impacts from Management Specific to Alternative III

The salable mineral allocations in Alternative III would result in 16% of the planning area being inaccessible for salable mineral development. Approximately 11% of the planning area would be accessible with constraints common to all action alternatives; 73% of the planning area would be accessible.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

The salable mineral allocations in Alternative IV-A would result in 24% of the planning area being inaccessible for salable mineral development. Approximately 9% of the planning area would be accessible with constraints common to all action alternatives; 67% of the planning area would be accessible.

The salable mineral allocations in Alternative IV-B (the Preferred Alternative) would result in 22% of the planning area being inaccessible for salable mineral development. Approximately 10% of the planning area would be accessible with constraints common to all action alternatives; 68% of the planning area would be accessible.

Impacts from Management Specific to Alternative V

The salable mineral allocations in Alternative V would result in 20% of the planning area being inaccessible for salable mineral development. Approximately 10% of the planning area would be accessible with constraints common to all action alternatives; 70% of the planning area would be accessible.

Impacts from Soil Resources Actions

Restrictions on uses in areas with potential for soil erosion by wind or water would constrain salable mineral development by requiring additional mitigation measures or surface occupancy restrictions to reduce impacts to those areas. These types of measures would tend to increase overall costs of salable mineral development. Table 4- 337 summarizes the impacts to salable mineral development from soil resources actions.

Table 4- 337. Areas with Soil-Related Restrictions that May Affect Salable Mineral Development (Acres)

Type of Restriction	Alternative					
	No Action	I	II	III	IV	V
Water erosion	0	218,000	218,000	218,000	1,122,000	1,122,000
Wind erosion	0	437,000	437,000	437,000	1,289,000	1,289,000
Slope	0	69,000	69,000	69,000	69,000	69,000
Planning Area Total [A]	**0**	**703,000**	**703,000**	**703,000**	**1,358,000**	**1,358,000**

[A] Footprint acres; many of the areas with wind erosion, water erosion, and slope restrictions overlap.

Impacts from Management Specific to the No Action Alternative

Soil management direction for the No Action Alternative does not specifically reference salable mineral development. The general guidelines provided would result in negligible constraints on salable mineral development, as they only require soil resources be considered in project-level planning.

Impacts from Management Common to the No Action and All Action Alternatives

Minimizing soil erosion by maintaining adequate perennial vegetation cover could result in minor constraints to salable mineral development, as all disturbed areas would need to be reseeded to provide perennial vegetation cover; these constraints would apply to all alternatives.

Impacts from Management Common to All Action Alternatives

Modifying routes or mitigating the erosive effects of transportation and travel would indirectly affect salable mineral development as it would apply to any ancillary routes developed or used; these constraints would apply to all action alternatives.

Impacts from Management Specific to Alternatives I, II, and III

Management specific to Alternatives I, II, and III would result in more constraints to salable mineral development than the No Action Alternative. These alternatives would require mitigation on soils with severe or very severe potential for wind erosion or with high potential for water erosion. In these areas as well as areas with slopes greater than 20%, an erosion control strategy for salable mineral development would be required. Overall, 51% of the planning area would be constrained by these soil resource actions.

Impacts from Management Specific to Alternatives IV and V

Management specific to Alternatives IV and V would result in more constraints to salable mineral development than the No Action Alternative and Alternatives I, II, and III due to more restrictive management being applied to a larger area. Alternatives IV and V would require mitigation on soils with moderate, severe, or very severe potential for wind erosion or with medium or high potential for water erosion. In these areas as well as areas with slopes between 20% and 40% (46,000 acres), an erosion control strategy for mineral exploration and development would be required. No surface disturbance from mineral exploration and development would be allowed on slopes greater than 40% (22,000 acres); this would be similar to a NSO restriction in these areas. Overall, 99% of the planning area would be constrained by these soil resource actions.

Impacts from Visual Resources Actions

VRM Class allocations prescribe the level of change to the visual landscape that would be allowed in areas within each class. Areas in VRM Class I or II are managed to preserve or retain the existing character of the landscape, which would constrain salable mineral development by requiring mitigation and special project considerations to return the area to its pre-existing visual character; these measures would tend to increase overall project costs. Areas in VRM Class IV would have the least constraint on salable mineral development. Table 4- 338 identifies the number of acres in each alternative in a VRM Class that may impose restrictions on salable mineral development.

Table 4- 338. Areas with Visual Resource Restrictions that May Affect Salable Mineral Development (Acres)

VRM Class	Alternative					
	No Action	I	II	III	IV	V
Class I and II	241,000	311,000	114,000	114,000	198,000	372,000

Impacts from Management Specific to the No Action Alternative

In the No Action Alternative, 17% of the planning area would be managed to preserve or retain its existing visual character (VRM Class I and II); this would result in moderate to major constraints on salable mineral development within those areas.

Impacts from Management Specific to Alternative I

In Alternative I, 23% of the planning area would be managed to preserve or retain its existing visual character; this would result in moderate to major constraints on salable mineral development within those areas.

Impacts from Management Specific to Alternatives II and III

In Alternative II, 8% of the planning area would be managed to preserve or retain its existing visual character; this would result in moderate to major constraints on salable mineral development within those areas.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

In Alternatives IV-A and IV-B (the Preferred Alternative), 14% of the planning area would be managed to preserve or retain its existing visual character; this would result in moderate to major constraints on salable mineral development within those areas.

Impacts from Management Specific to Alternative V

In Alternative V, 27% of the planning area would be managed to preserve or retain its existing visual character; this would result in moderate to major constraints on salable mineral development within those areas.

Summary of Direct and Indirect Impacts

Overall impacts to salable mineral development in the planning area are displayed in Table 4- 339. For analysis purposes, planning area acres were identified under three subheadings: Accessibility Determined through Salable Minerals Actions, Constraints Identified from Soil and Visual Resource Actions, and Overall Accessibility. Under *Accessibility Determined through Salable Minerals Actions*, acres were identified as accessible, accessible with restrictions, or inaccessible to salable minerals development. Under *Constraints Identified from Soil and Visual Resource Actions*, acres with soil or visual resource constraints were identified as to whether they occurred within areas accessible to salable mineral development or areas accessible with restrictions. To determine overall accessibility, acres within accessible areas that had soil or visual resource constraints were moved from the accessible category to accessible with restrictions. Acres with soil or visual resource constraints within areas accessible with restrictions are captured in the overall accessible with restrictions category, while inaccessible acres remain the same.

Table 4- 339. Summary of Impacts to Accessibility for Salable Mineral Development in the Planning Area by Alternative

Accessibility	Alternative						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
Accessibility Determined through Salable Minerals Actions							
Accessible	700	1,132,000	1,214,000	1,176,000	1,073,000	1,096,000	1,127,000
Accessible with Restrictions	1,494,000	175,000	187,000	174,000	145,000	154,000	169,000
Inaccessible	118,000	306,000	212,000	262,000	394,000	362,000	316,000
Constraints Identified from Soil and Visual Resource Actions [A]							
In Accessible Areas	100[B]	620,000	544,000	521,000	976,000	999,000	1,030,000
In Areas Accessible with Restrictions	223,147[B]	95,000	100,000	92,000	122,000	131,000	147,000
Overall Accessibility							
Accessible	600	512,000	669,000	655,000	97,000	97,000	97,000
Accessible with Restrictions	1,494,000	795,000	731,000	695,000	1,122,000	1,154,000	1,199,000
Inaccessible	118,000	306,000	212,000	262,000	394,000	362,000	316,000
Overall Acres with Constraints [C]	**1,612,000**	**1,101,000**	**943,000**	**957,000**	**1,516,000**	**1,516,000**	**1,516,000**

[A] Footprint acres; many of the acres for soil and visual resource restrictions overlap.
[B] Because the areas with the various mineral restriction categories cannot be mapped for the No Action Alternative, acres with visual resource constraints were distributed proportionally across the three categories for the purposes of analysis. This method assumes that the visual resource constraints are not correlated with any particular restriction category.
[C] Sum of acres accessible with restrictions and acres inaccessible to salable mineral development.

Impacts from the No Action Alternative

Within the area accessible for salable mineral development in the No Action Alternative, 100 acres are assumed to be allocated as VRM Class I or II, making these areas accessible with restrictions. Integrating constraints from each section, 7% of the planning area would be inaccessible, 93% would be accessible with restrictions, and less than 1% would be accessible. These areas could be further constrained if salable mineral development could impact soil resources.

Overall, there would be no change in the level of constraint on salable mineral development.

Impacts from Alternative I

Within the area accessible for salable mineral development in Alternative I, 620,000 acres have severe or very severe potential for wind erosion, have high potential for water erosion, are on slopes greater than 20%, or are allocated as VRM Class I or II, making these areas accessible with restrictions. Integrating constraints from each section, salable minerals on 19% of the planning area would be inaccessible, 49% would be accessible with restrictions, and 32% would be accessible. Overall, Alternative I would constrain salable mineral development less than the No Action Alternative; even though more acres would be inaccessible in Alternative I, fewer acres would be accessible with restrictions.

Overall, there would be a moderate decrease in the level of constraint on salable mineral development.

Impacts from Alternative II

Within the area accessible for salable mineral development in Alternative II, 544,000 acres have severe or very severe potential for wind erosion; have high potential for water erosion, are on slopes greater than 20%, or are allocated as VRM Class I or II, making these areas accessible with restrictions. Integrating constraints from each section, salable minerals on 13% of the planning area would be inaccessible, 45% would be accessible with restrictions, and 42% would be accessible. Overall, Alternative II would constrain salable mineral development less than the No Action Alternative and Alternative I.

Overall, there would be a major decrease in the level of constraint on salable mineral development.

Impacts from Alternative III

Within the area accessible for salable mineral development in Alternative III, 521,000 acres have severe or very severe potential for wind erosion, have high potential for water erosion, are on slopes greater than 20%, or are allocated as VRM Class I or II, making these areas accessible with restrictions. Integrating constraints from each section, salable minerals on 16% of the planning area would be inaccessible, 43% would be accessible with restrictions, and 41% would be accessible. Overall, Alternative III would constrain salable mineral development slightly more than Alternative II, due to slightly more acres being inaccessible to salable mineral development. Alternative III would still result in less constraint on salable mineral development than the No Action Alternative and Alternative I.

Overall, there would be a major decrease in the level of constraint on salable mineral development.

Impacts from Alternative IV (the Preferred Alternative)

Within the area accessible for salable mineral development in Alternative IV-A, 976,000 acres have moderate, severe, or very severe potential for wind erosion; have medium or high potential for water erosion; are on slopes greater than 20%; or are allocated as VRM Class I or II, making these areas accessible with restrictions. Integrating constraints from each section, salable minerals on 24% of the planning area would be inaccessible, 70% would be accessible with restrictions, and 6% would be accessible.

Within the area accessible for salable mineral development in Alternative IV-B (the Preferred Alternative), 999,000 acres have moderate, severe, or very severe potential for wind erosion; have medium or high potential for water erosion; are on slopes greater than 20%; or are allocated as VRM Class I or II, making these areas accessible with restrictions. Integrating constraints from each section, salable minerals on 22% of the planning area would be inaccessible, 72% would be accessible with restrictions, and 6% would be accessible.

Overall, Alternatives IV-A and IV-B would have a similar level of constraint on salable mineral development, with Alternative IV-A having slightly more areas inaccessible than Alternative IV-B. Both Alternatives IV-A and IV-B would have much more constraint on mineral leasing than Alternatives I, II, and III, but still less overall constraint than the No Action Alternative.

Overall, there would be a minor decrease in the level of constraint on salable mineral development.

Impacts from Alternative V

Within the area accessible for salable mineral development in Alternative V, 1,030,000 acres have moderate, severe, or very severe potential for wind erosion; have medium or high potential for water erosion; are on slopes greater than 20%; or are allocated as VRM Class I or II, making these areas accessible with restrictions. Integrating constraints from each section, salable minerals on 20% of the planning area would be inaccessible, 74% would be accessible with restrictions, and 6% would be accessible. Overall, Alternative V would constrain salable mineral development to a similar level as Alternative IV, with slightly fewer acres being inaccessible.

Overall, there would be a minor decrease in the level of constraint on salable mineral development.

Cumulative Impacts

Past, Present, and Reasonably Foreseeable Actions

The region within which cumulative impacts to salable mineral development were considered includes lands contained within the Bruneau and Jarbidge FOs and the Twin Falls County portion of the Burley FO. Entities that obtain salable minerals from lands within the planning area are likely to obtain salable minerals from these nearby FOs as well. The cost of transporting mineral materials makes it less likely that lands within other adjacent FOs would be sources for mineral materials for those entities.

Past, present, and reasonably foreseeable actions for the following resource use cumulatively affects salable mineral development:

- Minerals

These actions are described in detail in the *Introduction* to this chapter. In addition, past actions that have affected or constrained salable mineral development on Federal mineral estate within this region include the Bruneau and Twin Falls MFPs (BLM, 1982, 1983), to the extent those existing plans constrain or restrict salable mineral development. The Bruneau FO is currently developing a new RMP; however, as of this printing, this plan is still at the pre-draft stage. The Burley FO is scheduled to begin an RMP planning process within the next few years. These new RMPs may modify the type and location of constraints on salable mineral development; however, type and extent of those changes, if any, are not known at this time.

The 1983 Bruneau MFP specifies that the Bruneau FO should provide salable minerals to meet local demands. A total of 155,000 acres are closed to salable mineral development, including five WSAs, three ACECs, and three SRMAs. Salable mineral development is restricted in four WSAs and one SRMA (122,000 acres).

The 1982 Twin Falls MFP provides management direction for the Twin Falls County portion of the Burley FO; this MFP specifies that 20 to 30 acres near Hollister and 40 to 80 acres near Salmon Falls Creek Canyon are available for establishment of community sand and gravel pits. Extraction areas for building stone were identified on 160 acres, while 160 acres near Rabbit Springs were designated as a rockhounding area. The MFP also reserved other material source areas until demand warrants their development. For the purposes of analysis, it is assumed that a total of 430 acres of BLM-managed land are accessible for salable mineral development within the western portion of the Burley FO; the remaining acres are assumed to be accessible with restrictions.

Salable mineral development on State of Idaho mineral estate is administered by IDL. Restrictions on leasing salable minerals on State land beyond standard lease terms are determined on a case-by-case basis at the time of lease issuance if they are deemed necessary (Lomkin, 2009). However, 960 acres in the cumulative impact analysis area are unlikely to be leased for salable mineral development due to an existing USAF lease (Lomkin, 2009). For the purposes of this analysis, it is assumed that salable minerals on all other State lands are accessible.

Where the mineral estate is owned by private entities, those entities may place restrictions or constraints on salable mineral development; however, the type and extent of those restrictions, if any, are unknown. For the purposes of analysis, it is assumed that private entities are likely to impose at least some level of restriction on salable mineral development and therefore, that any salable minerals contained on those lands are accessible with restrictions.

Table 4- 340 describes the constraints on salable mineral development on mineral estate within the region, excluding Federal mineral estate within the planning area. Overall, salable minerals on 53% of the mineral estate within the region are accessible, 41% are accessible with restrictions, and 6% are inaccessible.

Table 4- 340. Summary of Constraints on Salable Mineral Development in the Region, excluding Federal Mineral Estate within the Planning Area (Acres)

Mineral Estate Management	Mineral estate	Accessible	Accessible with Restrictions	Inaccessible
BLM-Managed Lands				
Bruneau FO	1,543,000	1,266,000	122,000	155,000
Burley FO (Twin Falls County only)	368,000	400	367,000	0
Other Lands				
State of Idaho	215,000	214,000	0	960
Private	640,000	0	640,000	0
Total	**855,000**	**214,000**	**640,000**	**960**

Summary of Cumulative Impacts

Table 4- 341 summarizes the cumulative impacts of the alternatives on salable mineral development. Overall, Alternatives II and III would have the fewest cumulative impacts on salable mineral development in the region, followed by Alternative I, then Alternatives IV-A, IV-B, and V. The No Action Alternative would have the most cumulative impacts on salable mineral development. However, this impact would be due entirely to the No Action Alternative having a higher proportion of areas being accessible with restrictions.

Table 4- 341. Areas Available in the Region for Salable Mineral Development (Acres)

Accessibility	Alternative						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
Accessible							
Planning Area [A]	600	512,000	669,000	655,000	97,000		97,000
Rest of Region	1,480,488	1,480,488	1,480,488	1,480,488	1,480,000		1,480,000
Total	**1,481,088**	**1,992,488**	**2,149,488**	**2,135,488**	**1,577,000**		**1,577,000**
Accessible with Restrictions							
Planning Area [A]	1,494,000	795,000	731,000	695,000	1,122,000	1,154,000	1,199,000
Rest of Region	1,130,000	1,130,000	1,130,000	1,130,000	1,130,000	1,130,000	1,130,000
Total	**2,624,000**	**1,925,000**	**1,861,000**	**1,825,000**	**2,252,000**	**2,284,000**	**2,329,000**
Inaccessible							
Planning Area [A]	118,000	306,000	212,000	262,000	394,000	362,000	316,000
Rest of Region	156,000	156,000	156,000	156,000	156,000	156,000	156,000
Total	**274,000**	**462,000**	**368,000**	**418,000**	**550,000**	**518,000**	**472,000**

[A] Only includes Federal mineral estate within the planning area.

Cumulative Impacts from the No Action Alternative

If the No Action Alternative continues to be implemented, 34% of the mineral estate in the region would remain accessible for salable mineral development, while 60% would continue to be accessible with restrictions and 6% would continue to be inaccessible.

Cumulative Impacts from Alternative I

If Alternative I is implemented, 45% of the mineral estate in the region would be accessible for salable mineral development, while 44% would be accessible with restrictions and 11% would be inaccessible. This would result in less constraint overall and fewer cumulative impacts as compared to the No Action Alternative.

Cumulative Impacts from Alternative II

If Alternative II is implemented, 49% of the mineral estate in the region would be accessible for salable mineral development, while 43% would be accessible with restrictions and 8% would be inaccessible. This would result in the largest proportion of the region being accessible to salable mineral development without additional restrictions and, along with Alternative III, the fewest cumulative impacts of the alternatives.

Cumulative Impacts from Alternative III

If Alternative III is implemented, 49% of the mineral estate in the region would be accessible for salable mineral development, while 42% would be accessible with restrictions and 9% would be inaccessible. Along with Alternative II, this would result in the largest proportion of the region being accessible to salable mineral development without additional restrictions and the fewest cumulative impacts of the alternatives.

Cumulative Impacts from Alternative IV (the Preferred Alternative)

If Alternative IV-A is implemented, 36% of the mineral estate in the region would be accessible for salable mineral development, while 51% would be accessible with restrictions and 13% would be inaccessible. In Alternative IV-B (the Preferred Alternative), 36% of the mineral estate in the region would be accessible for salable mineral development, while 52% would be accessible with restrictions and 12% would be inaccessible. The differences between Alternatives IV-A and IV-B are relatively minor. Both alternatives would result in the highest proportion of the region being inaccessible to salable mineral development; however, the overall level of constraint and the degree of cumulative impacts would be lower than in the No Action Alternative.

Cumulative Impacts from Alternative V

If Alternative V is implemented, 36% of the mineral estate in the region would be accessible for salable mineral development, while 53% would be accessible with restrictions and 11% would be inaccessible. This alternative would have similar cumulative impacts as Alternative IV, with slightly fewer acres being inaccessible to salable mineral development.

4.4.6.3. Locatable Minerals

Analysis Methods

Indicators

The following indicator was used for the analysis of impacts to locatable mineral development:

- **Amount of constraint on locatable mineral development** – The primary factor within the alternatives that would affect the public’s ability to prospect, explore, and develop locatable minerals is the amount of constraint the alternative would place on locatable mineral development in the planning area; this indicator reflects the availability of Federal mineral estate for this type of activity. The amount of constraint on locatable mineral development within an area can vary widely. Some areas may be withdrawn from locatable mineral entry under the general mining laws and be unavailable for locatable mineral entry with no mitigation measures required. Other management prescribed by the alternatives may result in stipulations or measures for mitigation or reclamation. These would not affect where locatable mineral development could occur, but would reduce the public's flexibility and increase their costs in developing a claim.

Locatable minerals include gold, silver, copper, gem stones, lead, zinc, barite, gypsum, and certain varieties of high-calcium limestone, and other uncommon variety minerals. Locatable mineral development refers to the prospecting, exploration, and development of these minerals under the General Mining Law of 1872. As described in Chapter 3, exploration for and development of locatable mineral resources are nondiscretionary activities, meaning the BLM cannot prohibit reasonably necessary activities required for the prospecting, exploration, and development of valuable locatable mineral deposits. The 43 CFR 3809 regulations gives BLM the authority to regulate these activities and require mitigation or changes in operational practices to ensure activities do not result in "unnecessary or undue" degradation of the environment (43 CFR 3809.4).

Methods and Assumptions

I**mpacts to locatable mineral development** from management in the following sections of Chapter 2 were analyzed in detail: *Locatable Minerals*, *Soil Resources*, *Paleontological Resources*, and *Visual Resources*. Impacts from management in the *Water Resources*, *Riparian Areas and Wetlands*, *Fish*, *Wildlife*, *Special Status Species*, *Areas of Critical Environmental Concern*, *Wild and Scenic Rivers*, and *Wilderness Study Areas* sections were not analyzed in detail because the impacts were captured in the analysis of locatable minerals actions. Management from the remaining sections was not analyzed in detail because the management did not vary measurably between alternatives or impact the indicator for locatable minerals. **Impacts from management for locatable minerals** can be found under *Impacts from Minerals Actions* in the *Soil Resources*, *Water Resources*, *Riparian Areas and Wetlands*, *Fish*, *Special Status Fish and Aquatic Invertebrates*, *Special Status Wildlife*, *Noxious Weeds and Invasive Plants*, *Paleontological Resources*, *Cultural Resources*, *Non-WSA Lands with Wilderness Characteristics*, and *Wild and Scenic Rivers* sections.

The amount of constraint on locatable mineral development in each alternative was quantified through a GIS analysis of the locatable mineral allocations and management actions for soil, paleontological, and visual resources described in Chapter 2. The type of constraint was determined for each acre of Federal mineral estate within the planning area, including split-estate lands. The constraints were then arranged into a hierarchy that represents the varying types of constraint as follows:

- **Category 1: No Locatable Mineral Development, Existing Withdrawals** – Lands where locatable minerals currently cannot be prospected, explored for, or developed due to existing withdrawals, such as the Juniper Butte Range, Saylor Creek Range, and Hagerman Fossil Beds National Monument. Approximately 7% of the planning area (118,000 acres) has already been withdrawn from location under the mining laws.
- **Category 2: No Locatable Mineral Development, Recommended Withdrawals** – Lands where locatable minerals currently can be prospected, explored for, or developed but would be recommended for withdrawal in a particular alternative.
- **Category 3: Locatable Mineral Development Allowed, with Additional Mitigation or Reclamation Requirements** – Lands not currently under an existing withdrawal from location under the mining laws nor recommended for withdrawal in a particular alternative, but where additional management direction is likely to result in additional mitigation or reclamation requirements.
- **Category 4: Locatable Mineral Development Allowed** – Lands not currently under an existing withdrawal from location under the mining laws nor recommended for withdrawal in a particular alternative and where additional mitigation or reclamation requirements are less likely.

Some management direction in the sections analyzed in detail that would affect locatable mineral development cannot be quantified. In these cases, impacts are characterized as increasing or decreasing the amount of constraint on locatable mineral development.

Assumptions were developed based on ID Team knowledge of locatable mineral development and the planning area. These assumptions should not be construed to confine or redefine management contained within alternatives and were used to allow a comparison of impacts to locatable mineral development resulting from the alternatives. Assumptions used in this analysis of impacts to locatable mineral development include the following:

- Any areas recommended for withdrawal in the RMP will be withdrawn. As a result, acres recommended for withdrawal as well as those already withdrawn (i.e., Categories 1 and 2) will be assumed to be unavailable for locatable mineral development for the purposes of this analysis. Locatable minerals on these lands are considered to be inaccessible.
- Aside from the locatable mineral allocations, most management in the RMP that would affect locatable mineral development provides direction for reclamation or mitigation activities rather than direction for where location of mining claims may occur. This management, rather than preclude locatable mineral development in an area, would likely increase the costs associated with the development. Category 3 contains lands with these types of constraints; locatable minerals on these lands are considered to be accessible with restrictions. Locatable minerals on Category 4 lands are considered accessible with few restrictions.
- Locatable mineral development is expected to occur at levels similar to the past. Currently, there are 19 active mining claims (7 for Bruneau jasper, 12 for gold) in the planning area; and fewer than 100 acres are affected by this type of activity.
- Locatable minerals management applies to mineral entry on Federal mineral estate, including split-estate lands. Management identified for soils, paleontological resources, and visual resources only applies to mineral entry on lands with BLM surface management.
- Management for areas with very high potential for paleontological resources (PFY Class 5) would result in more constraint on locatable mineral development than areas with lower potential for paleontological resources.
- Management for areas within VRM Classes I and II would result in more constraint on locatable mineral development than areas within VRM Classes III and IV.

Direct and Indirect Impacts

Impacts from Locatable Minerals Actions

Table 4- 342 summarizes the impacts of the locatable minerals actions on locatable mineral development. Overall, based on areas inaccessible to locatable mineral development, locatable mineral development in the planning area would be most constrained in the No Action Alternative, followed by Alternatives I and IV, and then Alternative III. Alternatives II and V would have the fewest areas inaccessible to locatable mineral development. The proportion of Federal mineral estate in the planning area where locatable mineral development would be allowed with additional mitigation or reclamation requirements specified in the *Minerals* section of Chapter 3 would be relatively similar for all action alternatives.

Table 4- 342. Constraints on Locatable Mineral Development by Alternative (Acres)

Category [A]	Alternative					
	No Action	I	II	III	IV	V
1. Existing withdrawal	118,000	118,000	118,000	118,000	118,000	118,000
2. Recommended withdrawal	218,000[B]	117,000	46,000	92,000	148,000	53,000
3. Allowed with additional mitigation or reclamation requirements	0	293,000	314,000	308,000	289,000	311,000
4. Allowed	1,277,000	1,084,000	1,135,000	1,094,000	1,057,000	1,131,000

[A] Categories are arranged in decreasing levels of constraint.
[B] Locations recommended for withdrawal were not mapped in the 1987 RMP. This analysis assumes that these areas are in addition to areas already withdrawn, as descriptions of these in the RMP text suggest that none of these areas lay within existing withdrawals.

Impacts from Management Specific to the No Action Alternative

If the areas recommended for withdrawal were withdrawn by the Secretary of the Interior or Congress, locatable minerals on approximately 21% of the planning area would be inaccessible (Table 4- 342). Locatable minerals on the remaining 79% of the planning area would be accessible. The No Action Alternative would have the largest portion of the planning area unavailable for locatable mineral development.

Impacts from Management Common to All Action Alternatives

Due to existing withdrawals, approximately 7% of the planning area is inaccessible for locatable mineral development. Management common to all action alternatives would place stipulations or mitigation measures on locatable mineral plans of operation for operations that may cause unnecessary and undue degradation to resources, including habitat for sage-grouse; this would likely constrain locatable mineral development on 322,000 acres of Federal mineral estate in key sage-grouse habitat. Mitigation measures for activities affecting RCAs would follow direction contained in the ARMS (Appendix D), affecting 26,000 acres of Federal mineral estate. These stipulations and measures would constrain locatable mineral development by increasing the costs associated with such development.

These restrictions on locatable mineral development due to statute or PLO, sage-grouse habitat, and RCAs have been incorporated into the tables for management specific to each action alternative, as their specific acreage in each alternative may vary depending on how they overlap with each other and areas that would be recommended for withdrawal.

Impacts from Management Specific to Alternative I

If the areas recommended for withdrawal were withdrawn, approximately 15% of the planning area would be unavailable for locatable mineral development (Table 4- 342). Locatable minerals on 18% would be accessible with restrictions related to sage-grouse and RCAs; the remaining 67% of the planning area would be accessible. Along with Alternative IV, Alternative I would have the second largest area unavailable to locatable mineral development behind the No Action Alternative.

Impacts from Management Specific to Alternative II

If the areas recommended for withdrawal were withdrawn, approximately 10% of the planning area would be unavailable for locatable mineral development (Table 4- 342). Locatable minerals on 20% would be accessible with restrictions related to sage-grouse and RCAs; the remaining 70% of the planning area would be accessible. Along with Alternative V, Alternative II would have the smallest area unavailable to locatable mineral development in the planning area.

Impacts from Management Specific to Alternative III

If the areas recommended for withdrawal were withdrawn, approximately 13% of the planning area would be unavailable for locatable mineral development (Table 4- 342). Locatable minerals on 19% would be accessible with restrictions related to sage-grouse and RCAs; the remaining 68% of the planning area would be accessible. Alternative III would have the third largest area unavailable to locatable mineral development in the planning area, behind the No Action Alternative and Alternatives I and IV.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

If the areas recommended for withdrawal were withdrawn, approximately 16% of the planning area would be unavailable for locatable mineral development (Table 4- 342). Locatable minerals on 18% would be accessible with restrictions related to sage-grouse and RCAs; the remaining 66% of the planning area would be accessible. Along with Alternative I, Alternative IV would have the second largest area unavailable to locatable mineral development in the planning area behind the No Action Alternative.

Impacts from Management Specific to Alternative V

If the areas recommended for withdrawal were withdrawn, approximately 11% of the planning area would be unavailable for locatable mineral development (Table 4- 342). Locatable minerals on 19% would be accessible with restrictions related to sage-grouse and RCAs; the remaining 70% of the planning area would be accessible. Along with Alternative II, Alternative V would have the smallest area unavailable to locatable mineral development in the planning area.

Impacts from Soil Resources Actions

Restrictions on uses in areas with potential for soil erosion by wind or water could constrain locatable mineral development by requiring additional mitigation or reclamation measures to reduce impacts to those areas. These types of measures would tend to increase overall costs of locatable mineral development. Table 4- 343 summarizes the impacts to locatable mineral development from soil resources actions.

Table 4- 343. Areas with Soil-Related Restrictions that May Affect Locatable Mineral Development (Acres)

Type of Restriction	Alternative					
	No Action	I	II	III	IV	V
Water erosion	0	218,000	218,000	218,000	1,122,000	1,122,000
Wind erosion	0	437,000	437,000	437,000	1,289,000	1,289,000
Slope	0	69,000	69,000	69,000	69,000	69,000
Planning Area Total [A]	**0**	**703,000**	**703,000**	**703,000**	**1,358,000**	**1,358,000**

[A] Footprint acres; many of the areas with wind erosion, water erosion, and slope restrictions overlap.

Impacts from Management Specific to the No Action Alternative

Soil management direction for the No Action Alternative does not specifically reference locatable mineral development. The general guidelines provided would result in negligible constraints on locatable mineral development, as they only require soil resources be considered in project-level planning.

Impacts from Management Common to the No Action and All Action Alternatives

Minimizing soil erosion by maintaining adequate perennial vegetation cover could result in minor constraints to locatable mineral development, as all disturbed areas would need to be reseeded to provide perennial vegetation cover.

Impacts from Management Common to All Action Alternatives

Modifying routes or mitigating the erosive effects of transportation and travel would indirectly affect locatable mineral development as it would apply to any ancillary routes developed or used for locatable mineral development.

Impacts from Management Specific to Alternatives I, II, and III

Management specific to Alternatives I, II, and III would result in more constraints to locatable mineral development than the No Action Alternative. These alternatives would require mitigation on soils with severe or very severe potential for wind erosion or with high potential for water erosion. In these areas as well as areas with slopes greater than 20%, an erosion control strategy for mineral exploration and development would be required. Overall, 51% of the planning area would be constrained by these soil resource actions.

Impacts from Management Specific to Alternatives IV and V

Management specific to Alternatives IV and V would result in more constraints to locatable mineral development than the No Action Alternative and Alternatives I, II, and III due to more restrictive management being applied to a larger area. Alternative IV and V would require mitigation on soils with moderate, severe, or very severe potential for wind erosion or with medium or high potential for water erosion. In these areas as well as areas with slopes between 20% and 40% (46,000 acres), an erosion control strategy for mineral exploration and development would be required. On slopes greater than 40% (22,000 acres), additional mitigation and reclamation would be required. Overall, 99% of the planning area would be constrained by these soil resource actions.

Impacts from Paleontological Resources Actions

Management identified for paleontological resources may constrain locatable mineral development as those activities are likely to affect paleontological resources. Prospecting, exploration, and development of locatable minerals usually involves disturbance and extraction of surface and sub-surface rock formations This management constraint would only apply where paleontological resources were present. The areas most likely to be affected by management for paleontological resources are those with high or very high potential for paleontological resources: PFY Classes 4 and 5, respectively. However, because the planning area does not contain any PFY Class 4 areas, this analysis considers only those areas with very high potential for paleontological resources. Measures taken to reduce or mitigate impacts to paleontological resources would tend to increase overall costs of locatable mineral development.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative would provide for managing paleontological resources to protect, maintain, or enhance sites or areas for their scientific and educational values. Any locatable mineral development in paleontological resource areas would be constrained to the extent the activities would impact those resources; locatable mineral development in areas rated as PFY Class 5 would be most likely to be affected by this management (121,000 acres).

Impacts from Management Common to All Action Alternatives

Locatable mineral development in paleontological resource areas would be required to implement measures to protect those resources; locatable mineral development in areas rated as PFY Class 5 would be most likely to be affected by this management (121,000 acres). The degree of constraint on locatable mineral development would be relative to the specific measures required to mitigate impacts to paleontological resources. This management would have a similar level of constraint as the No Action Alternative.

Impacts from Management Specific to Alternatives I, II, III, IV, and V

Management specific to each action alternative pertains only to permits for paleontological research and therefore would not affect locatable mineral development.

Impacts from Visual Resources Actions

VRM Class allocations prescribe the level of change to the visual landscape that would be allowed in areas within each class. Areas in VRM Class I or II are managed to preserve or retain the existing character of the landscape, which may constrain locatable mineral development by requiring mitigation and special reclamation considerations to return the area to its pre-existing visual character; these measures would tend to increase overall project costs. Areas in VRM Class IV would have the least constraint on locatable mineral development. Table 4- 344 summarizes the impacts to locatable mineral development from visual resources actions.

Table 4- 344. Areas with Visual Resource Restrictions that May Affect Locatable Mineral Development (Acres)

VRM Class	Alternative					
	No Action	I	II	III	IV	V
Class I and II	241,000	311,000	114,000	114,000	198,000	372,000

Impacts from Management Specific to the No Action Alternative

In the No Action Alternative, 17% of the planning area would be managed to preserve or retain its existing visual character (VRM Class I and II areas); this would result in moderate to major constraints on locatable mineral development within those areas.

Impacts from Management Common to All Action Alternatives

The degree to which ensuring authorized uses are designed to meet visual resource management objectives would affect locatable mineral development would depend on where locatable mineral development occurs. Mining operations in VRM Class I and II areas would have more constraint than those located in VRM Class III and IV areas as reclamation efforts would be required to return the area to its pre-existing visual character.

Impacts from Management Specific to Alternative I

In Alternative I, 23% of the planning area would be managed to preserve or retain its existing visual character; this would result in moderate to major constraints on locatable mineral development within those areas.

Impacts from Management Specific to Alternatives II and III

In Alternatives II and III, 8% of the planning area would be managed to preserve or retain its existing visual character; this would result in moderate to major constraints on locatable mineral development within those areas.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

In Alternative IV, 14% of the planning area would be managed to preserve or retain its existing visual character; this would result in moderate to major constraints on locatable mineral development within those areas.

Impacts from Management Specific to Alternative V

In Alternative V, 27% of the planning area would be managed to preserve or retain its existing visual character; this would result in moderate to major constraints on locatable mineral development within those areas.

Summary of Direct and Indirect Impacts

Overall impacts to locatable mineral development in the planning area are displayed in Table 4- 345. For analysis purposes, planning area acres were identified under three subheadings: Accessibility Determined through Locatable Minerals Actions; Constraints Identified from Soil, Paleontological, and Visual Resource Actions; and Overall Accessibility. Under *Accessibility Determined through Locatable Minerals Actions*, acres were identified as accessible, accessible with restrictions, or inaccessible to locatable minerals development. Under *Constraints Identified from Soil, Paleontological, and Visual Resource Actions*, acres with constraints from these sections were identified as to whether they occurred within areas accessible to locatable mineral development or areas accessible with restrictions. To determine overall accessibility, acres within accessible areas that had soil, paleontological, or visual resource constraints were moved from the accessible category to accessible with restrictions. Acres with soil, paleontological, or visual resource constraints within areas accessible with restrictions are captured in the overall accessible with restrictions category, while inaccessible acres remain the same.

Impacts from the No Action Alternative

Within the area accessible for locatable mineral development in the No Action Alternative, 277,000 acres are assumed to be rated as PFY Class 5 or allocated as VRM Class I or II, making these areas accessible with restrictions. Integrating constraints from each section, locatable minerals on 21% of the planning area would be inaccessible, 17% would be accessible with restrictions, and 62% would be accessible. These areas could be further constrained if locatable mineral development could impact soil resources. The No Action Alternative would have the lowest overall levels of constraint of all alternatives. However, this is primarily due to far fewer acres being accessible with restrictions than any of the action alternatives; in contrast, the No Action Alternative would have the largest proportion of the planning area inaccessible of all alternatives.

Overall, there would be no change in the level of constraint on locatable mineral development.

Table 4- 345. Summary of Impacts to Locatable Mineral Development in the Planning Area by Alternative (Acres)

	Alternative					
	No Action	I	II	III	IV	V
Accessibility Determined through Locatable Minerals Actions						
Accessible	1,277,000	1,084,000	1,135,000	1,094,000	1,057,000	1,131,000
Accessible with Restrictions	0	293,000	314,000	308,000	289,000	311,000
Inaccessible	336,000	235,000	164,000	210,000	266,000	170,000
Constraints Identified from Soil, Paleontological, and Visual Resource Actions [A]						
In Accessible Areas	277,000[B]	621,000	610,000	570,000	960,000	1,033,000
In Areas Accessible with Restrictions	0[B]	194,000	126,000	121,000	263,000	286,000
Overall Accessibility						
Accessible	1,000,000	463,000	525,000	525,000	97,000	97,000
Accessible with Restrictions	277,000	914,000	924,000	878,000	1,250,000	1,345,000
Inaccessible	336,000	235,000	164,000	210,000	266,000	170,000

[A] Footprint acres; many of the acres for soil, paleontological, and visual resource restrictions overlap.
[B] Because the areas with the various mineral restriction categories cannot be mapped for the No Action Alternative, acres with paleontological and visual resource constraints were distributed proportionally across the three categories for the purposes of analysis. This method assumes that the paleontological and visual resource constraints are not correlated with any particular restriction category.

Impacts from Alternative I

Within the area accessible for locatable mineral development in Alternative I, 621,000 acres have severe or very severe potential for wind erosion, have high potential for water erosion, are on slopes greater than 20%, are rated as PFY Class 5, or are allocated as VRM Class I or II, making these areas accessible with restrictions. Integrating constraints from each section, locatable minerals on 15% of the planning area would be inaccessible, 57% would be accessible with restrictions, and 29% would be accessible. Overall, Alternative I would have fewer areas inaccessible to locatable mineral development than the No Action Alternative but a much larger proportion of the planning area accessible with restrictions.

Overall, there would be a moderate increase in the level of constraint on locatable mineral development.

Impacts from Alternative II

Within the area accessible for locatable mineral development in Alternative II, 610,000 acres have severe or very severe potential for wind erosion, have high potential for water erosion, are on slopes greater than 20%, are rated as PFY Class 5, or are allocated as VRM Class I or II, making these areas accessible with restrictions. Integrating constraints from each section, locatable minerals on 10% of the planning area would be inaccessible, 57% would be accessible with restrictions, and 33% would be accessible. Overall, Alternative II would have the least constraint on locatable mineral development of the action alternatives. Even though the acres accessible with restrictions would be similar to Alternative I, fewer areas would be inaccessible to locatable mineral development.

Overall, there would be a minor increase in the level of constraint on locatable mineral development.

Impacts from Alternative III

Within the area accessible for locatable mineral development in Alternative III, 570,000 acres have severe or very severe potential for wind erosion, have high potential for water erosion, are on slopes greater than 20%, are rated as PFY Class 5, or are allocated as VRM Class I or II, making these areas accessible with restrictions. Integrating constraints from each section, locatable minerals on 13% of the planning area would be inaccessible, 54% would be accessible with restrictions, and 33% would be accessible. Overall, the levels of constraint on locatable mineral development in Alternative III would be higher than in Alternative II but lower than in Alternative I.

Overall, there would be a minor increase in the level of constraint on locatable mineral development.

Impacts from Alternative IV (the Preferred Alternative)

Within the area accessible for locatable mineral development in Alternative IV, 960,000 acres have moderate, severe, or very severe potential for wind erosion; have medium or high potential for water erosion; are on slopes greater than 20%; are rated as PFY Class 5; or are allocated as VRM Class I or II, making these areas accessible with restrictions. Integrating constraints from each section, locatable minerals on 16% of the planning area would be inaccessible, 77% would be accessible with restrictions, and 6% would be accessible. Alternative IV would have the highest overall levels of constraint on locatable mineral development.

Overall, there would be a major increase in the level of constraint on locatable mineral development.

Impacts from Alternative V

Within the area accessible for locatable mineral development in Alternative V, 1,033,000 acres have moderate, severe, or very severe potential for wind erosion; have medium or high potential for water erosion; are on slopes greater than 20%; are rated as PFY Class 5; or are allocated as VRM Class I or II, making these areas accessible with restrictions. Integrating constraints from each section, locatable minerals on 11% of the planning area would be inaccessible, 83% would be accessible with restrictions, and 6% would be accessible. Along with Alternative IV, Alternative V would have the highest overall levels of constraint on locatable mineral development, although fewer areas would be inaccessible as compared to Alternative IV.

Overall, there would be a major increase in the level of constraint on locatable mineral development.

Cumulative Impacts

Past, Present, and Reasonably Foreseeable Actions

The region within which cumulative impacts to locatable mineral development were considered includes portions of the lands contained within the BLM Bruneau, Burley, Four Rivers, Jarbidge, and Owyhee FOs. These areas have similar geology and locatable mineral potential as the planning area (Bond, 1978; Hubbard, 1959).

Past, present, and reasonably foreseeable actions for the following resource use cumulatively affects locatable mineral development:

- Minerals

These actions are described in detail in the *Introduction* to this chapter. In addition, past actions that have affected or constrained locatable mineral development on Federal mineral estate within this region include the Owyhee RMP (BLM, 1999a), Bruneau MFP (BLM, 1983), and the Twin Falls MFP (BLM, 1982) to the extent those existing plans constrain or restrict locatable mineral development. The Bruneau FO is currently developing a new RMP; however, as of this printing, this plan is still at the pre-draft stage. The Burley FO is scheduled to begin an RMP planning process within the next few years. These new RMPs may modify the type and location of constraints on locatable mineral development; however, type and extent of those changes, if any, are not known at this time.

Many lands within these FOs are recommended for withdrawal from location under the general mining laws. Some lands within these FOs have already been withdrawn. As in the analysis of direct and indirect impacts, for the purposes of the cumulative impacts analysis, it is assumed that any areas recommended for withdrawal in these documents will be withdrawn. As a result, locatable minerals on acres recommended for withdrawal as well as those already withdrawn are assumed to be inaccessible. Also, some lands within these FOs may have additional mitigation or reclamation requirements; because these restrictions cannot be quantified, for this analysis, it is assumed these lands do not have additional restrictions.

The 1999 Owyhee RMP specifies several types of restriction on locatable mineral development within the Owyhee FO. A total of 8,000 acres have been withdrawn, and 173,000 acres have been recommended for withdrawal, including the Oregon NHT; several SRMAs, ACECs, and WSR suitable segments; and canyons in bighorn sheep habitat. The remainder of the Owyhee FO is available for locatable mineral development.

The 1983 Bruneau MFP specifies that the Bruneau FO should provide opportunities for exploration and development of locatable minerals, unless withdrawn from the 1872 mining laws. A total of 316,000 acres have been withdrawn; areas under withdrawal include bighorn sheep habitat, 12 WSAs, and the suitable WSR corridors of the Owyhee and Bruneau Rivers.

The 1982 Twin Falls MFP provides management direction for the Twin Falls County portion of the Burley FO. This MFP segregates 400 acres of historic and geologic sites from locatable mineral development; the remainder of the area is available for locatable mineral development.

Past action in the Four Rivers FO includes the 1993 legislation to create the Snake River Birds of Prey NCA (PL 103-64). This legislation withdrew the entire NCA from location under the general mining laws.

Locatable mineral development on State of Idaho mineral estate is administered by the IDL. Locatable mineral development is allowed on State mineral estate; however, the 1971 Surface Mining Act requires an approved reclamation plan and performance bond for each mining operation (IDL, 2009c). Restrictions on locatable mineral development on State land beyond these requirements are determined on a case-by-case basis at the time an application is received if they are deemed necessary (Lomkin, 2009). However, 960 acres in the cumulative impact analysis area are unlikely to be approved for locatable mineral development due to an existing USAF lease (Lomkin, 2009). For the purposes of this analysis, it is assumed that locatable minerals on all other State lands are accessible.

Where the mineral estate is owned by private entities, those entities may place restrictions or constraints on locatable mineral development; however, the type and extent of those restrictions, if any, are unknown. For the purposes of analysis, it is assumed that private entities are likely to impose at least some level of restriction on locatable mineral development and therefore, that any locatable minerals contained on those lands are accessible with restrictions.

Table 4- 346 describes the constraints on locatable mineral development on mineral estate within the region, excluding Federal mineral estate within the planning area. Overall, locatable minerals on 63% of the mineral estate within the region are accessible, 17% are accessible with restrictions, and 20% are inaccessible.

Table 4- 346. Summary of Constraints on Locatable Mineral Development in the Region, excluding Federal Mineral Estate within the Planning Area (Acres)

Mineral Estate Management	Mineral estate	Accessible	Accessible with Restrictions	Inaccessible [A]
BLM				
Owyhee FO	1,409,000	1,228,000	0	181,000
Bruneau FO	1,543,000	1,227,000	0	316,000
Birds of Prey NCA	514,000	0	0	514,000
Burley FO (Twin Falls County only)	368,000	367,000	0	400
Other				
State of Idaho [B]	391,000	390,000	0	960
Private [B]	854,000	0	854,000	0
Total	**1,245,000**	**390,000**	**854,000**	**960**

[A] Inaccessible acres include those acres withdrawn from mineral entry, recommended for withdrawal in RMPs, and segregated from mineral entry in MFPs.
[B] Includes those entities' mineral estate within the planning area and the rest of the region.

Summary of Cumulative Impacts

Table 4- 347 summarizes the cumulative impacts of the alternatives on locatable mineral development. Overall, the No Action Alternative would have the fewest cumulative impacts on locatable mineral development in the region, followed by Alternatives I, II, and III. Alternatives IV and V would have the most cumulative impacts on locatable mineral development. However, the differences between the alternatives would be primarily due to differences in areas accessible with restrictions; when considered in the regional context, the differences in inaccessible acres between alternatives would be relatively small.

Table 4- 347. Areas Available in the Region for Locatable Mineral Development (Acres)

Amount of Constraint	Alternative					
	No Action	I	II	III	IV	V
Accessible						
Planning Area [A]	1,000,000	463,000	525,000	525,000	97,000	97,000
Rest of Region	3,212,000	3,212,000	3,212,000	3,212,000	3,212,000	3,212,000
Total	**4,212,000**	**3,675,000**	**3,737,000**	**3,737,000**	**3,309,000**	**3,309,000**
Accessible with Restrictions						
Planning Area [A]	277,000	914,000	924,000	878,000	1,250,000	1,345,000
Rest of Region	854,000	854,000	854,000	854,000	854,000	854,000
Total	**1,131,000**	**1,768,000**	**1,778,000**	**1,732,000**	**2,104,000**	**2,199,000**
Inaccessible						
Planning Area [A]	336,000	235,000	164,000	210,000	266,000	170,000
Rest of Region	1,012,000	1,012,000	1,012,000	1,012,000	1,012,000	1,012,000
Total	**1,348,000**	**1,247,000**	**1,176,000**	**1,222,000**	**1,278,000**	**1,182,000**

[A] Only includes Federal mineral estate within the planning area.

Cumulative Impacts from the No Action Alternative

If the No Action Alternative continues to be implemented, 63% of the mineral estate in the region would remain accessible for locatable mineral development, while 17% would continue to be accessible with restrictions and 20% would continue to be inaccessible. The No Action Alternative would not increase the proportion of the region inaccessible for locatable mineral development or accessible with restrictions and therefore, would have the fewest cumulative impacts to locatable mineral development in the region of all the alternatives.

Cumulative Impacts from Alternative I

If Alternative I is implemented, 55% of the mineral estate in the region would be accessible for locatable mineral development, while 26% would be accessible with restrictions and 19% would be inaccessible. Alternative I would have more cumulative impacts on locatable mineral development than the No Action Alternative, but would be similar to Alternatives II and III in having the fewest cumulative impacts of the action alternatives.

Cumulative Impacts from Alternative II

If Alternative II is implemented, 56% of the mineral estate in the region would be accessible for locatable mineral development, while 27% would be accessible with restrictions and 17% would be inaccessible. Alternative II would have more cumulative impacts on locatable mineral development than the No Action Alternative, but would be similar to Alternatives I and III in having the fewest cumulative impacts of the action alternatives.

Cumulative Impacts from Alternative III

If Alternative III is implemented, 56% of the mineral estate in the region would be accessible for locatable mineral development, while 26% would be accessible with restrictions and 18% would be inaccessible. Alternative III would have more cumulative impacts on locatable mineral development than the No Action Alternative, but would be similar to Alternatives I and II in having the fewest cumulative impacts of the action alternatives.

Cumulative Impacts from Alternative IV (the Preferred Alternative)

If Alternative IV is implemented, 49% of the mineral estate in the region would be accessible for locatable mineral development, while 32% would be accessible with restrictions and 19% would be inaccessible. Along with Alternative V, Alternative IV would have the most cumulative impacts on locatable mineral development of all the alternatives.

Cumulative Impacts from Alternative V

If Alternative V is implemented, 49% of the mineral estate in the region would be accessible for locatable mineral development, while 33% would be accessible with restrictions and 18% would be inaccessible. Along with Alternative IV, Alternative V would have the most cumulative impacts on locatable mineral development of all the alternatives.

4.5. SPECIAL DESIGNATIONS

4.5.1. Areas of Critical Environmental Concern (ACECs)

Analysis Methods

Indicators

The following indicator was used for the analysis of impacts to Areas of Critical Environmental Concern (ACECs):

- **Acres containing values meeting ACEC relevance and importance criteria that would receive special management to maintain or enhance those values through ACEC designation** – ACEC designation is a management decision that impacts relevant and important values in existing and proposed ACECs that are designated as well as those that are not designated. Thus, the affected components of ACECs are the values that meet criteria for relevance and importance under any existing or proposed ACEC, rather than the ACEC designation itself. The alternatives vary in the degree to which they provide special management to maintain or enhance those values.

Methods and Assumptions

ACEC designation indicates that an area has values that meet criteria for relevance and importance and that special management has been established to protect those values. These values include historic, cultural, and scenic values; fish and wildlife resources; and natural systems or processes. Management associated with an ACEC designation is specific to the relevant and important values present in the ACEC. This special management is designed to provide proactive measures to maintain or enhance those values as well as measures necessary to protect those values from impacts of future activities.

This section analyzes how much of the area with values that meet relevance and importance criteria would receive special management through ACEC designation. To determine impacts for each alternative, the acres of each relevant and important value that would be within a designated ACEC were calculated. The amount of that value receiving special management was compared for each alternative to determine the relative amount of special management the alternatives would provide for each value.

I**mpacts to ACECs** from management in the *ACEC* section of Chapter 2 were analyzed in detail. This analysis focuses on whether or not special management is provided and assumes that any special management is more beneficial to a value than no special management. This section does not, however, analyze what the specific impacts of that special management are, nor does it analyze how areas with relevant and important values that do not receive special management are affected. These analyses can be found in the sections related to each relevant and important value (e.g., impacts to scenic values are analyzed under *Visual Resources*; impacts to sage-grouse are analyzed under *Special Status Wildlife*). **Impacts from management for ACECs** can be found under *Impacts from Areas of Critical Environmental Concern Actions* in the *Geologic Features*, *Water Resources*, *Upland Vegetation*, *Riparian Areas and Wetlands*, *Fish*, *Wildlife*, *Special Status Plants*, *Special Status Fish and Aquatic Invertebrates*, *Special Status Wildlife*, *Noxious Weeds and Invasive Plants*, *Paleontological Resources*, *Cultural Resources*, *Visual Resources*, *Livestock Grazing*, *Recreation*, *Transportation and Travel*, and *Wild and Scenic Rivers* sections.

The following assumptions were used to analyze impacts to values meeting criteria for relevance and importance:

- ACECs are designated to maintain or enhance the relevant and important values contained within each ACEC.
- Management actions associated with each ACEC designation are specific to the relevant and important values within that ACEC and are designed to maintain or enhance those values. None of

the special management for an ACEC would decrease the amount or condition of the relevant and important values within that ACEC.

- If an area containing values meeting relevance and importance criteria is not designated as an ACEC, there would be greater risk that the amount or condition of those values would decrease. However, the risk would be dependent on how those areas would be managed without the ACEC designation.

Direct and Indirect Impacts

Impacts from Areas of Critical Environmental Concern Actions

Acres containing relevant and important values that would receive special management through ACEC designation in each alternative are displayed in Table 4- 348 (Appendix W contains full descriptions of these relevant and important values). Relevant and important values contained in these areas are expected to be maintained or enhanced. Relevant and important values without special management would be at higher risk for decreases in the amount or condition of those values due to the other management prescribed in alternative; the risk would be site-specific depending on the management prescribed for other resources and uses. Areas containing relevant and important values within other special designations, such as WSAs or WSR corridors, would likely have lower risk than those without another special designation. The risk may also be lower for values that already have higher management priority due to law, regulation, or policy, such as special status species and cultural resources.

Table 4- 348. Areas with Values Meeting Relevance and Importance Criteria with ACEC Designation by Alternative (Acres)

Value	Total Acres	Alternative						
		No Action	I	II	III	IV		V
						IV-A	IV-B	
Historic Values	950	800	950	0	950	950	950	950
Cultural Values	635,000	86,000	85,000	0	53,000	261,000	190,000	615,000
Scenic Values	135,000	88,000	88,000	0	55,000	123,000	123,000	0
Fish or Wildlife Resources								
Bruneau Hot Springsnail	1,000	0	1,000	0	0	1,000	1,000	1,000
Snake River Snails	7,000	0	7,000	0	0	0	0	7,000
Shoshone Sculpin	7,000	0	7,000	0	0	0	0	7,000
White Sturgeon	7,000	0	7,000	0	0	0	0	7,000
Bull Trout	71,000	33,000	33,000	0	0	71,000	71,000	71,000
Redband Trout	271,000	88,000	88,000	0	55,000	260,000	189,000	271,000
Columbia Spotted Frog	70,000	0	0	0	0	70,000	0	70,000
Sage-Grouse	252,000	0	0	0	0	90,000	47,000	252,000
California Bighorn Sheep	123,000	85,000	85,000	0	52,000	123,000	123,000	123,000
Natural System or Process								
Slickspot Peppergrass	73,000	0	0	0	0	73,000	41,000	73,000
Davis Peppergrass	38,000	0	0	0	0	38,000	38,000	38,000
Bruneau River Phlox	86,000	85,000	86,000	0	52,000	86,000	86,000	86,000
Special Status Plant Assemblages	9,000	0	9,000	0	0	1,000	1,000	9,000
Upland Vegetation	139,000	3,000	3,000	0	3,000	136,000	66,000	0
Riparian Systems	132,000	85,000	85,000	0	52,000	123,000	123,000	0
Paleontologic and Geologic Resources	950	800	950	0	950	950	950	950
Thermal Springs and Seeps	1,000	0	1,000	0	0	1,000	1,000	1,000

Impacts from Management Specific to the No Action Alternative

In the No Action Alternative, the three existing ACECs would remain designated. As a result, the following proportions of lands containing relevant and important values would receive special management:

- 85% of lands with historic values
- 14% of lands with cultural values
- 65% of lands with scenic values
- 46% of lands with bull trout values
- 32% of lands with redband trout values
- 69% of lands with bighorn sheep values
- 99% of lands with Bruneau River phlox values
- 2% of lands with upland vegetation values
- 64% of lands with riparian system values
- 85% of lands with paleontologic and geologic values

None of the lands containing the following relevant and important values would receive special management:

- Bruneau hot springsnail
- Snake River snails
- Shoshone sculpin
- White sturgeon
- Spotted frog
- Sage-grouse
- Slickspot peppergrass
- Davis peppergrass
- Special status plant assemblages
- Thermal springs and seeps

Impacts from Management Specific to Alternative I

In Alternative I, the three existing ACECs would remain designated; however, boundary of the Sand Point ACEC would be expanded. Two new ACECs would be designated as well: Lower Bruneau Canyon and Middle Snake. As a result, the following proportions of lands containing relevant and important values would receive special management:

- 100% of lands with historic values
- 13% of lands with cultural values
- 65% of lands with scenic values
- 100% of lands with Bruneau hot springsnail values
- 100% of lands with Snake River snail values
- 100% of lands with Shoshone sculpin values
- 100% of lands with white sturgeon values
- 46% of lands with bull trout values
- 32% of lands with redband trout values
- 69% of lands with bighorn sheep values
- 100% of lands with Bruneau River phlox values
- 100% of lands with special status plant assemblage values
- 2% of lands with upland vegetation values
- 64% of lands with riparian system values
- 100% of lands with paleontologic and geologic values
- 100% of lands with thermal spring and seep values

None of the lands containing the following relevant and important values would receive special management:

- Spotted frog
- Sage-grouse

- Slickspot peppergrass
- Davis peppergrass

Impacts from Management Specific to Alternative II

In Alternative II, ACEC designation would be removed from the three existing ACECs, and no new ACECs would be designated. As a result, none of the lands containing the any relevant and important values would receive special management.

Impacts from Management Specific to Alternative III

In Alternative III, the three existing ACECs would remain designated. However, the boundary of the Sand Point ACEC would be expanded, and the boundary of the Bruneau-Jarbidge ACEC would be reduced. No new ACECs would be designated. As a result, the following proportions of lands containing relevant and important values would receive special management:

- 100% of lands with historic values
- 8% of lands with cultural values
- 41% of lands with scenic values
- 20% of lands with redband trout values
- 42% of lands with bighorn sheep values
- 61% of lands with Bruneau River phlox values
- 2% of lands with upland vegetation values
- 40% of lands with riparian system values
- 100% of lands with paleontologic and geologic values

None of the lands containing the following relevant and important values would receive special management:

- Bruneau hot springsnail
- Snake River snails
- Shoshone sculpin
- White sturgeon
- Bull trout
- Spotted frog
- Sage-grouse
- Slickspot peppergrass
- Davis peppergrass
- Special status plant assemblages
- Thermal springs and seeps

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

In Alternative IV-A, two existing ACECs would remain designated, and the boundaries of the Bruneau-Jarbidge and Sand Point ACECs would both be expanded. Although ACEC designation would be removed from Salmon Falls Creek ACEC, three new ACECs would be designated: Inside Desert (expanded boundary), Jarbidge Foothills (expanded boundary), and Lower Bruneau Canyon. As a result, the following proportions of lands containing relevant and important values would receive special management:

- 100% of lands with historic values
- 41% of lands with cultural values
- 91% of lands with scenic values
- 100% of lands with Bruneau hot springsnail values
- 100% of lands with bull trout values
- 96% of lands with redband trout values
- 100% of lands with spotted frog values
- 36% of lands with sage-grouse values
- 100% of lands with bighorn sheep values

- 100% of lands with Davis peppergrass values
- 100% of lands with Bruneau River phlox values
- 12% of lands with special status plant assemblage values
- 98% of lands with upland vegetation values
- 93% of lands with riparian system values
- 100% of lands with paleontologic and geologic values
- 100% of lands with thermal spring and seep values

None of the lands containing the following relevant and important values would receive special management:
- Snake River snails
- Shoshone sculpin
- White sturgeon

Alternative IV-B (the Preferred Alternative) is identical to Alternative IV-A, except the Inside Desert and Jarbidge Foothills ACECs would both have smaller boundaries than in Alternative IV-A. As a result, special management for relevant and important values contained in those ACECs would apply to a smaller area as follows:
- 30% of lands with cultural values
- 70% of lands with redband trout values
- 0% of lands with spotted frog values
- 19% of lands with sage-grouse values
- 56% of lands with slickspot peppergrass values
- 47% of lands with upland vegetation values

Impacts from Management Specific to Alternative V

In Alternative V, ACEC designation would be removed from two existing ACECs (Bruneau-Jarbidge and Salmon Falls Creek) because the majority of those areas would be encompassed in the new Sagebrush Sea ACEC designation. The boundary of the Sand Point ACEC would be expanded, and two additional ACECs would be designated: Lower Bruneau Canyon and Middle Snake. As a result, the following proportions of lands containing relevant and important values would receive special management:
- 100% of lands with historic values
- 97% of lands with cultural values
- 100% of lands with Bruneau hot springsnail values
- 100% of lands with Snake River snail values
- 100% of lands with Shoshone sculpin values
- 100% of lands with white sturgeon values
- 100% of lands with bull trout values
- 100% of lands with redband trout values
- 100% of lands with spotted frog values
- 100% of lands with sage-grouse values
- 100% of lands with bighorn sheep values
- 100% of lands with slickspot peppergrass values
- 100% of lands with Davis peppergrass values
- 100% of lands with Bruneau River phlox values
- 100% of lands with special status plant assemblage values
- 100% of lands with paleontologic and geologic values
- 100% of lands with thermal spring and seep values

None of the lands containing the following relevant and important values would receive special management:
- Scenic values
- Upland vegetation values

- Riparian system values

Even though the Sagebrush Sea ACEC boundary would contain lands with these values, because these values did not meet relevance and importance criteria in the Sagebrush Sea ACEC, there is no special management identified for them.

Summary of Direct and Indirect Impacts

Impacts from the No Action Alternative

Overall, in the No Action Alternative, 27% of lands containing relevant and important values would receive special management through ACEC designation; as a result, those relevant and important values are likely to be maintained or enhanced. On the remaining lands containing relevant and important values, there is a greater risk that those values will not be maintained than if they had been included in an ACEC designation.

Overall, there would be no change in the amount of lands containing relevant and important values receiving special management through ACEC designation.

Impacts from Alternative I

Overall, in Alternative I, 29% of lands containing relevant and important values would receive special management through ACEC designation; as a result, those relevant and important values are likely to be maintained or enhanced. On the remaining lands containing relevant and important values, there is a greater risk that those values will not be maintained than if they had been included in an ACEC designation. Alternative I generally provides more restrictions on uses and more actions to maintain or enhance resource values compared to the No Action Alternative; therefore, the overall risk to these values outside designated ACECs may be lower than the No Action Alternative.

Overall, there would be a negligible increase in the amount of lands containing relevant and important values receiving special management through ACEC designation.

Impacts from Alternative II

In Alternative II, ACEC designation would be removed from the three existing ACECs, and no new ACECs would be designated. As a result, none of the lands containing the any relevant and important values would receive special management; there is a greater risk these values will not be maintained than if they had been included in an ACEC designation. Alternative II generally provides fewer restrictions on uses than Alternative I and a similar level of restriction as the No Action Alternative; therefore, the overall risk to these values outside designated ACECs would be similar to the No Action Alternative.

Overall, there would be a major decrease in the amount of lands containing relevant and important values receiving special management through ACEC designation.

Impacts from Alternative III

Overall, in Alternative III, 16% of lands containing relevant and important values would receive special management through ACEC designation; as a result, those relevant and important values are likely to be maintained or enhanced. On the remaining lands containing relevant and important values, there is a greater risk that those values will not be maintained than if they had been included in an ACEC designation. Alternative III generally provides a similar level of restriction on uses as Alternative I, but fewer actions to maintain or enhance resource values; therefore, the overall risk to these values outside designated ACECs may be slightly higher than in Alternative I.

Overall, there would be a minor decrease in the amount of lands containing relevant and important values receiving special management through ACEC designation.

Impacts from Alternative IV (the Preferred Alternative)

Overall, in Alternative IV-A, 71% of lands containing relevant and important values would receive special management through ACEC designation; 54% would receive special management in Alternative IV-B (the

Preferred Alternative). As a result, those relevant and important values are likely to be maintained or enhanced. On the remaining lands containing relevant and important values, there is a greater risk that those values will not be maintained than if they had been included in an ACEC designation. Alternative IV generally provides more restrictions on uses and more actions to maintain or enhance resource values compared to the No Action Alternative and Alternatives I, II, and III; therefore, the overall risk to these values outside designated ACECs may be lower than in those alternatives.

Overall, there would be a major increase in the amount of lands containing relevant and important values receiving special management through ACEC designation.

Impacts from Alternative V

Overall, in Alternative V, 79% of lands containing relevant and important values would receive special management through ACEC designation; as a result, those relevant and important values are likely to be maintained or enhanced. On the remaining lands containing relevant and important values, there is a greater risk that those values will not be maintained than if they had been included in an ACEC designation. Alternative V generally provides a similar level of restriction on uses and actions to maintain or enhance resource values as Alternative IV. However, most of the lands containing those values are within the boundary of the Sagebrush Sea ACEC. Even though they do not meet criteria for relevance and importance within the entire ACEC, the values may benefit from management directed toward other relevant and important values. Therefore, the overall risk to these values outside designated ACECs may be even lower than in Alternative IV.

Overall, there would be a major increase in the amount of lands containing relevant and important values receiving special management through ACEC designation.

Cumulative Impacts

Cumulative impacts to the relevant and important values contained in existing and potential ACECs are addressed under the relevant Chapter 4 section for that value (e.g., cumulative impacts to cultural values are addressed in the *Cultural Resources* section on cumulative impacts).

4.5.2. National Historic Trails (NHTs)

Analysis Methods

Indicators

The following indicator was used for the analysis of impacts to National Historic Trails (NHTs):

- **The physical, visual, or acoustic setting that affects the historic preservation or recreational use of the Oregon NHT.**

Methods and Assumptions

Impacts to NHTs from management in the following sections of Chapter 2 were analyzed in detail: *National Historic Trails*, *Upland Vegetation*, *Noxious Weeds and Invasive Plants*, *Visual Resources*, *Livestock Grazing*, and *Land Use Authorizations*. Management from the remaining sections was not analyzed in detail because the management did not vary measurably between alternatives or impact the indicator for NHTs.

The Oregon Trail is the only NHT in the planning area. A 0.5-mile wide protective corridor, 0.25 miles on each side, surrounds the BLM-managed segments of 47 miles of the Oregon NHT within the planning area. This results in 11,000 acres of BLM-managed trail and corridor. The visual foreground, a critical component of the visual setting of the trail, is 1.5 miles on either side of the Oregon NHT. When including the visual foreground, an additional 31,000 acres is included. The combined corridor and foreground acreage is 42,000 acres.

Direct impacts to the Oregon NHT can result from a variety of actions or factors, including:

- Disturbing the soil or vegetation within trail corridors;
- Altering the characteristics of the immediate or surrounding environment or elements of the trail that contribute to its significance such as important landscape features mentioned or recorded in emigrant diaries or journals;
- Introducing visual or acoustic elements that are out of character with the landscape or historical setting of the trail or that affect trail user's recreational enjoyment of the trail; or
- Neglecting the resource to the extent that historic, recreational, or natural environmental values associated with the trail are deteriorated.

Actions such as data collection or preservation of the setting or historical context of the NHT will maintain or enhance trail values.

Assumptions used in this analysis include the following:

- Protection of the Oregon NHT segments and related sites occur in accordance with Federal laws and BLM regulations and agreements, regardless of whether they are specifically identified in the RMP.
- Certain projects, due to size or topography, may require consideration of visual intrusions into the setting beyond the foreground to comply with Section 106 of the NHPA.

Direct and Indirect Impacts

Impacts from National Historic Trail Actions

Impacts from Management Specific to the No Action Alternative

Management of the Oregon NHT in accordance with existing law, regulation, and policy would maintain or enhance trail characteristics.

Impacts from Management Common to All Action Alternatives

Management actions proposed in the action alternatives would control resource use and activities within the Oregon NHT and the protective corridor to avoid or limit surface disturbing activities and maintain the physical, visual, and acoustic setting of the Oregon NHT.

Actions proposed for all action alternatives would manage the Oregon NHT protective corridor as VRM Class II. This would maintain the visual setting of the Oregon NHT.

Individually analyzing land use authorizations to identify mitigation needs and maintain compliance would maintain the Oregon NHT characteristics.

Impacts from Upland Vegetation Actions

Management that prioritizes vegetation treatments that converts annual communities to native shrubland in the Oregon NHT protective corridor would restore historical vegetative context, maintaining or enhancing the physical setting of the Oregon NHT.

Impacts from Management Specific to the No Action Alternative

The Oregon NHT would not be targeted as a priority vegetation treatment area in the No Action Alternative. The absence of proactive shrubland restoration is less likely to enhance the physical setting than management that prioritizes these areas for treatment. Although lack of prioritization does not necessarily decrease the quality of the physical setting of the Oregon NHT, persistence of or conversion to annual communities does not represent or contribute to the historical vegetative context of the trail.

Impacts from Management Specific to Alternatives I and V

Alternatives I and V would prioritize Oregon NHT for treatment of annual communities to restore native shrubland. This would enhance the physical setting within the protective corridor by restoring the historical vegetative context.

Impacts from Management Specific to Alternatives II, III, and IV

There is no management specific to Alternatives II, III, or IV that directly targets the Oregon NHT for vegetation treatments.

Impacts from Noxious Weeds and Invasive Plants Actions

Management that prioritizes noxious weeds and invasive plant treatments in the Oregon NHT protective corridor would contribute to restoration of historical vegetative context.

Impacts from Management Specific to the No Action Alternative and Alternative II

Neither the No Action Alternative nor Alternative II specifies the Oregon NHT for treatment of noxious weeds or invasive plants. The absence of proactive noxious weed and invasive plant treatment is less likely to enhance the physical setting than management that prioritizes these areas for treatment. Although lack of prioritization does not necessarily decrease the quality of the physical setting of the Oregon NHT, persistence of or conversion to noxious weeds or invasive plants does not represent or contribute to the historical vegetative context of the trail.

Impacts from Management Specific to Alternatives I, III, IV, and V

Alternatives I, III, IV, and V would identify special designations, including the Oregon NHT, as priority treatment areas. This would maintain or improve the physical setting by protecting the historical vegetative context of the trail corridor.

Impacts from Visual Resource Actions

Designation of the Oregon NHT corridor as VRM Class I or II would maintain the historical visual context of the immediate corridor. Designation of the foreground area as VRM Class I and II would limit visual modifications in the area surrounding the corridor and provide additional management to maintain the visual character.

Impacts from Management Specific to the No Action Alternative

Table 4- 349 identifies the number of acres in each VRM Class for the Oregon NHT corridor and foreground in the No Action Alternative. The No Action Alternative contains management for the Oregon NHT protective corridor and foreground that would maintain or improve the visual setting on 56% of the combined area. Alterations to the visual setting would be allowed in the remaining 44%.

Table 4- 349. VRM Classes for the Oregon NHT Corridor and Foreground in the No Action Alternative (Acres)

	VRM Class			
	I	II	III	IV
Corridor Acres	10,000	1,000	0	100
Foreground Acres	10,000	3,000	400	18,000

Impacts from Management Specific to Alternatives I, III, IV, and V

Table 4- 350 identifies the number of acres in each VRM Class for the Oregon NHT corridor and foreground in Alternatives I, III, IV, and V. These alternatives assign the Oregon NHT protective corridor to VRM Class II, with the exception of an identified utility corridor which is VRM Class III. This would maintain or improve the visual setting on 25% of the corridor and foreground. Decreases in visual resources would be anticipated on 75% of the area, primarily resulting from structures and facilities associated with existing utility corridors.

Table 4- 350. VRM Classes for the Oregon NHT Corridor and Foreground in Alternatives I, III, IV (the Preferred Alternative), and V (Acres)

	VRM Class			
	I	II	III	IV
Corridor Acres	0	9,000	2,000	0
Foreground Acres	0	1,000	30,000	0

Impacts from Management Specific to Alternative II

Table 4- 351 identifies the number of acres in each VRM Class for the Oregon NHT corridor and foreground in Alternative II. Alternative II contains management for the Oregon NHT protective corridor and foreground that would maintain or improve the visual setting on 25% of the combined area. Alterations to the visual setting would be allowed in the remaining 75%. This alternative varies from the other action alternative in that some foreground acres would be managed as VRM Class IV instead of Class III, allowing more change to the visual setting of the foreground.

Table 4- 351. VRM Classes for the Oregon NHT Corridor and Foreground in Alternative II (Acres)

	VRM Class			
	I	II	III	IV
Corridor Acres	0	9,000	2,000	0
Foreground Acres	0	1,000	100	30,000

Impacts from Livestock Grazing Actions

Management that allocates land within the Oregon NHT corridor as unavailable for grazing would maintain or enhance trail values by avoiding impacts from livestock grazing or grazing infrastructure. Changes in the physical setting of Oregon NHT resources would result from grazing infrastructure; vegetation alterations from trailing, watering, or salting; and concentrated congregation of livestock. Decreases in Oregon NHT settings due to livestock grazing will be less likely where the protective corridor is unavailable for grazing.

Impacts from Management Specific to the No Action Alternative and Alternatives II and III

The No Action Alternative and Alternatives II and III would allocate 12% of the Oregon NHT protective corridor as unavailable for livestock grazing. This is a similar proportion as Alternatives I and IV. Changes to the physical, visual, or acoustic settings of the Oregon NHT are not anticipated in areas that are unavailable for grazing.

Impacts from Management Specific to Alternative I

Alternative I would allocate 15% of the Oregon NHT protective corridor as unavailable for livestock grazing. This is a similar proportion as the No Action Alternative and Alternatives II, III, and IV. Changes to the physical, visual, or acoustic settings of the Oregon NHT are not anticipated in areas that are unavailable for grazing.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Alternative IV would allocate 14% of the Oregon NHT protective corridor as unavailable for livestock grazing. This is a similar proportion as the No Action Alternative and Alternatives I, II, and III. Changes to the physical, visual, or acoustic settings of the Oregon NHT are not anticipated in areas that are unavailable for grazing.

Impacts from Management Specific to Alternative V

Alternative V would allocate 46% of the Oregon NHT protective corridor as unavailable for livestock grazing. This is a much larger proportion than the No Action Alternative and Alternatives I, II, III, and IV. Changes to the physical, visual, or acoustic settings of the Oregon NHT are not anticipated in areas that are unavailable for grazing.

Impacts from Land Use Authorizations Actions

Permanent facilities and construction and maintenance activities associated with land use authorizations would change the physical and visual setting of the Oregon NHT. These settings will be maintained or improved within ROW avoidance or exclusion areas.

Short-term impacts to NHT resources resulting from land use authorizations would include surface-disturbing activities and presence of equipment and personnel during construction or maintenance activities of approved authorizations. This would alter the physical, visual, and acoustic setting associated with the historical context of the Oregon NHT through the duration of these activities. Actions that would occur within the protective corridor would be analyzed on a case-by-case basis to determine necessary mitigation.

Long-term impacts resulting from land use authorizations would predominately affect the visual setting of the Oregon NHT. Construction of facilities such as wind turbines or overhead power transmission lines would contribute to a decrease in the historical visual context of the Oregon NHT. For comparison among alternatives, the degree of change to visual resources that would result from land use authorizations is relative to the proportion of potential wind energy development and existing and potential utility corridors.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative would manage all rutted segments of the Oregon NHT as avoidance/restricted areas for overhead, surface, and underground utilities. This action would maintain the physical and visual setting of undisturbed rutted segments of the Oregon NHT.

Existing and potential utility developments have impacts to Oregon NHT settings relative to the area authorized for use. Combined, 27% of the corridor and visual foreground have existing utility facilities or potential for utility development. This is more than Alternative V, but less than Alternatives I, II, III, and IV.

The Oregon NHT protective corridor is excluded from wind development, but 50% of the visual foreground has potential for wind development. This is more than in Alternatives I, III, IV, and V, but less than Alternative II.

Impacts from Management Common to All Action Alternatives

New ROWs would be granted subject to various stipulations and conditions. The placement of new ROWs in the protective corridor overlaying areas that have been previously disturbed or are part of an existing ROW corridor would limit any changes to settings by land use authorizations. This would maintain the physical, visual, and acoustic setting of the Oregon NHT.

Impacts from Management Specific to Alternatives I, III, and IV (the Preferred Alternative)

Changes to the Oregon NHT settings resulting from existing and potential utility developments are relative to the area authorized for this use; 28% of the corridor and visual foreground have existing utility facilities or potential for utility development. This is highest proportion of corridor and foreground land authorized for this use. The No Action Alternative and Alternative V have a lower proportion of combined area available for utility corridor authorization.

Alternatives I, III, and IV exclude the Oregon NHT protective corridor from wind energy development; however, 40% of the visual foreground area has potential for wind development in these alternatives. Visual setting on the remaining 60% of foreground area would not be changed due to wind energy development. This is similar to Alternative V and less than the No Action Alternative and Alternative II.

Impacts from Management Specific to Alternative II

Impacts from utility corridors in Alternative II are identical to Alternative I.

Alternative II excludes the Oregon NHT protective corridor from wind energy development. However, 52% of the visual foreground area has potential for wind development in this alternative. This is most area with potential for this authorization among all alternatives. Visual setting on the remaining 48% of foreground area would not be changed due to wind energy development.

Impacts from Management Specific to Alternative V

Changes to the Oregon NHT settings resulting from existing and potential utility developments are relative to the area authorized for this use; 23% of the corridor and visual foreground have existing utility facilities or potential for utility development. This is lowest proportion of corridor and foreground land authorized for this use.

Impacts for wind development in Alternative V are identical to Alternative I.

Summary of Direct and Indirect Impacts

Table 4- 352 identifies the percent of the Oregon NHT and protective corridor area with management actions that would maintain or improve NHT values.

Table 4- 352. Percent of the Oregon NHT and Protective Corridor Area with Management Actions to Maintain or Improve NHT Values by Resource or Resource Use

Resource or Resource Use		Alternative					
		No Action	I	II	III	IV	V
Upland Vegetation		0	100	0	0	0	100
Noxious Weeds and Invasive Plants		0	100	0	100	100	100
Livestock Grazing		12	15	12	12	14	46
Visual Resources		56	96	25	96	96	96
Land Use Authorizations	Wind Development	50	60	48	60	60	60
	Utility Development	73	72	72	72	72	77

Impacts from the No Action Alternative

The No Action Alternative provides more management that would maintain or improve the physical, visual, or acoustic setting of the Oregon NHT than Alternative II, but less than Alternatives I, III, IV, and V. Management in this alternative would be in accordance with current plans and guidelines for the Oregon NHT, but would provide no additional management to maintain or improve the physical, visual, and acoustic settings. The absence of priority treatments of upland vegetation and noxious weeds and invasive plants, and lack of visual resource management specific for the visual foreground would decrease the physical and visual setting. Overall, the No Action Alternative would result in moderate adverse impacts to the Oregon NHT, primarily due to actions for visual resources.

Impacts from Alternative I

Alternative I provides more management than the No Action Alternative and Alternatives II, III, and IV that would maintain or improve the physical, visual, or acoustic setting of the Oregon NHT, but less than Alternative V. This alternative would manage the Oregon NHT in accordance with current plans and guidelines, and prioritizes the protective corridor for noxious weeds and invasive plants treatments. Overall, Alternative I would result in moderate beneficial impacts to the Oregon NHT, primarily due to management actions for upland vegetation.

Impacts from Alternative II

Alternative II provides the least management among the alternatives to maintain or improve the physical, visual, or acoustic setting of the Oregon NHT. This alternative would manage the Oregon NHT in accordance with current plans and guidelines, but would provide no additional management to maintain or improve the physical, visual, and acoustic settings. The absence priority treatments of upland vegetation and noxious weeds and invasive plants, and designation of the visual foreground as VRM IV would indicate a change to the physical and visual setting. This alternative has the highest proportion of foreground area available for wind development authorization, which contributes the decreases to visual setting. Overall, Alternative II would result in moderate adverse impacts to the Oregon NHT, primarily due to actions for visual resources.

Impacts from Alternative III

Alternative III provides more management that would maintain or improve the physical, visual, or acoustic setting of the Oregon NHT than the No Action Alternative and Alternative II, but less than Alternatives I, IV, and V. This alternative would manage the Oregon NHT in accordance with current plans and guidelines, and prioritizes the protective corridor for noxious weeds and invasive plants treatments; however, this alternative does not prioritize the trail corridor for upland vegetation treatments. Designation of the trail foreground as Visual Resource Management Class III minimizes changes to the visual setting. Overall, Alternative III would result in minor beneficial impacts to the Oregon NHT, primarily due to actions for noxious weeds and invasive plants.

Impacts from Alternative IV (the Preferred Alternative)

Alternative IV provides more management that would maintain or improve the physical, visual, or acoustic setting of the Oregon NHT than the No Action Alternative and Alternatives II and III, but less than Alternatives I and V. This alternative is essentially identical to Alternative III, with slightly less protective corridor acres available for grazing thus avoiding changes to the physical settings of the trail from this use. Overall, Alternative IV would result in minor beneficial impacts to the Oregon NHT, primarily due to actions for noxious weeds and invasive plants.

Impacts from Alternative V

Alternative V provides the most management that would maintain or improve the physical, visual, or acoustic setting of the Oregon NHT. This alternative is essentially identical to Alternative I, with slightly less land available for utility corridor authorizations. This alternative also has the lowest proportion of corridor acres available for grazing, minimizing impacts to trail resources from this use. Overall, Alternative V would result in moderate beneficial impacts to the Oregon NHT, primarily due to management actions for upland vegetation.

Cumulative Impacts

The Oregon NHT segments that pass through other Federally managed lands have similar protections and are managed with equivalent protective standards. The Oregon NHT passes through State and private lands. Oregon NHT segments on State lands are subject different statutory protections than those that occur on Federal lands. Many of the trail segments that passed through private lands were disturbed or destroyed during agricultural development. Because most of the intact Oregon Trail NHT segments are on Federal lands, the cumulative impacts for all alternatives are likely to be negligible.

4.5.3. Wild and Scenic Rivers (WSRs)

OPLMA contains Wild and Scenic River (WSR) designations that affect the planning area. Management described for the No Action Alternative and all action alternatives in the Draft RMP/EIS for WSR suitable segments would be consistent with management for the newly designated WSRs. As described in the errata sheet at the front of Volume 1, the areas within the designated WSRs were formerly part of WSR suitable segments prior to their designation. As a result, the discussion in this chapter of potential impacts from management of WSRs is not affected by the change in designation from suitable to designated. The Proposed RMP/Final EIS will incorporate the designations contained in the Act.

Analysis Methods

Indicators

The following indicators were used for the analysis of impacts to WSRs:

- **Outstandingly Remarkable Values (ORVs)**
- **Tentative classification**

These indicators were selected because they represent the values required for a river segment's eligibility for inclusion into the National Wild and Scenic Rivers System (NWSRS) and the focus of protective management of eligible and suitable segments.

Methods and Assumptions

Impacts to WSRs from management in the following sections of Chapter 2 were analyzed in detail: *Wild and Scenic Rivers*, *Visual Resources*, *Minerals*, and *Areas of Critical Environmental Concern*. Management from the remaining sections was not analyzed in detail because the management did not vary measurably between alternatives or impact the indicator for WSRs. **Impacts from management for WSRs** can be found under *Impacts from Wild and Scenic Rivers Actions* in the *Geologic Features* and *Water Resources* sections.

This analysis of proposed management and subsequent impacts for WSRs is limited to eligible and suitable river segments within or bordering the planning area; these segments will be referred to as "study rivers" throughout this analysis. Only Congress or the Secretary of the Interior can designate a river as wild, scenic, or recreational for inclusion in the NWSRS; therefore, the determination and timing of the river designation are outside of BLM's control. Currently, there are no designated WSRs within or adjacent to the planning area.

Each study river has ORVs that qualify that segment for eligibility as well as a tentative classification as wild, scenic, or recreational. A study river's ORVs are present in the river itself or within 0.25 miles of either side of the river. Whether management decisions or actions that would affect individual resources or resource uses impact a study river depends on that segment's qualifying ORVs and tentative classification. These qualifying values are to be maintained or enhanced as set forth by Section 10(a) of the Wild and Scenic Rivers Act (WSRA) of 1968. A list of the WSR segments in the planning area and their ORVs and tentative classifications can be found in the *Wild and Scenic Rivers* section of Chapter 3.

A stream segment must first have free-flowing characteristics to qualify as a study river. There are no current proposals for dams or diversions on any current free-flowing waterway within the planning area. However, if Idaho were to issue new water rights or transfer rights to a waterway within the planning area, this could potentially impact the free-flowing character of affected WSR segments. For a dam or diversion to be sited and built on BLM-managed lands, a ROW would need to be secured for the development. Without specific proposals, impacts of this type of activity cannot be defined nor quantified and, as a result, will not be analyzed in detail. Any Federally approved water resource projects within a study river may be built only to the degree that they would be if the river were a designated WSR river.

Direct and Indirect Impacts

Impacts from Wild and Scenic Rivers Actions

Impacts from Management Specific to the No Action Alternative

The No Action Alternative would manage the suitable segments of the Bruneau and Jarbidge Rivers as components of the NWSRS. This would minimize impacts to these river segments by protecting the ORVs and tentative classification for these 100 miles and the associated corridors.

All 100 miles of the suitable Bruneau and Jarbidge Canyons rim-to-rim would be recommended for mineral entry withdrawal and would be managed as a utility avoidance area. This would afford protection from impacts associated with these types of developments, such as changes in landforms, additional transportation routes, or installation of electric transmission lines.

Impacts from Management Common to the No Action and All Action Alternatives

All 100 miles of rivers occurring along or within the boundaries of the planning area been found to be suitable would continue to be recommended for inclusion in the NWSRS; all 110 miles of eligible river segments would continue to be eligible for inclusion in the NWSRS. As a result, the ORVs and tentative classification of these segments would be maintained or improved by continuing protective management on these suitable and eligible river segments.

Impacts from Management Common to All Action Alternatives

Management to maintain or enhance suitable and eligible segment ORVs, water quality, and tentative classification and to conduct suitability studies on eligible segments would maintain or improve study river values. Recommending the eligible and suitable study rivers and corridors to be withdrawn from mineral entry and recognizing these segments as ROW avoidance areas would have no impact on the qualifying ORVs or tentative classification.

If Congress releases suitable study rivers from consideration for designation, qualifying ORVs and the associated tentative classification would be subject to management for adjacent lands, which could include actions that may decrease or diminish these attributes, as these rivers would no longer be managed to maintain or enhance those values.

Impacts from Management Specific to Alternatives I, IV, and V

Closing all designated, suitable, and eligible study rivers to salable and leasable mineral development would have no impacts to qualifying ORVs or tentative classification.

Impacts from Management Specific to Alternatives II and III

Allowing salable mineral development within a study river corridor could directly impact water quality and indirectly impact habitat and populations of the BLM Sensitive species that qualify several of the study rivers in the planning area for inclusion in the NWSRS. Other impacts relative to salable mineral development include removal or alteration of geologic features, alterations to scenic elements, and disruption of cultural resources.

Leasable mineral development with NSO restrictions is not likely to impact the qualifying ORVs or tentative classification of study rivers.

Impacts from Visual Resources Actions

Study rivers that qualify for inclusion in the NWSRS with a scenic ORV would become ineligible due to alterations in the visual resources. The four different VRM Classes allow for varying degrees of impact to the visual resources within that classification (BLM Handbook 8410-1, V.B.1-4). Variations in VRM Classes relative to the location of study rivers would allow for impacts to scenic quality and potential loss of a qualifying ORV. The designation as VRM Class I and II would maintain the regionally unique scenic quality. VRM Class III and IV would allow decreases to the scenic quality. Table 4- 353 identifies the study rivers with scenery as a qualifying ORV. Table 4- 354 contains the acres within the study river corridor in VRM Classes for those rivers.

Table 4- 353. Study Rivers with Scenery as a Qualifying ORV

Study Rivers with Outstandingly Remarkable Scenic Value	Miles	Corridor Acres
Bruneau River	60	7,000
Cougar Point Creek	1	300
Jarbidge River	29	8,000
Salmon Falls Creek (lower)	30	5,000
Salmon Falls Creek (upper)	9	1,000
West Fork Bruneau River	11	1,000
West Fork Jarbidge River	10	3,000
Total	**150**	**25,300**

Table 4- 354. VRM Classes for Study River Corridors with a Scenic ORV by Alternative (Acres)

VRM Class	Alternative					
	No Action	I	II	III	IV	V
Class I and II	26,000	26,000	26,000	26,000	26,000	26,000
Class III and IV	200	200	200	200	200	200

Impacts from Management Specific to the No Action Alternative

The No Action Alternative does not identify a VRM Class specifically for study rivers with a scenic ORV; however, 99% of study river corridors would be managed as VRM Class I or II, which would help retain the existing visual character. Alterations to the visual landscape that could impact the scenic ORV would be allowed on 1% of these study rivers.

Impacts from Management Specific to Alternatives I, II, III, IV, and V

The action alternatives would manage study rivers with a scenic ORV as VRM Class I. This would maintain the visual quality in 99% of these study river corridors. The remaining 1% could experience alterations to the visual landscape that could impact the scenic ORV.

Impacts from Minerals Actions

Impacts associated with exploration for and extraction of mineral resources could eliminate or alter values within a study river or corridor to a degree that would otherwise disqualify it as eligible or change attributes of the tentative classification. For leasable mineral development, WSRs corridors are open with NSO restrictions or closed in every alternative, resulting in no impacts to ORVs or tentative classification of WSRs. Table 4- 355 identifies impacts to study rivers from salable and locatable minerals actions.

Table 4- 355. Impacts to Study Rivers from Salable and Locatable Mineral Actions (Acres)

Mineral Allocations	Alternative					
	No Action	I	II	III	IV	V
Salable						
Maintain	32,000[B]	32,000	17,000	32,000	32,000	32,000
Decrease	0	0	15,000	0	0	0
Locatable						
Maintain	25,000[C]	32,000	32,000	32,000	32,000	32,000
Decrease	8,000	0	0	0	0	0

[A] Study river acreage that is not included in potential development area.
[B] Salable mineral sites located within WSR corridors are not anticipated to impact qualifying ORVs or tentative classification because of existence prior to the eligibility study. These sites were never spatially defined in the 1987 Jarbidge RMP.
[C] Wild and Scenic Rivers were not specifically recommended for withdrawal in the No Action Alternative; however, those locations were recommended for withdrawal for other reasons.

Impacts from Management Specific to the No Action Alternative

Establishment of new salable mineral sites would not occur in study river corridors in the No Action Alternative. This would maintain the ORVs and tentative classifications.

In the No Action Alternative, 76% (25,000 acres) of the study rivers would be recommended for locatable mineral withdrawal. This would maintain the ORVs and tentative classifications. The remaining 24% would be open to mineral entry, resulting in opportunities for alterations or decreases to qualifying ORVs and tentative classifications. However, demand for locatable minerals in the planning area is not expected to change from present levels; thus, the potential for impacts to occur in the life of the plan is low.

Impacts from Management Specific to Alternatives I, III, IV, and V

In Alternatives I, III, IV, and V, study river corridors would be closed to geothermal, oil, and gas leasing and development and to salable mineral development and would be recommended for withdrawal from locatable mineral entry; these actions would all result in maintaining the ORVs and tentative classifications of these rivers.

Impacts from Management Specific to Alternative II

In Alternative II, impacts from leasable and locatable mineral management would be identical to those described for Alternatives I, III, IV, and V. However, in Alternative II, 52% of the study river corridors would be closed to salable mineral development (17,000 acres), which would maintain the ORVs and tentative classifications in fewer of the study river corridors. The remaining 48% would be available for salable mineral development, resulting in potential alterations and decreases in qualifying ORVs. The acreage on which salable mineral development occurs is expected to increase from approximately 1,300 acres to approximately 3,300 acres over the life of the plan. This is approximately 0.2% of the area available for salable mineral development.

Impacts from Areas of Critical Environmental Concern Actions

Management of relevant and important values within ACECs would generally be complementary to management for study river values. Where ACEC and WSR management occur simultaneously, ORVs and classification would be less likely to change than when the segment is managed only as a WSR.

The relevant and important values for an ACEC are often identical to ORVs identified for an eligible or suitable river that occurs in the same area. For example, scenic values meet relevance and importance criteria in the Bruneau-Jarbidge ACEC and have been identified as an ORV for the Bruneau River. In such cases, overlapping ACEC management for that relevant and important value would also directly maintain or enhance that ORV. Management for other overlapping ACECs may also indirectly maintain or enhance a study river's ORVs, even if the ORV is not also a relevant and important value. Table 4- 356 displays acres of study rivers with overlapping ACEC designations.

Table 4- 356. Study River Corridor Acres with Overlapping ACEC Designations

<table>
<tr><th rowspan="3">Study Rivers</th><th colspan="7">Alternative</th></tr>
<tr><th rowspan="2">No Action</th><th rowspan="2">I</th><th rowspan="2">II</th><th rowspan="2">III</th><th colspan="2">IV</th><th rowspan="2">V</th></tr>
<tr><th>IV-A</th><th>IV-B</th></tr>
<tr><td>Bruneau River</td><td>7,000</td><td>7,000</td><td>0</td><td>3,000</td><td colspan="2">7,000</td><td>5,000</td></tr>
<tr><td>Cougar Point Creek</td><td>300</td><td>300</td><td>0</td><td>0</td><td colspan="2">300</td><td>300</td></tr>
<tr><td>Dave Creek</td><td>400</td><td>400</td><td>0</td><td>0</td><td colspan="2">700</td><td>800</td></tr>
<tr><td>East Fork Jarbidge</td><td>2,000</td><td>2,000</td><td>0</td><td>0</td><td colspan="2">2,000</td><td>2,000</td></tr>
<tr><td>Jarbidge River</td><td>8,000</td><td>8,000</td><td>0</td><td>8,000</td><td colspan="2">8,000</td><td>8,000</td></tr>
<tr><td>Rocky Canyon Creek</td><td>0</td><td>0</td><td>0</td><td>0</td><td>500</td><td>0</td><td>500</td></tr>
<tr><td>Salmon Falls Creek (upper)</td><td>0</td><td>0</td><td>0</td><td>0</td><td colspan="2">1,000</td><td>1,000</td></tr>
<tr><td>Salmon Falls Creek (lower)</td><td>3,000</td><td>3,000</td><td>0</td><td>3,000</td><td colspan="2">0</td><td>5,000</td></tr>
<tr><td>Snake River, Hagerman Reach</td><td>0</td><td>600</td><td>0</td><td>0</td><td colspan="2">0</td><td>600</td></tr>
<tr><td>Snake River, King Hill Reach</td><td>0</td><td>600</td><td>0</td><td>0</td><td colspan="2">0</td><td>600</td></tr>
<tr><td>Snake River, Three Island Reach</td><td>200</td><td>300</td><td>0</td><td>300</td><td colspan="2">300</td><td>300</td></tr>
<tr><td>West Fork Bruneau River</td><td>1,000</td><td>1,000</td><td>0</td><td>0</td><td colspan="2">1,000</td><td>1,000</td></tr>
<tr><td>West Fork Jarbidge River</td><td>900</td><td>900</td><td>0</td><td>100</td><td colspan="2">3,000</td><td>3,000</td></tr>
<tr><td>Total</td><td>22,800</td><td>24,100</td><td>0</td><td>14,400</td><td>23,800</td><td>23,300</td><td>28,100</td></tr>
</table>

Impacts from Management Specific to the No Action Alternative

By continuing existing management, 73% of study river corridors would have complementary ACEC management. Management to maintain or enhance relevant and important values within these ACECs would maintain or enhance study river ORVs and tentative classification.

Impacts from Management Specific to Alternative I

In Alternative I, 77% of study river corridors would have complementary ACEC management. Management of public lands to maintain or enhance relevant and important values within these ACECs would maintain or enhance study river ORVs and tentative classification.

Impacts from Management Specific to Alternative II

There would be no ACECs designated in Alternative II. Subsequently, study river corridors in this alternative would not have additional direct or indirect management to maintain or enhance ORVs or tentative classification.

Impacts from Management Specific to Alternative III

In Alternative III, 45% of study river corridors would have complementary ACEC management. Management of public lands to maintain or enhance relevant and important values within these ACECs would maintain or improve study river ORVs and tentative classification.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

Complimentary ACEC management would exist on 76% of study river corridors in Alternative IV-A and 75% of study river corridors in Alternative IV-B (the Preferred Alternative). Management of public lands to maintain or enhance relevant and important values within these ACECs would maintain or improve study river ORVs and tentative classification.

Impacts from Management Specific to Alternative V

In Alternative V, 89% of study river corridors would also have complementary ACEC management. Management of public lands to maintain or enhance relevant and important values within these ACECs would maintain or improve study river ORVs and tentative classification.

Summary of Direct and Indirect Impacts

Table 4- 357 summarizes the direct and indirect impacts of each alternative on eligible and suitable river segments. Overall management to maintain or enhance the ORVs and tentative classification of study rivers would mitigate the impacts from these actions.

Impacts from the No Action Alternative

The No Action Alternative ranks fifth for management that would maintain the existing ORVs and tentative classification. Decreases to these values would be due to the VRM Class II, III, and IV for study rivers with scenic ORVs; and leasable and locatable mineral development potential in study river corridors.

Impacts from Alternative I

Alternative I ranks second for management that would maintain the existing ORVs and tentative classification. Impacts from management proposed in this alternative are essentially identical to Alternatives III, IV, and V, with only a variation in complementary ACEC management.

Impacts from Alternative II

Alternative II ranks sixth for management that would maintain the existing ORVs and tentative classification. The most notable decreases to these values would be due to study river lands being available for salable mineral development and no complementary management from overlapping ACECs.

Impacts from Alternative III

Alternative III ranks fourth for management that would maintain the existing ORVs and tentative classification. Impacts from management proposed in this alternative are essentially identical to Alternatives I, IV, and V, with only a variation in complementary ACEC management.

Impacts from Alternative IV (the Preferred Alternative)

Alternative IV ranks third for management that would maintain the existing ORVs and tentative classification. Impacts from management proposed in this alternative are essentially identical to Alternatives I, III, and V, with only a variation in complementary ACEC management.

Impacts from Alternative V

Alternative V ranks first for management that maintains the existing ORVs and tentative classification. Impacts from management proposed in this alternative are essentially identical to Alternatives I, III, and V, with only a variation in complementary ACEC management.

Cumulative Impacts

WSR management proposed for the No Action and all action alternatives continues protective management for the study rivers previously deemed eligible or suitable. When analyzed cumulatively with any past, present, or reasonably foreseeable actions, this management would result in no cumulative impacts that would alter any of the study rivers in the NWSRS. In fact, management of these study rivers in all alternatives would enhance the regional WSR resources by providing management to minimize impacts to these resource values.

Table 4- 357. Impacts to WSR Corridors by Alternative (Percent)

Management Action			Alternative					
			No Action	I	II	III	IV	V
VRM Classes								
VRM Class I or II			99	99	99	99	99	99
VRM Class III or IV			1	1	1	1	1	1
Mineral Development								
Leasable	Oil and Gas	No impacts	N/A[A]	100	100	100	100	100
		Impacts	N/A[A]	0	0	0	0	0
	Geothermal	No impacts	N/A[A]	100	100	100	100	100
		Impacts	N/A[A]	0	0	0	0	0
Salable		Closed	100	100	52	100	100	100
		Open	0	0	48	0	0	0
Locatable		Withdrawn	76	100	100	100	100	100
		Open	24	0	0	0	0	0
ACECs								
Overlapping ACEC Designation			73	77	0	45	75[B]	89
No Overlapping ACEC Designation			27	23	100	55	25	11

Note: Management that would maintain or enhance a study river's ORVs and tentative classifications is displayed without shading, while management that would result in changes to a study river's ORVs or tentative classification is shaded.
[A] These areas are not spatially defined in the No Action Alternative.
[B] Mean percentage of Alternatives IV-A (76%) and IV-B (75%).

4.5.4. Wilderness Study Areas (WSAs)

OPLMA contains Wilderness designations that affect the planning area. Management described for the No Action Alternative and all action alternatives in the Draft RMP/EIS for Wilderness Study Areas (WSAs) would be consistent with management for the newly designated Bruneau-Jarbidge Rivers Wilderness. With several minor exceptions (described in the errata sheet at the front of Volume 1), the areas within the Bruneau-Jarbidge Rivers Wilderness were formerly within WSAs prior to their designation. The discussion in this chapter of potential impacts from management of WSAs does not reflect or quantify the distinction between WSAs and the Wilderness. The Proposed RMP/Final EIS will incorporate the designations contained in the Act.

Analysis Methods

Indicators

The following indicators were used for the analysis of direct and indirect impacts to Wilderness Study Areas (WSAs):

- **Naturalness**
- **Opportunities for solitude**
- **Opportunities for primitive, unconfined recreation**

These indicators are the individual wilderness characteristics that were specified for inventory in the Wilderness Act of 1977 and are also referred to collectively as wilderness characteristics as a whole in this analysis.

Methods and Assumptions

Impacts to WSAs from management in the following sections of Chapter 2 were analyzed in detail: *Wilderness Study Areas* and *Transportation and Travel*. Management from the remaining sections was not analyzed in detail because the management did not vary measurably between alternatives or impact the indicator for WSAs. **Impacts from management for WSAs** can be found under *Impacts from Special Designation Actions* in the the *Geologic Features* section.

WSAs are special designations that were previously established in the planning area by law and policy. No decisions or management actions in this RMP would change these designations. The three WSAs in the planning area are the Jarbidge River (64,000 acres), Bruneau River-Sheep Creek (28,000 acres), and Lower Salmon Falls Creek (2,000).

Under all alternatives, WSAs would continue to be managed consistent with the *Interim Management Policy for Lands under Wilderness Review* (IMP; BLM-H-8550-1) until such time as Congress either designates all or portions of the WSAs as wilderness or releases the WSAs, or portions of the WSAs, from further consideration for wilderness designation.

Lands released from WSA management would be subject to management as directed by Congress or as determined by existing land use plans. This analysis assumes that released lands would be managed under the direction contained in Chapter 2 of this document; the impacts to the existing wilderness characteristics are analyzed accordingly.

Transportation and travel management actions propose changes to existing inventoried ways. These variations to the use of motorized and mechanized vehicles on previously inventoried ways are analyzed in this section as well. A CTTMP will be completed within five years of the signing of the ROD. This will address all forms of travel across the planning area, including travel within WSA boundaries.

Direct and Indirect Impacts

Impacts from Wilderness Study Area Actions

Although management for ACECs, WSRs, and SRMAs is not intended to protect wilderness characteristics, the prescribed management may indirectly maintain wilderness characteristics in released areas. Table 4- 358 displays acres of ACEC, WSR, and SRMA designations that overlap WSAs.

Table 4- 358. WSAs with Additional ACEC, WSR, and SRMA Management Strategies (Acres)

Designation Type	Alternative					
	No Action	I	II	III	IV	V
ACEC	55,000	56,000	0	59,000	92,000	86,000
WSR	17,000	17,000	17,000	17,000	17,000	17,000
SRMA	N/A[A]	52,000	14,000	14,000	52,000	14,000
Combined Acres [B]	**55,000**	**78,000**	**17,000**	**63,000**	**94,000**	**88,000**

[A] SRMA acreage was not spatially defined in the 1987 Jarbidge RMP
[B] Combined acreage represents the footprint acres of the ACEC, WSR, and SRMAs combined within the WSAs.

Impacts from Management Specific to the No Action Alternative

Under the No Action Alternative, WSAs would continue to be managed under the IMP, which would result in maintaining or enhancing naturalness, opportunities for solitude, and opportunities for primitive, unconfined recreation. Lands that are released from WSA management would be available for actions and development as specified, including prescribed burning, brush control and seeding, pasture fencing, spring and reservoir developments, and new pipelines. These alterations and infrastructure construction would decrease the naturalness that currently exists in the vicinity of these proposed developments.

In the No Action Alternative, wilderness characteristics on 55,000 acres (58%) may be indirectly maintained if the WSAs were released from WSA status (Table 4- 358).

Impacts from Management Common to All Action Alternatives

Under all action alternatives, WSAs would continue to be managed under the IMP, which would result in maintaining or enhancing naturalness, opportunities for solitude, and opportunities for primitive, unconfined recreation.

All the action alternatives would continue to manage released WSA lands within any ACEC, WSR, or SRMA boundary designated according to the management prescribed for those designations. The impacts to naturalness and opportunities for solitude and primitive, unconfined recreation would be dependent upon the prescribed management for these individual designations. In general, these designations would be protective to some, if not all, of the wilderness character within the affected boundaries. Acres of WSA lands within those designations would be as displayed in Table 4- 358.

Impacts from Management Specific to Alternatives I, II, and III

If WSAs are released by Congress from wilderness study, Alternative I would manage the released lands in accordance with associated legislation or direction for adjacent non-wilderness lands. If protective legislation were not prescribed and the released lands lacked other designated management such as ACEC, WSR, or SRMA, the naturalness and opportunities for solitude and primitive recreation would likely decrease depending on the resource uses and developments proposed.

Impacts from Management Specific to Alternatives IV and V

If WSAs are released by Congress from wilderness study without attached management legislation, the affected lands would be managed in accordance with the *Non-WSA Lands with Wilderness Characteristics* section of Chapter 2. This action would maintain the naturalness and opportunities for solitude and primitive recreation of the lands.

Impacts from Transportation and Travel Actions

Transportation and travel decisions that close or limit the use of motorized and mechanized travel in WSAs maintain opportunities for primitive and unconfined recreation, preserve solitude, and enhance naturalness. Within the designated OHV category for WSAs (limited to designated ways and closed to motorized vehicle use), those decisions that allow the least number of miles open to motorized and mechanized travel would be the most beneficial to wilderness values and WSA management.

Impacts from Management Specific to the No Action Alternative

In the No Action Alternative, motorized and mechanized travel would be limited to the 27 miles of inventoried ways in the WSAs. This limitation is intended as a protective measure for wilderness characteristics. This would maintain the naturalness and opportunities for solitude and primitive recreation as they currently exist.

Impacts from Management Specific to Alternatives I, II, III, and V

Alternative I would limit travel within WSAs to inventoried ways until designated in the CTTMP. Designation of ways would be limited to the identified inventoried ways. However, an inventoried way would not have to be designated, potentially resulting in a decreased mileage of routes within WSA boundaries. This would maintain or enhance existing wilderness characteristics within WSAs.

Impacts from Management Specific to Alternative V

Alternative V would close inventoried ways to motorized vehicle use. This would maintain or enhance existing wilderness characteristics within the WSA lands.

Summary of Direct and Indirect Impacts

Overall, Alternatives IV and V would result in the least impact to wilderness characteristics on lands within WSAs, followed by Alternatives I, III, the No Action Alternative, and then Alternative II. Alternative II would have the lowest level of indirect management for wilderness values and thus would allow the greatest opportunity for impact if the WSAs are released. Table 4- 359 summarizes impacts to wilderness characteristics within WSAs.

Table 4- 359. Acres of Released WSA Lands with Management that Maintains Wilderness Characteristics

Maintenance of Wilderness Characteristics	Alternative					
	No Action	I	II	III	IV	V
Directly Maintained [A]	0	0	0	0	94,000	94,000
Indirectly Maintained [A]	55,000	78,000	17,000	63,000	94,000	88,000

[A] Changes due to management prescribed in the RMP; legislation releasing the WSA may prescribe management with different impacts.

Impacts from the No Action Alternative

Because WSAs would continue to be managed under the IMP, wilderness characteristics in WSAs would continue to be maintained or enhanced. Limiting motorized and mechanized transportation to the inventoried ways in the No Action Alternative is intended to minimize impacts to the wilderness characteristics and is consistent with the IMP. This has been mostly effective, but due to the use of large-scale maps during the initial delineation of these inventoried ways, some extensions of the inventoried ways and use of non-inventoried ways has occurred, promoting decreases in naturalness at these locations.

If WSA lands were to be released, the No Action Alternative would allow for range infrastructure that would most likely decrease the existing wilderness characteristics. Construction of fences, pipelines and reservoirs, removal of brush, prescribed burning, and seedings would alter the degree of naturalness present in these locations. Other management strategies would apply where ACECs, WSRs, and SRMAs are designated. This additional management would provide indirect protection of wilderness characteristics on 58% of the existing WSA lands.

Management under the No Action Alternative would result in moderate adverse impacts to wilderness characteristics on lands released from WSA management.

Impacts from Alternative I

Because WSAs would continue to be managed under the IMP, wilderness characteristics in WSAs would continue to be maintained or enhanced. Individual designation of inventoried ways in the CTTMP as proposed in Alternative I would allow for better definition of existing placement, ending points, and intended destinations. In some instances, ways may not be designated. This would close a particular way to motorized and mechanized travel, maintaining or enhancing the wilderness characteristics in that area.

Alternative I would manage released lands in accordance with associated legislation or direction for adjacent non-wilderness lands. Potential decreases in wilderness characteristics would be possible if protective management is not otherwise specified by Congress for these released lands. However, other management associated with overlying designations such as ACECs, WSRs, and SRMAs would provide indirect management for wilderness characteristics on 83% of the existing WSA lands.

Management under Alternative I would result in moderate adverse impacts to wilderness characteristics on lands released from WSA management.

Impacts from Alternative II

The impacts to wilderness characteristics within WSAs from Alternative II would be similar to Alternative I. However, in Alternative II, additional management as WSR or SRMA would provide indirect management for wilderness characteristics on 18% of the existing WSA lands. Management under Alternative II would have major adverse impacts to wilderness characteristics on lands released from WSA management.

Impacts from Alternative III

The impacts to wilderness characteristics within WSAs from Alternative III are similar to Alternative I. However, in Alternative III, additional management as ACEC, WSR, or SRMA would provide indirect management for wilderness characteristics on 67% of the existing WSA lands. Management under Alternative III would result in moderate adverse impacts to wilderness characteristics on lands released from WSA management.

Impacts from Alternative IV (the Preferred Alternative)

The impacts to wilderness characteristics within WSAs from Alternative IV would be similar to Alternative I with respect to these areas' current status as WSAs. However, the impacts to wilderness characteristics in released WSAs would differ. Alternative IV would manage released lands according to management specified for non-WSA lands with wilderness characteristics, affording the highest level of management among the alternatives for the existing naturalness and opportunities for solitude and primitive, unconfined recreation. This management strategy would be in addition to indirect management of wilderness characteristics from designations such as ACECs, WSRs, and SRMAs that comprise nearly all

WSA acres. Combined, the direct and indirect management for wilderness characteristics in Alternative IV would include 100% of the existing WSA acres.

Management under Alternative IV would result in no impact to wilderness characteristics on lands released from WSA management.

Impacts from Alternatives V

Because WSAs would continue to be managed under the IMP, wilderness characteristics in WSAs would generally continue to be maintained or enhanced. Alternative V would also close to motorized vehicle use all 27 miles of inventoried ways within WSAs. This would maintain and enhance existing wilderness characteristics in those areas.

Similar to Alternative IV, Alternative V would manage released lands according to management specified for non-WSA lands with wilderness characteristics, affording the highest level of management among alternatives for the existing naturalness and opportunities for solitude and primitive, unconfined recreation. This management strategy would be in addition to indirect management of wilderness characteristics from designations such as ACECs, WSRs, and SRMAs that comprise 94% of WSA acres. Combined, the direct and indirect management for wilderness characteristics in Alternative IV would include 100% of the existing WSA acres.

Management under Alternative V would result in no impact to wilderness characteristics on lands released from WSA management.

Cumulative Impacts

Past, Present, and Reasonably Foreseeable Actions

The cumulative impact analysis considers impacts to WSA lands and non-WSA lands with wilderness characteristics within and adjacent to the planning area, Forest Service Inventoried Roadless Areas adjacent to and near the planning area, and the designated Jarbidge Wilderness of the Humboldt-Toiyabe National Forest (Table 4- 360). This is a general representation of the current regional area inventoried to have wilderness characteristics from the perspective of the users that would typically benefit from resources or uses within the planning area.

Past, present, and reasonably foreseeable actions for the following resource cumulatively affects wilderness characteristics:

- Wilderness Characteristics

These actions are described in detail in the *Introduction* to this chapter. Of the 406,000 acres with wilderness characteristics within this region, 87% are currently managed to maintain or enhance their wilderness characteristics. The remaining 13% represent the non-WSA lands with wilderness characteristics within the planning area, and may or may not be recognized for management of those characteristics depending upon alternative.

If WSA lands are released from wilderness study, Congress has the authority to prescribe management that applies to the released lands. This management could further protect or enhance these lands, or remove protective management altogether; however, the extent or existence of these management prescriptions cannot be anticipated. For the purpose of the cumulative impact analysis, the following assumptions were made:

- Congress would act upon WSAs in whole.
- Release language from Congress would remove identified WSAs from management under the IMP and return this land into multiple-use management according to the existing land use plan (Section 202 of FLPMA).
- Portions of the WSAs within the Bruneau FO (80,000 acres) would also be released to multiple-use management and would not be managed for their wilderness characteristics.
- Portions of the WSA within the Burley FO (2,000 acres) would continue to have indirect management for wilderness characteristics as part of the Salmon Falls Creek ACEC.

Table 4- 360. Lands Inventoried to Have Wilderness Characteristics within the Region

Agency	Designation	Name	Acres	% of Region with Wilderness Characteristics
BLM – Bruneau, Burley, and Jarbidge Field Offices	Wilderness Study Areas [A]	Jarbidge River WSA	71,000[B]	18
		Bruneau River-Sheep Creek WSA	101,000[C]	25
		Lower Salmon Falls Creek WSA	3,000[D]	1
	Non-WSA lands with wilderness characteristics	Black Canyon	8,000	2
		Columbet Table	4,000	1
		Corral Creek	6,000	1
		East Fork Jarbidge	6,000	2
		Hole in the Ground	7,000	2
		Long Draw	17,000	4
		Salmon Falls Creek	5,000	1
USFS – Humboldt Toiyabe National Forest	Designated Wilderness [A]	Jarbidge Wilderness	160,000	39
	Inventoried Roadless Areas	Biroth Ridge	5,000	1
		Elk Mountain	9,000	2
		Wilson Creek	5,000	1
		Total	**407,000**	**100**

[A] These lands are currently being managed specifically to maintain the wilderness characteristics.
[B] 7,000 acres of the Jarbidge River WSA are part of the Bruneau FO.
[C] 73,000 acres of the Bruneau River-Sheep Creek WSA are part of the Bruneau FO.
[D] 2,000 acres of the Lower Salmon Falls Creek WSA are part of the Burley FO.

A CTTMP will be completed within five years of the signing of the ROD. This will address all forms of travel across the planning area, including travel within WSA boundaries. Variations for management of inventoried ways are proposed across the alternatives, but are not anticipated to have an appreciable impact on wilderness characteristics regionally and therefore have been excluded from the cumulative impacts analysis.

Summary of Cumulative Impacts

Table 4- 361 and Table 4- 362 display the cumulative impacts on wilderness characteristics of the management proposed within the alternatives. Table 4- 361 displays the areas that would be managed for wilderness characteristics until Congress acts on the WSAs, while Table 4- 362 displays the areas that would be managed for wilderness characteristics if Congress releases all WSAs to be managed under the direction provided in this management plan. The cumulative impacts to regional wilderness characteristics relative to the planning area vary across the alternatives mostly due to the varying management of non-WSA lands with wilderness characteristics (Table 4- 361); the impacts change considerably when Congressional release of WSA lands is considered (Table 4- 362).

Cumulative Impacts from the No Action Alternative

WSAs managed in whole or part by the Jarbidge FO comprise 43% of the regional land with wilderness character and will continue to be managed in accordance with the IMP for lands under wilderness review. The absence of any direct management of non-WSA lands with wilderness characteristics in the No Action Alternative accounts for the expected decrease in regional land upon which naturalness, and opportunities for solitude and primitive, unconfined recreation occur. Under the No Action Alternative, 87% of the regional land recognized with wilderness characteristics would be managed to maintain or enhance these values, which along with Alternatives II and III represent the highest potential impact to wilderness characteristics in the region.

Table 4- 361. Areas Managed for Wilderness Characteristics Prior to Congressional Action on WSAs in the Region (Acres)

Name	Alternative					
	No Action	I	II	III	IV	V
Jarbidge River WSA	71,000	71,000	71,000	71,000	71,000	71,000
Bruneau River-Sheep Creek WSA	101,000	101,000	101,000	101,000	101,000	101,000
Lower Salmon Falls Creek WSA	3,000	3,000	3,000	3,000	3,000	3,000
Black Canyon	0	0	0	0	8,000	8,000
Columbet Table	0	4,000	0	0	4,000	4,000
Corral Creek	0	0	0	0	6,000	6,000
East Fork Jarbidge	0	6,000	0	0	6,000	6,000
Hole in the Ground	0	7,000	0	0	7,000	7,000
Long Draw	0	17,000	0	0	17,000	17,000
Salmon Falls Creek	0	0	0	0	5,000	5,000
Jarbidge Wilderness (FS)	160,000	160,000	160,000	160,000	160,000	160,000
Biroth Ridge IRA (FS)	5,000	5,000	5,000	5,000	5,000	5,000
Elk Mountain IRA (FS)	9,000	9,000	9,000	9,000	9,000	9,000
Wilson Creek IRA (FS)	5,000	5,000	5,000	5,000	5,000	5,000
Total	**354,000**	**388,000**	**354,000**	**354,000**	**407,000**	**407,000**

Table 4- 362. Areas Expected to Maintain or Enhance Wilderness Characteristics if WSAs are Released by Congress in the Region (Acres)

Name	Alternative					
	No Action	I	II	III	IV	V
Jarbidge River WSA	33,000	55,000	9,000	46,000	64,000	64,000
Bruneau River-Sheep Creek WSA	20,000	21,000	6,000	14,000	28,000	28,000
Lower Salmon Falls Creek WSA	3,000	3,000	3,000	3,000	3,000	3,000
Black Canyon	0	0	0	0	8,000	8,000
Columbet Table	0	4,000	0	0	4,000	4,000
Corral Creek	0	0	0	0	6,000	6,000
East Fork Jarbidge	0	6,000	0	0	6,000	6,000
Hole in the Ground	0	7,000	0	0	7,000	7,000
Long Draw	0	17,000	0	0	17,000	17,000
Salmon Falls Creek	0	0	0	0	5,000	5,000
Jarbidge Wilderness (FS)	160,000	160,000	160,000	160,000	160,000	160,000
Biroth Ridge IRA (FS)	5,000	5,000	5,000	5,000	5,000	5,000
Elk Mountain IRA (FS)	9,000	9,000	9,000	9,000	9,000	9,000
Wilson Creek IRA (FS)	5,000	5,000	5,000	5,000	5,000	5,000
Total	**235,000**	**292,000**	**197,000**	**242,000**	**327,000**	**327,000**

If WSA lands are released from study status and returned to management as specified by the current land use plans, portions of these lands would be subject to management as prescribed by other existing designations such as ACECs, WSRs, and SRMAs. Management specific to these designations is expected to indirectly maintain or enhance some or all of the wilderness characteristics. In the No Action Alternative, these intersecting designations would result in direct or indirect management for wilderness characteristics on 58% of lands with these characteristics within the region. This would be more than in Alternative II, but less than in Alternatives I, III, IV, and V.

Cumulative Impacts from Alternative I

As in the No Action Alternative, Alternative I would continue to manage WSAs according to the IMP; Alternative I would also manage four areas of non-WSA lands with wilderness characteristics to maintain their wilderness character. Including these four areas, 95% of the land with wilderness characteristics in the region would be managed to maintain or enhance these values.

If WSA lands are released from study status and returned to management as specified by the current land use plans, overlapping ACEC, WSR, and SRMA designations would result in direct or indirect management for wilderness characteristics on 72% of lands with these characteristics within the region. This would be more than in Alternatives I, II, and III, but less than in Alternatives IV and V.

Cumulative Impacts from Alternative II

As in the No Action Alternative, Alternative II would continue to manage WSAs according to the IMP, but would not manage non-WSA lands with wilderness characteristics to maintain their wilderness character. The impacts relative to this decision would be identical to the No Action Alternative, resulting in 87% of the regional land recognized with wilderness characteristics being managed to maintain or enhance these values.

If WSA lands are released from study status and returned to management as specified by the current land use plans, overlapping ACEC, WSR, and SRMA designations would result in direct or indirect management for wilderness characteristics on 48% of lands with these characteristics within the region. Compared to all the alternatives, this would be the lowest proportion of the regional area to be managed for wilderness characteristics.

Cumulative Impacts from Alternative III

As in the No Action Alternative and Alternative II, Alternative III would continue to manage WSAs according to the IMP, but would not manage non-WSA lands with wilderness characteristics to maintain their wilderness character. The impacts relative to this decision would be identical to the No Action Alternative and Alternative II, resulting in 87% of the regional land recognized with wilderness characteristics being managed to maintain or enhance these values.

If WSA lands are released from study status and returned to management as specified by the current land use plans, overlapping ACEC, WSR, and SRMA designations would result in direct or indirect management for wilderness characteristics on 60% of lands with these characteristics within the region. This would be more than in the No Action Alternative and Alternative II, but less than in Alternatives I, IV and V.

Cumulative Impacts from Alternative IV (the Preferred Alternative)

As in the No Action Alternative, Alternative I would continue to manage WSAs according to the IMP; Alternative IV would also manage seven areas of non-WSA lands with wilderness characteristics to maintain their wilderness character. Including these seven areas, 100% of the land with wilderness characteristics in the region would be managed to maintain or enhance these values.

Alternative IV specifies that lands released from WSA management would be managed for their wilderness characteristics according to the *Non-WSA Lands with Wilderness Characteristics* section of Chapter 2, unless otherwise specified by Congress. This would afford the highest degree of protection for the naturalness and opportunities for solitude and primitive, unconfined recreation on existing WSA lands. The regional area being managed for wilderness characteristics would decrease to 80%, but only due to the released WSAs outside the planning area being managed for multiple use rather than for wilderness characteristics.

Cumulative Impacts from Alternative V

The cumulative impacts for Alternative V would be identical to those described for Alternative IV.

4.6. SOCIAL AND ECONOMIC FEATURES

4.6.1. Social Conditions

Analysis Methods

Indicators

The following indicator was used for the analysis of impacts to social conditions:

- **Quality of life –** Quality of life is a subjective assessment of the general well-being of individuals and societies. In general, quality of life includes economic measures such as wealth and employment in addition to the built environment, physical and mental health, education, recreation and leisure time, and social belonging (Gregory, et al., 2009). Because data is not available on an individual level, the analysis will focus on a community quality of life. A community's quality of life "is constructed of the shared characteristics residents experience in places… and the subjective evaluations residents make of those conditions" (Myers, 1987). For this analysis, communities are described in terms of stakeholder groups. These groups are perceived to have similar experiences and values that will lead them to react similarly to land management decisions.

Methods and Assumptions

Impacts to social conditions from management in the following sections of Chapter 2 were analyzed in detail: *Livestock Grazing*, *Recreation*, *Transportation and Travel*, and *Land Use Authorizations*. Management from the remaining sections was excluded from detailed analysis because either the management did not affect stakeholder quality of life or the relationship between the management and quality of life could not be reliably characterized.

Because it is impossible to describe changes in quality of life for every individual invested in the planning area, individuals were grouped into several key stakeholder groups described in the *Social Conditions* section of Chapter 3. Individuals within connected stakeholder groups were assumed to experience the same change in quality of life based on actions in the sections identified above.

It was assumed disconnected stakeholder groups would be affected in the same proportion that their individual values or group missions and charters coincide or depart from the various objectives described in Chapter 2. Impacts to the quality of life of disconnected stakeholders are not analyzed in further detail in this section. To the extent these individuals or groups are physically associated with the planning area their use is reflected in the connected stakeholder group most closely reflecting their use of the Jarbidge planning area.

Ranchers

Ranchers are assumed to derive quality of life from their ability to earn a living through ranching (economic measures) and its associated way of life (physical and mental health, recreation and leisure time, and social belonging). Scoping comments submitted by ranchers revealed they use the planning area for scientific, educational, spiritual, aesthetic, and recreational purposes. The identities and ways of life of ranchers in the planning area are deeply connected with these lands, and they take great pride in the care that they and their ancestors have devoted to these lands (Evans, 2008).

Local (Non-Ranching) Residents

In 2001, 40.2% of Idahoans reported they were highly satisfied with their quality of life in Idaho (Gonzales, 2002). "Residents frequently perceive a shared interest in the fate of their community, because the attributes forming the local quality of life constitute a collective good contributing to the quality of their lives" (Myers, 1987). The quality of life for local residents can be tied to the economic viability of their community. In particular, measures associated with jobs have been weighted highly by local residents (Myers, 1987). If livestock grazing, recreation, or land use authorization actions increase the economic viability of the community, particularly as it is associated with jobs, is it assumed the quality of life will increase for those local residents. In addition, recreational opportunities can be included as a measure of community quality of life (Myers, 1987). As recreational opportunities increase, the quality of life for local residents is anticipated to increase.

Recreators

Recreation is a popular use of the planning area. The activities recreation stakeholders participate in are described in the *Recreation* section of Chapter 3. The quality of life for recreators (recreation and leisure time) would increase as the quality of their recreational experience increases. A quality recreation experience is a result of the availability of the desired activity and the setting in which that activity occurs. This is specific to the type of recreator and must be discussed separately as actions that increase the quality of life for one recreator may decrease the quality of life for another recreator.

Dispersed Recreators

The recreational experience for a dispersed recreator would increase as the number of opportunities to participate in hiking, camping, or another type of dispersed recreation increases. Setting is particularly important for dispersed recreators as they are often looking for an experience in a naturally-appearing landscape that does not contain roads, facilities, or evidence of use. Dispersed recreators often travel alone or in small group sizes. For dispersed recreators in the planning area, the most important characteristic of a quality experience is the ability to participate in their preferred activity while having few contacts with other groups.

Motorized Recreators

Motorized recreators in the planning area are more difficult to classify as there are several subgroups. One subgroup, recreational riders, can be characterized as driving for pleasure. This stakeholder group is looking for an experience similar to that of dispersed recreators where they can experience the natural landscape of the planning area with few contacts with other groups. These recreators may or may not want the ability to travel cross-county.

The second subgroup, play riders, is seeking the ability to challenge their riding skills and test the ability of their machine through activities such as hill climbing and racing. This group is less concerned with participating in motorized recreation in a naturally-appearing landscape or the number of contacts with other recreators. They are interesting in riding their vehicle, despite surrounding conditions.

Hunters and Fishermen

"The universal value of the need for escape (relaxation and change) and for nature (natural and wild settings) are the primary motivations for hunters and fishermen (Sanyal, et al., 2007). The most important motivation for mule deer hunters in the IDFG Magic Valley Region is "doing something with family," followed by "being with friends" and "developing close friendships" (Sanyal, et al., 2007).

In a 2008 survey conducted by Responsive Management and the National Shooting Sports Foundation, Idaho hunters identified four factors important when choosing lands on which to hunt: the land is not crowded with other sportsmen, the land is public land, the land is easy to access by foot, and the land is familiar to them (Responsive Management & National Shooting Sports Foundation, 2009). When asked in an open-ended question if any other factors where important in their decision-making process, hunters commonly mentioned a good game population and land without predator problems (Responsive Management & National Shooting Sports Foundation, 2009). A survey of mule deer hunters in the Magic Valley Region identified access to public lands and areas with the greatest chance of mule deer harvest as the most important influences on selecting a hunting area (Sanyal, et al., 2007). The most important attributes for a quality hunting experience are being close to nature, bringing back memories, viewing scenery, seeing a deer in a natural setting, and doing something with family (Sanyal, et al., 2007). Preserving these qualities would maintain or increase the quality of life for hunters in the planning area.

While river recreation is an important recreational opportunity in the planning area, none of the alternatives would alter the recreational experience to the degree it would impact river recreators' quality of life.

Direct and Indirect Impacts

Impacts from Livestock Grazing Action

Two indicators of impacts to livestock grazing are expected to impact the quality of life for planning area stakeholders: availability of forage for livestock grazing and effort needed to reduce resource and use conflicts. Table 4- 363 ranks each of the alternatives using the livestock grazing indicators.

Table 4- 363. Comparison of Alternative by Livestock Grazing Indicators

Livestock Grazing Indicators	Alternative						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
AUMs at Full Plan Implementation (1=most, 7=least)	4	3	1	2	6	5	7
Effort (1=least, 6=most)	2	2	1	3	5	4	6

Livestock grazing actions affect each of the stakeholder groups differently. Ranchers are expected to experience an increase in quality of life because an increase in forage allocated to livestock grazing because it would affect economic measures by allowing the rancher to become more profitable and possibly allowing their family to continue the ranching tradition. Every rancher interviewed for the analysis had family members who would want to become ranchers if it were economically feasible (Evans, 2008), but it is assumed that it would require more forage allocation to support an additional rancher than current levels. It is assumed for the purposes of this analysis that a change of 10,000 AUMs beyond the baseline AUM range in the No Action Alternative would change the size of the rancher stakeholder group by one. AUMs used for this analysis are the number of AUMs that would be available for livestock based on the vegetation allocation, the areas available for livestock grazing, and the vegetation treatment objectives for each alternative, combined with the 2006 vegetation production data. These AUM estimates are discussed in more detail in the *Livestock Grazing* section. Additionally, the amount of effort required for livestock grazing management to reduce resource and use conflicts also impacts ranchers' quality of life. The more effort expended by a rancher on livestock management, the less time that rancher has to spend on recreation and leisure activities. For Table 4- 363, the closer the alternative ranks to 1, the more a rancher's quality of life is expected in increase. The *Livestock Grazing* and *Economic Conditions* sections contain further discussion of these indicators and their impacts.

As forage availability increases, the quality of life for local communities may increase because individual ranchers will have more money to infuse into the local economy, influencing economic measures such as output, employment, and income (see the *Economic Conditions* section).

Livestock grazing actions are not expected to impact the quality of life of recreators.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative is unlikely to change economic measures influencing quality of life for ranchers as the amount of forage allocated to livestock grazing in unlikely to change significantly. This would result in little change to the economic measures of output, employment, and income. The amount of effort required to reduce resource and resource use conflicts is also unlikely to change, resulting in no change to recreation or leisure time for ranchers.

The quality of life for local (non-ranching) residents is unlikely to change as the economic measures of output, employment, and income are unlikely to change under the No Action Alternative.

Impacts from Management Specific to Alternative I

Alternative I would result in an increase in quality of life for ranchers due to an improvement in economic measures as a result of increased output, employment, and income. The amount of effort required to reduce resource and resource use conflicts is unlikely to change, resulting in no change to recreation or leisure time for ranchers.

The quality of life for local (non-ranching) residents would increase as the economic measures of output, employment, and income would increase under Alternative I.

Impacts from Management Specific to Alternative II

Alternative II would result in a larger increase in the quality of life of ranchers than any other alternative. More forage would be allocated to livestock grazing, increasing the economic measures of output, employment, and income. Less effort would be required to reduce resource and resource use conflicts, allowing ranchers more time to participate in recreation and leisure time.

The quality of life for local (non-ranching) residents would increase as the economic measures of output, employment, and income would increase under Alternative II.

Impacts from Management Specific to Alternative III

Alternative III would result in an increase in quality of life for ranchers due to an improvement in economic measures as a result of increased output, employment, and income. More effort would be required to reduce resource and resource use conflicts, resulting in less time available for recreation and leisure activities.

The quality of life for local (non-ranching) residents would increase as the economic measures of output, employment, and income would increase under Alternative III.

Impacts from Management Specific to Alternative IV

Alternative IV would result in a decrease in quality of life for ranchers due to a decline in economic measures as a result of decreased output, employment, and income. More effort would be required to reduce resource and resource use conflicts, resulting in less time available for recreation and leisure activities.

The quality of life for local (non-ranching) residents would decrease as the economic measures of output, employment, and income would decrease under Alternative IV.

Impacts from Management Specific to Alternative V

Alternative V would result in a larger decrease in the quality of life of ranchers than any other alternatives. Less forage would be allocated to livestock grazing, decreasing the economic measures of output, employment, and income. More effort would be required to reduce resource and resource use conflicts, resulting is less time available for recreation and leisure activities.

The quality of life for local (non-ranching) residents would decrease as the economic measures of output, employment, and income would decrease under Alternative V.

Impacts from Recreation Actions

Continuing population growth in the surrounding region is anticipated to increase demand for recreation opportunities in the planning area, ultimately increasing visitor use numbers, and potentially increasing tourism revenue in the region (see the *Economic Conditions* section). Management actions from recreation actions would benefit the quality of life of local (non-ranching) residents if those actions resulted in an increase in tourism dollars to the local communities. An increase in recreational opportunities would also increase the quality of life for local (non-ranching) residents. Table 4- 364 displays the change in the number of recreation opportunities by alternative.

Table 4- 364. Change in the Number of Acres Managed for Recreation Opportunities by Alternative

Indicator	Alternative					
	No Action	I	II	III	IV	V
Change in Number of Acres Managed for Recreation Opportunities	No change	Increase	No Change	Increase	Increase	Decrease

Recreation management actions would influence the number, types, and quality of recreation opportunities available for various recreation stakeholder groups. Table 4- 365 identifies the number of acres in SRMAs that would provide targeted management for the activities of the different recreation stakeholder groups. It is assumed that as the number of acres managed for the activities a particular recreation stakeholder group participates in increases, the quality of the recreation experience, and thus quality of life, for the stakeholder group would increase.

Table 4- 365. Acres with SRMA Management Benefiting Recreation Stakeholders

Recreation Stakeholder Group	Alternative					
	No Action	I	II	III	IV	V
Dispersed	77,000	300,500	16,000	16,500	165,000	16,000
Recreational Riders	0	36,500	5,000	34,500	34,500	0
Play Riders	2,700	4,500	0	4,500	4,500	3,000
Hunters and Fishermen	121,000	305,030	21,030	21,030	170,000	16,000

Management actions proposed for recreation are not anticipated to impact the quality of life of ranchers or populations that support or oppose grazing. If these individuals also participate in recreational activities, impacts to their quality of life are addressed as impacts to the recreation stakeholder group.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative does not contain management aimed at promoting additional recreational opportunities in the planning area. Local communities would be expected to see an increase in tourism dollars between 0% and 5% as a result of population increase. This would result in a small increase in the economic measure of employment and income, which could result in an increase of quality of life in the community. Quality of life due to the number of recreation opportunities available would not change.

The No Action Alternative serves as the baseline condition for recreational activities in the planning area. Continued management under the No Action Alternative would not change the quality of life for recreators.

Impacts from Management Specific to Alternative I

Due to the amount of active recreation management under Alternative I, recreation use in the planning area is expected to increase by 5% to 10%. This would result in a small increase in the economic measure of employment and income. This could result in an increase in spending in local communities and an increase in their quality of life. Quality of life for local (non-ranching) residents could also be increased as the number of recreation opportunities is expected to increase.

Alternative I nearly quadruples the number of acres managed for dispersed recreational experiences. This is expected to increase the quality of life for dispersed recreators. Unlike the No Action Alternative, Alternative I would manage acres for recreational riders, increasing their quality of life. The number of acres managed for play riders would increase compared to the No Action Alternative, increasing their quality of life. The number of acres managed for hunting and fishing is two and a half times larger than under the No Action Alternative, increasing the quality of life for hunters and fishermen.

Impacts from Management Specific to Alternative II

Active management of recreation under Alternative II is expected to increase recreational use of the planning area by up to 5%. This would result in a small increase in the economic measure of employment and income. This could result in an increase in spending in local communities and an increase in their quality of life. Quality of life due to the number of recreation opportunities available would not change.

Under Alternative II, dispersed recreators and hunters and fishermen are expected to experience a decrease in their quality of life due to fewer acres managed for those activities compared to the No Action Alternative. The number of acres managed for recreational riders would increase compared to the No Action Alternative, resulting in an expected increase in quality of life that subgroup; however, no acres would be managed for play riders, decreasing their quality of life.

Impacts from Management Specific to Alternative III

Due to the amount of active recreation management under Alternative III, recreation use in the planning area is expected to increase by 5% to 10%. This would result in a small increase in the economic measure of employment and income. This could result in an increase in spending in local communities and an increase in their quality of life. Quality of life for local (non-ranching) residents could also be increased as the number of managed recreation opportunities is expected to increase.

Under Alternative III, dispersed recreators and hunters and fishermen are expected to experience a decrease in their quality of life due to fewer acres managed for those activities compared to the No Action Alternative. Unlike the No Action Alternative, Alternative III would manage acres for recreational riders, increasing their quality of life. The number of acres managed for play riders would increase compared to the No Action Alternative, increasing their quality of life.

Impacts from Management Specific to Alternative IV

Active management of recreation under Alternative IV is expected to increase recreational use of the planning area by 5% to 10%. This would result in a small increase in the economic measure of employment and income. This could result in an increase in spending in local communities and an increase in their quality of life. Quality of life for local (non-ranching) residents could also be increased as the number of managed recreation opportunities is expected to increase.

Alternative IV would have more than double the number of acres managed for dispersed recreational experiences. This is expected to increase the quality of life for dispersed recreators Unlike the No Action Alternative, Alternative IV would manage acres for recreational riders, increasing their quality of life. The number of acres managed for play riders would increase compared to the No Action Alternative, increasing their quality of life. The number of acres managed for hunting and fishing is one and a half times larger than under the No Action Alternative, increasing the quality of life for hunters and fishermen.

Impacts from Management Specific to Alternative V

Because Alternative V proposes less active management of recreation, recreational use of the planning area is expected to decrease by 5% to 10%. This would result in a small decrease in the economic measure of employment and income, which could result in less spending in local communities and a decrease in their quality of life. The number of managed recreational opportunities is expected to decrease under Alternative V. This would result in a decrease in quality of life for local (non-ranching) residents.

Under Alternative V, dispersed recreators and hunters and fishermen are expected to experience a decrease in their quality of life due to fewer acres managed for those activities compared to the No Action Alternative. As in the No Action Alternative, no acres would be managed for recreational riders resulting in no change to their quality of life. The number of acres managed for play riders would be similar compared to the No Action Alternative, resulting in a slight expected increase in quality of life.

Impacts from Transportation and Travel Actions

During scoping, ranchers expressed the desire to conduct livestock management activities, such as placing salt and supplements, repairing fences, and seeing to injured livestock, through the use of motorized vehicles. Areas closed to motorized vehicle use may require increased effort to minimize conflicts between livestock grazing and resources or resource uses because permittees may have to access these areas on foot or horse, unless otherwise authorized (see the *Livestock Grazing* section).

This would decrease the amount of time permittees have for recreation or leisure activities. In addition, some TMAs focus on facilitating livestock grazing management (Table 4- 366). It is assumed that more acres in a TMA with this focus would lead to an increased quality of life for ranchers.

Table 4- 366. TMA Focus by Alternative

TMA Focus	Alternative [A]				
	I	II	III	IV	V
Livestock Grazing	667,000	213,000	0	0	0
Dispersed Recreation	350,000	0	0	213,000	0
Motorized Recreation [B]	41,000	0	34,000	34,000	3,000
Hunting [C]	350,000	0	0	416,000	0

[A] TMAs were not identified in the No Action Alternative.
[B] This included acres managed for both motorized subgroups.
[C] TMAs with a focus on big game habitat were assumed to benefit hunting.

Transportation and travel is directly related to access issues. In order to participate in recreational activities, the recreator must have access to the desired location. Because access can be achieved through hiking, horse riding, biking, and motorized vehicles, different recreation stakeholder groups place different values on motorized access. Motorized access may not be as important for dispersed recreators as increased access often leads to increased use. As dispersed recreators are looking for a solitary experience, they may appreciate the lack of access to their desired location. However, the quality of the recreation experience for certain subgroups of motorized recreators increases with more access because it allows them to participate in their chosen activity in more locations. However, large increases could lead to problems with crowding and lower satisfaction of motorized recreators using the planning area. Crowding could also occur if opportunities for motorized recreational use are reduced in the planning area or other recreation areas such as Forest Service lands and State parks.

Access is an important issue to hunters and fishermen. “Research indicates that difficulty with access to lands for hunting has become a constraint to recruiting and retaining sportsmen” (Responsive Management & National Shooting Sports Foundation, 2009). When ask whether lack of access had caused hunters not to hunt a particular species as much as they would have liked in the past 5 years, 44% of hunters agreed that it had done so. Nearly 20% of hunters identified “Not having [all-terrain vehicle] ATV access in general” and “Not being able to retrieve their harvest because of ATV restrictions” as access problems. Road closures were listed among the top four access-related problems (Responsive Management & National Shooting Sports Foundation, 2009). However, a survey of mule deer hunters in the Magic Valley Region revealed the most frequent travel mode was foot, followed by car or truck; however, 46% of respondents owned an ATV or trail bike (Sanyal, et al., 2007). The most important reasons for using an ATV or trail bike while hunter were to retrieve big game or hunt with others who use ATVs (Sanyal, et al., 2007). When asked about their response to expanded ATV or trail bike restrictions, most mule deer hunters were fairly to extremely likely to hunt in Idaho and fairly likely to hunt without an ATV or trail bike (Sanyal, et al., 2007). For this analysis, it is assumed that a decrease in access will result in a slight decrease in quality of life for hunters. Because none of the alternatives would prohibit access to important fishing areas in the planning area, fishermen were not included in the analysis.

Because recreators within the same stakeholder group may have different values on motorized access, focus of TMAs was used to determine the impact of transportation and travel management actions on the recreator stakeholder groups. It was assumed that a management focus on the specific recreation activity would result in access that would be acceptable to the stakeholder group. The number of acres with a TMA focus on motorized recreation, dispersed recreation, and hunting are identified in Table 4- 366.

Impacts from transportation and travel actions are not anticipated to impact the quality of life for local (non-ranching) residents or the populations supporting or opposing livestock grazing.

Impacts from Management Specific to the No Action Alternative

Travel designations in the No Action Alternative would result in minimal additional effort to reduce livestock grazing conflicts with resources and uses, resulting in no change in quality of life and the time available for ranchers to participate in recreation and leisure activities. There are no TMAs focusing on livestock grazing management in the No Action Alternative, further resulting in no change to the quality of life of ranchers.

Transportation and travel management is unlikely to change the quality of life for recreators under the No Action Alternative because there are no TMAs to focus travel management on recreational activities.

Impacts from Management Specific to Alternative I

Travel designations in Alternative I would increase the amount of effort needed to reduce livestock grazing conflicts with resources and uses, resulting in a decrease in the quality of life of ranchers due to less time available to participate in recreation and leisure activities. However, 667,000 acres would have a TMA focus on livestock grazing management. This would somewhat moderate the decrease in quality of life.

Under Alternative I, 350,000 acres would have a TMA focus on dispersed recreation and hunting. This would increase the quality of life of these stakeholder groups. Alternative I includes 41,000 acres in a TMA focusing on motorized recreation. While motorized recreators may experience some decrease in quality of life due to having less areas open to cross-country motorized vehicle use than under the No Action Alternative, more acres would be managed for their specific recreation activity.

Overall, Alternative I has more acres managed for activities affecting the stakeholder groups than any other alternative.

Impacts from Management Specific to Alternative II

Travel designations in Alternative II would not impact livestock grazing (see the *Livestock Grazing* section), resulting in little change in the quality of life and the time available for ranchers to participate in recreation and leisure activities. However, 2130,000 acres would be managed with a focus on livestock grazing management. This could result in a slight increase in the quality of life of ranchers.

Under Alternative II, none of the TMAs would focus on dispersed recreation, motorized recreation, or hunting. This would result in no change to the quality of life of these stakeholder groups.

Impacts from Management Specific to Alternative III

Travel designations in Alternative III would require increased effort to reduce conflicts between livestock grazing and resources and resource uses in the short term, but could reduce effort in the long term (see the *Livestock Grazing* section), resulting in a long-term increase in quality of life due to more time available for ranchers to participate in recreation and leisure activities. None of the TMAs in Alternative III have a focus on livestock grazing management, resulting in no additional impact on quality of life for ranchers.

Under Alternative III, 34,000 acres would be managed with a TMA focus on motorized recreation. While this is less than under Alternative I, it still provides more focused management than under the No Action Alternative, resulting in an increase in the quality of life for motorized recreators. Alternative III does not have TMAs focusing on dispersed recreation or hunting, resulting in no change in the quality of life for these stakeholder groups.

Impacts from Management Specific to Alternative IV

Travel designations in Alternative IV would require more effort to reduce conflicts between livestock grazing and resources and resource uses (see the *Livestock Grazing* section), resulting in a decrease in the quality of life for ranchers due to less time to participate in recreation and leisure activities. In addition, no TMAs are managed with a focus on livestock grazing management.

Under Alternative IV, 213,000 acres would be managed with a TMA focus on dispersed recreation, 34,000 acres with a focus on motorized recreation, and 416,000 acres with a focus on hunting. While these acres are smaller than under Alternative I, overall, they would still result in an increase in the quality of life of these stakeholder groups.

Impacts from Management Specific to Alternative V

Travel designations in Alternative V would require more effort to reduce conflicts between livestock grazing and resources and resource uses (see the *Livestock Grazing* section), resulting in a decrease in the quality of life for ranchers due to less time to participate in recreation and leisure activities. In addition, no TMAs are management with a focus on livestock grazing management.

Under Alternative V, 3,000 acres would be managed with a TMA focus on motorized recreation. This would provide only a slight increase in the quality of life for motorized recreators, one that may be eliminated by the reduction in areas open to cross-country motorized vehicle use. Alternative V does not have TMAs focusing on dispersed recreation or hunting, resulting in no change in the quality of life for these stakeholder groups.

Impacts from Land Use Authorizations Actions

As discussed under *Impacts from Land Use Authorizations* in the *Livestock Grazing* section, construction and structures can displace livestock, result in more concentrated grazing, and ultimately require more effort to minimize resource and resource use conflicts. As the amount of wind energy development increases, the quality of life of ranchers is anticipated to decrease.

According to the 17th Annual Idaho Public Policy Survey, 59.5% of Idahoans rated wind generation as the most desirable source of electricity generation. When this data was analyzed by region of the state, 59.5% of Idahoans in Region III, which included Owyhee and Elmore Counties, and 72.2% of Idahoans in Region IV, which included Twin Falls County, thought wind generation was the most desirable (Energy Policy Institute, 2006). However, literature has demonstrated "certain services are *in principle* considered as beneficial by the majority of the population, but that proposed facilities to provide these services are *in practice* often strongly opposed by local residents" (van der Horst, 2007). Interestingly, opinions about wind energy tend to change throughout the planning process. Opposition to projects is weaker before a local project is proposed, strongest at the planning phase, and weaker after the facility has become operational (van der Horst, 2007). Thus the impact of wind energy development on local (non-ranching) residents may change throughout development of the project. Wind energy development has the potential to add to the economies of local communities (see the *Economic Conditions* section). It is assumed that wind energy development will decrease the quality of life for local (non-ranching) residents in the short term and increase their quality of life in the long term.

Land use authorizations, including those for wind energy development, have the potential to affect the setting of recreation opportunities for dispersed recreators and hunters and fishermen, decreasing their quality of life (see the *Recreation* section). While the relationship between wind energy development and big game populations is not definitive, there is some indications of negative impacts due to habitat loss and increased human presence (Arnett, et al., 2007). This could further decrease the quality of life for hunters as the wind energy development assumed for the analysis under the No Action Alternative and Alternatives I and II[27] would occur in big game habitat. The combination of a change in setting and a change in big game population would result in a large decrease in quality of life for hunters. The impact from wind energy development on motorized recreators is unclear.

Management for land use authorizations is not expected to affect the quality of life for the populations that support or oppose livestock grazing.

Impacts from Management Specific to the No Action Alternative

The No Action Alternative has the second highest risk wind energy development projects would result in mitigation affecting forage availability and effort needed to reduce livestock grazing conflicts with resources and resource uses. Thus, it would have the second largest potential decrease in quality of life for ranchers.

[27] The assumption of where wind energy developments would occur is based on assumptions in the *Economic Conditions* section.

Wind energy development could increase the quality of life for local (non-ranching) residents by increasing output, employment, and income in the long term; however there would likely be short-term decreases in quality of life.

Wind energy development could decrease the quality of life for dispersed recreators because it could impact opportunities such as natural scenery viewing and the settings for primitive hiking and camping. Further, wind energy development may occur in big game winter range, resulting in a large decrease in the quality of life of hunters.

Impacts from Management Specific to Alternative I

Alternative I contains the second lowest potential for impacts from wind energy development to forage availability and effort needed to reduce livestock grazing conflicts with resources and resource uses. Thus, it would have the second lowest potential decrease in quality of life for ranchers.

Wind energy projects are not expected to be constructed under Alternative I. This would maintain the quality of life of local (non-ranching) residents in the short term. There may be a loss of opportunity for improvement in economic measures in the long-term, although the impact of that loss on quality of life is not clear.

Because wind energy projects are not expected to be constructed under Alternative I, there would be no impacts to the quality of life of recreators in the planning area.

Impacts from Management Specific to Alternative II

Alternative II contains the largest potential for impacts from wind energy development to forage availability and effort needed to reduce livestock grazing conflicts with resources and resource uses. Thus it would have the largest potential for decrease in the quality of life of ranchers.

Wind energy development could increase the quality of life for local (non-ranching) residents by increasing output, employment, and income in the long term; however there would likely be short-term decreases in quality of life.

Wind energy development could decrease the quality of life for dispersed recreators because it could impact opportunities such as natural scenery viewing and the settings for primitive hiking and camping. Further, wind energy development may occur in big game winter range, resulting in a large decrease in the quality of life of hunters.

Impacts from Management Specific to Alternative III

Alternative III would result in a moderate potential for impacts from wind energy development to forage availability and effort needed to reduce livestock grazing conflicts with resources and resource uses. Thus, it may result in a moderate decrease in the quality of life of ranchers.

Impacts to quality of life of local (non-ranching) residents and recreators from wind energy development under Alternative III would be the same as under Alternative I.

Impacts from Management Specific to Alternative IV

Alternative IV would result in a moderate potential for impacts from wind energy development to forage availability and effort needed to reduce livestock grazing conflicts with resources and resource uses. Thus, it may result in a moderate decrease in the quality of life of ranchers.

Impacts to quality of life of local (non-ranching) residents and recreators from wind energy development under Alternative III would be the same as under Alternative I.

Impacts from Management Specific to Alternative V

Alternative V contains the lowest risk for impacts from wind energy development to forage availability and effort needed to reduce livestock grazing conflicts with resources and resource uses. Thus it would have the lowest risk to decreasing the quality of life of ranchers.

Impacts to quality of life of local (non-ranching) residents and recreators from wind energy development under Alternative V would be the same as under Alternative I.

Summary of Direct and Indirect Impacts

The following discussion attempts to summarize the direct and indirect impacts on stakeholder groups in the planning area.

Impacts from the No Action Alternative

For the most part, the No Acton Alternative will not result in changes to quality of life for stakeholders in the planning area (Table 4- 367). There may be some increase in quality of life to local (non-ranching) residents due to increases in recreation and wind energy development; however, any potential wind energy development would result in decreases in the quality of life of other stakeholders.

Table 4- 367. Impacts to Quality of Life from the No Action Alternative

Stakeholder Group	Livestock Grazing	Recreation	Transportation and Travel	Land Use Authorizations
Ranchers	No Change		No Change	Decrease
Local (Non-Ranching) Residents	No Change	Increase		Increase
Dispersed Recreators		No Change	No Change	Decrease
Recreational Riders		No Change	No Change	
Play Riders		No Change		
Hunters and Fishermen		No Change	No Change	Decrease

Impacts from Alternative I

For the most part, Alternative I would result in an increase in the quality of life of stakeholders in the planning area (Table 4- 368). Some decreases in quality of life may be experienced due to transportation and travel management.

Table 4- 368. Impacts to Quality of Life from Alternative I

Stakeholder Group	Livestock Grazing	Recreation	Transportation and Travel	Land Use Authorizations
Ranchers	Increase		Decrease	No Change
Local (Non-Ranching) Residents	Increase	Increase		No Change
Dispersed Recreators		Increase	Increase	No Change
Recreational Riders		Increase	Decrease	
Play Riders		Increase		
Hunters and Fishermen		Increase	Increase	No Change

Impacts from Alternative II

Alternative II would result in varying impacts on quality of life for stakeholders in the planning area (Table 4- 369). The quality of life for local (non-ranching) residents and recreational riders is likely to increase, while the quality of life for dispersed recreators, play riders, and hunters and fishermen is likely to decrease. The quality of life of ranchers is likely to increase, unless wind energy development occurs.

Table 4- 369. Impacts to Quality of Life from Alternative II

Stakeholder Group	Livestock Grazing	Recreation	Transportation and Travel	Land Use Authorizations
Ranchers	Increase		Increase	Decrease
Local (Non-Ranching) Residents	Increase	Increase		Increase
Dispersed Recreators		Decrease	No Change	Decrease
Recreational Riders		Increase	No Change	
Play Riders		Decrease		
Hunters and Fishermen		Decrease	No Change	Decrease

Impacts from Alternative III

Alternative III would result in varying impacts on quality of life for stakeholders in the planning area (Table 4- 370). Local (non-ranching) residents and motorized recreators are likely to experience an increase in quality of life, while hunters and fishermen are likely to experience a decrease in quality of life. It is difficult to determine an overall change in the quality of life for ranchers and dispersed recreators under Alternative III.

Table 4- 370. Impacts to Quality of Life from Alternative III

Stakeholder Group	Livestock Grazing	Recreation	Transportation and Travel	Land Use Authorizations
Ranchers	Increase		Decrease	No Change
Local (Non-Ranching) Residents	Increase	Increase		No Change
Dispersed Recreators		Decrease	Increase	No Change
Recreational Riders		Increase	No Change	
Play Riders		Increase		
Hunters and Fishermen		Decrease	No Change	No Change

Impacts from Alternative IV

Alternative IV would result in varying impacts on quality of life of stakeholders in the planning area (Table 4- 371). All recreators stakeholder groups would likely experience an increase in their quality of life, while ranchers would experience a decrease in their quality of life.

Table 4- 371. Impacts to Quality of Life from Alternative IV

Stakeholder Group	Livestock Grazing	Recreation	Transportation and Travel	Land Use Authorizations
Ranchers	Decrease		Decrease	No Change
Local (Non-Ranching) Residents	Decrease	Increase		No Change
Dispersed Recreators		Increase	Increase	No Change
Recreational Riders		Increase	Increase	
Play Riders		Increase		
Hunters and Fishermen		Increase	Increase	No Change

Impacts from Alternative V

For the most part, Alternative V would result in a decrease in the quality of life for stakeholders in the planning area (Table 4- 372). Recreational riders would be the only stakeholder groups to experience an increase in their quality of life.

Table 4- 372. Impacts to Quality of Life from Alternative V

Stakeholder Group	Livestock Grazing	Recreation	Transportation and Travel	Land Use Authorizations
Ranchers	Decrease		Decrease	No Change
Local (Non-Ranching) Residents	Decrease	Decrease		No Change
Dispersed Recreators		Decrease	No Change	No Change
Recreational Riders		No Change	No Change	
Play Riders		Increase		
Hunters and Fishermen		Decrease	No Change	No Change

Cumulative Impacts

There is no method known for assessing cumulative impacts on quality of life for planning area stakeholders. Assembling a list of past, present, and reasonably foreseeable actions that affect quality of life for such a diverse array of stakeholders is not possible. Because quality of life encompasses all facets of these stakeholders' lives, the list of actions would be prohibitively large.

4.6.2. Economic Conditions

Analysis Methods

Indicators

The following impact indicators were used for the analysis of impacts to economic conditions:

- **Output in the Four-County Region**
- **Employment in the Four-County Region**
- **Income in the Four-County Region**

The Four-County Region includes the following four counties: Elmore, Owyhee, and Twin Falls Counties, ID, and Elko County, NV.

Methods and Assumptions

Impacts to economic conditions from management in the following sections of Chapter 2 were analyzed in detail: *Upland Vegetation*, *Fish*, *Wildlife*, *Livestock Grazing*, *Recreation*, *Transportation and Travel* and *Land Use Authorizations.* Impacts from management in the *Minerals* section were not analyzed in detail because few economical quantities of minerals have been located in the planning area. Management from the remaining sections was not analyzed in detail because the management did not vary measurably between alternatives or impact the indicators for economic conditions.

Modeling the Four-County Regional Economy

In Chapter 3, the economic conditions of affected communities were determined through GIS analysis of updates of census data performed by Claritas Demographics. This allowed descriptions of the population within the planning area and a slightly larger Jarbidge Impact Area that included several communities surrounding the planning area. To estimate the potential economic impacts of BLM management actions in the planning area, an inter-industry input-output economic model was developed using IMPLAN Pro Software and Data (Minnesota IMPLAN Group, 2004). IMPLAN stands for Impact Analysis for Planning and has been used for various analyses to derive county, regional, and state impacts from changes in economic activity, resource availabilities, industrial targeting, and other planning studies.

The data required to run the IMPLAN model are only available for entire counties; therefore, the impact analysis in Chapter 4 uses 2006[28] economic data for Elmore, Owyhee, and Twin Falls Counties, ID, and Elko County, NV. Conducting the economic analysis at the four-county scale is appropriate because there are few, if any, economic linkages within the planning area itself (e.g., there are no retail services). Even an analysis at the scale of the Jarbidge Impact Area will only capture purchases of basic goods and services because residents will travel to the larger communities of Twin Falls, Elko, and Mountain Home for purchases of more specialized goods and services. Where appropriate, economic data from other sources are described to provide additional information, even though those data may not be compatible with the four-county IMPLAN results.

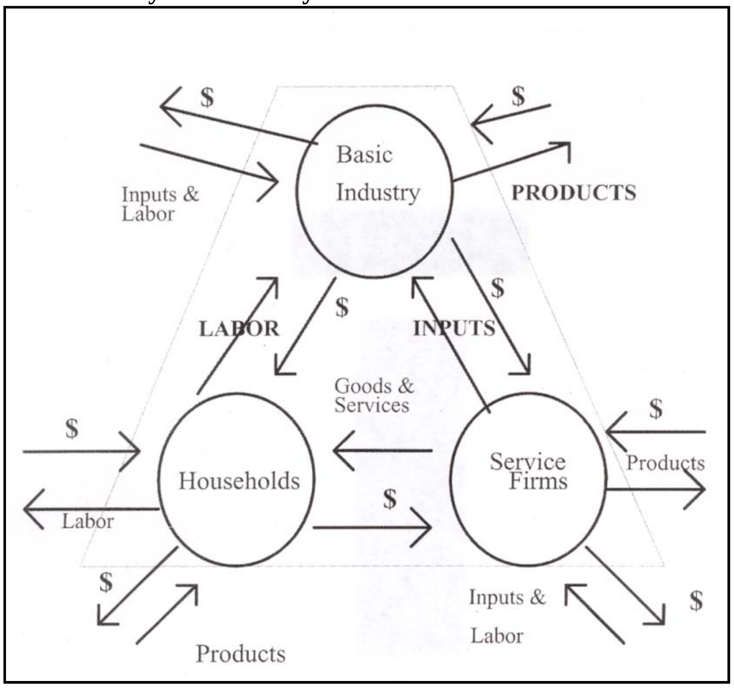
Figure 4- 1 illustrates the major dollar flows of goods and services in any economy. The foundation of the Four-County Region’s economy includes businesses that sell some or all of their goods and services to buyers outside of the area. Such a business is defined as a “basic industry.” The flows of products out of and dollars into the Four-County Region are represented by the two arrows in the upper right portion of Figure 4- 1.

To produce these goods and services for export outside the Four-County Region, the basic industry may purchase inputs from outside of the area (upper left portion of Figure 4- 1). In addition, the basic industry may use labor provided by Four-County Region residents or “households” (left side of Figure 4- 1), and inputs from service industries located within the Four-County Region (right side of Figure 4- 1).

[28] Baseline data for 2006 were the most recent data available for the four counties.

The flow of labor, goods, and services in the Four-County Region is completed by households using their earnings to purchase goods and services from the area's service industries (bottom of Figure 4- 1). It is evident from the interrelationships illustrated in Figure 4- 1 that a change in any one segment of the planning area's economy could ripple throughout the entire Four-County Region's economic system.

Figure 4- 1. Overview of Community Economic System



For example, the Cattle Ranching and Farming Sector impacts the four-county economy modeled for this impact analysis in the following ways. The Cattle Ranching and Farming Sector's activities can be considered a basic industry as it draws dollars from outside the Four-County Region from those who purchase the livestock and farm products from local ranchers. These dollars may be used to hire a few people from the household sector such as laborers to herd the livestock. However, most of the Four-County Region economic linkages are from purchases made by the Cattle Ranching and Farming Sector, such as purchases from equipment sales and repair businesses, fuel stations, and other retail businesses. As earnings increase, these businesses will hire additional people and buy more inputs from other businesses. Thus, a change in the Cattle Ranching and Farming Sector can work its way throughout the entire four-county economy.

The total impact of a change in the economy consists of direct, indirect, and induced impacts. Direct impacts are the changes in the activities of the impacting industry, such as the reduction of operations by the Cattle Ranching and Farming Sector. The impacting industry changes its purchases of inputs as a result of the direct impact. This produces an indirect impact in the business sectors. Both the direct and indirect impacts change the flow of dollars to the Four-County Region's households. The households alter their consumption accordingly. The effect of this change in household consumption on businesses in the Four-County Region is referred to as an induced impact.

Table 4- 373 summarizes the characteristics of the four-county economy as represented by IMPLAN. Data for the 220 IMPLAN economic sectors occurring in the Four-County Region were aggregated by North American Industry Classification System (NAICS) Sector, the standard used by Federal statistical agencies in classifying business establishments[29]. Total sector output in the Four-County Region in 2006

[29] IMPLAN sectors and their corresponding NAICS code can be found in Appendix A of the IMPLAN Database Guide (Minnesota IMPLAN Group, 2004); the first two digits of the NAICS code correspond to the NAICS Sector, which can be viewed online at http://www.census.gov/cgi-bin/sssd/naics/naicsrch?chart=2007.

was $9.4 billion. These sectors employed over 86,000 people, and these “households” earn $3.2 billion in the form of employee compensation (wages) and proprietor income (owner profit).

Table 4- 373. Output, Employment, and Income for NAICS Sectors Estimated by IMPLAN for the Four-County Region in 2006

NAICS Sector [A]	Output ($ millions)	Employment (# of people)	Income [B] ($ millions)
Manufacturing	1,493	4,600	200
Agriculture, Forestry, Fishing, and Hunting	1,055	9,200	210
Government	1,038	16,200	913
Mining, Quarrying, and Oil and Gas Extraction	829	2,400	201
Retail Trade	672	10,400	271
Construction	619	5,300	210
Accommodation and Food Services	609	9,200	209
Health Care and Social Assistance	445	6,400	232
Wholesale Trade	340	2,500	129
Professional, Scientific, and Technical Services	335	2,800	134
Transportation and Warehousing	330	3,000	131
Finance and Insurance	301	1,800	86
Other Services	225	4,200	82
Information	166	1,000	35
Real Estate, Rental, and Leasing	163	1,500	29
Administrative, Support, and Waste Management and Reduction Services	160	4,100	83
Utilities	87	300	19
Arts, Entertainment, and Recreation	50	1,000	18
Management of Companies	47	300	19
Educational Services	17	400	8
Special Sectors [C]	391	0	0
Total	**9,372**	**86,600**	**3,219**

[A] Sectors are organized in descending order of sector output, with the exception of Special Sectors.
[B] Income includes employee compensation (wages) and proprietor income (owner profit).
[C] Special Sectors are IMPLAN sectors to account for the economic value of owner-occupied dwellings and inventory valuation adjustment.

This economic impact analysis focuses on the aspects of the Four-County Region’s economy that could be affected by management actions contained in Chapter 2. The following general assumptions were used when analyzing impacts to economic conditions:

- The IMPLAN model used in this analysis provides an unbiased representation of the economy of the Four-County Region.
- Including the four counties that contain portions of the planning area, which all have towns and cities of relatively large populations and numbers of businesses, will allow the IMPLAN model to capture business transactions and characterize the regional economy. Since there are no towns or cities inside the planning area, it is assumed individuals living, working, or recreating in the planning area conduct their business primarily within the towns or cities in the four counties.
- The year 2006, the most recent year data were available for the four counties, was a representative year.
- Economic impacts associated with *Upland Vegetation* actions are primarily related to those actions’ effects on vegetation production and, therefore, forage available for livestock grazing.
- Economic impacts associated with *Fish* and *Wildlife* actions are primarily related to those actions’ effects on fish and wildlife populations and, therefore, hunting and fishing.
- Economic impacts associated with *Livestock Grazing* actions are primarily related to those actions’ effects on forage available for livestock grazing.
- Economic impacts associated with *Recreation* and *Transportation and Travel* actions are primarily related to those actions’ effects on hunting, fishing, and motorized recreation.

- Economic impacts associated with *Land Use Authorizations* actions are primarily related to those actions' effects on areas available for wind energy development.
- *Minerals* actions are not anticipated to have measureable economic impacts over the life of the plan. Few economical quantities of minerals have been located in the planning area. Nevertheless, a large, new mine or rapid oil and gas development in the planning area could have measurable direct economic impacts on the Four-County Region through BLM severance tax payments to the State and property tax revenue to the counties. There could also be measurable employment and spending effects in the Mining, Quarrying, and Oil and Gas Extraction Sector. However, even if substantial mineral developments occur during the life of the plan, there is a high likelihood that the associated economic impacts would be small; therefore, the economic impacts of minerals actions are not modeled or estimated in this analysis.
- Economic impacts associated with other management contained in Chapter 2 that may affect the economy of the Four-County Region cannot be reliably quantified because of lack of data and knowledge of relationships needed to estimate quantities. By not analyzing effects of these actions, the economic impacts measured in this analysis likely underestimate total economic impacts of the alternatives.
- BLM employees and payments made by the Federal government to local governments such as Payments in Lieu of Taxes (PILT) could have direct economic impacts to the Four-County Region. However, since BLM employment and payments are not directly determined by actions in the RMP, these economic impacts are not addressed in this analysis.

Livestock Grazing Impacts

One subset of the NAICS Agriculture, Forestry, Fishing, and Hunting Sector is the Cattle Ranching and Farming Industry Group; this industry group corresponds to the IMPLAN Cattle Ranching and Farming Sector. This IMPLAN sector includes economic data related to both the beef and dairy cattle industries and is the IMPLAN sector most affected by livestock grazing in the planning area.

Overall, the NAICS Agriculture, Forestry, Fishing, and Hunting Sector ranks second in total output (11% of output), third in employment (11%), and fourth in income (7%) among the NAICS Sectors in the four-county economy (Table 4- 373). Within the NAICS Agriculture, Forestry, Fishing, and Hunting Sector, the Cattle Ranching and Farming Sector ranks first in output and employment (50% and 37%, respectively) and third in income (20%; Table 4- 374). However, the value and ranking of industry sector output and employment do not by themselves reveal the importance of an economic sector. Another way to view the importance of an economic sector to an area's economy is by the sector's contribution to the local economic base. Economic base or basic sectors are those that export to economies outside the area's boundaries. These sectors bring dollars into the local economy for expanded economic development. The Cattle Ranching and Farming Sector ranked second among the 220 IMPLAN sectors in the Four-County Region in value of exports. This export value is an indication of the importance of the Cattle Ranching and Farming Sector to economic development in the Four-County Region.

The connection between BLM management actions and the Cattle Ranching and Farming Sector is based on management of livestock grazing and rangeland resources. Cattle ranchers can be authorized use of BLM allotments for livestock grazing through grazing permits. The amount of livestock grazing on BLM-managed lands is measured in AUMs. Cattle ranches use BLM grazing as part of a forage resource rotation that includes base property (i.e., private grazing land owned by the rancher) and other resources. Assuming that Federal AUMs are part of an overall grazing system, a change in BLM livestock grazing management can affect the optimal use of the forage resources throughout the planning area. Furthermore, based on discussions with other rangeland-managing agencies such as the Forest Service, there is not any significant additional rangeland currently available in the Jarbidge area. Therefore, reductions in AUMs on planning area lands cannot be replaced by increased AUMs in another nearby location.

One of the key relationships between livestock grazing management actions by BLM and rancher income is illustrated below. Table 4- 375 shows the income received and expenses paid by agricultural producers in the Four-County Region from 1996 through 2006. Yearly values are shown for cash receipts and other income, production expenses, realized net income, and farm labor and proprietors' income. Total cash receipts from agricultural operations in 2006 were estimated to be almost $1 billion. Realized net incomes ranged from a high of almost $220 million in 2004 to a low of about $90 million in 1997.

Table 4- 374. Output, Employment, and Income for IMPLAN Sectors within the NAICS Agriculture, Forestry, Fishing, and Hunting Sector Estimated by IMPLAN for the Four-County Region in 2006

IMPLAN Sector [A]	Output ($ millions)	Employment (# of people)	Income [B] ($ millions)
Cattle Ranching and Farming	523	3,440	41
All Other Crop Farming	277	1,080	66
Agriculture and Forestry Support Activities	67	2,500	52
Vegetable and Melon Farming	59	270	25
Grain Farming	48	550	9
Sugarcane and Sugar Beet Farming	37	870	9
Animal Production- Except Cattle and Poultry	23	370	4
Hunting and Trapping	11	80	1
Greenhouse and Nursery Production	5	30	3
Logging	4	20	1
Fruit Farming	1	10	0
Poultry and Egg Production	0.006	0	0.001
Total	**1,055**	**9,220**	**210**

[A] Sectors are organized in descending order of sector output; these IMPLAN sectors variously correspond with NAICS Industry Groups and NAICS Industries.

Table 4- 375. Income Received and Expenses Paid by Farmers in the Four-County Region, 1996-2006

Year	Cash Receipts and Other Income [A]	Production Expenses [B]	Realized Net Income [C]	Farm Labor and Proprietors' Income [D]
1996	$647,422,000	$536,538,000	$110,884,000	$138,853,000
1997	$679,716,000	$588,240,000	$91,476,000	$139,754,000
1998	$690,144,000	$562,075,000	$128,069,000	$168,882,000
1999	$705,700,000	$574,741,000	$130,959,000	$181,419,000
2000	$755,092,000	$621,136,000	$133,956,000	$149,613,000
2001	$862,231,000	$663,403,000	$198,828,000	$197,625,000
2002	$884,032,000	$749,008,000	$135,024,000	$178,833,000
2003	$896,399,000	$756,345,000	$140,054,000	$160,352,000
2004	$970,309,000	$750,466,000	$219,843,000	$191,983,000
2005	$987,175,000	$795,788,000	$191,387,000	$177,557,000
2006	$986,767,000	$853,610,000	$133,157,000	$156,964,000
Average	**$824,090,000**	**$677,395,000**	**$146,694,000**	**$167,440,000**
Standard Deviation	**$131,715,900**	**$108,053,800**	**$39,392,700**	**$20,011,640**
Coefficient of Variation	**0.1598**	**0.1595**	**0.2685**	**0.1195**

Source: (Bureau of Economic Analysis, 2009)
[A] Includes cash receipts from farm marketing of crops and livestock; receipts from other farm-related activities, including recreational services, sales of forest products, and custom-feeding services performed by farm operators; payments to farmers under several Federal Government farm subsidy programs; imputed value of home consumption, which is the value of the farm productions produced and consumed on farms; and imputed gross rental value of farm dwellings.
[B] Includes expenditures incurred by farm operators in the production of agricultural commodities, including livestock and crops; major expense categories are inputs to the production process (feed, livestock and poultry, seed, fertilizer, etc.), labor (cash wages, employer contributions to social security, perquisites, and contract labor expenses), and other (interest, net rent paid to nonoperator landlords, capital consumption, property taxes, etc.).
[C] Realized net income consists of cash receipts and other income less production expenses.
[D] Includes net farm proprietors' income and the wages and salaries, pay-in-kind, and other labor income of hired farm laborers arising directly from the current production of agricultural commodities, either livestock or crops; but specifically excludes the income of non-family farm corporations.

Table 4- 375 illustrates the economic variability in the agricultural sector with estimates of standard deviation and coefficient of variation[30]. The coefficient of variation for production expenses is relatively low as shown in Table 4- 375. This means that, although output prices may have varied, production expenses or purchase linkages with other sectors of the four-county economy have been relatively constant. The data suggest that agricultural producers in the Four-County Region faced with variable output prices would likely maintain their local input purchase linkages and realize lower net returns to their operation rather than purchase outside the region or change their operation. This means that changes to BLM livestock grazing management actions would have a direct impact on the four-county economy regardless of economic conditions.

The economic activity that occurs within the planning area economy as a result of one AUM of livestock production is estimated using University of Nevada, Reno and University of Idaho cow-calf budgets (Curtis, et al., 2007; Rimbey, et al., 2004). This research on representative ranch production in Owyhee County, ID, and Elko County, NV, estimated the value of production to be $31.22 per AUM. Using the IMPLAN model for the Four-County Region, the total economic impact was estimated to be $57.34 per AUM (Minnesota IMPLAN Group, 2004). The total economic impact generated by cattle production is greater than the value of production or the sale price of cattle because of the multiplier effect. Each dollar of expenditure in the local economy creates multiple impacts as it circulates around the four-county economy. When a rancher buys supplies from a local feed store, some of the dollars leak outside the area, but some are used to purchase more goods and services inside the area. The IMPLAN model was used to estimate this multiplier effect by estimating transactions between the various sectors of the Four-County Region and its households. The multiplier effect means that each AUM of production value generates an estimated 0.000455 jobs and $9.77 in labor earnings. This represents one job per approximately 2,198 AUMs. These multipliers are summarized in Table 4- 376.

Table 4- 376. Estimated Economic Impact of One AUM in the Planning Area (2006 Dollars)

	BLM Grazing	Ranch Production Perspective
Value of Production	$31.22	$65.71
Total Impacts (Output)	$57.34	$120.69
Number of Jobs (Employment)	0.000455	0.000958
Labor Earnings (Income)	$9.77	$20.57

Estimating the economic impact of livestock grazing on the planning area using only BLM AUMs in many cases underestimates the actual importance of this forage resource. A previous study by Alevy et al. in Elko County, NV, estimated that one public land AUM supports 2.21 AUMs at the ranch level (Alevy, et al., 2007). Therefore, one AUM of Federal grazing can potentially generate as much as $65.71 of livestock production. This assumes that since Federal AUMs are part of an overall grazing system, a change in Federal grazing affects the optimal use of the rest of the forage resources. From the perspective of total ranch production, a public land AUM has a total value of $120.69 in output, $20.57 in labor earnings, and 0.000958 jobs, as shown in Table 4- 376.

Economic impacts are measured in terms of changes in output, employment, and income for each alternative as estimated from the Ranch Production Perspective in Table 4- 376. Income is expressed as total labor earnings, which is the sum of employee compensation and proprietor income as defined by the IMPLAN model. The BLM grazing estimates in Table 4- 376 are not used in the impact estimate because forage resource management practices in the planning area are better characterized from the Ranch Production Perspective and using the Ranch Production Perspective should capture the maximum potential economic impacts associated with an alternative.

To assess impacts from livestock grazing, output, employment, and income were calculated for the estimated number of AUMs for livestock in each alternative, both at initial and full plan implementation. These AUM estimates incorporate management regarding areas available or unavailable for livestock grazing, the amount of vegetation production allocated for livestock, and the type and amount of upland

[30] Coefficient of variation is the standard deviation divided by the average value of the variable.

vegetation treatments proposed in each alternative (Table 4- 377). These AUM estimates are discussed in more detail in the *Livestock Grazing* section.

Table 4- 377. Estimated AUMs for Livestock at Initial and Full Plan Implementation

AUMs	Alternative						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
Initial Plan Implementation [A]	200,000	194,000-267,000	352,000-427,000	279,000-352,000	100,000-156,000	103,000-161,000	50,000-100,000
Full Plan Implementation [B]	160,000-260,000	196,000-267,000	394,000-477,000	302,000-382,000	89,000-141,000	92,000-145,000	49,000-98,000

[A] For Alternatives I through V, AUMs at initial implementation of the plan reflect the number of AUMs that would be available for livestock based on the vegetation allocation and the areas available for livestock grazing, combined with the 2006 vegetation production data, the most recent year for which production data are available. The AUMs used in the analysis for Alternatives I through V are provided solely to assist the reader in comparing the effects of the alternatives and should not be construed to confine or redefine the management contained within those alternatives.
[B] For Alternatives I through V, AUMs at full plan implementation reflect the number of AUMs that would be available for livestock if the alternative's vegetation treatment objectives are achieved. For the No Action Alternative, this number reflects the total range within which AUMs can vary in that alternative.

Output, employment, and income in the Four-County Region resulting from estimated AUMs under an alternative were compared to output, employment, and income resulting from the current level of AUMs under the No Action Alternative. This comparison is presented in two ways:

- **As a percent relative to output, employment, and income for the current level of AUMs under the No Action Alternative** – This comparison depicts the economic impact of livestock grazing management in an alternative with respect to the economic impact of current livestock grazing management. These percent changes tend to be large. They overestimate the importance of the change to the Cattle Ranching and Farming Sector of the Four-County Region and the economy of the Jarbidge Impact Area.
- **As a percent relative to output, employment, and income for the Cattle Ranching and Farming Sector** – This comparison depicts the economic impact of livestock grazing management in an alternative with respect to the Cattle Ranching and Farming Sector of the Four-County Region (Table 4- 374), as IMPLAN results show the Agriculture, Fishing, Forestry, and Hunting Sector being most affected by livestock grazing in the planning area. These percent changes tend to be small. They underestimate the importance of the change to the economy of the planning area and the Jarbidge Impact Area.

The following assumptions specific to livestock grazing were used when analyzing impacts to economic conditions:

- AUMs on BLM-managed lands are part of an overall grazing system, and change affects the optimal use of the forage resources in the planning area. There is no excess grazing capacity that can be substituted for BLM-managed grazing lands.
- There is no difference between permitted AUMs and actual AUMs grazed for purposes of the analysis.
- The economic impacts of livestock grazing are similar for cattle- and sheep-based grazing operations.
- The AUM valuation estimates listed in Table 4- 376 are reasonable and unbiased. There is uncertainty in these estimates because each ranch in the planning area is unique and not completely represented by the representative ranches used to develop the AUM values. The error introduced by these estimates is random and, therefore, unbiased. No estimate of the degree of uncertainty was made.
- Output, employment, and income for the Four-County Region displayed in Table 4- 373 already include output, employment, and income resulting from the current level of AUMs under the No Action Alternative.

Recreation Impacts

Recreational activity in the planning area is diverse but consists mostly of dispersed recreation opportunities. The largest numbers of visitor-days recorded from October 1998 to September 2007 were for camping, big game hunting, driving for pleasure, fishing, and motorized recreation (BLM, 2008a). The recreational uses in the planning area most likely to have economic impacts are big game hunting, fishing, and motorized recreation.

On average, recreators spent approximately 4,300 visitor-days hunting in the planning area each year between 2006 and 2008; over 70% of the visitor-days were for big game hunting (see the *Economic Conditions* section of Chapter 3). Based on recreation spending estimates from a recent survey of National Forest visitors (Stynes & White, 2005), hunters spent approximately $250,000 for their trips to the planning area. While this large amount is spent during the primary tourism off-season, it is an insignificant share of total spending in the two sectors in which most of the spending occurs: the Accommodation and Food Service Sector and the Retail Trade Sector (Table 4- 373).

Within the planning area, recreators spent an average of 2,000 visitor-days fishing each year between 2006 and 2008 (see the *Economic Conditions* section of Chapter 3). In 2003, spending by anglers on fishing trips to Twin Falls County, including portions outside the planning area, was estimated at $5,755,453 (IDFG, 2003). This value includes spending on food and beverages in stores and restaurants, fishing tackle and gear, fuel, motels, licenses, and campground and access fees among other things. Further, it was estimated that $3,429,257 was spent on trips to Salmon Falls Reservoir, including portions outside the planning area, and $178,210 on trips to Cedar Creek Reservoir, which lies entirely within the planning area (IDFG, 2003).

On average, recreators spent approximately 4,000 visitor-days participating in motorized recreation in the planning area each year between 2006 and 2008; 65% of the visitor-days were for cross-country motorized recreation (see the *Economic Conditions* section of Chapter 3). Based on recreation spending estimates from a recent survey of National Forest visitors (Stynes & White, 2005), motorized recreators spent approximately $68,000 for their trips to the planning area.

Changes in recreation visitor use due to population growth and management that would affect motorized recreation, big game hunting, and fishing were estimated for the No Action Alternative and all action alternatives (Table 4- 378). Employment and income for estimated changes in recreation visitor days in each alternative were calculated using IMPLAN to assess the impacts from those levels of recreation use.

Table 4- 378. Estimated Changes in Recreation Visitor Use and Recreation Spending by Alternative

	Alternative					
	No Action	**I**	**II**	**III**	**IV**	**V**
% Change from Current Levels	0 to 5% increase	5 to 10% increase	0 to 5% increase	5 to 10% increase	5 to 10% increase	5 to 10% decrease
Recreation Visitor Days	19,540 to 20,517	20,517 to 21,494	19,540 to 20,517	20,517 to 21,494	20,517 to 21,494	17,586 to 18,563
Recreation Spending	$674,354 to $708,072	$708,072- $741,790	$674,354 to $708,072	$708,072 to $741,790	$708,072 to $741,790	$606,919 to $640,636

Employment and income in the Four-County Region resulting from estimated recreation use under an alternative were compared to employment and income resulting from the current level of recreation use under the No Action Alternative. This comparison is presented as a percent relative to employment and income for the current level of recreation use under the No Action Alternative. Under all alternatives, the effects of the alternatives relative to entire sectors of the four-county economy are negligible and are not discussed further.

The following assumptions specific to recreation were used when analyzing impacts to economic conditions:

- The estimates of changes in recreation use listed in Table 4- 378 are reasonable and unbiased. There is uncertainty in these estimates because it is difficult to project how recreators' behavior would change due to management affecting recreation in the planning area.
- In the absence of changes to management that may affect recreation, recreation use levels are expected to increase due to increasing population in the Four-County Region.

Land Use Authorizations Impacts

Land use authorizations include ROWs, land use permits, and leases. This section focuses on the economic impacts of management associated with wind energy ROWs, as management for non-wind energy land use authorizations is not anticipated to have measureable economic impacts over the life of the plan. Electric or natural gas transmission ROWs could have measurable economic impacts, but because they would be located on Federal land, little direct economic impact would be realized; impacts would result from activities such as short-term construction employment and spending. Even if substantial non-wind energy developments occur during the life of the plan, there is a high likelihood that the associated economic impacts would be small; therefore, the economic impacts for these management actions are not modeled or estimated in this analysis.

Table 4- 379 describes the potential economic impacts of hypothetical wind projects of three different sizes; these figures were generated by the Jobs and Economic Development Impact (JEDI) Model, developed and maintained by the National Renewable Energy Laboratory (NREL, 2009). The JEDI model uses cost and local purchase relationships from existing wind projects across the nation and is reviewed by wind developers. These project expenditures were then expanded into economic impacts using 2006 IMPLAN multipliers for Idaho.

A 20-MW project would be typical of the projects developed on private land to meet requirements of the Public Utilities Regulatory Policies Act of 1978 (PURPA). Projects of this size are not normally built on public land because they cannot support the expense of the NEPA process. A mid-sized commercial project of 150 MW might be developed on Federal, State, or private land. Twin Falls County Planning and Zoning reports preliminary inquires about a project of this scale on private land near the planning area (B. Crafton, Twin Falls County Planning and Zoning, personal communication, October 21, 2009). A large-scale commercial project of 400 MW is likely to involve public land and would only be built where exceptional wind resources exist. The proposed China Mountain Wind Project could be this large. The economic analyses for the 20- and 150-MW projects assume the use of 1.5-MW wind turbines, while the analysis for the 400-MW project assumes the use of larger 2.3-MW turbines in order to minimize the project footprint and environmental impacts.

A 20-MW project would cost a total of $39.6 million to build, but because most of the equipment is imported from outside the region, the effect on output in the four-county region would be $12.9 million. Operations would generate increased local output of $490,000 per year for 25 years, or a present value of $8.3 million. A 400-MW project would cost $791 million to construct, with $223 million of increased output in the Four-County Region. Operations would add $8.8 million per year, or a present value of $149 million. It would provide a total of 2,121 temporary jobs during construction and 80 permanent jobs for the 25 years of project life. Wind energy taxes were computed separately using an assumed 30% wind capacity factor and an electricity price of $75 per MW-hour to calculate 3% of gross earnings. The present value of wind tax revenues ranges from $2.1 million for the 20-MW project to $40 million for a 400-MW project. Land lease payments to landowners are estimated to have a present value ranging from $1.1 million for the 20-MW project to $20.3 million for the 400-MW project. These results are intended to illustrate the scale of potential impacts from wind energy development; they do not reflect impacts of a specific existing or proposed project.

Table 4- 379. Economic Impacts of Representative Wind Projects

	20 MW	150 MW	400 MW
Number of Turbines	14	100	174
Size of Turbine (MW)	1.5	1.5	2.3
Total Project Size (MW)	**20**	**150**	**400**
Installed Project Cost	$39,620,000	$296,533,000	$790,659,000
Direct Operating & Maintenance Costs	$478,000	$2,851,000	$7,644,000
Wind Energy Taxes [A]	$124,173	$886,950	$2,366,383
Present Value Wind Energy Taxes [B]	**$2,099,000**	**$14,995,000**	**$40,006,000**
Land Leases	$63,000	$450,000	$1,201,000
Present Value Land Leases [B]	**$1,065,000**	**$7,608,000**	**$20,304,000**
Construction			
Direct Project Output	$2,050,000	$5,380,000	$12,810,000
Total Output	**$12,940,000**	**$84,340,000**	**$222,930,000**
Direct Employment	40	88	201
Total Employment (Temporary)	**141**	**810**	**2,121**
Direct Labor Income	$1,910,000	$4,270,000	$9,830,000
Total Labor Income	**$4,860,000**	**$25,450,000**	**$66,160,000**
Annual Operations			
Direct Project Output	$60,000	$430,000	$1,020,000
Total Output	**$490,000**	**$3,390,000**	**$8,810,000**
Present Value Total Output [B]	**$8,283,926**	**$57,311,242**	**$148,941,605**
Direct Employment [C]	1	9	21
Total Employment [C] (Permanent)	**5**	**31**	**80**
Direct Labor Income	$60,000	$430,000	$1,020,000
Total Labor Income	**$160,000**	**$1,090,000**	**$2,750,000**
Present Value Total Labor Income [B]	**$2,704,955**	**$18,427,508**	**$46,491,420**

Source: (NREL, 2009), except Idaho Wind Energy Tax.
[A] Idaho taxes wind energy projects at 3% of gross earnings in lieu of property tax. This analysis assumes 30% capacity factor and $75/megawatt hours (MWH) electricity price including the sale of green tags.
[B] Operations impacts need to be converted to a present value to assess BLM management policies. A 25 year project life and 3% social discount rate are used for this analysis.

Total output, employment, and income in the Four-County Region resulting from potential wind energy development under an alternative were compared to output, employment, and income resulting from the current level of wind energy development under the No Action Alternative. This comparison is presented as whether an alternative has the potential to increase output, employment, and income related to wind energy development compared to current levels. These total effects are spread across multiple sectors of the four-county economy; thus, comparisons at the sector scale are not presented. However, direct impacts to output, employment, and income during the construction and operations phases are displayed in Table 4- 379 ; these direct impacts are compared to the Construction and Utilities Sectors (Table 4-373), respectively, to provide the larger context of these impacts.

The following assumptions specific to land use authorizations were used when analyzing impacts to economic conditions:

- Economic impacts of *Land Use Authorizations* actions are primarily related to wind energy development; other types of ROWs and land use authorizations are assumed to have minimal, if any, economic impact.
- Two portions of the planning area have potential for wind energy development based on wind resource potential (lands rated Fair (Class 3) or higher; Map 78): the northeast corner and the southeast corner of the planning area.
- The effects of *Land Use Authorizations* actions on future wind energy development in the northeast corner of the planning area would be similar for all alternatives. It is assumed that the majority of projects in this portion of the planning area would be in the 20-MW range due to the lower wind resource potential. Wind energy development in this portion of the planning area is also likely to occur

primarily on private lands, as their size is assumed to be too small to allow construction on BLM-managed lands due to the cost of the NEPA process. As a result, this analysis does not include an estimate of outcome, employment, and income that may result from wind energy development in the northeast corner of the planning area as these numbers would not vary by alternative.

- The major difference between alternatives with respect to wind energy development is the availability of the southeast corner of the planning area for wind energy development. It is assumed the higher wind resource potential in this portion of the planning area would make a large, commercial wind energy project more feasible than in the northeast corner. For the purposes of analysis, it is assumed that the majority of this area would need to be available for wind energy development to allow consideration of a 400-MW wind energy project. For alternatives in which this portion of the planning area would be available, the impacts of constructing a hypothetical 400-MW project are displayed.

Direct and Indirect Impacts

Impacts from Social and Economic Conditions Actions

Impacts from Management Specific to the No Action Alternative

Under the No Action Alternative, BLM must consider the cost-effectiveness of all management actions. The difference between cost-effectiveness and sustainability of a proposed management action is subtle, but could result in different types or extent of management actions. For example, substantially reducing the number of AUMs may prove to have fewer benefits than costs (negatively cost-effective); however, reducing the number of AUMs may not be as adverse in supporting long-term sustainability of the economy by encouraging more diverse enterprise in the planning area or more efficient use of forage resources.

Impacts from Management Common to All Action Alternatives

Under the action alternatives, BLM must consider whether the activity or action supports social, economic, and environmental health and sustainability. The difference between cost-effectiveness and sustainability of a proposed management action is subtle, but could result in different types or extent of management actions. For example, substantially reducing the number of AUMs may prove to have fewer benefits than costs (negatively cost-effective). However, reducing the number of AUMs may not be as adverse in supporting long-term sustainability of the economy by encouraging more diverse enterprise in the planning area or more efficient use of forage resources.

Impacts from Upland Vegetation and Livestock Grazing Actions

Impacts from Management Specific to the No Action Alternative

The estimated economic impacts from *Upland Vegetation* and *Livestock Grazing* actions under the No Action Alternative are summarized in Table 4- 380. The estimates reported are from the Ranch Production Perspective to capture the maximum potential economic impacts associated with this alternative.

Table 4- 380. Livestock Grazing Economic Impacts from the No Action Alternative

Indicator	Current AUMs/ Initial Implementation	Full Implementation	
		Low AUM Estimate	High AUM Estimate
Output	$24,138,000	$19,310,000	$31,379,000
Employment	192	153	249
Income	$4,114,000	$3,291,000	$5,348,000

The economic impacts of the current AUM levels are assumed to be captured in the baseline estimates for the Cattle Ranching and Farming Sector as listed in Table 4- 374. At initial implementation of the No Action Alternative, the current AUM levels would continue. Therefore, there would be no impacts to output, employment, or income.

The No Action Alternative would also allow between 20% fewer and 30% more AUMs to be authorized as the plan is implemented (Table 4- 377). As a result, changes to output, employment, and income would also range from a 20% decrease to a 30% increase. Compared to the Cattle Ranching and Farming Sector, impacts to output would range from a 1% decrease to a 1% increase, impacts to employment would range from a 1% decrease to a 2% increase, and changes in income would range from a 2% decrease to a 3% increase.

Impacts from Management Specific to Alternative I

The estimated economic impacts from *Upland Vegetation* and *Livestock Grazing* actions under Alternative I are summarized in Table 4- 381. The number of AUMs at initial implementation under Alternative I is expected to decrease by 3% or increase by 33% compared to current AUM levels under the No Action Alternative (Table 4- 377). As a result, the magnitude of the economic impacts to output, employment, and income relative to current AUM levels ranges from a 3% decrease to a 33% increase. Changes in output relative to the Cattle Ranching and Farming Sector would range from 0% to a 1% increase; changes in employment would range from 0%to a 2% increase; and changes in income would range from 0%to a 3% increase.

Table 4- 381. Livestock Grazing Economic Impacts from Alternative I

Indicator	Initial Implementation		Full Implementation	
	Low AUM Estimate	High AUM Estimate	Low AUM Estimate	High AUM Estimate
Output	$23,471,000	$32,170,000	$23,669,000	$32,461,000
Employment	186	255	188	258
Income	$4,000,000	$5,483,000	$4,034,000	$5,533,000

Because AUM levels are not projected to change substantially with full implementation of the plan (1% increase from initial implementation levels; Table 4- 377), the overall economic impacts at full implementation would be similar to those at initial implementation.

Impacts from Management Specific to Alternative II

The estimated economic impacts from *Upland Vegetation* and *Livestock Grazing* actions under Alternative II are summarized in Table 4- 382. The number of AUMs at initial implementation under Alternative II is expected to increase between 76% and 114% compared to current AUM levels under the No Action Alternative (Table 4- 377). As a result, output, employment, and income would also increase between 76% and 114% relative to current AUM levels. Output relative to the Cattle Ranching and Farming Sector would increase between 3% and 5%, employment would increase between 4% and 6%, and income would increase between 6% and 9%.

Table 4- 382. Livestock Grazing Economic Impacts from Alternative II

Indicator	Initial Implementation		Full Implementation	
	Low AUM Estimate	High AUM Estimate	Low AUM Estimate	High AUM Estimate
Output	$42,464,000	$51,550,000	$47,572,000	$57,762,000
Employment	337	409	378	458
Income	$7,237,000	$8,786,000	$8,108,000	$9,845,000

AUM levels are expected to further increase with full implementation of the plan due to vegetation treatments that would increase vegetation production (Table 4- 377); at full implementation, AUMs could range between 97% and 139% higher than current AUM levels. As a result, output, employment, and income would also increase between 97% and 139% relative to current AUM levels. Relative to the Cattle Ranching and Farming Sector, output would increase between 4% and 6%, employment would increase between 5% and 7%, and income would increase between 8% and 11%.

Impacts from Management Specific to Alternative III

The estimated economic impacts from *Upland Vegetation* and *Livestock Grazing* actions under Alternative III are summarized in Table 4- 383. The number of AUMs at initial implementation under Alternative III is expected to increase between 39% and 76% compared to current AUM levels under the No Action Alternative (Table 4- 377). As a result, output, employment, and income would also increase between 39% and 76% relative to current AUM levels. Output relative to the Cattle Ranching and Farming Sector would increase between 2% and 3%, employment would increase between 2% and 4%, and income would increase between 3% and 6%.

Table 4- 383 Livestock Grazing Economic Impacts from Alternative III

Indicator	Initial Implementation		Full Implementation	
	Low AUM Estimate	High AUM Estimate	Low AUM Estimate	High AUM Estimate
Output	$33,613,000	$42,449,000	$36,474,000	$46,048,000
Employment	267	337	290	366
Income	$5,729,000	$7,235,000	$6,217,000	$7,848,000

AUM levels are expected to further increase with full implementation of the plan due to vegetation treatments that would increase vegetation production (Table 4- 377); at full implementation, AUMs could range between 51% and 91% higher than current AUM levels. As a result, output, employment, and income would also increase between 51% and 91% relative to current AUM levels. Relative to the Cattle Ranching and Farming Sector, output would increase between 2% and 4%, employment would increase between 3% and 5%, and income would increase between 4% and 7%.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

The estimated economic impacts from *Upland Vegetation* and *Livestock Grazing* actions under Alternatives IV-A and IV-B (the Preferred Alternative) are summarized in Table 4- 384. The number of AUMs at initial implementation under Alternatives IV-A and IV-B is expected to decrease between 22% and 50% and between 20% and 48%, respectively, compared to current AUM levels under the No Action Alternative (Table 4- 377). As a result, output, employment, and income would also decrease between 22% and 50% under Alternative IV-A and between 20% and 48% under Alternative IV-B relative to current AUM levels. Under Alternatives IV-A and IV-B, output relative to the Cattle Ranching and Farming Sector would decrease between 1% and 2%, employment would decrease between 1% and 3%, and income would decrease between 2% and 5%.

Table 4- 384. Livestock Grazing Economic Impacts from Alternatives IV (the Preferred Alternative)

Indicator	Initial Implementation		Full Implementation	
	Low AUM Estimate	High AUM Estimate	Low AUM Estimate	High AUM Estimate
Alternative IV-A				
Output	$12,093,000	$18,856,000	$10,794,000	$17,011,000
Employment	96	150	86	135
Income	$2,061,000	$3,214,000	$1,840,000	$2,899,000
Alternative IV-B				
Output	$12,452,000	$19,403,000	$11,153,000	$17,558,000
Employment	99	154	89	139
Income	$2,122,000	$3,307,000	$1,901,000	$2,993,000

AUM levels are expected to decrease slightly with full implementation of the plan due to vegetation treatments that would decrease vegetation production (Table 4- 377). At full implementation, AUMs in Alternative IV-A could range between 30% and 55% lower than current AUM levels; AUMs in Alternative IV-B could range between 27% and 54% lower than current AUM levels. As a result, output, employment, and income would decrease by the same proportions. However, relative to the Cattle Ranching and Farming Sector, output under Alternatives IV-A and IV-B would still decrease between 1% and 2%.

Employment would decrease between 2% and 3% under Alternative IV-A, and between 1% and 3% under Alternative IV-B; income would decrease between 3% and 5% under both sub-alternatives.

Impacts from Management Specific to Alternative V

The estimated economic impacts from *Upland Vegetation* and *Livestock Grazing* actions under Alternative V are summarized in Table 4- 385. The number of AUMs at initial implementation under Alternative V is expected to decrease between 50% and 75% compared to current AUM levels under the No Action Alternative (Table 4- 377). As a result, output, employment, and income would also decrease between 50% and 75% relative to current AUM levels. Output relative to the Cattle Ranching and Farming Sector would decrease between 2% and 3%, employment would decrease between 3% and 4%, and income would decrease between 5% and 7% at initial implementation.

Table 4- 385. Livestock Grazing Economic Impacts from Alternative V

Indicator	Initial Implementation		Full Implementation	
	Low AUM Estimate	High AUM Estimate	Low AUM Estimate	High AUM Estimate
Output	$6,009,000	$12,017,000	$5,903,000	$11,806,000
Employment	48	95	47	94
Income	$1,024,000	$2,048,000	$1,006,000	$2,012,000

Because AUM levels are not projected to change substantially with full implementation of the plan (1% decrease from initial implementation levels; Table 4- 377), the overall economic impacts at full implementation would be similar to those at initial implementation.

Impacts from Fish, Wildlife, Recreation, and Transportation and Travel Actions

Table 4- 386 displays impacts to employment and income associated with changes in recreation visitor use by alternative.

Table 4- 386. Recreation Economic Impacts by Alternative

Indicator	Current Recreation Use	Alternative					
		No Action	I	II	III	IV	V
Employment	3	3 to 4	4	3 to 4	4	4	3
Income	$69,900	$69,000 to $73,400	$73,400 to $76,900	$69,000 to $73,400	$73,400 to $76,900	$73,400 to $76,900	$62,900 to $66,400

Impacts from Management Specific to the No Action Alternative

The economic impacts associated with changes in recreation visitor use under the No Action Alternative are summarized in Table 4- 386. Compared to employment and income for current recreation use levels, changes to employment would range from 0% to a 33% increase, while changes to income would range from 0% to a 5% increase. However, not all types of recreation activities are affected in the same way.

Hunting and fishing effort may increase and the quality of hunting and fishing experiences may decrease under the No Action Alternative because fish and big game populations are expected to experience minor to major adverse impacts (see the *Fish* and *Wildlife* sections), resulting in negative economic impacts. In addition, under the No Action Alternative, new SRMAs to provide focused management for hunting and fishing opportunities would not be designated.

Motorized recreation, on the other hand, is expected to expand in and adjacent to popular use areas, resulting in positive economic impacts; however, motorized recreation in the remainder of the planning area is expected to remain constant. However, focused management for motorized recreation would be limited to the existing Yahoo SRMA. In addition, the No Action Alternative would not include improved route designation, maps, and travel management, as in the action alternatives; thus, these benefits to motorized recreators who primarily recreate on routes would not be realized. These factors would partially offset positive economic impacts resulting from keeping the majority of the planning area open to cross-country motorized recreation.

Impacts from Management Specific to Alternative I

The economic impacts associated with changes in recreation visitor use under Alternative I are summarized in Table 4- 386. Compared to employment and income for current recreation use levels, employment would increase 33% and income would increase between 5% and 10% under Alternative I. There would be more SRMAs and intensive management supporting motorized recreation and hunting activities under Alternative I than under any other alternatives, resulting in positive economic impacts.

Major beneficial impacts to big game populations under Alternative I (see the *Wildlife* section) as well as new SRMAs with focused management for big game hunting (e.g., the Canyonlands and Jarbidge Foothills SRMAs) may increase the quality of hunting experiences, resulting in positive economic impacts. Even though fish are expected to experience minor adverse impacts (see the *Fish* section), new SRMAs with focused management for fishing (i.e., the Little Pilgrim and Salmon Falls Reservoir SRMAs) would likely increase the quality of fishing experiences.

Creation of the Deadman/Yahoo SRMA would benefit motorized recreation as it would focus on providing enhanced opportunities for cross-country motorized recreation. Improved route designation, maps, and travel management would also contribute to enhanced motorized recreation opportunities, benefitting on- and off-route motorized recreators. These positive impacts would be partially offset by limiting motorized vehicle use to designated routes in the majority of areas currently open to cross-country motorized vehicle use and increasing the acres closed to motorized vehicle use.

Impacts from Management Specific to Alternative II

The economic impacts associated with changes in recreation visitor use under Alternative II are summarized in Table 4- 386. Compared to employment and income for current recreation use levels, changes to employment would range from 0% to a 33% increase, while changes to income would range from 0% to a 5% increase. These impacts would be similar to those under the No Action Alternative, although they result from different factors.

The quality of hunting and fishing experiences may decrease under Alternative II because fish and big game populations are expected to experience minor to major adverse impacts (see the *Fish* and *Wildlife* sections), resulting in negative economic impacts. These impacts may be partially offset by the creation of new SRMAs with focused management for fishing (i.e., the Little Pilgrim and Salmon Falls Reservoir SRMAs).

Eliminating all areas open for cross-country motorized vehicle use as well as the existing SRMA with a focus on motorized recreation would have a negative impact on motorized recreation, especially on motorized recreators who primarily recreate off routes. However, this impact may be partially offset by improved route designation, maps, and travel management, which would provide a more positive recreation experience to motorized recreators who primarily recreate on routes.

Impacts from Management Specific to Alternative III

The economic impacts associated with changes in recreation visitor use under Alternative III are summarized in Table 4- 386. Compared to employment and income for current recreation use levels, employment would increase 33% and income would increase between 5% and 10% under Alternative III. These impacts would be similar to those under Alternative I, although they result from different factors.

Moderate beneficial impacts to big game populations under Alternative III (see the *Wildlife* section) may increase the quality of hunting experiences, resulting in positive economic impacts. Even though fish are expected to experience minor adverse impacts (see the *Fish* section), new SRMAs with focused management for fishing (i.e., the Little Pilgrim and Salmon Falls Reservoir SRMAs) would likely increase the quality of fishing experiences.

Creation of the Deadman/Yahoo SRMA would benefit motorized recreation as it would focus on providing enhanced opportunities for cross-country motorized recreation, although the benefit would be slightly lower than in Alternative I due to the reduced area open to cross-country motorized vehicle use. Improved route designation, maps, and travel management would also contribute to enhanced motorized recreation opportunities, benefitting on- and off-route motorized recreators. These positive impacts would be partially offset by limiting motorized vehicle use to designated routes in the majority of areas currently open to cross-country motorized vehicle use.

Impacts from Management Specific to Alternative IV (the Preferred Alternative)

The economic impacts associated with changes in recreation visitor use under Alternative IV are summarized in Table 4- 386. Compared to employment and income for current recreation use levels, employment would increase 33% and income would increase between 5% and 10% under Alternative IV. These impacts would be similar to those under Alternatives I and III, although they result from different factors.

Major beneficial impacts to big game populations under Alternative IV (see the *Wildlife* section) as well as a new SRMA with focused management for big game hunting (e.g., the Canyonlands SRMA) may increase the quality of hunting experiences, resulting in positive economic impacts. Minor beneficial impacts to fish populations (see the *Fish* section) as well as a new SRMA with focused management for fishing (e.g., the Salmon Falls Reservoir SRMA) may increase the quality of fishing experiences, resulting in positive economic impacts; the impacts would be less than in Alternatives I and III where the Little Pilgrim SRMA would also be created.

Creation of the Deadman/Yahoo SRMA would benefit motorized recreation as it would focus on providing enhanced opportunities for cross-country motorized recreation, although the benefit would be slightly lower than in Alternative I due to the reduced area open to cross-country motorized vehicle use. Improved route designation, maps, and travel management would also contribute to enhanced motorized recreation opportunities, benefitting on- and off-route motorized recreators. These positive impacts would be partially offset by limiting motorized vehicle use to designated routes in the majority of areas currently open to cross-country motorized vehicle use and increasing the acres closed to motorized vehicle use to an even greater degree than under Alternative I.

Impacts from Management Specific to Alternative V

The economic impacts associated with changes in recreation visitor use under Alternative V are summarized in Table 4- 386. Compared to employment and income for current recreation use levels, employment would remain constant and income would decrease between 5% and 10%. However, not all types of recreation activities are affected in the same way.

Minor to moderate beneficial impacts to fish and big game populations under Alternative V (see the *Fish* and *Wildlife* sections) may increase the quality of hunting and fishing experiences, resulting in positive economic impacts. However, the lack of SRMAs with focused management for hunting or fishing would limit opportunities for increasing the quality of hunting and fishing experiences in the planning area.

Focused management for motorized recreation would be limited to the existing Yahoo SRMA, reducing opportunities for this type of recreation elsewhere in the planning area. Improved route designation, maps, and travel management would contribute to enhanced motorized recreation opportunities, in this alternative mostly benefitting motorized recreators who primarily recreate on routes. These positive impacts would be partially offset by limiting motorized vehicle use to designated routes in the majority of areas currently open to cross-country motorized vehicle use. In addition, Alternative V would have nearly three times the acreage closed to motorized vehicle use as compared to Alternative I. This includes closing all ways within WSAs, limiting access and recreational use of those areas

Impacts from Land Use Authorizations Actions

Impacts from Management Specific to the No Action Alternative and Alternative II

Under the No Action Alternative and Alternative II, the majority of the southeast corner of the planning area would be available for wind energy development, which would allow consideration of a 400-MW wind energy project in that area. If a 400-MW wind energy project were to be constructed there under the No Action Alternative or Alternative II, the economic impacts would be as displayed in Table 4- 387. Because there are currently no wind energy developments in the southeast corner of the planning area, the No Action Alternative and Alternative II allow the opportunity to increase output, employment, and income due to wind energy development.

Construction of a 400-MW project would likely occur over two to three years, resulting in a 1% increase in output, a 1% to 2% increase in employment, and a 2% increase in income in the Construction Sector due to direct impacts during the construction period. The operations phase would result in a 1% increase in output, a 7% increase in employment, and a 5% increase in income in the Utilities Sector during the life of the project due to direct impacts.

Table 4- 387. Wind Energy Economic Impacts from the No Action Alternative and Alternative II

Indicator	Construction Phase [A]	Operations Phase [B]
Direct Impacts		
Output	$12,810,000	$1,020,000
Employment	201	21
Income	$9,830,000	$1,020,000
Total Impacts		
Output	$222,930,000	$8,810,000
Employment	2,121	80
Income	$66,160,000	$2,750,000

[A] Construction of a 400-MW project would likely occur over two to three years; therefore, construction-related output, employment, and income would be spread across a two- to three-year period.
[B] The project life of a 400-MW project is estimated to be approximately 25 years; therefore, operations-related output, employment, and income would occur annually over that time period.

Impacts from Management Specific to Alternatives I, III, IV (the Preferred Alternative), and V

Alternatives I, III, IV, and V make the majority of the southeast corner of the planning area unavailable for wind energy development, which would not allow consideration of a 400-MW wind energy project in that area. Under these alternatives that preclude construction of commercial-scale wind energy projects in the area with the highest wind resource potential, the opportunity to increase output, employment, and income due to wind energy development as displayed in Table 4- 387 would be foregone.

Summary of Direct and Indirect Impacts

Table 4- 388 displays a summary of impacts to output, employment, and income resulting from estimated AUMs at initial and full implementation of an alternative. Impacts are displayed in two ways: as percents relative to output, employment, and income for the current level of AUMs under the No Action Alternative and as percents relative to output, employment, and income for the Cattle Ranching and Farming Sector. As described under *Methods and Assumptions*, the comparison relative to current livestock grazing management overstates the importance of the change to the Cattle Ranching and Farming Sector of the Four-County Region and the economy of the Jarbidge Impact Area; conversely, the comparison relative to the Cattle Ranching and Farming Sector underestimates the importance of the change to the economy of the planning area and the Jarbidge Impact Area. Ideally, these impacts could be quantified for and presented relative to the economy of the Jarbidge Impact Area; however, economic data are not available for that scale of analysis.

Table 4- 388. Impacts Resulting from Estimated AUM Levels at Initial and Full Implementation of the Plan by Alternative

Indicator	Alternative						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
Impacts to Relative to Current AUM Levels [A]							
Estimated AUMs at Initial Implementation							
Output, Employment, and Income	0%	-3% to 33%	76% to 114%	39% to 76%	-22% to -50%	-20% to -48%	-50% to -75%
Estimated AUMs at Full Implementation							
Output, Employment, and Income	-20% to 30%	-2% to 34%	97% to 139%	51% to 91%	-30% to -55%	-27% to -54%	-51% to -76%
Impacts to Relative to the Cattle Ranching and Farming Sector [B]							
Estimated AUMs at Initial Implementation							
Output	0%	0% to 1%	3% to 5%	2% to 3%	-1% to -2%	-1% to -2%	-2% to -3%
Employment	0%	0% to 2%	4% to 6%	2% to 4%	-1% to -3%	-1% to -3%	-3% to -4%
Income	0%	0% to 3%	6% to 9%	3% to 6%	-2% to -5%	-2% to -5%	-5% to -7%
Estimated AUMs at Full Implementation							
Output	-1% to 1%	0% to 1%	4% to 6%	2% to 4%	-1% to -2%	-1% to -2%	-2% to -3%
Employment	-1% to 2%	0% to 2%	5% to 7%	3% to 5%	-2% to -3%	-1% to -3%	-3% to -4%
Income	-2% to 3%	0% to 3%	8% to 11%	4% to 7%	-3% to -5%	-3% to -5%	-5% to -7%

[A] Percent change relative to output, employment, or income for current AUM levels under the No Action Alternative (Table 4-380).

[B] Percent change relative to output, employment, or income for the Cattle Ranching and Farming Sector (Table 4- 374); calculations assume that output, employment, and income for the Cattle Ranching and Farming Sector already include output, employment, and income for current AUM levels under the No Action Alternative.

Table 4- 389 displays a summary of impacts to employment and income resulting from changes in recreation visitor use due to population growth and management that would affect recreation in the planning area. Impacts are displayed as percents relative to employment and income resulting from current recreation visitor use in the planning area. Because changes in the employment number are so low, any minor variation represents a large percentage change. Therefore, the change in income is more representative of the level of impact to the economy.

Table 4- 389. Impacts Resulting from Changes in Recreation Visitor Use by Alternative

Indicator	Alternative					
	No Action	I	II	III	IV	V
Employment	0% to 33%	33%	0% to 33%	33%	33%	0%
Income	0% to 5%	5% to 10%	0% to 5%	5% to 10%	5% to 10%	-5% to -10%

Table 4- 390 displays a summary of impacts to output, employment, and income resulting from the construction and operation of a hypothetical 400-MW wind energy project in the southeast corner of the planning area, if such a development could be considered under an alternative. Impacts are displayed as percents relative to output, employment, and income resulting from wind energy development currently occurring in that portion of the planning area. These impacts are intended to illustrate differences between the alternatives; it is not within the scope of this analysis to speculate on the likelihood or probability such a project would be approved or ultimately constructed.

Table 4- 390. Impacts Potentially Resulting from Wind Energy Development in the Southeast Corner of the Planning Area by Alternative

Indicator	Alternative					
	No Action	I	II	III	IV	V
Output, Employment, and Income	Increase	No Change	Increase	No Change	No Change	No Change

Positive economic impacts are associated with increases in output, employment, or income. Negative economic impacts are associated with decreases in output, employment, or income. The following scale is used to rate the magnitude of impacts to output, employment, or income resulting from livestock grazing, recreation, and wind energy development:

- **Negligible economic impacts** – Changes of up to 5%
- **Minor economic impacts** – Changes of more than 5% and up to 25%
- **Moderate economic impacts** – Changes of more than 25% and up to 50%
- **Major economic impacts** – Changes of more than 50% or changes that allow for a new economic opportunity

Impacts from the No Action Alternative

There would be no economic impacts associated with livestock grazing under the No Action Alternative at initial implementation of the plan as AUM levels would be similar to current AUM levels. The economic impacts associated with livestock grazing at full implementation would range from minor negative to moderate positive relative to current AUM levels, although these effects would be negligible relative to the Cattle Ranching and Farming Sector as a whole. Impacts associated with recreation would be negligible relative to current recreation use levels. The opportunity to consider commercial-scale wind energy development in the southeast corner of the planning area has the potential to result in major positive impacts relative to current levels of wind energy development, although these effects would be negligible to minor positive relative to the Construction and Utilities Sectors as a whole.

Impacts from Alternative I

The economic impacts associated with livestock grazing under Alternative I at initial and full implementation of the plan would range from negligible to moderate positive relative to current AUM levels, although these effects would be negligible relative to the Cattle Ranching and Farming Sector as a whole. Impacts associated with recreation would be negligible to minor positive relative to current recreation use levels. There would be negligible impacts associated with wind energy development in the southeast corner of the planning area as the current lack of commercial-scale wind energy development would likely continue.

Impacts from Alternative II

The economic impacts associated with livestock grazing under Alternative II at initial and full implementation of the plan would be major positive relative to current AUM levels; these effects would be negligible to minor positive relative to the Cattle Ranching and Farming Sector as a whole. Impacts associated with recreation would be negligible relative to current recreation use levels. The opportunity to consider commercial-scale wind energy development in the southeast corner of the planning area has the potential to result in major positive impacts relative to current levels of wind energy development, although these effects would be negligible to minor positive relative to the Construction and Utilities Sectors as a whole.

Impacts from Alternative III

The economic impacts associated with livestock grazing under Alternative III would be moderate to major positive relative to current AUM levels at initial implementation of the plan and major positive at full implementation of the plan; these effects would be negligible to minor positive relative to the Cattle Ranching and Farming Sector as a whole. Impacts associated with recreation would be negligible to minor positive relative to current recreation use levels. There would be negligible impacts associated with wind energy development in the southeast corner of the planning area as the current lack of commercial-scale wind energy development would likely continue.

Impacts from Alternative IV (the Preferred Alternative)

The economic impacts associated with livestock grazing under Alternatives IV-A and IV-B would be minor to moderate negative relative to current AUM levels at initial implementation of the plan and moderate to major negative at full implementation of the plan; however, these effects would be negligible relative to the Cattle Ranching and Farming Sector as a whole. Impacts associated with recreation would be negligible to minor positive relative to current recreation use levels. There would be negligible impacts associated with wind energy development in the southeast corner of the planning area as the current lack of commercial-scale wind energy development would likely continue.

Impacts from Alternative V

The economic impacts associated with livestock grazing under Alternative V would be moderate to major negative relative to current AUM levels at initial implementation of the plan and major negative at full implementation of the plan; these effects would be negligible to minor negative relative to the Cattle Ranching and Farming Sector as a whole. Impacts associated with recreation would be negligible to minor negative relative to current recreation use levels. There would be negligible impacts associated with wind energy development in the southeast corner of the planning area as the current lack of commercial-scale wind energy development would likely continue.

Cumulative Impacts

Past, Present, and Reasonably Foreseeable Actions

The cumulative impact analysis area is the same as the analysis area for direct and indirect impacts: Elmore, Owyhee, and Twin Falls Counties, ID, and Elko County, NV.

Other actions within the analysis area that would affect output, employment, and income include all other types of economic activities that occur within the analysis area. The industry sectors affected by these economic activities include those listed in Table 4- 373. The baseline conditions (2006) for the total economy of the Four-County Region are displayed in Table 4- 391.

Table 4- 391. Baseline (2006) Conditions for the Total Economy of the Four-County Region

Indicator	Total Economy
Output	$9,370,000,000
Employment	87,000
Income	$3,219,000,000

In addition, growth in population and income in the Four-County Region and in Idaho will continue to drive demand for resources in the planning area, such as forage and minerals, as well as recreation activities, such as ATV and motorcycle riding and hunting. The cumulative economic impact analysis considers the effects of these past, present, and reasonably foreseeable trends in population and income. The scope of this cumulative analysis is to consider future population growth to 2030 and across the geographic area that includes the four counties in the planning area and the State of Idaho.

Based on the forecasts shown in Table 4- 392, population in Idaho will increase by 452,000 people (30%) between 2010 and 2030, while the Four-County Region is projected to grow 17.5%. This large increase in population growth would increase demand for natural resources and recreation use in the planning area. Increased demand for natural resources and recreation would have positive economic impacts; however, economic impacts to particular industry sectors cannot be determined.

Personal income in Idaho is forecast to increase by about 3% per year between 2006 and 2011 (Global Insight, 2008). Per capita personal income in Idaho was $28,300 in 2006 and is predicted to be $36,500 in 2011. One example of how income growth can affect resource and recreation use in the planning area is the purchase and use of ATVs and off-highway motorcycles. More than 145,300 participants spent a total of 47,400 visitor-days in the planning area for motorized recreation using ATVs, cars, trucks, sport utility vehicles, dune buggies, and motorcycles (excludes snowmobiles) between 1998 and 2007 (BLM, 2008a). ATV and motorcycle use has increased rapidly in the region, as illustrated by the growth in registrations shown in Table 4- 393. Between 2003 and 2007, registrations increased by more than 50% in Elmore, Owyhee, and Twin Falls Counties; during the same period, population increased by about 3% or less in these counties. Registrations in the State of Idaho increased even faster, by more than 60% during the five-year period.

Table 4- 392. Population Projections for the Four-County Region and the State of Idaho

County	2005	2010	2020	2030
Elmore, ID	28,634	32,000	34,900	37,700
Owyhee, ID	11,073	11,500	12,400	13,200
Twin Falls, ID	69,419	71,700	79,200	86,600
Elko, NV	47,586	63,200	70,100	72,200
Four-County Total	**156,712**	**178,400**	**196,600**	**209,700**
Idaho Total	**1,429,100**	**1,517,300**	**1,741,300**	**1,969,600**
Sources: (Global Insight, 2008; NDWR, 2009; US Census Bureau, 2006)				

Table 4- 393. Number of ATVs, UTVs, and Off-Highway Motorcycles Registered by County of Residence

County	2003	2004	2005	2006	2007	% Change from 2003 to 2007
Elmore, ID	1,385	1,552	1,689	1,880	2,128	54%
Owyhee, ID	628	677	735	853	988	57%
Twin Falls, ID	3,888	4,118	4,746	5,289	5,971	54%
Three-County Total	**5,901**	**6,347**	**7,170**	**8,022**	**9,087**	**54%**
Idaho Total	**81,396**	**91,037**	**104,127**	**117,567**	**131,961**	**62%**
Source: (IDPR, 2008)						

Based on population and income growth forecasts for the Four-County Region and Idaho, demand for recreation use in the planning area is expected to increase at least in proportion to population growth in the region. The exact magnitude of this increase in demand is not known, however. For example, the increase in cross-country motorized recreation in the planning area would depend in part on the availability of other motorized recreation areas and the relative quality of motorized recreation experiences in the planning area. Similarly, demand for rangeland and forage resources in the planning area will depend in part on population growth and availability of other rangeland and forage resources. Currently, there is very little spare rangeland or forage resource capacity in the planning area. Some of the trends that would impact future demand for rangeland in the planning area include population and income growth, transition of private rangeland into residential development (which would reduce the amount of rangeland resources in the region), and increased demand for alternative uses of planning area rangeland such as mineral and energy development or recreation use that could reduce rangeland available for livestock.

With regard to wind energy development, the southeast corner of the planning area is clearly the area with the greatest wind resource potential within the planning area. There are only a few other areas rated Fair (Class 3) or Good (Class 4), primarily in the northeast corner of the planning area; smaller-scale projects would more likely be developed on private land in this area. A mid-sized project exceeding 100 MW could possibly be built on private lands, but transmission facilities would likely cross public lands. Overall, the development of wind projects within the Idaho portion of the planning area would be limited given that the State of Idaho does not have a renewable portfolio standard or other incentives for alternative energy development.

With the forecast data available, it is not possible to quantify how these trends would affect output, employment, and income for the total economy of the Four-County Region displayed in Table 4- 391. However, because the contributions of the planning area to these conditions are relatively small in every alternative, it is assumed for the purpose of the cumulative impacts analysis that the conditions displayed in Table 4- 391 would provide an adequate basis for estimating cumulative impacts. Qualitative analysis is also presented where appropriate.

Summary of Cumulative Impacts

To assess cumulative impacts of the alternatives, output, employment, and income for current AUM levels and current recreation use levels were calculated as a percent of the total economy of the Four-County Region (Table 4- 394). It is assumed that output, employment, and income for the Four-County Region displayed in Table 4- 391 already include output, employment, and income resulting from current AUM and recreation use levels.

Table 4- 394. Output, Employment, and Income for Current AUM and Recreation Use Levels as a Percent of the Total Economy of the Four-County Region

Indicator	% of Total Economy
Output	0.3%
Employment	0.2%
Income	0.1%

These were then compared to output, employment, and income associated with the estimated full implementation AUMs, recreation visitor use, and potential wind energy development under each alternative as a percent of the total economy of the Four-County Region (Table 4- 395) to determine the effect of the alternative on the four-county economy as a whole. Output associated with recreation use is not included as output data are not available. Because direct and indirect impacts of recreation use on employment and income are negligible at the sector scale, it is likely the impacts of recreation on output are negligible as well and would not noticeably affect the outcome of this analysis. Output, employment, and income associated with the operations phase of a hypothetical 400-MW wind energy project are used for this analysis, as output, employment, and income from the construction phase would be temporary.

Table 4- 395. Output, Employment, and Income for the Estimated Full Implementation AUMs, Recreation Visitor Use, and Potential Wind Energy Development as a Percent of the Total Four-County Economy

Indicator	Alternative						
	No Action	I	II	III	IV		V
					IV-A	IV-B	
Output	0.3 to 0.4%	0.3%	0.6 to 0.7%	0.4 to 0.5%	0.1 to 0.2%	0.1 to 0.2%	0.1%
Employment	0.3 to 0.4%	0.2 to 0.3%	0.5 to 0.6%	0.3 to 0.4%	0.1 to 0.2%	0.1 to 0.2%	0.1%
Income	0.2 to 0.3%	0.1 to 0.2%	0.3 to 0.4%	0.2%	0.1%	0.1%	<0.1 to 0.1%
Note: Ranges reflect results from low and high AUM and visitor use estimates for an alternative; cells with no ranges indicate impacts from low and high estimates were the same.							

Cumulative Impacts from the No Action Alternative

With full implementation of the No Action Alternative, output, employment, and income associated with livestock grazing, recreation, and wind energy development would comprise less than 1% of the total economy of the Four-County Region. For all three indicators, the change from the levels associated with current AUMs and recreation use would not exceed 0.2% of the four-county economy.

The lack of any substantial change in the amount of management to improve motorized recreation opportunities and experiences is not expected to substantially increase the amount of motorized recreation, even as the population and income of the Four-County Region and State increase. Wind energy development would lead to an increase in the Construction Sector during the period of construction and an increase in the Utility Sector annually during the operations phase.

Cumulative Impacts from Alternatives I, III, and IV

With full implementation of Alternatives I, III, and IV, output, employment, and income associated with livestock grazing, recreation, and wind energy development would each comprise less than 1% of the total economy of the Four-County Region. For all three indicators, the change from the levels associated with current AUMs and recreation use would not exceed 0.2% of the four-county economy.

These alternatives all provide for management to improve motorized recreation opportunities and experiences in a larger area than in the No Action Alternative and Alternative V. This may lead to a larger increase in the amount of motorized recreation compared to the No Action Alternative and Alternative V. Cumulative impacts would likely be negligible, but it is possible minor positive impacts could occur if the increase in the amount of motorized recreation was primarily due to motorized recreators who do not currently recreate in the Four-County Region. These alternatives will not realize the positive economic impacts from wind energy development in the No Action Alternative; this may affect feasibility of wind energy development on adjacent State and private lands.

Cumulative Impacts from Alternative II

With full implementation of Alternative II, output, employment, and income associated with livestock grazing, recreation, and wind energy development would each comprise less than 1% of the total economy of the Four-County Region. For all three indicators, the change from the levels associated with current AUMs and recreation use would not exceed 0.4% of the four-county economy.

The lack of areas available for cross-country motorized vehicle use would likely decrease the desirability of the planning area for motorized recreation; this may lead to a decrease in the amount of motorized recreation, even as the population and income of the Four-County Region and State increase. Cumulative impacts would likely be negligible, but it is possible minor negative impacts could occur if motorized recreators began to travel outside the Four-County Region to engage in cross-country motorized recreation. Wind energy development would lead to an increase in the Construction Sector during the period of construction and an increase in the Utility Sector annually during operations.

Cumulative Impacts from Alternative V

With full implementation of Alternative V, output, employment, and income associated with livestock grazing, recreation, and wind energy development would each comprise less than 1% of the total economy of the Four-County Region. For all three indicators, the change from the levels associated with current AUMs and recreation use would not exceed 0.2% of the four-county economy.

The lack of any substantial change in the amount of management to improve motorized recreation opportunities and experiences is not expected to substantially increase the amount of motorized recreation, even as the population and income of the Four-County Region and State increase. These alternatives will not realize the positive economic impacts from wind energy development in the No Action Alternative; this may affect feasibility of wind energy development on adjacent State and private lands.

4.6.3. Environmental Justice

As discussed in the *Environmental Justice* section of Chapter 3, the only population that meets the criteria to be an Environmental Justice population for the planning area is that of individuals with Hispanic ethnicity in Owyhee County. None of the management outlined in Chapter 2 would impact a specific race or ethnicity. Management would affect employment and income in specific economic sectors, particularly the Agricultural, Forestry, Fishing, and Hunting Sector (see the *Economic Conditions* section). Therefore, Hispanic employees in that sector would be affected to a similar degree as described in the *Economic Conditions* section. Specific impacts to Environmental Justice populations from management actions in the Jarbidge Draft RMP/EIS cannot be analyzed because data are not available by sector employment and ethnicity.

4.7. WORKS CITED

Abdel-Magid, A. H., Schuman, G. E., & Hart, R. H. (1987). Soil Bulk Density and Water Infiltration as Affected by Grazing Systems. *Journal of Range Management, 40*(4), 307-309.

Ada County Mosquito Abatement District. (2007). *Comprehensive Plan for Managing Mosquitoes in Ada County, Idaho* (Comprehensive Plan): Ada County Mosquito Abatement District.

Adams, G. M. (2007). Bringing Green Power to the Public Lands: The Bureau of Land Management's Authority and Discretion to Regulate Wind-Energy Developments. *Journal of Environmental Law and Litigation, 21*(445).

Adams, J. A., Endo, A. S., Stolzy, L. H., Rowlands, P. G., & Johnson, H. B. (1981). Controlled Experiments on Soil Compaction Produced by Off Road Vehicles in Mojave Desert, California. *Journal of Applied Ecology, 19*(1), 167-175.

Alevy, J., Fadali, E., & Harris, T. R. (2007). *Analysis of Impacts of Public Land Grazing on the Elko County Economy, Jarbidge and Mountain City Management Area: Part VII: Economic Impacts of Federal Grazing in Elko County* (Technical Report No. UCED 2006/07-11). Reno, NV: University of Nevada.

Allen, G. T., & Ramirez, P. (1990). A Review of Bird Deaths on Barbed-Wire Fences. *The Wilson Bulletin, 102*(3), 553-558.

Alpe, M. J., Kingery, J. L., & Mosley, J. C. (1999). Effects of Summer Sheep Grazing on Browse Nutritive Quality in Autumn and Winter. *Journal of Wildlife Management, 63*(1), 346-354.

American Society of Mammalogists. (2008). *Effects of Wind-Energy Facilities on Bats and Other Wildlife* (Unanimous Resolution): American Society of Mammalogists.

Anderson, D. C., Harper, K. T., & Rushforth, S. R. (1982). Recovery of Crytogamic Soil Crusts from Grazing on Utah Winter Ranges. *Journal of Range Management, 35*, 355-359.

Anderson, D. E., Rongstad, O. J., & Mytton, W. R. (1990). Home-Range Changes in Raptors Exposed to Increased Human Activity Levels in Southeastern Colorado. *Wildlife Society Bulletin, 18*(2), 134-142.

Anderson, J. E., & Inouye, R. S. (2001). Landscape-Scale Changes in Plant Species Abundance and Biodiversity of a Sagebrush Steppe Over 45 Years. *Ecological Monographs, 71*(4), 531-556.

Andrews, K. M., & Gibbons, J. W. (2005). How Do Highways Influence Snake Movement? *Copeia, 4*, 772-782.

Anthony, R. G. (1976). Influence of Drought on Diets and Numbers of Desert Deer. *Journal of Wildlife Management, 40*(1), 140-144.

Armentrout, D. J., & Hall, F. (2006). *Conservation Strategy for Sage-Grouse (Centrocercus urophasianus) and Sagebrush Ecosystems within the Buffalo-Skedaddle Population Management Unit*. Susanville, CA: USDI, Bureau of Land Management, Eagle Lake Field Office.

Arnett, E. B., Brown, W. K., Erickson, W. P., Fiedler, J. K., Hamilton, B. L., Henry, T. H., et al. (2008). Patterns of Bat Fatalities at Wind Energy Facilities in North America. [Invited Paper]. *Journal of Wildlife Management, 72*(1), 61-78.

Arnett, E. B., Inkley, D. B., Johnson, D. H., Larkin, R. P., Manes, S., Manville, A. M., et al. (2007). *Impacts of Wind Energy Facilities on Wildlife and Wildlife Habitat* (Wildlife Society Technical Review No. 07-2). Bethesda, MD: The Wildlife Society.

Austin, D. D. (2000). Managing Livestock Grazing for Mule Deer (*Odocoileus hemionus*) on Winter Range in the Great Basin. *Western North American Naturalist, 60*(2), 198-203.

Backer, D. M. (2004). Impacts of Fire-Suppression Activities on Natural Communities. *Conservation Biology, 18*(4), 937-947.

Bailey, D. W., & Welling, G. R. (1999). Modification of Cattle Grazing Distribution with Dehydrated Molasses Supplement. *Journal of Range Management, 52*(6), 575-582.

Bailey, D. W., Welling, G. R., & Miller, E. T. (2001). Cattle Use of Foothills Rangeland Near Dehydrated Molasses Supplement. *Journal of Range Management, 54*(4), 338-347.

Baker, C. W., & Munger, J. C. (2000). *Bruneau Dunes Tiger Beetle Study - IV* (BLM Challenge Cost Share Project). Boise, ID: Boise State University.

Baker, C. W., Munger, J. C., McCauley, L., Olson, M., & Stevens, G. (1994). *Bruneau Dunes Tiger Beetle Inventory* (Technical Bulletin No. 94-1). Boise, ID: USDI, Bureau of Land Management, Idaho State Office.

Baker, W. L. (2006). Fire and Restoration of Sagebrush Ecosystems. [Peer Reviewed]. *Wildlife Society Bulletin, 34*(1), 177-185.

Barclay, R. M. R., Baerwald, E. F., & Gruver, J. C. (2007). Variation in Bat and Bird Fatalities at Wind Energy Facilities: Assessing the Effects of Rotor Size and Tower Height. *Canadian Journal of Zoology, 85*, 381-387.

Barnett, J. K., & Crawford, J. A. (1994). Pre-Laying Nutrition of Sage Grouse Hens in Oregon. *Journal of Range Management, 47*(1), 114-118.

Barton, D. C., & Holmes, A. L. (2007). Off-Highway Vehicle Trail Impacts Breeding Songbirds in Northeastern California. [Research Note]. *Journal of Wildlife Management, 71*(5), 1617-1620.

Bartos, D. L., Brown, J. K., & Booth, G. D. (1994). Twelve Years Biomass Response in Aspen Communities Following Fire. *Journal of Range Management, 47*(1), 79-83.

Bauer, K. L. (1991). Observations on the Developmental Biology of Rumpp (Coleoptera: Cicindelidae). *Great Basin Naturalist, 51*(3), 226-235.

Baydack, R. K., & Hein, D. A. (1987). Tolerance of Sharp-Tailed Grouse to Lek Disturbance. *Wildlife Society Bulletin, 15*(4), 535-539.

Bayley, P. B., & Li, H. W. (2008). Stream Fish Responses to Grazing Exclosures. *North American Journal of Fisheries Management, 28*, 135-147.

Beck, J. L., Connelly, J. W., & Reese, K. P. (2008). Recovery of Greater Sage-Grouse Habitat Features in Wyoming Big Sagebrush Following Prescribed Fire. *Restoration Ecology*.

Beck, J. L., & Mitchell, D. L. (2000). Influences of Livestock Grazing on Sage Grouse Habitat. *Wildlife Society Bulletin, 28*(4), 993-1002.

Beeson, D. R., Powell, J. M., & Lewis, M. C. (1999). Effects of Pollution on Freshwater Organisms *Water Environment Research, 71*(5), 1092-1100.

Belnap, J. (2001). Biological Soil Crusts and Wind Erosion. In J. Belnap & O. L. Lange (Eds.), *Biological Soil Crusts: Structure, Function, and Management* (Vol. Ecological Studies 150, pp. 339-347). Berlin, Heidelberg, New York: Springer-Verlag.

Belnap, J. (2002). Impacts of Off-Road Vehicles on Nitrogen Cycles in Biological Soil Crusts: Resistance in Different U.S. Deserts. *Journal of Arid Environments, 52*, 155-165.

Belnap, J. (2003). The World at Your Feet: Desert Biological Soil Crusts. *Frontiers in Ecology and the Environment, 1*(4), 181-189.

Belnap, J., & Eldridge, D. (2001). Disturbance and Recovery of Biological Soil Crusts. In J. Belnap & O. L. Lange (Eds.), *Biological Soil Crusts: Structure, Function, and Management* (Vol. Ecological Studies 150, pp. 363-383). Berlin, Heidelberg, New York: Springer-Verlag.

Belnap, J., Kaltenecker, J. H., Rosentreter, R., Williams, J., Leonard, S., & Eldridge, D. (2001). *Biological Soil Crusts: Ecology and Management* (Technical Reference No. 1730-2). Denver, CO: USDI, Bureau of Land Management, National Science and Technology Center.

Belnap, J., & Phillips, S. L. (2001). Soil Biota in an Ungrazed Grassland: Response to Annual Grass (*Bromus tectorum*) Invasion. *Ecological Applications, 11*(5), 1261-1275.

Belnap, J., Phillips, S. L., Sherrod, S. K., & Moldenke, A. (2005). Soil Biota Can Change After Exotic Plant Invasion: Does this Affect Ecosystem Processes? *Ecology, 86*(11), 3007-3017.

Belnap, J., Prasse, R., & Harper, K. T. (2001). Influence of Biological Soil Crusts on Soil Environments and Vascular Plants. In J. Belnap & O. L. Lange (Eds.), *Biological Soil Crusts: Structure, Function, and Management* (Vol. Ecological Studies 150, pp. 281-300). Berlin, Heidelberg, New York: Springer-Verlag.

Best, T. L. (1996). *Lepus californicus*. *Mammalian Species*(530), 1-10.

Beymer, R. J., & Klopatek, J. M. (1992). Effects of Grazing on Cryptogamic Crusts in Pinyon-Juniper Woodlands in Grand Canyon National Park. *American Midland Naturalist, 127*, 139-148.

Bilbrough, C. J., & Richards, J. H. (1993). Growth of Sagebrush and Bitterbrush Following Simulated Winter Browsing: Mechanisms of Tolerance. *Ecology, 74*(2), 481-492.

Billings, W. D. (1994). *Ecological Impacts of Cheatgrass and Resultant Fire on Ecosystems in the Western Great Basin* (General Technical Report No. INT-GTR-313). Ogden, UT: USDA, Forest Service, Intermountain Research Station.

Bissonette, J. A., & Steinkamp, M. J. (1996). Bighorn Sheep Response to Ephemeral Habitat Fragmentation by Cattle. *Great Basin Naturalist, 56*(4), 319-325.

Bjornn, T. C., & Reiser, D. W. (1991). Habitat Requirements of Salmonids in Streams. In W. R. Meehan (Ed.), *Influences of Forest and Rangeland Mangement on Salmonid Fishes and Their Habitats* (Vol. American Fisheries Society Special Publication 19, pp. 83-138). Bethesda, MD: USDA, Forest Service.

Blaisdell, J. P., & Pechanec, J. F. (1949). Effects of Herbage Removal at Various Dates on Vigor of Bluebunch Wheatgrass and Arrowleaf Balsamroot. *Ecology, 30*(3), 298-305.

BLM. (1982). *Twin Falls Management Framework Plan*: USDI, Bureau of Land Management.

BLM. (1983). *Bruneau Management Framework Plan*: USDI, Bureau of Land Management.

BLM. (1997). *Idaho Standards for Rangeland Health and Guidelines for Livestock Grazing Management* Boise, ID: USDI, Bureau of Land Management, Idaho State Office.

BLM. (1998a). *A User's Guide to Assessing Proper Functioning Condition and the Supporting Science for Lotic Areas* (Technical Report No. 1737-15): USDI, Bureau of Land Management

BLM. (1998b). *Wildfire Prevention Strategies* (No. PMS 455 or NFES 1572). Boise, ID: National Interagency Fire Center, Bureau of Land Management National Fire & Aviation Training Support Group.

BLM. (1999a). *Owyhee Resource Management Plan*: USDI, Bureau of Land Management, Lower Snake River District, Boise Field Office.

BLM. (1999b). *A User's Guide to Assessing Proper Functioning Condition and the Supporting Science for Lentic Areas* (Technical Report No. 1737-16): USDI, Bureau of Land Management.

BLM. (2001). National Management Strategy for Motorized Off-Highway Vehicle Use on Public Lands (pp. 48). Washington, DC: USDI, Bureau of Land Management.

BLM. (2007a). *Analysis of the Management Situation for the Jarbidge Resource Management Plan*. Twin Falls, ID: USDI, Bureau of Land Management, Jarbidge Field Office.

BLM. (2007b). *Final Programmatic Environmental Impact Statement for Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States*. Washington, DC: USDI, Bureau of Land Management.

BLM. (2007c). *Noxious and Invasive Weed Treatment for the Boise District and Jarbidge Field Offices* (Environmental Assessment No. ID100-2005-EA-265). Boise, ID: USDI, Bureau of Land Management, Boise Distirict.

BLM. (2008a). *Visitor Days and Participants by Office, Activity Group and Activity* (Recreation Management Information System Report No. 19): USDI, Bureau of Land Manangement.

BLM. (2008b). *Wilderness Characteristics Technical Report* (Technical Report). Twin Falls, ID: USDI, Bureau of Land Management, Jarbidge Field Office.

BLM. (2009). *Approved Resource Management Plan Amendments/Record of Decision (ROD) for Designation of Energy Corridors on Bureau of Land Management-Administered Lands in the 11 Western States* (No. BLM/WO-GI-09-005-1800). Washington, D.C.: USDI, Bureau of Land Management.

Bond, J. G. (Cartographer). (1978). *Geologic Map of Idaho*.

Booth, M. S., Stark, J. M., & Caldwell, M. M. (2003). Inorganic N Turnover and Availability in Annual- and Perrenial-Dominated Soils in a Northern Utah Shrub-Steppe Ecosystem. *Biogeochemistry, 66*(3), 311-330.

Borkowski, J. J., White, P. J., Garrott, R. A., Davis, T., Hardy, A. R., & Reinhart, D. J. (2006). Behavioral Responses of Bison and Elk in Yellowstone to Snowmobiles and Snow Coaches. *Ecological Applications, 16*(5), 1911-1925.

Bouffard, S. H., Tindall, K. V., & Fothergill, K. (2009). Herbicide Treatment to Restore St. Anthony Dunes Tiger Beetle Habitat: A Pilot Study.

Boyle, S. A., & Samson, F. B. (1985). Effects of Nonconsumptive Recreation on Wildlife: A Review. *Wildlife Society Bulletin, 13*(2), 110-116.

Bradford, J. B., & Laurenroth, W. K. (2006). Controls Over Invasion of *Bromus tectorum*: The Importance of Climate, Soil, Disturbance and Seed Availability. *Journal of Vegetation Science, 17*, 693-704.

Brady, N. C. (1984). Chapter 16: Soil Erosion and Its Control *The Nature and Properties of Soils* (9th ed.). New York, NY: MacMillan Publishing Company.

Breyfogle, S., & Ferguson, S. A. (1996). *User Assessment of Smoke-Disperson Models for Wildland Biomass Burning* (General Technical Report No. PNW-GTR-379). Seattle, WA: USDA, Forest Service, Pacific Northwest Research Station.

Broadhead, W. H. (1999). Cattle, Control, and Conservation. *Cultural Resource Management*(9), 2.

Brooks, M. L., & Berry, K. H. (2006). Dominance and Environmental Correlates of Annual Plants in the Mojave Desert, USA. *Journal of Arid Environments, 67*, 100-124.

Brooks, M. L., D'Antonio, C. M., Richardson, D. M., Grace, J. B., Keeley, J. E., DiTomaso, J. M., et al. (2004). Effects of Invasive Alien Plants on Fire Regimes *BioScience, 54*(7), 677-688.

Brooks, M. L., Matchett, J. R., & Berry, K. H. (2006). Effects of Livestock Watering Sites on Alien and Native Plants in the Mojave Desert, USA. *Journal of Arid Environments, 67*, 125-147.

Brotherson, J. D., Rushforth, S. R., & Johansen, J. R. (1983). Effects of Long-term Grazing on Cryptogam Crust Cover in Navajo National Monument, Ariz. *Journal of Range Management, 36*(5), 579-581.

Brown, J. C., Evans, R. A., & Young, J. A. (1985). Effects of Sagebrush Control Methods and Seeding on Runoff and Erosion. *Journal of Range Management, 38*(3), 195-199.

Brown, J. K., & Smith, J. K. (2000). Wildland Fire in Ecosystems: Effects of Fire on Flora (pp. 257). Ogden, UT: USDA, Forest Service, Rocky Mountain Research Station.

Broyles, B. (1995). Desert Wildlife Water Developments: Questioning Use in the Southwest. *Wildlife Society Bulletin, 23*(4), 663-675.

Buenger, B. (2003). *The Impact of Wildland and Prescribed Fire on Archaeological Resources* Unpublished Dissertation, University of Kansas.

Bull, E. L., & Hayes, M. P. (2000). Livestock Effects on Reproduction of the Columbia Spotted Frog. *Journal of Range Management, 53*(3), 291-294.

Bunnell, K. D., Flinders, J. T., & Wolfe, M. L. (2006). Potential Impacts of Coyotes and Snowmobiles on Lynx: Conservation in the Intermountain West. [Peer Reviewed]. *Wildlife Society Bulletin, 34*(3), 828-838.

Bureau of Economic Analysis. (2009). CA45 Farm Income and Expenses: Elmore, Owyhee, and Twin Falls Counties, Idaho, and Elko County, Nevada. *Regional Economic Information System* Retrieved February 22, 2010, from http://www.bea.gov/regional/reis/default.cfm?&selTable=CA45

Burkett, D. W., & Thompson, B. C. (1994). Wildlife Association with Human-Altered Water Sources in Semiarid Vegetation Communities. *Conservation Biology, 8*(3), 682-690.

Burton, T. A. (2005). Fish and Stream Habitat Risks from Uncharacteristic Wildfire: Observations from 17 Years of Fire-Related Disturbances on the Boise National Forest, Idaho. *Forest Ecology and Management, 211*, 140-149.

Burton, T. A., Cowley, E. R., & Smith, S. J. (2007). *Monitoring Stream Channels and Riparian Vegetation - Multiple Indicators* (Idaho Technical Bulletin No. 2007-01): USDI, Bureau of Land Management, Idaho State Office and USDA, Forest Service, Intermountain Region.

Burton, T. A., Smith, S. J., & Cowley, E. R. (2008). *Monitoring Stream Channels and Riparian Vegetation - Multiple Indicators* (Interagency Technical Bulletin No. Version 5.0): USDI, Bureau of Land Management, Idaho State Office and USDA, Forest Service, Intermountain Region.

Byers, J. A. (2003). Pronghorn (*Antilocapra americana*). In G. A. Feldhamer, B. C. Thompson & J. A. Chapman (Eds.), *Wild Mammals of North America: Biology, Management, and Conservation* (2nd ed., pp. 998-1008). Baltimore and London: The Johns Hopkins University Press

Cabe, P. R. (1993). European Starling (*Sturnus vulgaris*), The Birds of North America Online. Retrieved December 28, 2008, from http://bna.birds.cornell.edu/bna/species/048

Carman, J. G., & Brotherson, J. D. (1982). Comparison of Sites Infested and Not Infested with Saltcedar (*Tamarix pentandra*) and Russian Olive (*Elaeagnus angustifolia*). *Weed Science, 30*(4), 360-364.

Carpinelli, M. F., Sheley, R. L., & Maxwell, B. D. (2004). Revegetating Weed-Infested Rangeland with Niche-Differentiated Desirable Species. *Journal of Range Management, 57*(1), 97-105.

Cassirer, E. F., Freddy, D. J., & Ables, E. D. (1992). Elk Responses to Disturbance by Cross-Country Skiers in Yellowstone National Park. *Wildlife Society Bulletin, 20*(4), 375-381.

Certini, G. (2005). Effects of Fires on Forest Soils: A Review. *Oecologia, 143*(1), 1-10.

CH2MHILL. (2008). *Slickspot Peppergrass (Lepidium papilliferum) Permanent Monitoring Plots: Juniper Butte Range*. Mountain Home Air Force Base, ID: United States Air Force, Environmental Management, 366 CES/CEVA.

Chambers, J. C., Roundy, B. A., Blank, R. R., Meyer, S. E., & Whittaker, A. (2007). What Makes Great Basin Sagebrush Ecosystems Invasible by *Bromus tectorum*. *Ecological Monographs, 77*(1), 117-145.

Clark, R. N., & Gibbons, D. R. (1991). Recreation. In W. R. Meehan (Ed.), *Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitats* (Vol. American Fisheries Society Special Publication 19, pp. 459-481). Bethesda, MD: USDA, Forest Service.

Clark, W. R., Schmitz, R. A., & Bogenschutz, T. R. (1999). Site Selection and Nest Success of Ring-Necked Pheasants as a Function of Location in Iowa Landscapes. *Journal of Wildlife Management, 63*(3), 976-989.

Clary, W. P. (1999). Stream Channel and Vegetation Responses to Late Spring Cattle Grazing *Journal of Range Management, 52*, 218-227.

Clary, W. P., & Kinney, J. W. (2000). *Streambank Response to Simulated Grazing*: USDA, Forest Service.

Coates-Markle, L. (2000). *Summary Recommendation - BLM Wild Horse and Burro Population Viability Forum, April 1, 1999* (Wild Horse and Burro Program Resource Notes No. 35).

Coates, P. S. (2007). *Greater Sage-Grouse (Centrocercus uruphasianus) Nest Predation and Incubation Behavior.* Unpublished Dissertation, Idaho State University, Pocatello, ID.

Connelly, J. W., Arther, W. J., & Markham, O. D. (1981). Sage Grouse Leks on Recently Disturbed Sites. *Journal of Range Management, 52*(2), 153-154.

Connelly, J. W., Knick, S. T., Schroeder, M. A., & Stiver, S. J. (2004). Conservation Assessment of Greater Sage-Grouse and Sagebrush Habitats. Unpublished Report. Western Association of Fish and Wildlife Agencies.

Connelly, J. W., Schroeder, M. A., Sands, A. R., & Braun, C. E. (2000). Guidelines to Manage Sage Grouse Populations and Their Habitats. *Wildlife Society Bulletin, 28*(4), 967-985.

Cothran, G. (2009). Personal Communication with S. Stokke on July 16.

Cox, R. D., & Anderson, V. J. (2004). Increasing Native Diversity of Cheatgrass-Dominated Rangeland through Assisted Sucession. *Journal of Range Management, 57*, 203-210.

Cravey, S. P. (2005). *Are Pesticides a Factor in Bird Declines?* Unpublished Essay of Distinction, Evergreen State College, Olympia, WA.

Crawford, J. A., Olson, R. A., West, N. E., Mosley, J. C., Schroeder, M. A., Whitson, T. D., et al. (2004). Ecology and Management of Sage-Grouse and Sage-Grouse Habitat. *Journal of Range Management, 57*(1), 2-19.

Crooks, K. R., Suarez, A. V., Bolger, D. T., & Soule, M. E. (2001). Extinction and Colonization of Birds on Habitat Islands. *Conservation Biology, 15*(1), 159-172.

CSFTT. (2003). *Conservation Agreement and Strategy: Columbia Spotted Frog (Rana luteiventris) Great Basin Population, Nevada, and Northeastern Subpopulations, Jarbidge-Independence and Ruby Mountain*: Columbia Spotted Frog Technical Team.

Curtis, K. R., Brough, E., Torell, R., & Riggs, W. (2007). *Elko County Cow-Calf Production Costs & Returns, 2006* (Fact Sheet No. 07-08): University of Nevada Cooperative Extension.

D'Antonio, C. M., & Vitousek, P. M. (1992). Biological Invasions by Exotic Grasses, the Grass/Fire Cycle, and Global Change. *Annual Review of Ecology and Systematics, 23*, 63-87.

Davies, K. W., Bates, J. D., & Miller, R. F. (2007). The Influence of *Artemisia tridentata* ssp. *wyomingensis* on Microsite and Herbaceous Vegetation Heterogeneity. *Journal of Arid Environments, 69*, 441-457.

DeBano, L. F., Neary, D. G., & Folliott, P. F. (2005). *Wildland Fire in Ecosystems: Effects of Fire on Soils and Water* (General Technical Report No. RMRS-GTR-42-vol 4.). Ogden, UT: USDA, Forest Service, Rocky Mountain Research Station.

DeCesare, N. J., & Pletscher, D. H. (2006). Movements, Connectivity, and Resource Selection of Rocky Mountain Bighorn Sheep. *Journal of Mammalogy, 87*(3), 531-538.

Dechant, J. A., Sondreal, M. L., Johnson, D. H., Igl, L. D., Goldade, C. M., Nenneman, M. P., et al. (1998). Effects of Management Practices on Grassland Birds: Short-Eared Owl. Retrieved February 14, 2001, from http://www.npwrc.usgs.gov/resource/literatr/grasbird/shortear/shortear.htm

Dechant, J. A., Sondreal, M. L., Johnson, D. H., Igl, L. D., Goldade, C. M., Rabie, P. A., et al. (2001). *Effects of Management Practices on Grassland Birds: Ferruginous Hawk*. Jamestown, ND: Northern Prairie Wildlife Research Center.

Dechant, J. A., Sondreal, M. L., Johnson, D. H., Igl, L. D., Goldade, C. M., Zimmerman, A. L., et al. (1999). Effects of Management Practices on Grassland Birds: Western Meadowlark. Retrieved February 14, 2001, from http://www.npwrc.usgs.gov/resource.literatr/grasbird/weme/weme.htm

DeLong, A. K., Crawford, J. A., & DeLong Jr., D. C. (1995). Relationships Between Vegetational Structure and Predation of Artificial Sage Grouse Nests. *Journal of Wildlife Management, 59*(1), 88-92.

Denman, K. L., Brasseur, G., Chidthaisong, A., Ciais, P., Cox, P. M., Dickinson, R. E., et al. (2007). Couplings Between Changes in the Climate System and Biogeochemistry. In S. Solomon, D. Qin, M. Manning, Z. Chen, M. Marquis, K. B. Averyt, M. Tignor & H. L. Miller (Eds.), *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (pp. 499-587). Cambridge and New York: Cambridge University Press.

DEQ. (2000). Bruneau Subbasin Assessment and Total Maximum Daily Loads of the 303(d) Water Bodies. Twin Falls, ID: Idaho Department of Environmental Quality.

DEQ. (2008). *Air Monitoring Overview: How DEQ Assesses Air Quality*: Idaho Department of Environmental Quality.

DiTomaso, J. M. (2000). Invasive Weeds in Rangelands: Species, Impacts, and Management. *Weed Science, 48*(2), 255-265.

Dobkin, D. S., Rich, A. C., & Pyle, W. H. (1998). Habitat and Avifaunal Recovery from Livestock Grazing in a Riparian Meadow System of the Northwestern Great Basin. *Conservation Biology, 12*(1), 209-221.

DOE. (2009, 12/09/2008). Idaho Wind Resource Map. Retrieved April 9, 2009, from http://www.windpoweringamerica.gov/maps_template.asp?stateab=id

Doherty, K. E., Naugle, D. E., Walker, B. L., & Graham, J. M. (2008). Greater Sage-Grouse Winter Habitat Selection and Energy Development. *Journal of Wildlife Management, 72*(1), 187-195.

Donovan, T. M., Thompson, I., Frank R., Faaborg, J., & Probst, J. R. (1995). Reproductive Success of Migratory Birds in Habitat Sources and Sinks. *Conservation Biology, 9*(6), 1380-1395.

Downer, A. (1992). *Vandalizing and Looting of Archeological Sites on Indian Lands: The Navajo Reservation, a Case Study From the Southwestern United States* (General Technical Report No. PNW-GTR-293). Portland, OR: USDA, Forest Service.

Dramstad, W. E., Olson, J. D., & Forman, R. T. (1996). *Landscape Ecology Principles in Landscape Architecture and Land Use Planning*. Washington, DC: Island Press.

Drut, M. S., Pyle, W. H., & Crawford, J. A. (1994). Diets and Food Selection of Sage Grouse Chicks in Oregon. *Journal of Range Management, 47*(1), 90-93.

Dunham, J. B., Young, M. K., Gresswell, R. E., & Rieman, B. E. (2003). Effect of Fire on Fish Populations: Landscape Perspectives on Persistence of Native Fishes and Nonnative Fish Invasion *Forest Ecology and Management, 178*(1-2), 183-196.

Dwire, K. A. (2001). *Relations Among Hydrology, Soils, and Vegetation in Riparian Meadow: Influence on Organic Matter Distribution and Storage.* Unpublished Dissertation, Oregon State University, Corvallis, OR.

Dwire, K. A., & Kauffman, J. B. (2003). Fire and Riparian Ecosystems in Landscapes of the Western USA. *Forest Ecology and Management, 178*, 61-74.

Dyksterhuis, E. J. (1949). Condition and Management of Range Land Based on Quantitative Ecology. *Journal of Range Management, 2*(3), 104-115.

Eckert, J., Richard E., Peterson, F. F., & Belton, J. T. (1986). Relation Between Ecological-Range Condition and Proportion of Soil-Surface Types. *Journal of Range Management, 39*(5), 409-414.

Eckert, J., Richard E., Wood, M. K., Blackburn, W. H., & Peterson, F. F. (1979). Impacts of Off-Road Vehicles on Infiltration and Sediment Production of Two Desert Soils. *Journal of Range Management, 32*(5), 394-397.

Ehrenfeld, J. G. (2003). Effects of Exotic Plant Invasions on Soil Nutrient Cycling Processes. *Ecosystems, 6*(6), 503-523.

Eigenbrod, F., Hecnar, S. J., & Fahrig, L. (2008). Accessible Habitat: An Improved Measure of the Effects of Habitat Loss and Roads on Wildlife Populations. [Research]. *Landscape Ecology, 23*, 159-168.

Eldridge, D. J., & Rosentreter, R. (2004). *Shrub Mounds Enhance Water Flow in a Shrub-Steppe Community in Southwestern Idaho, USA* (Proceedings No. RMRS-P-31): USDA, Forest Service.

Ellison, L. (1960). Influence of Grazing on Plant Succession of Rangelands. *The Botanical Review, 26*(1), 1-78.

Emmerich, W. E., & Cox, J. R. (1992). Hydrologic Characteristics Immediately after Seasonal Burning on Introduced and Native Grasslands. *Journal of Range Management, 45*(5), 476-479.

Energy Policy Institute. (2006). Energy Policy Issues (pp. 18): Boise State University.

EPA. (2008). *Inventory of US Greenhouse Gas Emissions and Sinks: 1990-2006*. Washington, DC: US Environmental Protection Agency.

Evans, M. (2008). Personal Communication with Unknown on 2008.

Evans, R. D., & Lange, O. L. (2001). Biological Soil Crusts and Ecosystems Nitrogen and Carbon Dynamics. In J. Belnap & O. L. Lange (Eds.), *Biological Soil Crusts: Structure, Function, and Management* (Vol. Ecological Studies 150, pp. 263-279). Berlin, Heidelberg, New York: Springer-Verlag.

Evans, R. D., Rimer, R., Sperry, L., & Belnap, J. (2001). Exotic Plant Invasion Alters Nitrogen Dynamics in an Arid Grassland. *Ecological Applications, 11*(5), 1301-1310.

Farley, G. H., Ellis, L. M., Stuart, J. N., & Scott Jr., N. J. (1994). Avian Species Richness in Different-Aged Stands of Riparian Forest Along the Middle Rio Grande, New Mexico. *Conservation Biology, 8*(4), 1098-1108.

Fawcett, J., William B. (1997). *Final Report: Intensive Cultural Resource Inventories and Archaeological Investigations of Fire Rehabilitations in Southern Idaho: 1994 -1996*. Logan, UT: Utah State University.

Flanders-Wanner, B. L., White, G. C., & McDaniel, L. M. (2004). Weather and Prairie Grouse: Dealing with Effects Beyond our Control. *Wildlife Society Bulletin, 32*(1), 22-34.

Fleischner, T. L. (1994). Ecological Costs of Livestock Grazing in Western North America. [Review]. *Conservation Biology, 8*(3), 629-644.

Forman, R. T., & Alexander, L. E. (1998). Roads and Their Major Ecological Effects *Annual Review of Ecology and Systematics, 29*, 207-231.

Forster, P., Ramaswamy, V., Artaxo, P., Berntsen, T., Betts, R., Fahey, D. W., et al. (2007). Changes in Atmospheric Constitutents and in Radiative Forcing. In S. Solomon, D. Qin, M. Manning, Z. Chen, M. Marquis, K. B. Averyt, M. Tignor & H. L. Miller (Eds.), *Climate Change 2007: The Physical Science Basis* (pp. 129-234). Cambridge, United Kingdom and New York, NY: Cambridge University Press.

Freddy, D. J., Bronaugh, W. M., & Fowler, M. C. (1986). Responses of Mule Deer to Disturbance by Persons Afoot and Snowmobiles. *Wildlife Society Bulletin, 14*(1), 63-68.

Freilich, J. E., Emlen, J. M., Duda, J. T., Freeman, D. C., & Cafaro, P. J. (2003). Ecological Effects of Ranching: A Six-Point Critique. *BioScience, 53*(8), 759-765.

Frey, S. N., & Conover, M. R. (2006). Habitat Use by Meso-Predators in a Corridor Environment. [Research]. *Journal of Wildlife Management, 70*(4), 1111-1118.

Frost, R., A., Wilson, L. M., Launchbaugh, K. L., & Hovde, E. M. (2008). Seasonal Change in Forage Value of Rangeland Weeds in Northern Idaho. *Invasive Plant Science and Management, 1*(4), 343-351.

Furniss, M. J., Roelofs, T. D., & Yee, C. S. (1991). Road Construction and Maintenance. In W. R. Meehan (Ed.), *Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitats* (Vol. American Fisheries Society Special Publication 19, pp. 297-324). Bethesda, MD: USDA, Forest Service.

FWS. (1995). Snake River Aquatic Species Recovery Plan (pp. 92). Boise, ID: USDI, Fish and Wildlife Service, Snake River Basin Office, Ecological Services.

FWS. (2002). *Recovery Plan for the Bruneau Hot Springsnail (Pyrgulopsis bruneauensis)*. Portland, OR: USDI, Fish and Wildlife Service, Region 1.

FWS. (2008). *Greater Sage-Grouse Interim Status Update* (Interim Status Update No. GSGII): USDI, Fish and Wildlife Service, Mountain-Prairie Region, Wyoming Ecological Services Office.

Ganskopp, D., Aguilera, L., & Vavra, M. (2007). Livestock Forage Conditioning Among Six Northern Great Basin Grasses. *Rangeland Ecology and Management, 60*(1), 71-78.

Ganskopp, D., Angell, R., & Rose, J. (1992). Response of Cattle to Cured Reproductive Stems in a Caespitose Grass. *Journal of Range Management, 45*(4), 401-404.

Ganskopp, D., Svejcar, T., Taylor, F., Farstvedt, J., & Paintner, K. (1999). Seasonal Cattle Management in 3 to 5 Year Old Bitterbrush Stands. *Journal of Range Management, 52*, 166-173.

Ganskopp, D., Svejcar, T., & Vavra, M. (2004). Livestock Forage Conditioning: Bluebench Wheatgrass, Idaho Fescue and Bottlebrush Squirreltail. *Journal of Range Management, 57*(4), 384-392.

Geist, V. (1982). Adaptive Behavioral Strategies. In J. W. Thomas & D. E. Toweill (Eds.), *Elk of North America Ecology and Management: A Wildlife Management Institute Book* (pp. 219-277). Calgary, Canada: University of Calgary.

Gelbard, J. L., & Belnap, J. (2003). Roads as Conduits for Exotic Plant Invansions in a Semiarid Lanscape. *Conservation Biology, 17*(2), 420-432.

Gelbard, J. L., & Harrison, S. (2003). Roadless Habitats as Refuges for Native Grasslands: Interactions with Soil, Aspect, and Grazing. *Ecological Applications, 13*(2), 404-415.

George, T. L., Fowler, A. C., Knight, R. L., & McEwen, L. C. (1992). Impacts of Severe Drought on on Grassland Birds in Western North Dakota. *Ecological Applications, 2*(3), 275-284.

Giesen, K. M., & Connelly, J. W. (1993). Guidelines for Management of Columbian Sharp-Tailed Grouse Habitats. *Wildlife Society Bulletin, 21*(3), 325-333.

Gilbert, P. F., Wallmo, O. C., & Gill, R. B. (1970). Effect of Snow Depth on Mule Deer in Middle Park, Colorado. *Journal of Wildlife Management, 34*(1), 15-23.

Giordanego, J. H., Frasier, G. W., & Trlica, M. J. (2003). Hydrologic and Sediment Responses to Vegetation and Soil Disturbances. *Journal of Range Management, 56*(2), 152-158.

Global Insight. (2008). *Idaho Economic Forecast, National Variables Forecast*: Global Insight.

Goguen, C. B., & Mathews, N. E. (2001). Brown-Headed Cowbird Behavior and Movements in Relation to Livestock Grazing. *Ecological Applications, 11*(5), 1533-1544.

Gomez-Mestres, I., & Tejedo, M. (2003). Local Adaption of an Anuran Amphibian to Osmotically Stressful Environments. *Evolution, 57*(8), 1889-1899.

Gonzales, J. E. (2002). 13th Annual Idaho Public Policy Survey. Boise, ID: Boise State University, College of Social Sciences and Public Affairs, Social Science Research Center.

Goodrich, S. (2005). *Classification and Capabilities of Woody Sagebrush Communities of Western North America with Emphasis on Sage-Grouse Habitat* (Proceedings No. RMRS-P-38). Fort Collins, CO: USDA, Forest Service, Rocky Mountain Research Station.

Gratson, M. W., & Whitman, C. L. (2000). Road Closures and Density and Success of Elk Hunters in Idaho. *Wildlife Society Bulletin, 28*(2), 302-310.

Gregg, M. A., Barnett, J. K., & Crawford, J. A. (2008). Temporal Variation in Diet and Nutrition of Preincubating Greater Sage-Grouse. *Rangeland Ecology and Management, 61*(5), 535-542.

Gregg, M. A., Crawford, J. A., Drut, M. S., & DeLong, A. K. (1994). Vegetational Cover and Predation of Sage Grouse Nests in Oregon. *Journal of Wildlife Management, 58*(1), 162-166.

Gregory, D., Johnston, R., Geraldine, P., Watts, M., & Whatmore, S. (Eds.). (2009). *Dictionary of Human Geography* (5th ed.). West Sussex, England: John Wiley & Sons.

Gregory, S. V., Swanson, F. J., Mckee, W. A., & Cummins, K. W. (1991). An Ecosystem Perspective of Riparian Zones: Focus on Links Between Land and Water. *BioScience, 41*, 540-551.

Gresswell, R. E. (1999). Fire and Aquatic Ecosystems in Forested Biomes of North America. *Transactions of the American Fisheries Society, 128*(2), 193-221.

Gucker, C. L. (2006). *Cerocarpus ledifolius*: USDA, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory

Gutzwiller, K. J. (Ed.). (2002). *Applying Landscape Ecology in Biological Conservation*. New York, NY: Springer.

Hann. (2008). Interagency and the Nature Conservancy Fire Regime Condition Class (FRCC). from http://www.frcc.gov

Hann, W. (2004). *Interagency Fire Regime Condition Class (FRCC) Guidebook, Version 1.3.0*: USDA, Forest Service; USDI; The Nature Conservancy; and Systems for Environmental Management.

Hansen, P. L., & Hall, J. B. (2002). Classification and Management of USDI Bureau of Land Management's Riparian and Wetland Sites in Eastern and Southern Idaho. Corvallis, MT: Bitterroot Restoration, Inc.

Hanser, S. E., & Huntly, N. J. (2006). The Biogeography of Small Mammals of Fragmented Sagebrush-Steppe Landscapes. *Journal of Mammology, 87*(6), 1165-1174.

Harrington, J. L., & Conover, M. R. (2006). Characteristics of Ungulate Behavior and Mortality Associated with Wire Fences. [Peer Reviewed]. *Wildlife Society Bulletin, 34*(4), 1295-1305.

Harrison, R. D., Chatterton, N. J., Waldron, B. L., Davenport, B. W., Palazzo, A. J., Horton, W. H., et al. (2000). *Forage Kochia: Its Compatibility and Potential Aggressiveness on Intermountain Rangelands*. Logan, UT: Utah State University, Utah Agricultural Experiment Station; USDA, Agricultural Research Service, Forage and Range Research Laboratory; U.S. Army Cold Regions Research; Engineering Laboratory, Hanover, NH.

Hart, R. H., Clapp, S., & Test, P. S. (1993). Grazing Strategies, Stocking Rates, and Frequency and Intensity of Grazing on Western Wheatgrass and Blue Grama. *Journal of Range Management, 46*(2), 122-126.

Hausleitner, D., Reese, K. P., & Apa, A. D. (2005). Timing of Vegetation Sampling at Greater Sage-Grouse Nests. [Research Note]. *Rangeland Ecology and Management, 58*, 553-556.

Hawkes, C. V., Belnap, C., D'Antonio, C., & Firestone, M. K. (2006). Arbuscular Mycorrhizal Assemblages in Native Plant Roots Change in the Presence of Invasive Exotic Grasses. *Plant and Soil, 281*, 369-380.

Hayes, S. G., Leptich, D. J., & Zager, P. (2002). Proximate Factors Affecting Male Elk Hunting Mortality in Northern Idaho. *Journal of Wildlife Management, 66*(2), 491-499.

Hedrick, D. W., Hyder, D. N., Sneva, F. A., & Poulton, C. E. (1966). Ecological Response of Sagebrush-Grass Range in Central Oregon to Mechanical and Chemical Removal of *Artemisia*. *Ecology, 47*(3), 432-439.

Hempy-Mayer, K., & Pyke, D. A. (2008). Defoliation Effects on *Bromus tectorum* Seed Production: Implications for Grazing. *Rangeland Ecology and Management, 61*(1), 116-123.

Hendricks, P., Kudray, G. M., Lenard, S., & Maxell, B. (2007). *A Multi-scale Analysis Linking Prairie Breeding Birds to Site and Landscape Factors Including USGS GAP Data*. Helena, MT: Montana Natural Heritage Progam.

Hester, J. W., Thurow, T. L., & Taylor, J., C.A. (1997). Hydrologic Characteristics of Vegetation Types as Affected by Prescribed Burning. *Journal of Land Management, 50*(2), 199-204.

Hilty, J. H., Eldridge, D. J., Rosentreter, R., Wicklow-Howard, M. C., & Pellant, M. (2004). Recovery of Biological Soil Crusts Following Wildfire in Idaho. *Journal of Range Management, 57*(1), 89-96.

Hobbs, N. T. (1989). Linking Energy Balance to Survival in Mule Deer: Development and Test of a Simulation Model. *Wildlife Monographs, 101*, 3-39.

Holecheck, J. L. (1988). An Approach for Setting the Stocking Rate. *Rangelands, 10*(1), 10-14.

Holecheck, J. L., Gomez, H., Milinar, F., & Galt, D. (1999). Grazing Studies: What We've Learned. *Rangelands, 21*(2), 12-16.

Holecheck, J. L., Pieper, R. D., & Herbel, C. H. (1998). *Range Management: Principles and Practices*. Upper Saddle River, NJ: Prentice-Hall, Inc.

Holecheck, J. L., Valdez, R., Schemnitz, S. D., Pieper, R. D., & Davis, C. A. (1982). Manipulation of Grazing to Improve or Maintain Wildlife Habitat. *Wildlife Society Bulletin, 10*(3), 204-210.

Holloran, M. J. (2005). *Greater Sage-Grouse (Centrocercus urophasianus) Population Response to Natural Gas Field Development in Western Wyoming.* Unpublished Dissertation, University of Wyoming, Laramie, WY.

Holloran, M. J., & Anderson, S. H. (2005). Spatial Distribution of Greater Sage-Grouse Nests in Relatively Contiguous Sagebrush Habitats. *The Condor*(107), 742-752.

Holloran, M. J., Heath, B. J., Lyon, A. G., Slater, S. J., Kuipers, J. L., & Anderson, S. H. (2005). Greater Sage-Grouse Nesting Habitat Selection and Success in Wyoming. *Journal of Wildlife Management, 69*(2), 638-649.

Holmes, A. L., Green, G. A., Morgan, R. L., & Livezey, K. B. (2003). Burrowing Owl Nest Success and Burrow Longevity in North Central Oregon. *Western North American Naturalist, 63*(2), 244-250.

Holmes, T. L., Knight, R. L., Stegall, L., & Craig, G. R. (1993). Responses of Wintering Grassland Raptors to Human Disturbance. *Wildlife Society Bulletin, 21*(4), 461-468.

Holthuijsen, A. M., Eastland, W. G., Ansell, A. R., Kochert, M. N., Williams, R. D., & Young, L. S. (1990). Effects of Blasting on Behavior and Productivity of Nesting Prairie Falcons. *Wildlife Society Bulletin, 18*(3), 270-281.

Horn, J. W., Arnett, E. B., & Kunz, T. H. (2008). Behavioral Responses of Bats to Operating Wind Turbines. [Management and Conservation]. *Journal of Wildlife Management, 72*(1), 123-132.

Howard, J. L. (1996). *Populus tremuloides*.

Howard, J. L. (1999). *Artemisia tridentata ssp. wyomingensis*.

Howard, R. P., & Wolfe, M. L. (1976). Range Improvement Practices and Ferruginous Hawks. *Journal of Range Management, 29*(1), 22-37.

Hubbard, C. R. (1959). *A Survey of the Mineral Resources of Idaho* (Pamphlet No. 105). Moscow, ID: Idaho Bureau of Mines and Geology.

Hull, A. C. (1949). Growth Periods and Herbage Production of Cheatgrass and Reseeded Grasses in Southwestern Idaho. *Journal of Range Management, 2*, 183-186.
Huwar, S. L., Anderson, D. R., Remington, T. E., & White, G. C. (2008). Using Human-Imprinted Chicks to Evaluate the Importance of Forbs to Sage-Grouse. [Management and Conservation Note]. *Journal of Wildlife Management, 72*(7), 1622-1627.
Idaho Sage-grouse Advisory Committee. (2006). *Conservation Plan for the Greater Sage-grouse in Idaho*: Idaho Sage-grouse Advisory Committee.
IDFG. (2003). *Idaho Sport Fishing Economic Report*. Boise, ID: Idaho Department of Fish and Game.
IDL. (2009a). Bureau of Surface and Mineral Resources. Retrieved April 9, 2009, from http://www.idl.idaho.gov/bureau/smr/smr_index.htm
IDL. (2009b). Mineral Leasing. Retrieved February 10, 2009, from http://www.idl.idaho.gov/bureau/Minerals/min_leasing/leasing.htm
IDL. (2009c). Surface Mining. Retrieved February 10, 2009, from http://www.idl.idaho.gov/bureau/Minerals/surface_mine/sm_index.htm
IDPR. (2008). *Idaho OHV Residence Statistics*: Idaho Department of Parks and Recreation.
Ingelfinger, F., & Anderson, S. H. (2004). Passerine Response to Roads Associated with Natural Gas Extraction in a Sagebrush Steppe Habitat. *Western North American Naturalist, 64*(3), 385-395.
Ingram, L. J., Stahl, P. D., Schuman, G. E., Buyer, J. S., Vance, G. F., Ganjegunte, G. K., et al. (2008). Grazing Impact on Soil Carbon and Micorbial Communitities in a Mixed Grass Ecosystem. *Soil Science Society of America Journal, 72*(4), 939-948.
IPCC. (2006). *2006 IPCC Guidelines of National Greenhouse Gas Inventories*. IGES, Japan: National Greenhouse Gas Inventories Program.
Iverson, R., Hinkley, S., Webb, R. M., & Hallet, B. (1981). Physical Effects of Vehicular Distubances on Arid Landscapes. [Report]. *Science, 212*(4497), 915-917.
James, A. R. C., & Stuart-Smith, A. K. (2000). Distribution of Caribou and Wolves in Relation to Linear Corridors. *Journal of Wildlife Management, 64*(1), 154-159.
Jansen, B. D., Krausman, P. R., Heffelfinger, J. R., & Devos Jr., J. C. (2006). Bighorn Sheep Selection of Landscape Features in an Active Copper Mine. [Peer Reviewed]. *Wildlife Society Bulletin, 34*(4), 1121-1126.
Jantz, P., & Goetz, S. (2008). Using Widely Available Geospatial Data Sets to Assess the Influence of Roads and Buffers on Habitat Core Areas and Connectivity *Natural Areas Journal, 28*(8), 261-274.
Johansen, J. R. (2001). Impacts of Fire on Biological Soil Crusts. In J. Belnap & O. L. Lange (Eds.), *Biological Soil Crusts: Structure, Function and Management* (Vol. Ecological Studies 150, pp. 385-397). Berlin, Heidelberg, New York: Springer-Verlag.
Johnson, B. R., & Raines, G. L. (1996). *Digital Representation of the Idaho State Geological Map: A Contribution to the Interior Columbia River Basin Ecosystem Management Project* (Open File Report No. 95-690): USDI, US Geological Survey.
Johnson, C. (2004). *Archaeological Sites and Fire - Induced Changes*. Vernal, UT: USDA, Forest Service, Ashley National Forest.
Johnson, C. W., Schumaker, G. A., & Smith, J. P. (1980). Effects of Grazing and Sagebrush Control on Potential Erosion. *Journal of Range Management, 33*(6), 4.
Johnson, K. A. (2000). *Prunus virginiana*. Retrieved May 25, 2007, from http://www.fs.fed.us/database.feis/
Joyce, L. A. (1993). The Life Cycle of the Range Condition Concept. *Journal of Range Management, 46*(2), 132-138.
Kaltenecker, J. H., Wicklow-Howard, M. C., & Pellant, M. (1999). Biological Soil Crusts: Natural Barriers to *Bromus tectorum* L. Establishment in the Northen Great Basin, U.S.A. In D. Eldridge & D. Freudenberger (Eds.), *People and Rangelands Building in the Future: Proceedings of the Sixth International Rangeland Congress* (Vol. 1, pp. 109-111). Townsville, Queensland, Australia: International Rangeland Congress.
Kauffman, J. B., & Krueger, W. C. (1984). Livestock Impacts on Riparian Ecosystems and Streamside Management Implications...A Review. *Journal of Range Management, 37*(5), 430-438.
Kauffman, J. B., Krueger, W. C., & Vavra, M. (1983). Effects of Late Season Cattle Grazing on Riparian Plant Communities. *Journal of Range Management, 36*, 685-691.

Kay, C. E., & Bartos, D. L. (2000). Ungulate Herbivory on Utah Aspen: Assessment of Long-Term Exclosures. *Journal of Range Management, 53*(2), 145-153.

Keller, B. J., & Bender, L. C. (2007). Bighorn Sheep Response to Road-Related Disturbances in Rocky Mountain National Park, Colorado. [Research]. *Journal of Wildlife Management, 71*(7), 2329-2337.

Kie, J. R. (1996). The Effects of Cattle Grazing on Optimal Foraging in Mule Deer (*Odocoileus hemionus*). *Forest Ecology and Management, 88*(1-2), 131-138.

King, S. E., & Grace, J. B. (2000). The Effects of Gap Size and Disturbance Type on Invasion of Wet Pine Savanna by Cogongrass, *Imperata cylindrica* (Poaceae). *American Journal of Botany, 87*(9), 1279-1286.

Knick, S. T., & Rotenberry, J. T. (1995). Landscape Characteristics of Fragmented Shrubsteppe Habitats and Breeding Passerine Birds. *Conservation Biology, 9*(5), 1059-1071.

Knight, R. L., & Kawashima, J. Y. (1993). Responses of Raven and Red-Tailed Hawk Populations to Linear Right-of-Ways. *Journal of Wildlife Management, 57*(2), 266-271.

Knutson, M. G., Richardson, W. B., Reineke, D. M., & Gray, B. R. (2004). Agricultural Ponds Support Amphibian Populations. *Ecological Applications, 14*(3), 669-684.

Kormondy, E. J. (1969). *Concepts of Ecology* (4 ed.). Upper Saddle River, NJ: Prentice Hall, Inc.

Krausman, P. R., & Bowyer, R. T. (2003). Mountain Sheep (*Ovis canadensis* and *O. dalli*). In G. A. Feldhamer, B. C. Thompson & J. A. Chapman (Eds.), *Wild Mammals of North America: Biology, Management, and Conservation* (2nd ed., pp. 1095-1115). Baltimore and London: The John Hopkins University Press.

Kriwox, E. (2009). Personal Communication with A. Betts on April 10, 2009.

Krueger, H. O., & Anderson, S. H. (1985). *The Use of Cattle as a Management Tool for Wildlife in Shrub-Willow Riparian Systems* (General Technical Report No. RM-120). Tucson, AZ: USDA, Forest Service.

Kunz, T. H., Arnett, E. B., Cooper, B. M., Erickson, W. P., Larkin, R. P., Mabee, T., et al. (2007). Assessing Wind Energy Developments on Nocturnally Active Birds and Bats: A Guidance Document. [Invited Paper]. *Journal of Wildlife Management, 71*(8), 2449-2486.

Kuvlesky Jr., W. P., Brennan, L. A., Morrison, M. L., Boydston, K. K., Ballard, B. M., & Bryant, F. C. (2007). Wind Energy Development and Wildlife Conservation: Challenges and Opportunities [Invited Paper]. *Journal of Wildlife Management, 71*(8), 2487-2498.

LANDFIRE. (2007, January 2007). LANDFIRE Rapid Assessment Reference Condition Models. Retrieved February 8, 2007, from http://www.landfire.gov/index.php

Lange, R. T. (1969). The Piosphere: Sheep Track and Dung Patterns. *Journal of Range Management, 22*(6), 396-400.

Larson, J. R., & Duncan, D. A. (1982). Annual Grassland Response to Fire Retardant and Wildfire. *Journal of Range Management, 35*(6), 700-703.

Launchbaugh, K., Brammer, B., Brooks, M. L., Bunting, S., Clark, P., Davison, J., et al. (2008). *Interactions Among Livestock Grazing, Vegetation Type, and Fire Behavior in the Murphy Wildland Fire Complex in Idaho and Nevada, July 2007* (U.S. Geological Survey Open File Report No. 2008-1214).

Laycock, W. A. (1991). Stable States and Thresholds of Range Condition on North American Rangelands: A Viewpoint. *Journal of Range Management, 44*(5), 427-433.

Laycock, W. A., Buchanan, H., & Krueger, W. C. (1972). Three Methods of Determining Diet, Utilization, and Trampling Damage on Sheep Ranges. *Journal of Range Management, 25*(5), 352-356.

Laycock, W. A., & Conrad, P. W. (1967). Effect of Grazing on Soil Compaction as Measured by Bulk Density on a High Elevation Cattle Range. *Journal of Range Management, 20* (2), 136 -140.

Lehman, R. N., Kennedy, P. L., & Savidge, J. A. (2007). The State of the Art in Raptor Electrocution Research: A Global Review. *Biological Conservation, 176*, 159-174.

Lesica, P. (1997). Spread of *Phalaris arundinacea* Adversely Impacts the Endangered Plant *Howllia aquatilis*. *Great Basin Naturalist, 57*(4), 366-368.

Lesica, P., & Miles, S. (2001). Natural History and Invasion of Russian Olive Along Eastern Montana Rivers. *Western North American Naturalist, 61*(1), 1-10.

Leslie Jr., D. M., & Douglas, C. L. (1980). Human Disturbance at Water Sources of Desert Bighorn Sheep. *Wildlife Society Bulletin, 8*(4), 284-290.

Leu, M., Hanser, S. E., & Knick, S. (2008). The Human Footprint in the West: A Large Scale Analysis of Anthropogenic Impacts. *Ecological Applications, 18*(5), 1119-1139.

Loft, E. R., Kie, J. G., & Menke, J. W. (1993). Grazing in the Sierra Nevada: Home Range and Space Use Patterns of Mule Deer as Influenced by Cattle. *California Fish and Game, 79*(4), 145-166.

Loft, E. R., Menke, J. W., & Kie, J. G. (1991). Habitat Shifts by Mule Deer: The Influence of Cattle Grazing. *Journal of Wildlife Management, 55*(1), 16-26.

Loft, E. R., Menke, J. W., Kie, J. G., & Bertram, R. C. (1987). Influence of Cattle Stocking Rate on the Structural Profile of Deer Hiding Cover. *Journal of Wildlife Management, 51*(3), 655-664.

Lomkin, M. (2009). Personal Communication with A. Betts on March 25, 2009.

Longland, W. S., & Bateman, S. L. (2002). Viewpoint: The Ecolgical Value of Shrub Islands on Disturbed Sagebrush Rangelands. *Journal of Range Management, 55*(6), 571-575.

Lowther, P. E. (1993). Brown-Headed Cowbird. *Birds of North America*(47), 24.

Luce, C. H., & Black, T. A. (1999). Sediment Production from Forest Roads into Western Oregon. *Water Resources Research 35* (8), 2561-2570.

Luce, R. J., & Keinhath, D. (2007). *Spotted Bat (Euderma maculatum): A Technical Conservation Assessment* USDA, Forest Service, Rocky Mountain Region.

Lyon, A. G., & Anderson, D. C. (2003). Potential Gas Development Impacts on Sage Grouse Nest Initiation and Movement. *Wildlife Society Bulletin, 31*(2), 486-491.

MacCracken, J. G., Uresk, W., & Hansen, R. M. (1983). Plant Community Variability in a Small Area in Southeastern Montana. *Great Basin Naturalist, 43*(4), 660-668.

Mack, R. N., & Thompson, J. N. (1982). Evolution in Steppe with Few Large, Hoofed Mammals. *American Naturalist, 119*(6), 757-773.

Mackie, R. J., Kie, J. G., Pac, D. F., & Hamlin, K. L. (2003). Mule Deer (*Odocoileus hemionus*). In G. A. Feldhamer, B. C. Thompson & J. A. Chapman (Eds.), *Wild Mammals of North America: Biology, Management, and Conservation* (2nd ed., pp. 889-905). Baltimore and London: The Johns Hopkins University Press.

Marble, J. R., & Harper, K. T. (1989). Effect of Timing of Grazing on Soil-Surface Cryptogamic Communities in a Great Basin Low-Shrub Desert: A Preliminary Report. *Great Basin Naturalist, 49*, 104-107.

Marks, J. S., & Marks, V. S. (1988). Winter Habitat Use by Columbian Sharp-Tailed Grouse in Western Idaho. *Journal of Wildlife Management, 52*(4), 743-746.

Marlette, G. M., & Anderson, J. E. (1986). Seed Banks and Propagule Dispersal in Crested-Wheatgrass Strands. *The Journal of Applied Ecology, 23*(1), 161-175.

Marra, P. P., Griffing, S., Caffrey, C., Kilpatrick, A. M., McLean, R., Brand, C., et al. (2004). West Nile Virus and Wildlife. *BioScience, 54*(5), 393-402.

Martin, J. W., & Carlson, B. A. (1998). Sage Sparrow. *Birds of North America*(326), 1-20.

Martin, S. C., & Ward, D. E. (1973). Salt and Meal-Salt Help Distribute Cattle Use on Semidesert Range. *Journal of Range Management, 26*(2), 94-97.

Masters, R. A., & Sheley, R. L. (2001). Principles and Practices for Managing Rangeland Invasive Plants. *Journal of Range Management, 54*(5), 502-517.

Maurer, D. A., & Zedler, J. B. (2002). Differential Invasion of a Wetland Grass Explained by Tests of Nutrients and Light Availability on Establishment and Clonal Growth. *Oecologia, 131*(2), 279-288.

McAdoo, J. K., Longland, W. S., & Evans, R. A. (1989). Nongame Bird Community Responses to Sagebrush Invasion of Crested Wheatgrass Seedings. *Journal of Range Management, 53*(2), 494-502.

McCloskey, J. T., & Thompson, J. E. (2000). Sex-related Differences in Migration Chronology and Winter Habitat Use of Common Snipe. [Short Communications]. *The Wilson Bulletin, 112*(1), 143-148.

McMurry, N. (1986). *Artemisia nova*.

Meays, C. L., Laliberte, A. S., & Doescher, P. S. (2000). Defoliation Response of Bluebunch Wheatgrass and Crested Wheatgrass: Why We Cannot Graze These Two Species in the Same Manner. *Rangelands, 22*(6), 16-18.

Meehan, W. R. (Ed.). (1991). *Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitats* (Vol. American Fisheries Society Special Publication 19). Bethesda, MD: USDA, Forest Service, Pacific Northwest Research Station and Forest Environment Research.

Melgoza, R., Nowack, S., & Taush, R. J. (1990). Soil Water Exploitation After Fire: Competition Between *Bromus tectorum* (Cheatgrass) and Two Native Species. *Oecologia, 83*(1), 7-13.

Memmot, K. L., Anderson, V. J., & Monsen, S. B. (1998). Seasonal Grazing Impact on Cryptogamic Crusts in a Cold Desert Ecosystem. *Journal of Range Management, 51*, 4.

Merriam, K. E., Kelley, J. E., & Beyers, J. L. (2006). Fuel Breaks Affect Nonnative Species Abundance in California. *Ecological Applications, 16*(2), 515-527.

Merrill, E. H., Stanton, N. L., & Hak, J. C. (1994). Responses of Bluebunch Wheatgrass, Idaho Fescue, and Nematodes to Ungulate Grazing in Yellowstone National Park. *Oikos, 69*, 231-240.

Meyer, K. A., Cassinelli, J. D., & Elle, F. S. (2008). Life History Characteristics of the Wood River Sculpin, *Cottus leiopomus* (Cottidae), in Idaho. *Copeia*(3), 648-655.

Meyer, S. E. (1994). *Germination and Establishment Ecology of Big Sagebrush: Implications for Community Restorations* (General Technical Report No. INT-GTR-313). Ogden, UT: USDA, Forest Service, Intermountain Research Station.

Meyer, S. E., Quinney, D., & Weaver, J. (2005). A Life History Study of the Snake River Plains Endemic *Lepidium papilliferum* (Brassicaceae). *Western North American Naturalist, 65*(1), 11-23.

Meyer, S. E., Quinney, D., & Weaver, J. (2006). A Stochastic Population Model for *Lepidium papilliferum* (Brassicaceae), a Rare Desert Ephemeral with a Persistent Seed Bank. *American Journal of Botany, 93*(6), 891-902.

Miller, S. G., Knight, R. L., & Miller, C. K. (1998). Influence of Recreational Trails on Breeding Bird Communities. *Ecological Applications, 8*(1), 162-169.

Miller, S. G., Knight, R. L., & Miller, C. K. (2001). Wildlife Responses to Pedestrians and Dogs. *Wildlife Society Bulletin, 29*(1), 124-132.

Minnesota IMPLAN Group. (2004). *Minnesota IMPLAN Group Pro User Guide, Analysis Guide, and Data Guide Software* (Software).

Monsen, S. B. (1994). *Selection of Plants for Fire Suppression on Semiarid Sites* (General Technical Report No. INT-GTR-313). Ogden, UT: USDA, Forest Service, Intermountain Research Station.

Morrison, P. H., & Swanson, F. J. (1990). *Fire History and Pattern in a Cascade Range Landscape* (General Technical Report No. PNW-GTR-254): USDA, Forest Service.

Munger, J. C., & Oelrich, K. (2006). *Columbia Spotted Frog Great Basin Population (Owyhee Subpopulation) Long-Term Monitoring Plan* (Cost Share Report No. 006G106180). Boise, ID: Boise State University.

Myers, D. (1987). Community-Relevant Measurement of Quality of Life: A Focus on Local Trends. *Urban Affairs Quarterly, 23*(1), 108-125.

Nader, G., Henkin, Z., Smith, E., Ingram, K., & Narvaez, N. (2007). Planned Herbivory in the Management of Wildfire Fuels. *Rangelands, 27*, 18-24.

Nagel, J. M., & Griffin, K. L. (2001). Construction Cost and Invasive Potential: Comparing *Lythrum salicaria* (Lythraceae) with Co-Occurring Native Species Along Pond Banks. *American Journal of Botany, 88*(12), 2252-2258.

Naiman, R. J., Decamps, H., & Pollock, M. (1993). The Role of Riparian Corridors in Maintaining Regional Biodiversity. *Ecological Applications, 3*(2), 209-212.

Naiman, R. J., Johnson, C. A., & Kelley, J. C. (1988). Alteration of North American Streams by Beaver. *BioScience, 38*(11), 753-762.

NDEP. (2005). Nevada's 2004 303(d) Impaired Waters List (pp. 109). Carson City, NV: Nevada Division of Environmental Protection, Bureau of Water Quality Planning.

NDWR. (2009). Elko County Socioeconomic Overview. Retrieved February 17, 2009, from http://water.nv.gov/WaterPlanning/overview/el/el_over.cfm

Neff, J. C., Ballantyne, A. P., Farmer, G. L., Mahowald, N. M., Conroy, J. L., Landry, C. C., et al. (2008). Increasing Eolian Dust Deposition in the Western United States Linked to Human Activity *Nature Geoscience 1*, 1-7.

Nelson, R. L., McHenry, M. L., & Platts, W. S. (1991). Mining. In W. R. Meehan (Ed.), *Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitats* (Vol. American Fisheries Society Special Publication 19, pp. 425-457). Bethesda, MD: USDA, Forest Service.

New Mexico Department of Game and Fish. (2005). *Habitat Fragmentation and the Effects of Roads on Wildfire and Habitats*: New Mexico Department of Game and Fish.

Newbold, T. A. S. (2005). Desert Horned Lizard (*Phrynosoma platyrhinos*) Locomotor Performance: The Influence of Cheatgrass (*Bromus tectorum*). *The Southwestern Naturalist, 50*(1), 17-23.

Norris, L. A., Lorz, H. W., & Gregory, S. V. (1991). Forest Chemicals. In W. R. Meehan (Ed.), *Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitat* (Vol. American Fisheries Society Special Publication 19, pp. 207-296). Bethesda, MD: USDA, Forest Service.

NREL. (2009). Job and Economic Development Impact Models. Retrieved November 2009, from http://www.nrel.gov/analysis/jedi/

Nunney, L. (2002). The Effective Size of Annual Plant Populations: The Interaction of a Seed Bank with Fluctuation Population Size in Maintaining Genetic Variation. *The American Naturalist, 160*(2), 195-204.

Nussbaum, R. A., Brodie, J., Edmund D., & Storm, R. M. (1983). *Amphibians and Reptiles of the Pacific Northwest*. Moscow, ID: University of Idaho Press.

O'Dea, M. E., & Guertin, D. P. (2003). Prescribed Fire Effects on Erosion Parameters in a Perennial Grassland. *Journal of Range Management, 56*(1), 27-32.

O'Shea, T. J., Clark Jr., D. R., & Boyle, T. P. (2001). Impacts of Mine-Related Contaminants on Bats. In K. C. Vories & D. Throgmorton (Eds.), *Proceedings on Bat Conservation and Mining* (pp. 17). Alton, IL: USDI, Office of Surface Mining, Reclamation and Enforcement.

Odum, E. P. (1971). *Fundamentals of Ecology* (3rd ed.). Philadelphia, PA: W.B. Saunders Co.

Olendorff, R. R. (1993). *Status, Biology and Management of Ferruginous Hawks: A Review* (Special Report). Boise, ID: USDI, Bureau of Land Management, Raptor Research and Technical Assistance Center.

Olson, B. E., & Wallander, R. T. (1998). Effect of Sheep Grazing on a Leafy Spurge-Infested Idaho Fescue Community. *Journal of Range Management, 51*(2), 247-252.

Osborn, A., Vetter, S., Hartley, R., Walsh, L., & Brown, J. (1987). *Impacts of Domestic Livestock Grazing on the Archeological Resources of Capitol Reef National Park, Utah*. Springfield, VA: US Department of Commerce.

Osterman-Kelm, S., Atwill, E. R., Rubin, E. S., Jorgensen, M. C., & Boyce, W. M. (2008). Interactions Between Feral Horses and Desert Bighorn Sheep at Water. *Journal of Mammalogy, 89*(2), 459-466.

Otting, N. J. (1999). *Ecological Characteristics of Montane Floodplain Plant Communities in the Upper Grande Ronde Basin, Oregon.* Unpublished Thesis, Oregon State University, Corvallis, OR.

Ouren, D. S., Haas, C., Melcher, C. P., Stewart, S. C., Ponds, P. D., Sexton, N. R., et al. (2007). *Environmental Effects of Off-Highway Vehicles on Bureau of Land Management Lands: A Literature Synthesis, Annotated Bibliographies, Extensive Bibliographies, and Internet Resources* (Open File Report No. 2007-1353): USDI, US Geological Survey.

Padgett, P. E., Meadows, D., Eubanks, E., & Ryan, W. E. (2007). Monitoring Fugitive Dust Emisions from Off-Highway Vehicles Traveling on Unpaved Roads and Trails Using Passive Samplers. *Environmental Monitoring Assessment, 2008*(144), 93-103.

Papouchis, C. M., Singer, F. J., & Sloan, W. B. (2001). Response of Desert Bighorn Sheep to Increased Human Recreation. *Journal of Wildlife Management, 65*(3), 573-582.

Parker, K. L., Robbins, C. T., & Hanley, T. A. (1984). Energy Expenditures for Locomotion by Mule Deer and Elk. *Journal of Wildlife Management, 48*(2), 474-488.

Pearl, C. A., Adams, M. J., Leuthold, N., & Bury, R. B. (2005). Amphibian Occurence and Aquatic Invaders in a Changing Landscape: Implications for Wetland Mitigation in the Willamette Valley, Oregon, USA. *Wetlands, 25*(1), 76-88.

Pellant, M. (1990). *The Cheatgrass-Wildfire Cycle - Are There Any Solutions?* (General Technical Report No. INT-276). Ogden, UT: USDA, Forest Service, Intermountain Research Station.

Pellant, M., Shaver, P., Pyke, D. A., & Herrick, J. E. (2005). *Interpreting Indicators of Rangeland Health, Version 4* (Technical Reference No. 1734-6). Denver, CO: USDI, Bureau of Land Management, National Science and Technology Center.

Peterson, J. A. (1995). Idaho-Snake River Downwarp Province (017) *USGS National Oil and Gas Assessment, USGS Digital Data Series DDS-30, Release 2*.

Pierson, F. B., Bates, J. D., Svejcar, T. J., & Hardegree, S. P. (2007). Runoff and Erosion After Cutting Western Juniper. *Rangeland Ecology and Management, 60*(3), 285-292.

Pierson, F. B., & Wight, J. R. (1991). Variability of Near-Surface Soil Temperature on Sagebrush Rangeland. *Journal of Range Management, 44*(5), 491-497.

Pilliod, D. S., Bury, R. B., Hyde, E. J., Pearl, C. A., & Corn, P. S. (2003). Fire and Amphibians in North America. *Forest Ecology and Management 178*, 163-181.

Pitman, J. C., Hagen, C. A., Robel, R. J., Loughlin, T. M., & Applegate, R. D. (2005). Location and Success of Lesser Prairie-Chicken Nests in Relation to Vegetation and Human Disturbance. *Journal of Wildlife Management, 69*(3), 1259-1269.

Pitt, M. D. (1986). Assessment of Spring Defoliation to Improve Fall Forage Quality of Bluebunch Wheatgrass (*Agropyron spicatum*). *Journal of Range Management, 39*(2), 175-181.

Platou, K. A., & Tueller, P. T. (1985). Evolutionary Implications for Grazing Management Systems. *Rangelands, 7*(2), 57-61.

Platt, K., & Jackman, E. R. (1946). *The Cheatgrass Problem in Oregon* (Extension Bulletin No. 668). Corvallis, OR: Oregon State College.

Platts, W. S. (1991). Livestock Grazing. In W. R. Meehan (Ed.), *Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitats* (Vol. American Fisheries Society Special Publication 19, pp. 389-423). Bethesda, MD: USDA, Forest Service.

Ponzetti, J. M., & McCune, B. P. (2001). Biotic Soil Crusts of Oregon's Shrub Steppe: Community Composition in Relation to Soil Chemistry, Climate, and Livestock Activity. *The Bryologist, 104*(2), 212-225.

Ponzetti, J. M., McCune, B. P., & Pyke, D. A. (2007). Biotic Soil Crusts in Relation to Topography, Cheatgrass and Fire in the Columbia Basin, Washington. *The Bryologist, 110*(4), 706-722.

Poole, K. G., & Mowat, G. (2005). Winter Habitat Relationships of Deer and Elk in the Temperate Interior Mountains of British Columbia. *Wildlife Society Bulletin, 33*(4), 1288-1302.

Popolizio, C. A., Goetz, H., & Chapman, P. L. (1994). Short-Term Response of Riparian Vegetation to Four Grazing Treatments. *Journal of Range Management, 47*(1), 48-53.

Porneluzi, P. A., & Faaborg, J. (1999). Season-Long Fecundity, Survival, and Viability of Ovenbirds in Fragmented and Unfragmented Landscapes. *Conservation Biology, 13*(5), 1151-1161.

Porter, K. R., & Hakanson, D. E. (1976). Toxicity of Mine Drainage to Embryonic and Larval Boreal Toads (Budonidae: *Bufo boreas*) *Copeia, 2*, 327-331.

Prichard, D., Anderson, J., Correll, C., Fogg, J., Gebhardt, K., Krapf, R., et al. (1998). *Riparian Area Management: A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lotic Areas* (Technical Reference No. 1737-15). Denver, CO: USDI, Bureau of Land Management; USDA, Forest Service; and USDA, Natural Resources Conservation Service.

Prosser, C. W., Sedivec, K. K., & Barker, W. T. (2000). Tracked Vehicle Effects on Vegetation and Soil Characteristics. *Journal of Range Management, 53*(6), 66-670.

Quigley, T. M., & Arbelbide, S. J. (Eds.). (1997). *An Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins* (Vol. III. General Technical Report PNW-GTR-405). Portland, OR: USDA, Forest Service, Pacific Northwest Research Station and USDI, Bureau of Land Management.

Radl, V., Gattinger, A., Chronakova, A., Nemcova, A., Cuhel, J., Simek, M., et al. (2007). Effects of Cattle Husbandry on Abundance and Activity of Methanogenic Archaea in Upland Soils. *The Upland Society of Microbial Ecology Journal, 2007*(1), 443-452.

Ralphs, M. H., Kothman, M. M., & Taylor, C. A. (1990). Vegetation Response to Increased Stocking Rates in Short-Duration Grazing. *Journal of Range Management, 43*(2), 104-108.

Rau, B. M., Chambers, J. C., Blank, R. R., & Miller, W. W. (2005). Hydrologic Response of a Central Nevada Pinyon-Juniper Woodland to Prescribed Fire. *Rangeland Ecology and Management, 58*(6), 614-622.

Rawls, W., Brakensiek, D. L., & Savabi, M. R. (1989). Infiltration Parameters for Rangeland Soils Journal of Range Management. *Journal of Range Management, 42*(2), 139-142.

Renfrew, R. B., & Ribic, C. A. (2003). Grassland Passerine Nest Predators Near Pasture Edges Identified on Videotape. *The Auk, 120*(2), 371-383.

Renfrew, R. B., Ribic, C. A., & Nack, J. L. (2005). Edge Avoidance by Nesting Grassland Birds: A Futile Strategy in a Fragmented Landscape. *The Auk, 122*(2), 618-636.

Resource Planning Unlimited Inc. (2003a). *Idaho Agricultural Best Management Practices: A Field Guide for Evaluating BMP Effectiveness*: Idaho Department of Environmental Quality, Idaho Soil Conservation Commision.

Resource Planning Unlimited Inc. (2003b). Idaho Agricultural Pollution Abatement Plan: Idaho Soil Conservation Commission and Idaho Department of Environmental Quality.

Responsive Management, & National Shooting Sports Foundation. (2009). *Issues Related to Hunting Access in the United States: Idaho Results*: U.S. Fish and Wildlife Service.

Reynolds, T. D., & Trost, C. H. (1980). The Response of Native Vertebrate Populations to Crested Wheatgrass Planting and Grazing by Sheep. *Journal of Range Management, 33*(2), 122-125.

Richardson, C. T., & Miller, C. K. (1997). Recommendations for Protecting Raptors from Human Disturbance: A Review. *Wildlife Society Bulletin, 25*(3), 634-638.

Richardson, D. M., Pysek, P., Rejmanek, M., Barbour, M., Panetta, F. D., & West, C. J. (2000). Naturalization and Invasion of Alien Plants: Concepts and Definitions. *Diversity and Distributions, 6*, 93-107.

Rieman, B., & Clayton, J. (1997). Wildfire and Native Fish: Issues of Forest Health and Conservation of Sensitive Species. *Fisheries, 22*(11), 6-15.

Rieman, B., Lee, D., Chandler, G., & Myers, D. (1997). *Does Wildlife Threaten Extinction for Salmonids? Responses of Redband Trout and Bull Trout Following Recent Large Fires on the Boise National Forest*. Paper presented at the Species and Habitats Conference.

Rimbey, N. R., Smathers, R. L., & Gray, W. C. (2004). *Cow-Calf-500 Cow, Summer on Federal Range, Winter on Federal and Private Range*. Moscow, ID: University of Idaho, College of Agriculture and Life Sciences.

Robel, R. J., Hughes, J. P., Keane, T. D., & Kemp, K. E. (2003). Do Artificial Nests Reveal Meaningful Patterns of Predation in Kansas Grasslands? *The Southewestern Naturalist, 48*(3), 460-464.

Rogers, C. M., Taitt, M. J., Smith, J. N. M., & Jongejan, G. (1997). Nest Predation and Cowbird Parasitism Create a Demographic Sink in Wetland-Breeding Song Sparrows. *The Condor, 99*(3), 622-633.

Rogers, R. W., & Lange, R. T. (1971). Lichen Populations on Arid Soil Crusts Around Sheep Watering Places in South Australia. *Oikos, 22*(1), 93-100.

Rosenstock, S. S., Ballard, W. B., & Devos Jr., J. C. (1999). Viewpoint: Benefits and Impacts of Wildlife Water Developments. [Feature]. *Journal of Range Management, 52*, 302-311.

Rosenthal, L. R. (2007). *Evaluation of Distribution and Fish Passage in Relation to Road Culverts in Two Eastern Montana Prairie Streams.* Unpublished Thesis, Montana State University, Bozeman, MT.

Rosentreter, R. (1994). *Displacement of Rare Plants by Exotic Grasses* (General Technical Report No. INT-GTR-313). Ogden, UT: USDA, Forest Service, Intermountain Research Station.

Rotenberry, J. T., Patten, M. A., & Preston, K. L. (1999). Brewer's Sparrow. *Birds of North America*(390), 1-23.

Rowland, M. M., Wisdom, M. J., Johnson, B. K., & Kie, J. G. (2000). Elk Distribution and Modeling in Relation to Roads. *Journal of Range Management, 64*(3), 672-684.

Ryel, R. J., Caldwell, M. M., Leffler, A. J., & Yoder, C. K. (2003). Rapid Soil Moisture Recharge to Depth by Roots in a Stand of *Artemisia tridentata*. *Ecology, 84*(3), 757-764.

Ryel, R. J., Caldwell, M. M., Yoder, C. K., Or, D., & Leffler, A. J. (2002). Hydraulic Redistribution in a Stand of *Artemisia tridentata*: Evaluation of Benefits to Transpiration Assessed with a Simulation Model. *Oecologia, 130*(2), 173-184.

Saab, V. A., Bock, C. E., Rick, T. D., & Dobkin, D. S. (1995). Livestock Grazing Effects in Western North America. In T. E. Martin & D. M. Finch (Eds.), *Ecology and Management of Neotropical Migratory Birds: A Synthesis and Review of Critical Issues* (pp. 311-353). New York, NY: Oxford University Press.

Sampson, M. P. (2007). *Effects of Off-Highway Vehicles on Archaeological Sites in Red Rock Canyon State Park*: California State Parks.

Sanyal, N., Krumpe, E., & Coombs, D. (2007). *2007 Idaho Mule Deer Hunter Study Final Report* (Final Report): Idaho Department of Fish and Game.

Sauer, R. H. (1978). Effect of Removal of Standing Dead Material on Growth of *Agropyron spicatum*. *Journal of Range Management, 31*(2), 121-122.

Saunders, W. C., & Fausch, K. D. (2007). Improved Grazing Management Increases Terrestrial Invertebrate Inputs that Feed Trout in Wyoming Rangeland Streams. *Transactions of the American Fisheries Society, 136*, 1216-1230.

Sawyer, H., Nielson, R. M., Lindzey, F., Keith, L., Powell, J. H., & Abraham, A. A. (2007). Habitat Selection of Rocky Mountain Elk in a Nonforested Environment. [Research]. *Journal of Wildlife Management, 71*(3), 868-874.

Sawyer, H., Nielson, R. M., Lindzey, F., & McDonald, L. L. (2006). Winter Habitat Selection of Mule Deer Before and During Development of a Natural Gas Field. [Invited Article]. *Journal of Wildlife Management, 70*(2), 396-403.

Schommer, T. J., & Woolever, M. M. (2008). *A Review of Disease Related Conflicts Between Domestic Sheep and Goats and Bighorn Sheep* (General Technical Report No. RMRS-GTR-209). Fort Collins, CO: USDA, Forest Service, Rocky Mountain Research Station.

Schulz, T. T., & Leininger, W. C. (1991). Nongame Wildlife Communities in Grazed and Ungrazed Montane Riparian Sites. *Great Basin Naturalist, 51*(33), 286-292.

Scott, J. H., & Burgan, R. E. (2005). *Standard Fire Behavior Fuel Models: A Comprehensive Set for Use with Rothermel's Surface Spread Model* (General Technical Report No. RMRS-GTR-153). Fort Collins, CO: USDA, Forest Service, Rocky Mountain Research Station.

Semlitsch, R. D., & Bodie, J. R. (1998). Are Small, Isolated Wetlands Expendable? *Conservation Biology, 12*(5), 1129-1133.

Sera, W. E., & Early, C. N. (2003). *Microtus montanus*. *Mammalian Species, 716*, 1-10.

Sestak, M. (2002). Simple Approach Smoke Estimation Model (SASEM) (Version 4.1.0): USDI, Bureau of Land Management.

Sestak, M. L., & Riebau, A. R. (1988). *SASEM: Simple Approach Smoke Estimation Model* (Technical Note No. 382). Denver, CO: USDI, Bureau of Land Management.

Sharrow, S. H., & Ismail, S. (2004). Carbon and Nitrogen Storage in Agroforests, Tree Plantations and Pastures in Western Oregon, USA. *Agroforestry Systems, 69*, 123-130.

Shepherd III, J. F. (2006). *Landscape-Scale Habitat Use by Greater Sage-Grouse (Centrocercus urophasianus) in Southern Idaho.* Unpublished Dissertation, University of Idaho, Moscow, ID.

Sigler, W. F., & Sigler, J. W. (1987). *Fishes of the Great Basin: A Natural History*. Reno, NV: University of Nevada Press.

Singer, F. J., & Zeigenfuss, L. (2000). *Genetic Effective Population Size in the Pryor Mountain Wild Horse Herd: Implications for Conservation Genetics and Viability Goals in Wild Horses* (Resource Notes No. 29). Denver, CO: USDI, Bureau of Land Management.

Singer, F. J., Zeigenfuss, L. C., & Spicer, L. (2001). Role of Patch Size, Disease, and Movement in Rapid Extinction of Bighorn Sheep. *Conservation Biology, 15*(5), 1347-1354.

Skovlin, J. M. (1984). Impacts of Grazing on Wetlands and Riparian Habitat: A Review of Our Knowledge. In N. R. C. N. A. o. Sciences (Ed.), *Developing Strategies for Rangeland Management* (pp. 1001-1103). Boulder, CO: Westview Press.

Smith, D. G., Murphy, J. R., & Woffinden, N. D. (1981). Relationships Between Jackrabbit Abundance and Ferruginous Hawk Reproduction. *The Condor, 83*(1), 52-56.

Sperry, L. J., Belnap, J., & Evans, R. D. (2006). *Bromus tectorum* Invasion Alters Nitrogen Dynamics in An Undisturbed Arid Grassland Ecosystem. *Ecology, 87*(3), 603-615.

Stanton, N. L. (1988). The Underground in Grasslands. *Annual Review of Ecology and Systematics, 19*, 573-589.

Steenhof, K., Kochert, M. N., Carpenter, L. B., & Lehman, R. N. (1999). Long-Term Prairie Falcon Population Changes in Relation to Prey Abundance, Weather, Land Uses and Habitat Conditions. *The Condor, 101*(1), 28-41.

Steenhof, K., Kochert, M. N., & Roppe, J. A. (1993). Nesting by Raptors and Common Ravens on Electrical Transmission Line Towers. *Journal of Wildlife Management, 57*(2), 271-281.

Steinberg, P. D. (2002). *Artemisia arbuscula*: USDA, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory.

Steinfeld, H., Gerber, P., Wassenaar, T., Castel, V., Rosales, M., & de Haan, C. (2006). *Livestock's Long Shadow: Environmental Issues and Options*: Food and Agricultural Organization of the United Nations.

Stephenson, G. R., & Veigel, A. (1987). Recovery of Compacted Soil on Pastures Used for Winter Cattle Feeding. *Journal of Range Management, 40*(1), 46-48.

Stevens, R. (2004). Incorporating Wildlife Habitat Needs into Restoration and Rehabilitation Projects. In S. B. Monsen, R. Stevens & N. L. Shaw (Eds.), *Restoring Western Ranges and Wildlands* (Vol. I, pp. 155-174). RMRS-GTR-136-vol-1. Fort Collins, CO: USDA, Forest Service, Rocky Mountain Research Station.

Stevens, R., & Monsen, S. B. (2004). Guidelines for Restoration and Rehabilitation of Principal Plant Communities. In S. B. Monsen, R. Stevens & N. L. Shaw (Eds.), *Restoring Western Ranges and Wildlands* (Vol. 1, pp. 199-294). RMRS-GTR-136-vol-1. Fort Collins, CO: USDA, Forest Service, Rocky Mountain Research Station.

Stewart, K. M., Bowyer, R. T., Kie, J. G., Cimon, N. J., & Johnson, B. K. (2002). Temporospatial Distributions of Elk, Mule Deer, and Cattle: Resource Partitioning and Competitive Displacement. *Journal of Mammalogy, 83*(1), 229-244.

Stohlgren, T. J., Otsuki, Y., Villa, C. A., Lee, M., & Belnap, J. (2001). Patterns of Plant Invasions: A Case Example in Native Species Hotspots and Rare Habitats. *Biological Invasions, 3*, 37-50.

Strait, R., Roe, S., Bailie, A., Lindquist, H., & Jamison, A. (2008). *Idaho Greenhouse Gas Inventory and Reference Case Projections 1990-2020*: Idaho Department of Environmental Quality.

Strand, E. K., Brockett, B. H., Goehring, B. J., Hatch, S., Kuchy, A. L., Stebleton, A. A., et al. (2007). *Individual Summaries of Published Scientific Literature Related to the Interactions among Grazing, Fire, and Invasive Plants in the Sagebrush Steppe Ecosystem*. Moscow, ID: University of Idaho.

Stromberg, J. C., Tiller, R., & Richter, B. (1996). Effects of Groundwater Decline on Riparian Vegetation of Semiarid Regions: The San Pedro, Arizona. *Ecological Applications, 6*(1), 113-131.

Stynes, D. J., & White, E. M. (2005). *Spending Profiles of National Forest Visitors, NVUM Four Year Report; Report to USDA Forest Service*. East Lansing, MI: Michigan State University.

Sullivan III, A. P., Uphus, P. M., Roos, C. I., & Mink II, P. B. (2002). Inadvertent Vandalism: The Hidden Challenge for Heritage Resource Management. *Cultural Resource Management*(2), 42-45.

Svejcar, T. (2003). Applying Ecological Principles to Wildland Weed Management. *Weed Science, 51*(2), 266-270.

Swanson, D. A. (1998). Effects of Management Practices on Grassland Birds: Savannah Sparrow. Retrieved February 14, 2001, from http://www.npwrc.usgs.gov/resource/literatr/grasbird/savannah/savannah.htm

Swanson, F. J., Gregory, S. V., Sedell, J. R., & Campbell, A. G. (1982). Land-Water Interaction: The Riparian Zone. In R. L. Edmonds (Ed.), *Analysis of Coniferous Forest Ecosystems in the Western United States* (pp. 267-291). Stroudsburg, PA: Hutchinson Ross.

Switalski, T. A., Bissonette, J. A., DeLuca, T. H., Luce, C. H., & Madej, M. A. (2004). Benefits and Impacts of Road Removal. [Review]. *Frontiers in Ecology and the Environment, 2*(1), 21-28.

Tate, K. W., Dudley, D., McDougald, N. K., & George, M. R. (2004). Effect of Canopy and Grazing on Soil Bulk Density. *Journal of Range Management, 57*(4), 411-417.

Teensma, P. D. A. (1987). *Fire History and Fire Regimes of the Central Western Cascades of Oregon.* Unpublished Dissertation, University of Oregon, Eugene, OR.

Thompson, K. M., Holloran, M. J., Slater, S. J., Kuipers, J. L., & Anderson, S. H. (2006). Early Brood-Rearing Habitat Use and Productivity of Greater Sage-Grouse in Wyoming. *Western North American Naturalist, 66*(3), 332-342.

Trimble, S. W., & Mendel, A. C. (1995a). *The Cow as a Geomorphic Agent - A Critical Review*: Department of Geography, Univeristy of California, Los Angeles, USA.

Trombulak, S. C., & Frissell, C. A. (2000). Review of Ecological Effects of Roads on Terrestrial and Aquatic Communities. *Conservation Biology, 14*(1), 18-30.

Turner, M. G., Romme, W. H., GArdner, R. H., & Hardgrove, W. H. (1997). Effects of Fire SIze and Pattern on Early Succession in Yellowstone National Park. *Ecological Monographs, 67*, 411-433.

Unsworth, J. W., Pac, D. F., White, G. C., & Bartman, R. M. (1999). Mule Deer Survival in Colorado, Idaho, and Montana. *Journal of Wildlife Management, 63*(1), 315-326.

US Census Bureau. (2006). Annual Estimates of the Population for Counties of Idaho: April 1, 2000 to July 1, 2005 (pp. 2).

USDA. (1998). *Stemming the Invasive Tide: Forest Service Strategy for Noxious and Nonnative Invasive Plant Management*. Washington, DC: USDA, Forest Service.

USDA. (2002). *Wildland Fire in Ecosystems: Effects of Fire on Air* (General Technical Report No. RMRS-GTR-42-Volume 5): USDA, Forest Service, Rocky Mountain Research Station.

USDI. (2008). *Guidance for Developing Aquatic Conservation Strategies: For BLM Resource Management Plans in the Interior Columbia Basin (Idaho, Eastern Oregon, Eastern Washington, Western Montana, and Northern Nevada)*: U.S. Department of the Interior, Bureau of Land Management.

USFS, NOAA, BLM, FWS, & EPA. (2004). A Framework for Incorporating the Aquatic and Riparian Component of the Interior Columbia Basin Strategy into BLM and Forest Service Plan Revisions (pp. 9): USDI, USDC, USDOI, EPA.

Usher, M. B. (1988). Biological Invasions of Nature Reserves: A Search for Generalizations. *Biological Conservation, 44*(1988), 119-135.

Vallentine, J. F. (2001). *Grazing Management* (2nd ed.). San Diego, CA: Academic Press.

Vallentine, J. F., & Stevens, A. R. (1994). *Use of Livestock to Control Cheatgrass - A Review* (General Technical Report). Ogden, UT: USDA, Forest Service, Intermountain Research Station.

van der Horst, D. (2007). NIMBY or not? Exploring the Relevance of Location and the Politics of Voiced Opinions in Renewable Energy Siting Controversies. *Energy Policy, 35*(2007), 2705-2714.

Van Haveren, B. P. (1983). Soil Bulk Density as Influenced by Grazing Intensity and Soil Type on a Shortgrass Prairie Site. *Journal of Range Management, 36*(5), 586-588.

Van Horne, B., Olson, G. S., Schooley, R. L., Corn, J. G., & Burnham, K. P. (1997). Effects of Drought and Prolonged Winter on Townsend's Ground Squirrel Demography in Shrubsteppe Habitats. *Ecological Monographs, 67*(3), 295-315.

Vander Haegen, W. M. (2007). Fragmentation by Agriculture Influences Reproductive Success of Birds in a Shrubsteppe Landscape. *Ecological Applications, 17*(3), 934-947.

Vander Haegen, W. M., Schroeder, M. A., & DeGraaf, R. M. (2002). Predation on Real and Artificial Nests in Shrubsteppe Landscapes Fragmented by Agriculture. *The Condor, 104*(3), 496-506.

Vavra, M. (2005). Livestock Grazing and Wildlife: Developing Compatibilities. [Invited Synthesis Paper]. *Rangeland Ecology and Management, 58*, 128-134.

Vitousek, P. M. (1990). Biological Invasions and Ecosystem Processes: Towards an Integration of Population Biology and Ecosystem Studies. *Oikos, 57*(1), 7-13.

WAFWA. (2007). *Recommendation for Domestic Sheep and Goat Management in Wild Sheep Habitat*: Western Association of Fish and Wildlife Agencies, Wild Sheep Working Group, Initial Subcommitee.

Walker, B. L., Naugle, D. E., & Doherty, K. E. (2007). Greater Sage-Grouse Population Response to Energy Development and Habitat Loss. [Research]. *Journal of Wildlife Management, 71*(8), 2644-2654.

Walker, B. L., Naugle, D. E., Doherty, K. E., & Cornish, T. E. (2007). West Nile Virus and Greater Sage-Grouse: Estimating Infection Rate in a Wild Bird Population. *Avian Diseases, 51*, 691-696.

Walsberg, G. E. (2005). Cattle Grazing in a National Forest Greatly Reduces Nesting Success in a Ground-Nesting Sparrow. *The Condor, 107*, 714-716.

Wambolt, C. L., Frisina, M. R., Douglass, K. S., & Sherwood, H. W. (1997). Grazing Effects on Nutritional Quality of Bluebunch Wheatgrass for Elk. *Journal of Range Management, 50*, 503-506.

Wambolt, C. L., & Payne, G. F. (1986). An 18-Year Compromise of Control Methods for Wyoming Big Sagebrush in Southwestern Montana *Journal of Range Management, 39*(4), 314-319.

Warren, S. D. (2001a). Biological Soil Crusts and Hydrology in North American Deserts. In J. Belnap & O. L. Lange (Eds.), *Biological Soil Crusts: Structure, Function, and Management* (Vol. Ecological Studies 150, pp. 327-337). Berlin, Heidelbert, New York: Springer-Verlag.

Warren, S. D. (2001b). Synopsis: Influence of Biological Soil Crusts on Arid Land Hyrology and Soil Stability. In J. Belnap & O. L. Lange (Eds.), *Biological Soil Crusts: Structure, Function, and Management* (Vol. Ecological Studies 150, pp. 349-360). Berlin, Heidelberg, New York: Springer-Verlag.

Warren, S. D., & Eldridge, D. J. (2001). Biological Soil Crusts and Livestock in Arid Ecosystems: Are They Compatible? In J. Belnap & O. T. Lange (Eds.), *Biological Soil Crusts: Structure, Function, Management* (Vol. Ecological Studies Vol. 150, pp. 401-415). Berlin, Heidelbert, New York: Springer-Verlag.

Watson, J. W., McAllister, K. R., & Pierce, D. J. (2003). Home Ranges, Movements, and Habitat Selection of Oregon Spotted Frogs (*Rana pretiosa*). *Journal of Herpetology, 37*(2), 292-300.

Weisberg, P. J. (1998). *Fire History, Fire Regimes, and Development of Forest Structure in the Central Western Oregon Cascades.* Unpublished Dissertation, Oregon State University.

Weiss, S. B., & Murphy, D. D. (1998). A Control Strategy for Invasive Species *Endangered Species UPDATE, 7*(3 and 4), 6.

Welch, B. L. (2005). *Big Sagebrush: A Sea Fragmented into Lakes, Ponds, and Puddles* (General Technical Report No. RMRS-GTR-144). Fort Collins, CO: USDA, Forest Service, Rocky Mountain Research Station.

West, N. E., & Yorks, T. P. (2002). Vegetation Responses Following Wildfire on Grazed and Ungrazed Sagebrush Semi-Desert. *Journal of Range Management, 55*, 171-181.

Westenskow-Wall, K. J., Krueger, W. C., Bryant, L. D., & Thomas, D. R. (1994). Nutrient Quality of Bluebunch Wheatgrass Regrowth on Elk Winter Range in Relation to Defoliation. *Journal of Range Management, 47*, 240-244.

Whisenant, S. G. (1989). *Changing Fire Frequencies on Idaho's Snake River Plains: Ecological and Management Implications* (General Technical Report No. INT-GTR-276). Ogden, UT: US Department of Agriculture, Forest Service, Intermountain Research Station.

White, C. L., & Thurow, T. L. (1985). Reproduction of Ferruginous Hawks Exposed to Controlled Disturbance. *The Condor, 87*(1), 14-22.

White, C. S., & Loftin, S. (2000). Response of 2 Semiarid Grasslands to Cool-Season Prescribed Fire. *Journal of Range Management, 53*(1), 52-61.

Whittacker, D. G., Ostermann, S. D., & Boyce, W. M. (2004). Genetic Variability of Reintroduced California Bighorn Sheep in Oregon. *Journal of Wildlife Management, 68*(4), 850-859.

Williams, B. K., Szaro, R. C., & Shapiro, C. D. (2007). *Adaptive Management: The US Department of the Interior Technical Guide*. Washington, DC: USDI, Adaptive Management Working Group.

Willms, W. D., & Chanasyk, D. S. (2006). Grazing Effects on Snow Accumulation on Rough Fescue Grasslands. *Rangeland Ecology and Management, 59*(4), 400-405.

Winterfeld, G. F., & Rapp, R. A. (Eds.). (2009). *Survey of Idaho Fossil Resources*. Pocatello, ID: Erathem-Vanir Geological Consultants.

Winward, A. H. (1986). Vegetation Characteristics of Riparian Areas *Transactions of the Western Section of the Wildlife Society* (pp. 98-101). Sparks, NV: Wildlife Society.

Winward, A. H. (1991). A Renewed Commitment to Management of Sagebrush Grasslands *Special Report 880: Management in the Sagebrush Steppe* (pp. 2-7). Corvallis, OR: Oregon State University Agricultural Experiment Station in cooperation with USDA Agricultural Research Service.

Wisdom, M. J., Holthausen, R. S., Wales, B. C., Hargis, C. D., Saab, V. A., Lee, D. C., et al. (2000). *Source Habitat for Terrestrial Vertebrates of Focus in the Interior Columbia Basin: Broad-Scale Trends and Management Implications. Volume 2: Group Level Results* (General Technical Report No. PNW-GTR-485): USDA, Forest Service, Pacific Northwest Research Station.

Wisdom, M. J., Preisler, H. K., Cimon, N. J., & Johnson, B. K. (2004). *Effects of Off-Road Recreation on Mule, Deer and Elk*. Paper presented at the Transactions of the North American Wildlife and Natural Resource Conference 69: in press.

Wissenbach, M. (2009). Personal Communication with A. Betts on April 10, 2009.

Wolfe, D. H., Patten, M. A., Shochat, E., Pruett, C. L., & Sherrod, S. K. (2007). Causes and Patterns of Mortality in Lesser Prairie-Chickens *Tympanuchus pallidicinctus* and Implications for Management. *Wildlife Biology, 13*(1), 95-104.

Wright, H. A., Neuenschwander, L. F., & Britton, C. M. (1979). *The Role and Use of Fire in Sagebrush-Grass and Pinyon-Juniper Plant Communities* (General Technical Report No. INT-58). Ogden, UT: USDA, Forest Service, Intermountain Forest and Range Experiment Station.

Wyman, S., Bailey, D., Borman, M., Cote, S., Eisner, J., Elmore, W., et al. (2006). *Grazing Management Processes and Strategies for Riparian-Wetland Areas* (Technical Reference No. 1737-20). Denver, CO: USDI, Bureau of Land Management, National Science and Technology Center.

Yeo, J. J. (2005). Effects of Grazing Exclusion on Rangeland Vegetation and Soils, East Central Idaho. *Western North American Naturalist, 65*(1), 91-102.

Yosef, R. (1996). Loggerhead Shrike. *Birds of North America*(231), 1-28.

Young, J., & Blank, R. R. (1995). *Cheatgrass and Wildfire in the Intermountain West.* Paper presented at the 1995 Symposium Proceedings, California Exotic Plant Pest Council.

Young, J. M. (1984). *Class II Cultural Resource Inventory of the Owyhee, Bruneau, and Jarbidge Resource Areas, Boise District BLM*. Boise, ID: USDI, Bureau of Land Management, Boise District.

Zaroban, D. W. (2008, in press). Habitat Associations of Wood River Sculpin (*Cottus leiopomus*). Western North American Naturalist.

Zou, L., Miller, S. N., & Schmidtmann, E. T. (2006). Mosquito Larval Habitat Mapping Using Remote Sensing and GIS: Implications of Coalbed Methane Development and West Nile Virus. *Journal of Medical Entomology, 43*(5), 1034-1041.

CHAPTER 5:
CONSULTATION AND COORDINATION

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Consultation and Coordination

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5.1. INTRODUCTION

The Bureau of Land Management (BLM) planning processes for the Jarbidge Resource Management Plan (RMP)/Environmental Impact Statement (EIS) were conducted in accordance with the requirements of the National Environmental Policy Act of 1969 (NEPA), Council on Environmental Quality (CEQ) regulations, and Department of the Interior (DOI) and BLM policies and regulations. NEPA and the associated regulatory/policy framework require Federal agencies to involve interested publics in their decision-making processes. Title II, Section 202 of the Federal Land Policy and Management Act of 1976 (FLPMA) directs BLM to coordinate planning efforts with American Indian Tribes, other Federal agencies, and State and local governments as part of its land use planning process. This chapter documents the collaborative approach undertaken by BLM throughout the development of the Jarbidge Draft RMP/EIS.

5.2. CONSULTATION WITH THE TRIBES

5.2.1. Shoshone-Bannock Tribes

Formal government-to-government consultation with the Shoshone-Bannock Tribes is conducted through the Fort Hall Business Council, coordinated with the Shoshone-Bannock environmental staff. A brief introduction to the Jarbidge RMP was given to the Fort Hall Business Council on April 27, 2006. A presentation on the Jarbidge Draft RMP/EIS was given to tribal environmental staff on June 26, 2008.

5.2.2. Shoshone-Paiute Tribes

Consultation on the Jarbidge RMP with the Shoshone-Paiute Tribes is conducted through the Twin Falls District's established government-to-government consultation process, the Wings and Roots Native American Campfire. The Jarbidge RMP was briefly discussed at Wings and Roots meetings between December 2005 and September 2006. The Shoshone-Paiute Tribal Staff toured the southern portion of the planning area with Jarbidge Field Office (FO) staff on August 10, 2006. Consultation with the Shoshone-Paiute Tribes for the Jarbidge RMP/EIS began in October 2006 and continued on a monthly basis through the entire planning process.

5.3. COORDINATION WITH FEDERAL GOVERNMENT AGENCIES

The following Federal government agencies were invited to participate in the RMP planning process as cooperating agencies:

- Mountain Home Air Force Base
- National Park Service – Hagerman Fossil Beds National Monument
- Natural Resources Conservation Service
- United States Fish and Wildlife Service (FWS) – Boise
- FWS – Reno
- United States Geological Survey (USGS) – Forest and Rangeland Ecosystem Science Center
- USGS – Water Resources Division

The Hagerman Fossil Beds National Monument accepted the BLM's invitation, finalized an MOU to formally establish the relationship, and participated as a member of the ID Team. The Natural Resources Conservation Service, FWS – Boise, and FWS – Reno formally declined the invitation to become a cooperating agency.

Members of the ID Team and the Twin Falls District managers conducted briefings and presentations on the Jarbidge RMP to a variety of Federal government agencies. These presentations and meetings include:

- Mountain Home Air Force Base (annually)
- FWS Bull Trout Recovery Team (various)
- FWS (various)
- Humboldt-Toiyabe National Forest, Jarbidge Ranger District (September 2007)

5.4. COORDINATION WITH STATE AND LOCAL GOVERNMENT AGENCIES

A number of State and local government agencies were invited to participate in the RMP planning process as cooperating agencies (Table 5- 1). The Idaho State Department of Agriculture (ISDA), Idaho Department of Fish & Game (IDFG), Idaho Department of Lands (IDL), Idaho Department of Parks & Recreation (IDPR), the Twin Falls County Commissioners, and the Elko County Board of Commissioners accepted the invitation and finalized Memorandums of Understanding (MOUs) to formally establish the relationship. Representatives from IDFG, IDL, IDPR, and ISDA participated as members of the Jarbidge RMP Interdisciplinary Team (ID Team). The Owyhee County Commissioners participated in the Jarbidge RMP through their existing coordination agreement with the Twin Falls District. The Idaho Department of Transportation (ITD), the Idaho Department of Water Resources (IDWR), and the Idaho State Historic Preservation Office (SHPO) formally declined the invitation to become a cooperating agency.

Table 5- 1. State and Local Government Agencies Invited to Establish Cooperating Agency Status for the Jarbidge RMP

State Agencies	Local Agencies
Idaho Department of Fish and Game	Elko County Board of Commissioners
Idaho Department of Lands	Elmore County Board of Commissioners
Idaho Department of Transportation	Owyhee County Commissioners
Idaho Department of Water Resources	Twin Falls County Commissioners
Idaho Governor’s Office of Species Conservation	
Idaho State Department of Agriculture	
Idaho State Historic Preservation Office	
Idaho Department of Parks and Recreation	

Members of the ID Team and the Twin Falls District managers conducted briefings and presentations on the Jarbidge RMP to a variety of State and local government agencies. These presentations and meetings include:

- Owyhee County Commissioners (monthly)
- Nevada Division of Wildlife (April 2006)
- Elko County Board of Commissioners (August 2006, August 2007, and September 2007)
- Twin Falls County Commissioners (December 2006 and July 2007)

5.5. ADDITIONAL COLLABORATION EFFORTS

5.5.1. Newsletters

At the beginning of the Jarbidge RMP process, a mailing list was generated of individuals likely to be interested in the Jarbidge RMP. ID Team members compiled a mailing list for the RMP, including individuals and organizations on other BLM mailing lists; Jarbidge FO permit and lease holders; Tribes; Federal, State, and local government agencies; mailing list requests; and other individuals or organizations thought to be interested in the Jarbidge planning effort.

A newsletter was mailed in May 2006 with a reply card individuals could mail use to remain on the mailing list. Additional newsletters were mailed in September 2006, January 2007, and March 2007.

5.5.2. Website

First, an e-mail address and website for the RMP were created when the NOI was published. The website was developed to communicate information about the Jarbidge RMP. This website, located at http://www.blm.gov/id/st/en/prog/planning/jarbidge_resource.html, contained the following informational pages:

- Why is this Plan being Prepared,
- Planning Process,
- How to get Involved and Comment,
- Public Meetings,
- News & Newsletters,
- Federal Register Notices,
- Planning Documents, and
- Maps & Photos.

5.5.3. Scoping

Scoping is the term used to describe the early and open process for identifying the issues to be addressed in the planning process. A Notice of Intent (NOI) to prepare the Jarbidge RMP was published in the Federal Register on January 10, 2006. This notice served as the beginning of BLM's formal scoping process for the RMP.

Open house scoping meetings were held in Twin Falls, Buhl, Glenns Ferry, and Three Creek, Idaho (ID), in May 2006. Fifty-six individuals participated in these meetings (Table 5- 2). The open house format was used to encourage two-way dialogue and discussions about issues to be addressed in the plan, concerns about the process, the planning criteria, and the development of the range of alternatives to be analyzed in the draft RMP/EIS. At each open house, at least five members of the RMP ID Team plus at least one manager from the Twin Falls District were available to answer questions from the public. Maps and posters were displayed around the room to facilitate discussion between the BLM staff and the public. Some attendees submitted written comments at the open houses. In addition, following each open house, ID Team members documented the issues and concerns they discussed with various publics.

Table 5- 2. Open House Scoping Meeting Schedule and Attendance

Location	Date	Number of Attendees
Twin Falls, ID	May 16, 2006	18
Buhl, ID	May 18, 2006	9
Glenns Ferry, ID	May 23, 2006	17
Three Creek, ID	May 24, 2006	12

Several methods were used to advertise the open house meetings and the scoping period for the Jarbidge RMP. The website provided information regarding the open houses and instructions for submitting scoping comments. A one-page mailing was sent to the mailing list on April 28, 2006, that informed recipients of the open house schedule and how to submit comments. These same parties were sent the Jarbidge RMP First Newsletter on May 12, 2006. The newsletter provided more information about the planning process, public participation in the RMP, and the open house schedule. The newsletter also contained a postage-paid reply card that could be returned as a request to remain on the mailing list and used to provide scoping comments[1]. Copies of the newsletter were distributed to attendees at meetings and briefings and were also available to the public at the Jarbidge, Shoshone, and Burley FOs.

A press release on the open houses and scoping process was sent to contacts from the Twin Falls District Media Distribution List the week of May 8, 2006; two newspapers printed stories and one radio station aired a story based on the press release. The local CBS affiliate, KMVT, produced a short segment on the Jarbidge RMP that aired during the evening newscasts on May 15, 2006. Print ads were also placed in six newspapers prior to the open houses.

5.5.4. Public Meetings

In addition to the public meetings held for scoping, a Community Economic Profile workshop was held in Glenns Ferry, ID, in September 2006 to present and get feedback on the findings of an economic analysis of the area by Dr. Richard Gardner; 14 people from a variety of agencies and organizations attended this workshop. A Data Fair was held in Twin Falls, ID, in January 2007 to give the public an opportunity to review the data used to develop the Jarbidge RMP. More than 75 people representing a wide array of Federal, State, and local government agencies, as well as the general public, attended to view the data and information used in developing the Jarbidge Draft RMP/EIS and talk with resource specialists.

The Twin Falls District Resource Advisory Council (RAC) hosted workshops about the Jarbidge RMP in April 2007. Workshops were planned to discuss alternative development, vegetation and livestock grazing, transportation, and areas for special designation or management. The workshop on vegetation and livestock grazing had 27 attendees, while 17 people attended the workshop on transportation. Due to a lack of interest, workshops on alternative development and areas for special designation or management were cancelled.

5.5.5. Briefings and Presentations

Members of the ID Team and the Twin Falls District managers conducted briefings and presentations on the Jarbidge RMP for a variety of groups. Many of these presentations were provided at regularly scheduled coordination meetings, but others were given at the group’s request. These presentations and meetings include:

- Twin Falls District Resource Advisory Council (quarterly)
- Idaho Congressional Briefing (quarterly)
- “71” Livestock Association (bi-annually)
- Jarbidge Sage-Grouse Local Working Group (various)
- Twin Falls Chamber of Commerce Government Affairs Committee (May 2006)
- The Wilderness Society (June 2006)
- Idaho ATV Association Inc., Southern Idaho Desert Racing Association, Treasure Valley Trail Machine Association (July 2006)
- Buhl Kiwanis (July 2006)

[1] To avoid sending unwanted mail, those who have not participated in scoping either by submitting comments, attending an open house or briefing, or requesting to remain on the mailing list were removed from the mailing list. Organizations, government agencies, and holders of permits or leases in the Jarbidge FO remain on the list regardless of their present level of participation.

- Twin Falls Monarch Lions Club (July 2006)
- Mid-Snake Resource Conservation and Development Council (July 2006)
- Mayors, Administrators, and City Councils Organization (July 2006)
- Twin Falls County Fair (August 30 through September 4, 2006)
- Twin Falls Rotary Club (February 2007)
- Three Creek Good Road District (March 2007)
- Twin Falls Optimist Club (April 2007)
- Idaho Conservation League, The Wilderness Society, Idaho Rivers United (June 2007)
- Castleford Men's Club (July 2007)
- Magic Valley ATV Riders, Inc. (February 2008)

In addition, BLM staff engaged in regular coordination with representatives of the Plaintiffs and Intervenors *Western Watersheds Project v. Bennett et al. (Case No. CV-04-181-S-BLW) (D. Idaho)*. BLM mangers and staff have also been in regular contact with program leads from the Idaho BLM State Office as well as the Idaho BLM State Leadership.

5.6. LIST OF PREPARERS

Table 5- 3 contains a list of the individuals who participated in the preparation of the Jarbidge RMP/EIS.

Table 5- 3. List of Preparers

Name	Title	Education
Core Team		
Betts, Aimee D.K.	Supervisory Natural Resource Specialist (RMP Project Manager)	BS Biology and History PhD Ecosystem Science
Crane, Kenneth (Ken)	Rangeland Management Specialist	BS Range Management MS Range Management
Forster, Katharine (Kate)	Fisheries Biologist	BS Fisheries
Hilty, Julienne (Julie)	Botanist	BS Biology MS Plant Ecology and Soil Science
Huber, Kimberly	Administrative Assistant	
Klott, James (Jim)	Wildlife Biologist	BS Wildlife Resources MS Zoology
Nisula, Amanda	Writer/Editor	BA Political Science MPA
Pike, Arnold (Arnie)	Supervisory Rangeland Management Specialist	BS Range Management
Ross, Ivon (Bonnie)	GIS Specialist	
Ross, Jeffrey (Jeff)	Archaeologist	BA Anthropology
Yingst, William (Max)	Outdoor Recreation Planner	BA General
Support Team		
Aoi, Michael (Mike)	Fire Planner	BS Computer Science
Armichardy, Daniel (Dan)	Fisheries Biologist	BS Fish and Wildlife MS Biology
Ash, John	Natural Resource Specialist	BS Biology/Chemistry/ Forestry MS Range and Soils
Brown, William (Brandon)	Fire Use Specialist	BS Zoology
Bupp, Richard (Rich)	Recreation Technician	AAS Water Resource Management BS Agricultural Systems Management
Griggs, Forrest	Geologist	BS Geology
Hagwood, Sheri	Botanist	BS Botany MS Botany
Mata, Jennifer	Fire Ecologist	BS Range Management/ Vegetation Ecology
Oke, Nicole	Administrative Assistant	BA Communication
Paulos, Christina	Administrative Assistant	
Pence, Fred	Realty Specialist	BS Geography and Industrial Technology
Skinner, Cassondra (Cassie)	GIS Specialist	BS Biology
Strickler, Daniel (Dan)	Rangeland Management Specialist	BS Rangeland Resources BS Crop and Soil Science
Tiel-Nelson, Heather	Public Affairs Specialist	BS Communications
Cooperating Agency Representative		
Cook, Jeff	Outdoor Recreation Analyst, Idaho Department of Parks and Recreation	BS Wildland Recreation Management
Kriwox, Erik	Senior Resource Specialist, Idaho Department of Lands	BS Agricultural Science and Technology
McDonald, Mike	Environmental Staff Biologist, Idaho Department of Fish and Game	BS Biology MS Biology

Wright, Kevin	Rangeland Management Specialist, Idaho State Department of Agriculture	BS Wildlife and Range Management MPA
Wissenbach, Mike	Environmental Protection Specialist, Hagerman Fossil Beds National Monument	BS Forestry MS Forest Resources
Social and Economic Analysis		
Eichman, Henry	Economist, USFS TEAMS Enterprise	BA Biology MS Agricultural and Resource Economics
Evans, Mariah	Associate Professor, University of Nevada-Reno	PhD Sociology
Gardner, Richard L.	Economist, Bootstrap Solutions	BS Resource Development MS Natural Resource Economics PhD Natural Resource Economics
Harris, Thomas	Professor, Department Chair, State Specialist, University of Nevada-Reno	BBA Economics and Finance MS Agricultural Economics PhD Agricultural Economics
Martin, John V.	Economist, Martin Economics	BS Agricultural and Natural Resource Economics MS Agricultural Business Management
Zelus, Paul R.	Sociologist, Zelus Associates	BA Classical Languages MA Sociology PhD Organizational Sociology

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