

Chapter 4. Environmental Consequences

Introduction

This chapter describes the environmental consequences of implementing proposed management actions from the Preferred Alternative described in Chapter 2. The purpose of this chapter is to determine the potential for significant impacts of the actions proposed in the Preferred Alternative on the human environment. As defined in 40 CFR Section 1508.14, the human environment is interpreted comprehensively to include natural and physical resources and the relationship of people with those resources. This chapter discusses the potential effects of management actions on various environmental, socioeconomic, and land use program areas.

For the purpose of this document the terms impacts and effects are synonymous. The Council on Environmental Quality directs federal agencies to examine three types of effects of their decisions: direct, indirect, and cumulative. Direct effects occur at the same time and place as the federal action or decision (in this case the proposed resource management plan [PRMP]); indirect effects are caused by the decision and take place at a later time or are farther removed in distance, but are still reasonably foreseeable; and cumulative effects 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 such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Effects are also defined as adverse or beneficial. An effect is considered adverse when the outcome of the action results in undesirable effects. A beneficial impact can result if the current condition is improved or if an existing undesirable effect is lessened. Both adverse and beneficial effects of management actions are described in this document; discussions focus on effects considered to be substantive.

Environmental Consequences of the Preferred Alternative

Throughout this analysis, assumptions about expected future actions or conditions, or general relationships between the decisions being made and expected environmental consequences, are used to facilitate the analysis. Some basic assumptions used for all resources are described below.

All decisions made by the PRMP would be in accordance with national policy and direction, and would be in force until a revised or amended land use plan changes those decisions. All PRMP decisions anticipate continuation of all valid existing rights. Currently authorized permits would be brought into compliance with new requirements as soon as is reasonably practicable following the Record of Decision and in accordance with legal authorities that guide those permits.

The PRMP is expected to guide land use activities for the next 15 to 20 years.

The Preferred Alternative describes future actions needed to implement management direction that will require funding and personnel. For many program areas, past funding has been insufficient to meet demands; future funding levels are uncertain but are not likely to show substantial increases. For the purposes of this analysis, it was assumed that existing resources and personnel would be redistributed to respond to new priorities set by this plan, although the amount of work accomplished annually to meet plan direction would continue to depend on annual budgets and overall BLM priorities. Full plan implementation assumes increased cooperation with other agencies, supplemental funding and resources supplied through grants, and an active volunteer program.

Measures that would avoid, minimize, rectify, reduce, or compensate for any potential adverse environmental effects of implementing the Preferred Alternative are summarized in Chapter 2. All analyses presented here incorporate those requirements. Acreage figures and other numbers used in this analysis are approximate projections only for comparison and analytic purposes. They do not reflect exact measurements or precise calculations.

Organization of Resource-Specific Environmental Consequences

Discussions of environmental consequences for each resource and resource use follow the outline described below:

Methodology, Assumptions, and Incomplete Information

Each resource section begins by discussing the methodology used for the analysis of environmental consequences and the basic assumptions that were used to support the impacts analysis. Examples of what would be included under assumptions include what data and indicators were used to evaluate effects, where the data came from (e.g., past observations, literature, professional judgment, or modeling), the analysis boundaries, technical assumptions, and how impacts were analyzed. Incomplete or unavailable information is also documented as applicable.

Analysis

This section describes impact intensity criteria that are used for analyzing the intensity of effects on the specific resource or land use. These intensity criteria are used for comparison of the degree of effects between alternatives. They are defined in each section under Negligible, Minor, Moderate, and Major impacts.

Analysis of the Preferred Alternative

This section describes general impacts that would result from implementing management actions from the Preferred Alternative on the resource or land use under consideration. Detailed information is not provided for resources with little to no anticipated effects.

Cumulative Effects

This section describes cumulative effects, which are the 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 such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Mitigation Measures

This section describes mitigation measures that would be implemented to mitigate substantive impacts resulting from the Preferred Alternative.

Unavoidable Adverse Impacts

This section describes adverse impacts to a resource that are considered “unavoidable” from implementing the Preferred Alternative.

Short-Term Uses Versus Long-Term Productivity

This section describes how short-term uses of a resource may result in degradation of, or benefit to, long-term productivity of that resource.

Irreversible and Irretrievable Impacts

This section describes significant impacts to a resource that are considered “irreversible”; that is the resource will not return to its original state or condition.

4.1 Potential Effects on Air Resources

This section describes the potential impacts on air resources from implementation of the Preferred Alternative.

4.1.1 Methodology and Assumptions

Sources of air pollutants include smoke from wildland fire and prescribed burning, vehicular/equipment emissions, and fugitive dust from use of unsurfaced roads and construction activities.

Smoke from wildland fires and prescribed burning are expected to result in the greatest impacts on air quality. ‘Wildland fire use’ (WFU) uses naturally ignited fire to protect, maintain, and enhance resources; in these areas, fire would be allowed to function in its natural ecological role. Wildland fires from within the plan area and from upwind sources would result in sporadic smoke impacts in summer. Wildfires are expected to burn at a greater intensity than prescribed burns and thus create more potential for air quality degradation. The application of greater fuels treatments and appropriate management response (AMR) and less use of full suppression is expected to result in fewer acres burned by wildfire in the long term, a reduction in fire intensity, and thus less air quality degradation.

Prescribed fire would be used to protect, maintain, and enhance resources. All prescribed burning activities would comply with the California Smoke Management Guidelines for Agricultural and Prescribed Burning. Eagle Lake Field Office (ELFO) resource managers will follow the direction and requirements of the Northeast Air Alliance (consisting of the Butte, Lassen, Modoc, Plumas, Shasta, Siskiyou and Tehama air pollution control districts) to achieve acceptable air-quality standards while implementing fuel reduction projects, prescribed fires, and wildland fire use projects. Protocol is in place within the Northeast Air Alliance that requires all prescribed burning projects be coordinated with other Bureau of Land Management (BLM), U.S. Department of Agriculture (USDA) Forest Service, and California Department of Forestry (CDF) offices through a daily smoke management conference call. Through this conference call, resource managers can mitigate and avoid any potential smoke management conflicts by collectively adjusting the timing of their respective projects. The use of prescribed fire would be based on approved Burn Plans and would follow project-specific prescriptions contained in these Burn Plans. Impacts from prescribed fire were assumed to be generally proportional to the acreage treated, with generalized consideration given to any differences in vegetation types treated. Smoke emissions from prescribed burning generally would dissipate in the direction of the most common winds. Ecosystems that contain more overall biomass would yield more smoke than more lightly vegetated rangelands and shrub steppe ecosystems. Smoke management strategies are becoming more and more complex as fire is used more frequently to preserve, restore, or maintain rangeland health and reduce hazardous fuels.

In general, use of prescribed fire and WFU would reduce emissions over the long term by reducing fuel loads but would result in a more consistent generation of emissions on an annual basis, because naturally ignited fires would be allowed to burn (as opposed to being subjected to suppression under AMR or full suppression strategies) and prescribed burns would be regularly conducted. WFU uses naturally ignited fire to protect, maintain, and enhance resources; in these areas, fire would be allowed to function in its natural ecological role.

Fugitive dust from vehicle travel mostly settles quickly and remains relatively close to the point of origin, resulting in only localized effects. Other sources of emissions (emissions from vehicles, minerals exploration, and construction activities) generally would be localized and of short duration. However, because of the non-attainment status for carbon monoxide and ozone in Washoe County, Nevada, any

emissions from BLM lands in Washoe County would be contributing to cumulative air quality impairments.

4.1.2 Incomplete or Unavailable Information

Acreage of lands subject to wildfire in any given year is unknown. Consequently, potential effects of wildfire are described in qualitative terms, based on the extent of fuels treatments and the assigned suppression prescription. Because the ranges of acreages identified for prescribed burning are generally broad, annual emissions from prescribed burning cannot be precisely determined; therefore, the potential effects of prescribed burns also are described in relative terms. The amount of airborne fugitive dust resulting from operation of vehicles on paved and unpaved roads, construction activities and other earth-moving activities, and disturbance of soils is not known and cannot be quantified. Further, the types of vehicles and equipment that would be necessary for specific plan actions are not known.

4.1.3 Analysis

The following impact thresholds were used for analyzing the intensity of effects on human health and air quality related values:

Negligible: No changes would occur, or changes in air quality would be below or at the level of detection and if detected, the effects would be considered slight.

Minor: Changes in air quality would be measurable, although the changes would be small and local. No air quality mitigating measures would be necessary.

Moderate: Changes in air quality would be measurable and would have appreciable consequences, although the effect would be relatively local. Air quality mitigating measures would be necessary, and they probably would be successful.

Major: Changes in air quality would be measurable, would have substantial consequences, and would be noticed regionally. Air quality mitigating measures would be necessary, and their success would be uncertain.

4.1.4 Analysis of the Preferred Alternative

Wildland fires would be managed according to the appropriate management response. Effects on air quality, including visibility and human health, would be consistent with current programs and policies. Prescribed fire and wildland fire would generate smoke that may cause a temporary localized conflict with residents, recreational users, and other visitors. Operation of motorized vehicles (including recreational vehicles) and any equipment with an internal combustion engine would result in pollutant emissions, including ozone precursors (reactive organic gases and nitrogen oxides), carbon monoxide, and particulate matter less than 10 micrometers in diameter (PM₁₀). The use of unsurfaced roads, recreational off-highway vehicles (OHVs), and construction activities would generate localized fugitive dust. Vehicular and equipment emissions and fugitive dust from use of unsurfaced roads—as well as timber harvest, construction activities, and other activities from new projects that would be undertaken—would require site-specific National Environmental Policy Act (NEPA) analysis. Appropriate management practices would be applied in compliance with NEPA.

Prescribed burning of 0–4,500 acres per year would result in a somewhat higher level of emissions, as would the designation of 10,339 acres as a WFU area. However, these factors would attenuate wildland fire intensity over the long term as fuel loads are reduced in those areas, because of the greater acreages subject to such treatments. Somewhat greater emissions on an annual basis would result from an increased

amount of prescribed burning and WFU; however, this approach would result in reduced emissions associated with periodic wildfires.

4.1.5 Cumulative Effects

Smoke from prescribed or wildland fires burning simultaneously on one or more adjacent national forest, Modoc, Lassen, and Plumas—adjacent BLM districts—Alturas Field Office, Surprise Field Office and Winnemucca field Office—and private and state lands, would have a significant impact on the air quality of northeastern California and northwest Nevada. Prevailing winds in the area are south and southwesterly. As a result, multiple fires could degrade air quality in Southern Oregon and northwest Nevada.

It is not likely that several prescribed fires would occur at the same time since a protocol is in place within the Northeast Air Alliance that requires all prescribed burning projects be coordinated with other BLM, USDA Forest Service, and CDF offices through a daily smoke management conference call. However, large wildland fires or escaped prescribed fires could occur in a number of areas at one time resulting in significant air quality degradation.

4.1.6 Mitigation Measures

No major adverse air quality impacts are projected under the Preferred Alternative. However, the following mitigating measures may be implemented to further minimize air quality emissions related to the proposed management decisions.

Prescribed burning would be concentrated in spring (mid-April through mid-June) and fall (mid-September through mid-November) to avoid coinciding with peak summer levels of air pollutants from other anthropogenic activities in the area and winter inversion potential. Computer modeling to assess smoke dispersion, and related smoke management techniques would be used to reduce the potential that prescribed burning would result in adverse air quality impacts.

4.1.7 Unavoidable Adverse Impacts

The adverse effects on air quality would be short term and limited to the local region. The intensity of effects would range from negligible to moderate, with most prescribed and wildland use fires causing minor effects. Fugitive dust from roads with current traffic use would produce short-term local effects of negligible intensity. Large wildland fires or escaped prescribed fires could occur in a number of areas at one time resulting in significant air quality degradation. The addition of sources outside the management area occurring during the same time period could produce more intense but still moderate effects throughout the area.

4.1.8 Short-Term Uses Versus Long-Term Productivity

Prescribed fire may result in short-term minor degradation of air quality through increases in wind-borne particulate (PM₁₀ and particulate matter less than 2.5 micrometers in diameter) due to loss of vegetation, and smoke. This short-term increase in local and sub-regional smoke associated with prescribed burns must be compared against the large regional smoke plumes of the wildfires that can be expected without prescribed burning over the long-term. Prescribed fires are planned and implemented with the intent to accelerate ecosystem and plant community recovery to a healthier and more vigorous state. This would result in beneficial long-term impacts to air quality.

4.1.9 Irreversible and Irretrievable Impacts

With proper management and remediation, there is no projected irreversible or irretrievable air quality impacts associated with the proposed management actions.

4.2 Potential Effects on Cultural Resources and Paleontology

This section describes the direct, indirect, and cumulative effects to cultural and paleontological resources from implementation of the Preferred Alternative. The overall cultural resource sensitivity of the ELFO is considered to be high. Management objectives for cultural and paleontological resources are likely to conflict with those of physical and biological resource objectives.

4.2.1 Methodology and Assumptions

BLM would comply with all federal cultural resource laws that implement Sections 106 and 110 of the National Historic Preservation Act of 1966 (NHPA) and other rules, agreements, laws, and regulations, especially as defined in the new BLM 8100 Manual (Cultural Resource Management), and with the existing BLM Nevada and California State Historic Preservation Office (SHPO) Protocols that implement 36 CFR 800 (Protection of Historic and Cultural Properties).

An interdisciplinary team and an interactive public-private partnership process would be used to determine potential impacts to cultural or paleontological resources and propose mitigation for each management action. The cultural resource data base (numbers, types, condition, National Register eligibility, and location of cultural resource sites) used to analyze potential effects on cultural resources is based on geographic information system (GIS) data, professional inventory and project reports (e.g., Delicorte 1997; King et al 2004; Manuel 2002; BLM 1981b, 1982, 1984; Hamusek 1992) and other information found in the files of BLM's ELFO and both the Nevada and California SHPOs.

Impacts

Impacts were assessed using criteria defined by regulations for *Protection of Historic Properties* (36 CFR Part 800). An effect is a direct or indirect alteration of the characteristics of an historic property that qualifies it for inclusion in the National Register of Historic Places (NRHP). Effects are adverse when the alterations diminish the integrity of a property's location, design, setting, materials, workmanship, feeling, or association.

Examples of adverse effects include but are not limited to the following:

- Physically destroying a property
- Inappropriately altering a property by not following the Secretary of the Interior's
- Standards for Treatment of Historic Properties (36 CFR Part 68) and applicable guidelines
- Moving a property from its historic location
- Changing the physical features within the property's setting that contribute to its historical significance
- Introducing visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features
- Transferring, selling, or leasing a property out of Federal ownership or control without adequate restrictions to ensure preservation.

Impacts from Natural Agents

The activities of various plants and animals and erosive actions of wind, water, and temperature have major impacts on cultural materials in the archaeological context, leading to loss of artifacts and features, and abundant variation in the record (Mathewson 1989; Schiffer 1987; Wildesen 1982). These impacts

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can take the form of bioturbation or churning of the soil as a result of rodent activity, the downslope movement of artifacts and cultural soils as a result of erosional processes and the deterioration of standing structures from moisture and heat. Overall these effects are cumulative, generally resulting in a loss of archaeological data that would render a site ineligible for the NRHP. The same factors would apply to paleontological materials.

Impacts from Human Agents

Human-caused actions which have harmful effects on archaeological and paleontological properties and data are complex, and continue to increase as populations expand into undeveloped areas. These human agents can be divided into incidental and intentional actions, which are discussed in the following paragraphs.

Incidental Actions

These activities may be defined as those destructive actions associated with the many forms of resource development, protection, and use that take place on the landscape. Although the loss of data and disturbance of cultural and paleontological properties are not intended, the end result is that part of the record disappears from the landscape. In this PRMP, these activities are categorized as: energy or minerals development, utilities and telecommunication developments, grazing, rangeland improvements or water development projects, recreational pursuits, construction, maintenance, and improvement of roads, fire suppression and fuels treatments, timber harvesting activities, and protection and habitat enhancement of botanical or biological resources.

Intentional Actions

Intentional actions which lead to loss of archaeological and paleontological sites and data are critical in that they are inherently harmful to the resource base. The worst of these actions, those related to vandalism, are particularly damaging since they lead to destruction without any return of scientific information.

Intentional destructive actions include but are not limited to:

- Excavation (digging, pothunting, use of heavy machinery)
- Carving, scratching, chipping, general defacement
- Surface collection of artifacts
- Removing, shooting at, painting, chalking, making casts and tracings of rock art
- Theft of artifacts from structures, stripping weathered boards or other timbers, breaking artifacts, objects, windows
- Removing part or all of a structure, causing structural damage or knocking structures over
- Dismantling, general destruction of structure (but apparently no removal)
- Arson
- Climbing or walking on resources
- Building new roads over, using modern vehicles on historic roads, off-road recreational vehicle use
- Rearrangement of or relocating of resources
- Use as firewood
- Removal through excavation or surface collection of paleontological resources

The NHPA requires agencies to take into consideration the effects of their actions on properties listed or eligible for listing on the NRHP. Significant cultural resource properties and Native American traditional cultural properties would be protected by management strategies designed to preserve such sites for future scientific research, recreational uses, educational use, or Native American use.

Paleontological properties are covered under the Paleontological Resources Protection Act. The act directs federal agencies to coordinate the management and protection of paleontological resources on federal lands using scientific principles and expertise. It also directs agencies to develop appropriate plans for paleontological resources that address inventory, monitoring, and scientific and educational use. The existing 43 CFR 3809 regulations do not contain a process for inventory and evaluation of paleontological resources like the procedures for cultural resources under the NHPA. The existing regulations state that operators cannot knowingly disturb, alter, injure, or destroy any scientifically important paleontological remains.

The exact locations of prehistoric, ethnographic, and historic cultural resources and traditional cultural properties are confidential and are not included in this document.

4.2.2 Incomplete and Unavailable Information

Thus far, more than 811 cultural sites have been found in the ELFO area, and professional estimates suggest the area has at least 3,000 unidentified cultural sites. Because less than 3% of the field office area has been professionally inventoried for the presence of cultural resources, we have used relevant statistical and other studies (see above) to estimate the numbers, types, locations, and condition of the cultural resources potentially found in the field office area. Several studies note a relationship between certain types of ecosystems and the locations known to have been used by historic, prehistoric, and ethnographic populations. The studies have estimated the overall cultural resource site density (numbers of sites/square acre/type of ecosystem) and sensitivity (numbers of sites potentially of NRHP eligibility) as higher than would be expected when compared to other areas within the northwest Great Basin. The physical condition (site matrix) of many of these cultural sites is unknown, but some of the above studies suggest a direct correlation between the condition of the land (land health) and the stability and condition of any associated cultural resource sites.

4.2.3 Analysis

Goals and objectives for cultural and paleontological resources focus on compliance with existing laws, regulations and Executive Orders, in addition to the BLM-CA and NV SHPO Protocol agreement, and the National Programmatic Agreement. Protection and preservation of culturally significant archaeological and paleontological sites are included in the Preferred Alternative, as well as consultation and coordination with Native American tribes.

Due to the nature of cultural and paleontological resources, it is difficult to state definitively what level of impacts can be expected at any site within a proposed management area. Negligible to moderate impacts on cultural and paleontological properties are expected as a result of land management activities under the Preferred Alternative.

Management actions including recreation and OHV use, fire use and suppression, fuels treatments, road construction and maintenance, juniper treatment, timber harvesting activities, livestock grazing and range improvements all possess the potential to adversely affect sensitive cultural and paleontological properties.

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Archaeological site vandalism and the unlicensed collection of artifacts and "digging" of sites are often indirect consequences of land management actions. Projects involving the construction, improvement, or maintenance of roadways have the potential to incur major effects to cultural and paleontological sites by facilitating public access to otherwise inaccessible areas. Vandalism may be precipitated by the disclosure of site locations either inadvertently through "flag and avoid" tactics, or purposefully through the sharing of sensitive resource information with non project related personnel.

Emergency fire suppression activities would have minor to major effects on cultural and paleontological properties. Any fire, wild or prescribed, may result in cultural resources being damaged, destroyed or result in inadvertent exposure of sites to increased visibility and illegal collection activities. High intensity wildland fires and prescribed burns would act to destroy or alter sensitive scientific data that can be gathered through the examination of obsidian hydration profiles. Fire use and fuels management actions that increase erosion, runoff and compaction rates of soils through vegetation loss and use of heavy equipment would engender minor to moderate adverse effects to cultural and paleontological resources located near or within such projects.

Fire rehabilitation efforts would generally increase the protection of cultural deposits that may have remained unaffected from wildland fire by preventing or reducing erosion and encouraging rapid re-vegetation of denuded surfaces. Potential impacts from rehabilitation activities, such as mechanical reseeding, would be mitigated under standard procedures.

Implementation of the Healthy Forest Initiative has the potential to incur minor to moderate impacts to cultural and paleontological resources through improved access to sites or the disclosure of site locations as a result of "flag and avoid" tactics. Long term potential disclosure of site locations would be a result of untreated islands or vegetation pockets that attract attention within treatment areas. Non-treated islands of cultural resources would have minor to moderate adverse effects as a result of livestock congregation within grazing allotments.

The development of public use fuel wood cutting areas would have minor to moderate effects to cultural resources as a result of increased access to archaeological or paleontological sites within the units. However, minor positive effects to archaeological sites within areas closed to fuel wood cutting would occur.

The construction of new permanent or temporary roads and the maintenance of existing roadways have the potential to cause negligible to major adverse effects to cultural and paleontological resources. These effects can be caused either indirectly by improving access to formerly remote areas, or directly through maintenance activities on roads that go through existing sites.

Vegetation treatment projects, including fuel reduction projects will be mitigated to avoid direct impacts to cultural resources. Other vegetation treatment actions would have minor effects to cultural resources located near or within aspen stands. The construction of exclosures or the introduction of fire has the potential to negatively affect resources that are located within or adjacent to treatment areas. The use of prescribed fire in oak woodland and curlleaf mountain-mahogany stands would have negligible to minor effects on cultural or paleontological resources located within or adjacent to the treatment areas. Vegetation management aimed at improving the sagebrush-steppe community has the potential for minor to major negative short-term impacts to cultural resources through the use of prescribed fire and/or mechanical treatments, improved access to and visibility of archaeological sites, and the use of herbicides in areas of culturally important plants.

Grazing and wild horse use in high sensitivity areas results in major long-term adverse effects to cultural resources (Foster-Curley 2003; Halford 1999; Horne and McFarland 1993; Osborne et al 1987). In

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general, there are three primary mechanisms to consider when addressing the effects of livestock grazing on cultural resources: (1) mechanical or physical impacts such as trampling, wallowing, and rubbing; (2) chemical impacts resulting from urine and feces; and (3) erosional impacts.

Livestock impact cultural resources through soil compaction and subsurface soil disturbance by trampling and pawing that mixes depositional associations and accelerates erosional processes; wallowing and trailing that results in the dispersion, breakage and/or loss of artifacts and other data that inform archaeologists as to the age, use and environmental setting of prehistoric sites; rubbing against standing structures and chemical reactions to urine and feces that result in the accelerated deterioration of historic properties (ASPPN I-15, 1990; Nielson 1991; Osborne et al. 1987; Roney 1977.)

Plants valued by Native American traditionalists are trampled or consumed by livestock, adversely affecting plant availability at some locations. For purposes of analysis it is assumed that the impacts of livestock use are distributed in proportion to the actual distribution of livestock, with the most intensive impacts occurring at livestock use concentration areas. Cultural resources located on lands having erosional or other types of watershed deterioration problems attributed to livestock use impacts are assumed to receive high impacts. Cultural resources are non-renewable, and impacts of livestock use on cultural resources are cumulative (Kobori et al 1980).

Recreational use would have negligible to moderate adverse impacts to cultural and paleontological resources through possible increased exposure of sites resulting in their use or disturbance, and the increased potential for vandalism and illegal artifact collection. Development and maintenance activities associated with the construction of campgrounds, trails, and viewing areas would have negligible to moderate adverse effects to cultural and paleontological sites. Overall, interpretive areas would have negligible to moderate adverse impacts in the short term, but ultimately long-term minor to moderate positive effects would be achieved through their development.

The creation of new special recreation management areas would have minor to moderate adverse short and long term effects as a result of the construction of facilities that would attract larger numbers of visitors to those areas. Projects implemented within these areas to protect cultural resources would likely also have minor to moderate negative cumulative impacts by drawing attention to archaeological sites. Overall, special designations such as areas of critical environmental concern (ACECs) could provide indirect benefits to cultural and paleontological resources through the restriction of surface disturbance and increased law enforcement patrols.

OHV travel in sensitive areas would result in minor to moderate adverse effects to cultural and paleontological sites through soil compaction, displacement, rutting and other disturbance. Opportunities for increased looting or vandalism as a result of increased access would also occur. The setting of Native American traditional cultural properties (TCPs) or sacred sites would be adversely affected through auditory or visual means by the use of OHVs within such areas.

Land management actions developed and implemented in conjunction with cultural resource staff represent the best opportunity for avoiding adverse impacts to properties eligible for the NRHP.

In addition, designations of ACECs and the identification of culturally significant properties would act to increase positive effects to cultural and paleontological deposits by promoting management goals focused on preserving such important areas.

The NHPA requires agencies to take into account the effects of their actions on properties listed or eligible for listing on the NRHP. The process begins with the identification and evaluation of cultural resources for NRHP eligibility, followed by an assessment of effects on eligible resources. The process

concludes after consultation. If an action could change in any way the characteristics that qualify the resource for inclusion on the NRHP, it is considered to have an effect. No adverse effect means there could be an effect, but the effect would not be harmful to the characteristics that qualify the resource for inclusion on the NRHP. Adverse effect means the action could diminish the integrity of the characteristics that qualify the resource for the NRHP.

In the following section, the analysis of the impacts of the Preferred Alternative is considered based on the proposed land use management actions and their potential level of impact to cultural and paleontological resources. For the purposes of this analysis, the levels of impacts to these resources were defined using 36 CFR Part 800 as a guide and modified as follows:

Negligible: The effect on archaeological or historic sites would be at the lowest levels of detection—barely measurable with any perceptible consequences, either beneficial or adverse, on archaeological resources. For the purposes of Section 106 of the NHPA, the site’s eligibility would not be threatened, and the determination of effect would be *no adverse effect*. The effect on paleontological resources would be at the lowest levels of detection—barely measurable with any perceptible consequences, either beneficial or adverse, on paleontological resources and the determination of effect would be *no adverse effect*.

Minor: The adverse effect on archaeological or historic resources would be measurable or perceptible, but it would be slight to localized within the relatively small area for a site or group of sites. The action would not affect the character or diminish the features of an NRHP eligible or listed archaeological site and would not permanently affect the integrity of any archaeological sites. For the purposes of Section 106, the site’s NRHP eligibility would remain intact, and the determination of effect would be *no adverse effect*. The adverse effect on paleontological resources would be measurable or perceptible, but it would be slight to localized within the relatively small area for a site or group of sites and the determination of effect would be *no adverse effect*.

Moderate: The adverse impact to cultural resources would be measurable and perceptible. The action would change one or more character-defining features of an archaeological resource, but it would not diminish the integrity of the resource to the extent that its National Register eligibility would be jeopardized. For purposes of Section 106, the site’s National Register eligibility would be threatened, and the determination of effect would be *adverse effect*. A beneficial moderate effect would involve site stabilization. For purposes of Section 106, the determination of effect would be *no adverse effect*. The adverse impact to paleontological sites would be measurable and perceptible and the determination of effect would be *no adverse effect*. A beneficial moderate effect would involve site stabilization.

Major: The adverse impact on archaeological or historic sites would be substantial, noticeable, and permanent. For National Register eligible or listed archaeological sites, the action would change one or more character-defining features of an archaeological resource, diminishing its integrity to the extent that it would no longer be eligible for listing on the NRHP. For purposes of Section 106, the site’s NRHP eligibility would be lost, and the determination of effect would be *adverse effect*. A beneficial major effect would involve active intervention to preserve and improve sites. For purposes of Section 106, the determination of effect would be *no adverse effect*. The adverse impact on archaeological or historic sites would be substantial, noticeable, and permanent and the determination of effect would be *no adverse effect*. A beneficial major effect would involve active intervention to preserve and improve sites.

4.2.4 Analysis of the Preferred Alternative

The Preferred Alternative would protect and stabilize large numbers of NRHP eligible cultural resources that are known to exist within the ELFO area and identify new areas that could contain NRHP eligible

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cultural resources. This alternative would also provide for compliance with existing laws, regulations, BLM cultural resources policy, and the California and Nevada BLM-State protocols. The Preferred Alternative would protect and stabilize known paleontological localities and identify formations that are likely to include paleontological resources.

Under the Preferred Alternative, the number of culturally sensitive areas under active cultural resource management would increase from 13 to 17, as would the number of acres from 9,084 to 60,798. Several areas under present management would receive more protection from new buffer zones and increased OHV restrictions. New areas have been listed in a new Class I inventory report (King et al 2004) and by ongoing field work for future cultural resource management opportunities.

Two new ACECs—North Dry Valley and Buffalo Creek Canyons—would be designated to protect the area's unique cultural resources. Additional ACECs would be developed on Willow Creek, Eagle Lake, and Lower Smoke Creek. Designation of ACECs would result in increased protection of cultural and paleontological sites within these areas due to restrictions to energy and mineral development, new rights-of-way, Visual Resource Management (VRM) Class II designation, and certain limits to livestock grazing. Upper Smoke Creek would be designated as a Wild and Scenic River (WSR), which would improve the protection and management of cultural resources in this area, by prevention of water diversion or construction of dams.

Fuels treatments on up to 10,000 acres per year would result in long-term beneficial impacts by protecting and stabilizing cultural resource sites.

Impacts from livestock grazing and wild horse use would continue in site-specific areas, as described under Analysis. Negligible to moderate adverse impacts would result from livestock and wild horse grazing from trampling and disturbance to individual cultural sites. Livestock grazing would be managed to meet standards for rangeland health and guidelines for livestock grazing, and this should reduce the amount and extent of impacts or damage to cultural resources. Impacts from wild horses would be reduced as herds are brought down to appropriate management levels.

The management of riparian zones to improve water quality and aquatic habitat while reducing soil erosion would benefit cultural resources. Restricting livestock grazing along streams, stabilizing stream banks, and closing roads in or near riparian areas would maintain or enhance conditions of archaeological sites in these areas.

Several areas under present management would receive more protection from establishing new buffer zones and increasing OHV restrictions. OHV use would be restricted to designated routes on 760,837 acres, and 261,511 acres would be 'Closed' to OHV use. This would significantly reduce damage to cultural sites from soil compaction, displacement, rutting, and other disturbances.

Many of the ongoing adverse impacts, such as erosion and vandalism, to cultural resources that were discussed in this PRMP and in both the Class I Inventory report (King et al 2004) and other data would be reduced once the Preferred Alternative is adopted because more cultural resources would be protected and the site surfaces allowed to stabilize.

Cultural resources would receive more intensive on the ground management and Cultural Resource Management Plans would be developed for those sites that are determined to be in jeopardy. In summary, the Preferred Alternative would result in minor adverse effects and moderate to major beneficial effects to cultural and paleontological resources. The Preferred Alternative would also result in minor to major beneficial effect on cultural resources.

4.2.5 Cumulative Impacts

Cumulative effects under current management from actions or activities by agencies or entities other than BLM could affect paleontological localities and archaeological districts, historic districts, cultural landscapes, and linear historic trails and prehistoric districts. The ELFO area has not been entirely surveyed for either paleontological or archaeological resources, but few districts or landscapes have been found. It is difficult therefore to determine whether more significant districts and landscapes exist and whether contributing elements exist on lands adjoining BLM-administered land. Ground-disturbing activities and actions that alter settings on adjoining government or private lands might affect the significance of potentially eligible districts and landscapes in these areas. Cumulative loss of significant resources might affect the eligibility of districts and cultural landscapes for listing on the NRHP.

Conversion of sagebrush habitats to agricultural use on adjacent private lands might degrade cultural resources by disturbing the integrity of resources. In addition, converting habitat to residential use by private landowners might result in similar cumulative effects. Juniper treatment and logging on private lands might involve ground-disturbing activities that degrade individual significant cultural resources and districts. All ground disturbance and actions by agencies or entities other than BLM with the potential to affect the integrity of resources could have cumulative effects on significant cultural resources. Additionally, all ground disturbance and actions by agencies or entities other than BLM with the potential to affect the integrity of resources could have cumulative effects on significant paleontological resources.

Cumulative effects to cultural resources as a result of livestock grazing may include the loss of information and data that would render a site ineligible for the NRHP. Areas of high livestock concentration and trailing, coupled with long periods of use or early turn out dates would have major long term cumulative effects that eventually result in the loss of the resource. Paleontological resources can also be sensitive to livestock grazing activities that could eventually result in the loss of the resource.

Compliance with Sections 106 and 110 of the NHPA and 43 CFR 3809 of the Paleontological Resources Protection Act would minimize potential effects.

4.2.6 Mitigation Measures

All actions proposed are subject to compliance with cultural resource laws and internal agency guidelines such as the Nevada and California Protocols. These laws and guidelines are intended to eliminate, reduce, or mitigate adverse impacts to cultural resources. Although the preferred treatment of important cultural and paleontological resources within an area of an undertaking is usually complete avoidance, this is not always possible or always the best alternative. As such, mitigation of impacts is offered as an alternative to avoidance. Proactive protective measures such as soil stabilization and fencing of cultural landscapes or paleontological localities, where needed, are good alternatives to complete avoidance. The site context (physical anthropological or paleontological record) is left intact (except for minor surface disturbance and natural environmental processes) and would eventually heal and protect the cultural or paleontological resource.

4.2.7 Unavoidable Adverse Impacts

The location and nature of many cultural or paleontological resources in the area are as yet unknown. Hence, it is not possible to determine if there would be unavoidable adverse impacts to these resources or what these impacts might be. There is some potential for unavoidable adverse impacts from nearly any proposed management decision. Some recent studies and the Class I inventory (King et al 2004) have found some adverse trends, such as erosion and artifact displacement, resulting from recreation and livestock grazing. But adherence to the relevant cultural resource laws and protocols and paleontological laws and regulations would allow the mitigation of many of these impacts.

4.2.8 Short-Term Uses Versus Long-Term Productivity

None.

4.2.9 Irreversible and Irretrievable Impacts

Casual, unauthorized activities (such as dispersed recreation, OHV use, vandalism, and natural processes (natural decay, deterioration, or erosion) all contribute to deterioration and destruction of cultural and paleontological resources. Once cultural or paleontological resources are damaged, they can not be replaced.

4.3 Potential Effects on Energy and Minerals

This section analyzes the direct, indirect, and cumulative effects on energy and minerals activities from implementing the Preferred Alternative. The current potential for energy (oil and gas) and locatable minerals development is very low in the field office area (John Snow, Nevada Division of Minerals, oral communication), as described in the *Reasonably Foreseeable Development Scenario, Appendix D*. The development of geothermal energy within the Eagle Lake Known Geothermal Resource Area (KGRA) has a medium potential of occurring. A demand for saleable minerals will continue, and small-scale development is expected. Even with low potential for the development of oil and gas and locatable minerals, objectives for energy and mineral resource management could conflict with those for physical, biological, and cultural resource management. These conflicts would be resolved through the following:

- mitigation measures,
- withdrawal of the land from mineral entry, or
- making specific parcels unavailable for development.

Mitigation measures would be incorporated as terms, conditions, and stipulations in permits and leases.

4.3.1 Methodology and Assumptions

Effects on energy and minerals development are considered adverse if they would restrict or raise the cost of mineral and energy exploration, development, and extraction. The effects considered were beneficial if they would increase access to the resources, and if more land would be open to development with fewer restrictions. Management Actions were considered less beneficial if additional land would be 'Closed' to development or more restrictive conditions would be placed on development.

4.3.2 Incomplete or Unavailable Information

Limited information exists on the location and extent of mineral resources in the ELFO area. Consequently, the first step in mineral and energy activities is often exploration to determine the extent and economic feasibility of mineral resource extraction. Until a potential permittee or lessee approaches BLM with an application or plan of operations, the location and extent of potential activities are unknown. As a result, the planning approach to energy and minerals management is to determine where mineral activities could conflict with other resources and consider conditions to mitigate the conflict or withdraw the lands from mineral entry.

4.3.3 Analysis

For this analysis, the defined levels of effects on energy and mineral management are as follows:

Negligible: The effect would be barely detectable and would not cause any more restrictions beyond the standard lease terms, or add higher costs to the exploration, development, or extraction of the resources. The amount of land open to energy and minerals development without restrictions would be maximized.

Minor: The effect would be slight, but detectable and would impose only minor restrictions or add slightly higher costs to the exploration, development, or extraction of the resources. The amount of land 'Open' to energy or mineral development would be slightly lower (up to 25%) than at present for an adverse effect or slightly higher (up to 25%) for a beneficial impact.

Moderate: The effect would be readily apparent and would moderately restrict or impose moderately higher costs to the exploration, development, and extraction of resources. The amount of land 'Open' to

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development of energy and minerals would be moderately lower (26-50%) than at present for an adverse impact or moderately higher (26-50%) for a beneficial impact.

Major: The effect would be severely adverse, and substantially more restrictions would be imposed or substantially higher costs would be added to the exploration, development, and extraction of resources. The amount of land ‘Open’ to energy and mineral development would be substantially lower (>50%) than at present for an adverse impact or substantially higher (>50%) for a beneficial impact.

Essentially, the goals and objectives for mineral and energy development are to help BLM meet local and national, nonrenewable and renewable energy and other public mineral needs, while ensuring a viable, long-term mineral industry and providing reasonable and necessary protections to other resources.

For both nonrenewable and renewable alternative energy resources, the following principles would apply.

- Encourage and facilitate the development by private industry of public land minerals to satisfy national and local needs and provide for economical and environmentally sound exploration, extraction, and reclamation.
- Process applications, permits, operating plans, mineral exchanges, leases, and other use authorizations for public lands in accord with existing policy and guidance.
- Monitor saleable, leasable, and locatable mineral operations to ensure proper resource recovery and evaluation, production verification, diligence, inspection and enforcement of contract sales, common-use areas, community pits, free-use permits, leases, and prospecting permits.

This PRMP would recognize and conform to the National Energy Policy (National Energy Policy Development Group 2001) by:

- recognizing the need for diversity in obtaining energy supplies,
- encouraging the conserving of sensitive resources, and
- improving opportunities for energy distribution.

4.3.4 Leasable Mineral Resources

4.3.4.1 Analysis

Lands ‘Open’ to mineral leasing would fall into one of three categories of conditions in leasing. The least restrictive are lands ‘Open’ to leasing under standard lease terms. The most restrictive are lands ‘Open’ for leasing with no surface occupancy requirements. In some areas, restrictions beyond the standard lease terms might be implemented to protect sensitive resources. The third category of conditions consists of these added restrictions, which this section refers to as restrictive stipulations.

4.3.4.2 Analysis of the Preferred Alternative

The existing wilderness study areas (WSAs)—380,359 acres (37%)—would remain ‘Closed’ to leasable minerals as per Interim Management Policy for Lands under Wilderness Review (IMP) (BLM 1995b). Any WSAs, or portions thereof, that are not designated as wilderness and are released by Congress from WSA status will be ‘Open’ to leasing unless ‘Closed’ by other management actions.

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The Preferred Alternative emphasizes resource management through commodity production combined with mitigation and resource protection. Under this action 391,339 acres of BLM-administered lands would be 'Open' to mineral leasing under standard lease terms.

A total of 147,227 acres (14%) would be required to abide by seasonal use restrictions to protect critical wildlife habitat, as follows:

- 28,494 acres in Fort Sage Special Recreation Management Area (SRMA),
- 10,156 acres in North Dry Valley ACEC, and
- 61,764 acres in Antelope/Schaefer/Bald Mountain ACEC, and
- 46,813 acres in South Dry Valley SRMA.

A total of 69,522 acres (7%) of BLM-administered lands would fall under permanent no surface occupancy rules, including the following areas:

- 24,340 acres along the Nobles Emigrant Trail,
- 2,756 acres in the Bizz Johnson Trail SRMA
- 2,887 acres in Pine Dunes ACEC,
- 2,130 acres in Willow Creek ACEC,
- 894 acres in Lower Smoke Creek ACEC,
- 36,515 acres Buffalo Creek Canyon ACEC.

Other no surface occupancy (NSO) restrictions would apply to the following:

- lands 0.25 to 0.60 miles from sage-grouse leks,
- lands 0.25 to 0.50 miles from known raptor nests and pronghorn kidding grounds.

A total of 414,679 acres (40%) of BLM-administered land would be 'Closed' to mineral leasing, including the Eagle Lake Basin ACEC and existing WSAs.

The adverse effects of wildlife habitat restrictions on energy and minerals development and operations would be negligible to minor. The total surface area of restrictions, outside of areas noted above, applied during the specific environmental assessment, would be relatively low, and needed mitigation would result in only a minor change to operations, such as the following:

- using structures that do not allow raptors to perch,
- selecting different access routes to avoid critical habitats,
- adjusting locations for drill rigs, and
- applying site-specific mitigation measures.

Energy and mineral operations generally require roads and other conveyance systems. Thus existing or proposed systems are generally advantageous to those operations as long as they are not restricted from use. The Preferred Alternative provides for adding 15 miles of new permanent roads to support recreation activities and invasive western juniper management.

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Lands and realty actions also might create access to public lands that were previously inaccessible, opening these lands to energy and mineral development without building new roads. The Preferred Alternative would also allow new utility corridor development, which could serve as transmission corridors for energy resources. The total benefit to energy and mineral development from these new developments would be negligible to slight because of the small percentage of lands affected by these actions.

The Preferred Alternative would allow the building of 15 miles of new permanent roads to support other resource objectives. BLM would evaluate restrictions to protect soil and water resources on a case-by-case basis. The width of sediment intrusion buffer zones around sensitive resources such as water bodies, cultural resources, or special status plant or animal habitats would be greater than 50 feet.

For streams with water quality-limited segments, uses and activities would be allowed when state water quality standards are either met or exceeded at the same or greater rate than without the activity.

The Preferred Alternative would have minor to moderate adverse effects to leasable energy and mineral exploration, development, and extraction under because of the acres that are 'Closed', fall under permanent no surface occupancy rules, or require restrictive stipulations. Conflicts with other resources would be resolved by applying mitigation measures or by closing specific parcels to mineral leasing. BLM would implement needed mitigation measures and incorporate them into terms, conditions, and stipulations in permits and leases. A minor benefit would result from additional or improved access through realty actions and new road construction. Additional lands would become 'Open' to leasable minerals within wilderness study areas if they are released by Congress, and returned to multiple use management.

The Preferred Alternative is expected to meet all of the demands within the field office area for leasable energy and mineral development. In accord with Executive Order 1312, federal policy requires that all decisions consider adverse impacts on the President's National Energy Policy. The Eagle Lake PRMP would not adversely affect energy and is in compliance with the National Energy Policy.

4.3.4.3 Cumulative Effects

The area of analysis for cumulative impacts on leasable minerals consists of the ELFO area and land within 50 miles of its boundaries. Because of the history of minimal interest in oil and gas exploration and the planning area's limited development potential, activity over the next 15 to 20 years is likely to be sporadic. Oil and gas activity will probably consist of issuing some competitive and over-the-counter leases, a few geophysical surveys, and perhaps the drilling of two or three exploratory wells. The total surface disturbance from exploratory drilling over the life of this plan is expected to be about 13 acres. Any oil and gas deposits found in the planning area would probably be too small to be economically developed. But if oil and gas are developed, the total surface disturbance from exploration and development would be about 800 acres.

The geothermal energy resources known to exist in the region are essentially undeveloped, especially in the field office planning area. With recent interest in geothermal resources expressed by some governmental and private entities, geothermal exploration may begin in the planning area, possibly leading to developing the resource. But the small, somewhat isolated population of the area makes unlikely any direct use of geothermal energy on public land.

Because of past geothermal exploration in California and Nevada and a projected increase in power demand, six notices of intent for surface geophysical surveys and five notices of intent to drill 30

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temperature gradient holes would be filed during the life of this plan. These notices of intent would most likely be filed in the KGRA.

Total surface disturbance from geophysical surveys over the life of the plan is expected to be about 0.5 acre. Disturbance from temperature gradient holes is expected to be 5.5 acres. Eight exploratory wells would be drilled during the life of the PRMP, resulting in a total surface disturbance of 34 acres. A generating facility, if built, would disturb from 25 to 75 acres.

The most favorable condition for exploring and developing mineral resources would be with as few restrictions as possible. Those involved in exploration and development face many environmental obligations to comply with standard requirements and lease and sale terms.

Any more measures for mitigating disturbance to lands and other resources impose even greater burdens on mineral exploration and development. Mitigation measures generally add costs to mineral exploration and development, thereby increasing the adverse effects to these programs. Stipulating no surface occupancy is most suitable for small areas where directional drilling might be feasible (up to 0.5 miles).

For large areas covering many square miles, such as the proposed ACECs, NSO stipulations may effectively close the area to mineral leasing. In addition, seasonal restrictions for other resource needs, such as wildlife habitat, could result in access times being too short for effective exploration and development.

Within the area being evaluated for cumulative effects are several ownerships, including BLM, that require lands be 'Closed' to leasable mineral operations. These lands include wildlife refuges, military withdrawals, WSAs, and other special management areas. Although the cumulative acreage of lands 'Closed' to mineral leasing is somewhat substantial, these impacts are minor to the industry because of low expected proposals for exploration and development.

Energy and minerals development potential and operations on lands outside BLM's jurisdiction are not expected to be significantly affected by the Preferred Alternative, and no cumulative impacts are expected.

4.3.4.4 Mitigation Measures

Mitigation measures would be incorporated as terms, conditions, and stipulations in permits and leases.

4.3.4.5 Unavoidable Adverse Impacts

The Preferred Alternative would not substantially restrict leasable mineral development. Accordingly, no unavoidable adverse impacts to mineral development would occur.

4.3.4.6 Short-Term Uses Versus Long-Term Productivity

If and when fossil fuel and mineral resources are extracted and the short-term beneficial uses (e.g., increased supply of minerals to meet demand, decreased production costs, increased royalties) are realized, the resources would no longer be available for long-term or future production.

4.3.4.7 Irreversible and Irretrievable Impacts

Extracting and developing mineral resources would cause an irreversible and irretrievable loss of those minerals because of the finite nature of the resource.

4.3.5 Locatable Mineral Resources

Public lands are either ‘Open’ or withdrawn from locatable mineral use. Withdrawal of lands from mineral entry can only occur through nondiscretionary actions by Congress or the Secretary of Interior. Locatable mining operations on lands ‘Open’ to mineral entry (as well as on claim locations that predate withdrawal) must be conducted in compliance with the 43 CFR 3809 (surface management) regulations. These regulations require an operator to prevent unnecessary or undue degradation of the land. The three levels of operation under these regulations are casual use, notice, and plan of operations.

4.3.5.1 Analysis

In general, casual use, which usually includes recreational mining, only negligibly disturbs federal lands and resources. For example, activities that do not involve the use of earthmoving equipment or explosives may be considered casual use. This level of mining does not require mechanized equipment or explosives, does not require notification of BLM, and does not require an approved plan of operations. But casual use does require reclamation.

Notice-level mining operations are on 5 acres or less within a mining claim or project area. The claimant or operator submits a notice to BLM. The notice declares the intention to begin an operation and allows BLM to review the operation for potential resource conflicts and to eliminate the need for federal action. The notice must describe the following:

- the proposed activities,
- the location on the ground,
- the start-up date,
- road access and construction, if any, and
- reclamation measures.

BLM’s receiving and reviewing a notice is not a federal action. Notice-level mining does not require preparing an environmental assessment (EA) or environmental impact statement (EIS). BLM does not have to approve a notice.

Plan of operations-level mining involves more than 5 acres and requires the operator to submit a plan of operations to BLM. A plan of operations must document in detail all actions that the operator plans to take from exploration through reclamation. It must include the following:

- a description of the proposed activities,
- road access and construction,
- reclamation measures,
- timeframes of non-operation, and
- a sketch or a map of the area to be disturbed, including all access routes.

For plan-level operations, BLM or the claimant/operator must prepare an EA or EIS before any surface-disturbing activities can begin. BLM must also approve the plan of operations before operations can begin. Extracting locatable minerals on special category lands, as defined in 43 CFR 3809.1-4, always requires a plan of operations. A plan of operations would have to be filed for operations conducted in the following areas:

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- areas in the National Wild and Scenic Rivers System and areas designated for potential addition to the system,
- designated ACECs,
- areas designated as ‘Closed’ to OHV use (as defined in 43 CFR 8340-5), and
- lands or waters known to contain federally proposed or listed threatened or endangered species, or their proposed or designated critical habitat.

The filing of plans of operation is generally more laborious than filing notices and the cost of extracting locatable minerals would increase on special category lands. Given the moderate potential for the occurrence of economical locatable minerals within the planning area and the limited development activity expected over the next 15 years, requirements for plans of operations would not likely have adverse economic impacts on most mining operators.

4.3.5.2 Analysis of the Preferred Alternative

The Preferred Alternative emphasizes resource management through commodity production combined with mitigation and measures for resource protection. Under this action 99% all of the BLM-administered lands in the field office area would be ‘Open’ to locatable minerals. Four ACECs totaling 8,406 acres would be recommended for withdrawal from mineral entry.

Existing WSAs—380, 359 acres (37%)—would continue to be regulated by the IMP (BLM 1995). The policy restricts mineral activities to those that don’t require reclamation.

Fencing riparian and other areas to protect unique plant communities from animals would result in negligible adverse effects because the total area fenced would be relatively low. But if the unique resource is within an area proposed for development, mitigation measures will be implemented on a case-by-case basis

Exploration, development, and extraction of locatable minerals in areas where cultural resources could be adversely affected would be mitigated or restricted. But because areas affected are expected to be relatively small, the adverse effect would be negligible to slight.

The Preferred Alternative allows for the building of 15 miles of new permanent roads to support recreation and other resource objectives. BLM would evaluate restrictions to protect soil and water resources on a case-by-case basis. Sediment intrusion buffer zones around sensitive resources such as water bodies, cultural resources, or special status plant or animal habitats would be at least 50 feet wide when relocation of site-specific activities is permissible.

For streams with water quality-limited segments, uses, and activities would be allowed if state water quality standards are either met or exceeded at the same or greater rate than without the activity.

The Preferred Alternative would have negligible to minor adverse effects on locatable mineral exploration, development, and extraction because no lands are ‘Closed’ and restrictive mitigation would be limited. Conflicts with other resources would be resolved through mitigation measures.

A minor benefit would result from additional or improved access through realty actions and new road construction. Additional lands would become ‘Open’ to leasable minerals within wilderness study areas if they are released by Congress, and returned to multiple use management.

4.3.5.3 Cumulative Effects

The area of analysis for cumulative impacts on locatable minerals consists of the ELFO area and land within 50 miles of its boundaries. Because of the planning area's history of minimal interest in locatable minerals exploration and limited development potential, activity over the next 15 to 20 years is likely to be sporadic. Locatable minerals activity will probably consist of the following:

- maintaining the present claims,
- staking a few new claims,
- noninvasive geophysical, geochemical, and geological exploration, and
- drilling exploration holes.

The major commodities of interest over the next 15 to 20 years will probably be gold/silver and zeolites. Other commodities that may be present in the field area are diatomite, bentonite, and perlite. This assessment is based on market conditions (especially for precious metals) and the favorable geologic environment for mineral occurrences. The economics of mining in the planning area will be driven by the relationship between production costs and the market price of the commodity.

Over the next 15 to 20 years, it is expected that two mines may be developed in the planning area: one open-pit gold mine using chemical heap leaching, at least in part; and one mine of zeolites.

Based on mineral exploration activity over the past 10 years and known occurrences in the planning area of hot springs type gold deposits, exploration for gold is expected to take place during the life of this plan. Depending on the market for gold, up to 25 exploration projects for hot springs gold deposits are expected over the next 15 to 20 years. A typical hot springs exploration project would involve six drill holes and approximately 0.5 mile of new road 12 feet wide (total disturbed width of 20 feet) for each drill hole, resulting in 4.2 acres of disturbance/project, or 105 acres of total disturbance.

A moderate amount of exploration for industrial minerals—mainly zeolite—is expected during the life of this plan. Depending on market conditions, up to three projects are expected for zeolite. Exploration for this commodity consists of auger holes or trenching and road construction. An average project would involve up to 10 auger holes; 5 trenches 20–25 feet wide, 60–125 feet long, and 15–25 feet deep; and 1,000 feet of road 12 feet wide (total disturbed width of 20 feet), for a disturbance of 0.8 to 1 acre/project.

The most favorable condition for exploration and development of mineral resources would be having as few restrictions as possible. Those involved in exploration and development face many environmental obligations to comply with NEPA and state and federal regulations.

Any more measures for mitigating disturbance to lands and other resources would impose even more adverse impacts to mineral exploration and development. Mitigation measures generally increase the cost of mineral exploration and development, thereby increasing the adverse effects to these programs. In addition, seasonal restrictions for other resource needs, such as wildlife habitat, could make access times too short for effective exploration and development.

Within the area being evaluated for cumulative effects, Congress' conversion of WSAs to wilderness would close 380,359 acres to mineral entry. Although the cumulative acreage of lands 'Closed' to mineral leasing would be substantial, these impacts are minor to the industry because of few expected proposals for exploration and development.

Energy and minerals development potential and operations on lands outside BLM's jurisdiction would not be affected significantly and no cumulative impacts are expected.

4.3.5.4 Mitigation Measures

The Preferred Alternative would not substantially decrease the acres 'Open' to locatable mineral development; nor would actions result in impacts that would require mitigating locatable mineral resources; therefore, mitigation measures would not be needed.

4.3.5.5 Unavoidable Adverse Impacts

The Preferred Alternative would not substantially restrict mineral development. Accordingly, no unavoidable adverse impacts would result to mineral development.

4.3.5.6 Short-Term Uses versus Long-Term Productivity

If and when locatable mineral resources are extracted and the short-term benefits (e.g., increased supply of minerals to meet demand, decreased production costs, increased commodity prices) are realized, the resources would no longer be available for long-term or future production.

4.3.5.7 Irreversible and Irrecoverable Impacts

Extracting and developing mineral resources would result in an irreversible and irretrievable loss of those minerals because of the finite nature of the resource.

4.3.6 Saleable Mineral Resources

Saleable minerals include decorative stone, sand and gravel, and aggregate. All existing saleable mineral material sites would be evaluated to determine continued need and ensure that they are meeting these needs.

4.3.6.1 Analysis of Preferred Alternative

The Preferred Alternative would allow applications for contract sale and free use permits. BLM would establish common use areas and community pits in open areas unless they are otherwise encumbered. The impacts of management decisions on these materials would be direct and beneficial in the long term.

The Preferred Alternative emphasizes resource management through commodity production combined with mitigation and measures for resource protection. Under this alternative 634,002 acres (62%) of BLM-administered lands would be 'Open' to saleable minerals activities. The WSAs (380,359 acres) would remain 'Closed' to saleable minerals, and four ACECs totaling 8,406 acres would be recommended for withdrawal from development of locatable minerals.

Exploration, development, and extraction of saleable minerals in areas where cultural resources could be disturbed would be mitigated or restricted. But because affected areas are expected to be relatively small, the adverse effect would be negligible to slight.

BLM would evaluate restrictions to protect soil and water resources on a case-by-case basis. Sediment intrusion buffer zones around sensitive resources such as water bodies, cultural resources, or special status plant or animal habitats would not have to exceed 50 feet in width when site-specific activities can be relocated.

For streams with water quality-limited segments, uses and activities would be allowed if state water quality standards are either met or exceeded at the same or greater rate than without the activity.

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Benefits to saleable minerals would occur from expanding existing operations. Sand and gravel for county and state roads would be sourced from existing pits. Expansion would be considered as needed. New sand and gravel pits would be permitted as needed for road maintenance after existing and previously closed pits have been exhausted, if the disturbance doesn't conflict with other resources.

Decorative rock (flat rock) collection for personal use would continue. Commercial decorative rock collection would continue in designated areas compatible with other resource uses. Areas designated for decorative rock collection would be restricted to locations accessed by existing roads.

Only small, rubber-tired (low-impact) equipment or hand collection would be allowed off of existing roads and active disturbance areas.

Sand and gravel would be provided for the local community within existing pits, and expansion would be allowed as needed to respond to local demand.

Conflicts with other resources would be resolved through mitigation measures. The entire field office area would remain 'Open' to collection of decorative stone and flat rock, according to BLM policies. Commercial operations would be allowed in designated areas.

A minor benefit would result from additional or improved access through realty actions and new road construction. Additional lands would become 'Open' to leasable minerals within wilderness study areas if they are released by Congress, and returned to multiple use management.

4.3.6.2 Cumulative Effects

The area of analysis for cumulative impacts on saleable minerals consists of the ELFO area and land within 50 miles of its boundaries. Because of the history of saleable minerals development within the planning area, activity over the next 15 to 20 years is likely continue at an increasing rate. As development continues within and around the field office area, nearby sources for saleable minerals will be depleted, and the demand will increase for low-cost public lands sources. Saleable minerals activity will probably consist of maintaining existing roadways and sales to people and companies for community growth. Any new saleable mineral operations are expected to by occupy fewer than 5 acres. The opening of any new saleable areas for other than state and county road maintenance will presumably be confined to Eagle Lake Valley proper because costs would increase as distances to resources increase.

The most favorable condition for developing saleable mineral resources would be with as few restrictions as possible. Those involved in saleable minerals development face many environmental obligations to comply with NEPA and state and federal regulations. Any more measures to mitigate disturbances to lands and other resources would bring about even more adverse impacts to saleable minerals development. Mitigation measures generally add costs to development, thereby increasing the adverse effects to these programs.

In addition, seasonal restrictions for other resource needs, such as wildlife habitat, could result in access times being too short or impinging too much on project timing for adequate removal of materials.

Energy and minerals development potential and operations on lands outside BLM's jurisdiction are not expected to be affected significantly by the Preferred Alternative, and no cumulative impacts are expected.

4.3.6.3 Mitigation Measures

The Preferred Alternative would not substantially decrease the acres ‘Open’ to saleable mineral development; nor would actions result in impacts that would require mitigating saleable mineral resources; therefore, mitigation measures would not be needed.

4.3.6.4 Unavoidable Adverse Impacts

The Preferred Alternative would not substantially restrict saleable mineral development. Accordingly, no unavoidable adverse impacts would result to mineral development.

4.3.6.5 Short-Term Uses Versus Long-Term Productivity

If and when saleable minerals are extracted and the short-term benefits (e.g., increased supply of minerals to meet demand, decreased production costs, increased commodity prices) are realized, the resources would no longer be available for long-term or future production.

4.3.6.6 Irreversible and Irretrievable Impacts

The extraction and development of saleable mineral resources from the ELFO area would result in an irreversible and irretrievable loss of those minerals because of the finite nature of the resource.

4.3.7 Renewable Energy

The National Energy Policy calls for an increase in renewable energy production on federal lands. Typical development would involve wind, solar, hydroelectric, and biomass infrastructure. Public lands are designated ‘Open’ or ‘Closed’ to renewable energy development. Renewable energy development would be conducted under permit and subject to specified terms and conditions. In order to protect sensitive resources, additional restrictions may be placed on site-specific plans of operation. These additional restrictions are referred to as “surface use and occupancy requirements”. Wind energy development best management practices are listed in Appendix N.

4.3.7.1 Analysis of the Preferred Alternative

The Preferred Alternative emphasizes resource management by balancing commodity production with resource protection. Under this alternative, 553,011 acres (54%) of BLM-administered lands would be ‘Open’ for renewable energy development.

WSAs (380,359 acres) are exclusion zones for all renewable energy development. Seven ACECs (89,397 acres) are rights-of-way (ROWs) avoidance areas. This means that any applications for new energy development, ROWs, or utility corridors would only be granted if BLM concurs 1) the only feasible location is within the ACEC, and 2) no relevant and important resources would be adversely affected. It is incumbent on the ROW applicant to investigate and document that the only feasible location is within the ACEC. BLM will utilize the applicant’s documentation to evaluate concurrence through a site-specific environmental analysis.

Wind energy projects will be designed and developed in accordance with the *Final Programmatic Environmental Impact Statement on Wind Energy Development on BLM-Administered Lands in the Western United States, 2005 (Wind Energy PEIS)*. Implementation of any proposed management actions would ensure that potential adverse impacts to the natural and cultural resources are minimized, consistent with the programmatic guidance of this EIS.

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Approximately 50% of the field office area would be managed as VRM Class II, and approximately 43% would be designated as VRM Class III (see Map VRM-1). Class I designations apply only to WSAs, and change of the WSA status would require an action by Congress. As described in Section 2.21 Visual Resources, natural settings would be significantly changed with development of wind energy farms, which would create strong visual contrasts in areas where wind turbines up to 200 feet high, transmission lines, and service roads would be located.

Only 7% of the field office area would be managed as VRM Class IV. The lands that would be managed under VRM Class IV criteria (major modification of the existing landscape) would permit new developments that could greatly alter the existing landscape.

The Preferred Alternative is expected to have moderate to major site-specific adverse effects on renewable energy development, primarily because 46% of the field office would be excluded or avoided for new development. In addition, 93% of the field office would be managed to meet VRM Class I, II and III objectives. Minor beneficial effects may accrue from realty actions.

A number of areas potentially suitable for wind energy development are identified in this PRMP as VRM Class II (see Chapter 2.21). BLM recognizes that wind energy development would likely be inconsistent with this VRM classification. An analysis to reconsider VRM classes for potential wind energy locations is being deferred until specific projects are proposed and a reasonably foreseeable development scenario is completed. This analysis will assess both site specific and cumulative visual impacts, and will include visual simulations to illustrate these impacts from key observation points, such as communities and trail corridors.

4.3.7.2 Cumulative Effects

The area of analysis for cumulative impacts on renewable energy development is the ELFO boundary plus an additional 50 miles beyond this border. Based on the history of renewable energy development and proposals within the planning area, the next 15 to 20 years is likely to see a moderate increase in renewable energy development. As technologies continue to develop, portable electrical generating plants based on biomass fuels are a possibility for the ELFO management area. The development of wind energy farms is also likely to increase.

The most favorable conditions for development of renewable energy infrastructure would be with the fewest restrictions possible. Individuals, government entities, and private companies involved in development face numerous environmental obligations in order to comply with NEPA plus state and federal regulations.

Additional measures for mitigation of disturbance to lands and (other) resources would result in further impacts and additional costs for renewable energy development.

Development of renewable energy resources on lands outside BLM jurisdiction are not expected to be significantly affected, and no cumulative impacts are anticipated.

4.3.7.3 Mitigation Measures

None.

4.3.7.4 Unavoidable Adverse Impacts

None.

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4.3.7.5 Short-Term Uses versus Long-Term Productivity

None.

4.3.7.6 Irreversible and Irretrievable Impacts

None.

4.4 Potential Effects on Environmental Justice

This section describes the potential impacts on environmental justice from implementation of the Preferred Alternative. The PRMP planning process incorporated environmental justice considerations in order to meet federal law requirements by addressing any adverse human health or environmental impacts that may affect minority or low-income populations to a greater extent than the general population in the areas.

The only environmental justice population found in the ELFO area is the Native American community. Most management actions would not affect this population. Proposed management activities with the greatest potential to result in effects related to environmental justice issues in the field office area are associated with cultural resources, fire and fuels, visual resources, and energy and minerals. Although potential effects exist, their impacts would be minor and are not expected to result in disproportionate effects on environmental justice populations. Where potential adverse effects have been identified, measures to avoid or reduce these effects have been recommended.

4.4.1 Methodology and Assumptions

No assumptions were made in the analysis of environmental justice effects.

4.4.2 Incomplete or Unavailable Information

Adequate information is available to analyze the effects on environmental justice at the plan level.

4.4.3 Analysis of the Preferred Alternative

No effects related to environmental justice are anticipated from management actions associated with air resources; soil resources; terrestrial and aquatic wildlife; vegetation; water resources; wild horses and burros; forestry; grazing; lands and realty; recreation resources; special management areas; or utilities, transportation, and telecommunications.

Any action that would bring the public closer to TCPs (e.g., building interpretive sites) could result in adverse effects on Native Americans. Such actions would be implemented in close consultation with Native American communities. Fencing off cultural resources that would restrict access to Native Americans is considered an adverse effect. Fencing off cultural resources to the general population while allowing Native Americans occasional access is considered a beneficial effect, as the sacred sites, TCPs, and other resources would be protected.

Increases in particulates in the air associated with prescribed burning and AMR would adversely affect air quality during the summer fire season and periods when prescribed burns could be implemented. These short-term reductions in air quality would affect all populations in the field office area to the same degree. Because wildland urban interface (WUI) areas are prioritized for fuel treatment, it would be beneficial to consult tribes when defining WUI areas on or near tribal lands.

Management actions resulting in aesthetic changes (e.g., fencing) on public lands that are near tribal lands may result in impacts on Native Americans.

Renewable energy development, in particular the development of wind farms, may result in impacts on Native Americans, if located on public lands that are near tribal lands, or in areas with cultural significance to the tribes. Consultation with tribal groups regarding proposed projects in proximity to sacred sites with high visual resources value would avoid potential use conflicts.

4.4.4 Summary of Effects of the Preferred Alternative

Impacts on environmental justice communities from the Preferred Alternative are not expected to be significant and would not differ.

4.4.5 Cumulative Effects

There are no anticipated cumulative effects of the Preferred Alternative on environmental justice communities.

4.4.6 Mitigation Measures

None.

4.4.7 Unavoidable Adverse Impacts

None.

4.4.8 Short-Term Uses Versus Long-Term Productivity

None.

4.4.9 Irreversible and Irretrievable Impacts

None.

4.5 Potential Effects on Fire and Fuels

This section describes the potential direct, indirect, and cumulative effects on wildland fire and fuels management from implementation of the Preferred Alternative.

4.5.1 Methodology and Assumptions

The following assumptions were used in assessing impacts of resource program management actions on fire and fuels.

- Increased population density and increased use of public lands would positively correlate with an increase in the potential for human-caused ignitions.
- Natural ignitions (lightning strikes) and weather events affecting fire behavior (e.g., wind, precipitation, and relative humidity) are random events. Therefore, the amount of land that would burn annually as a result of wildfire could not be predicted.
- Effects on the fire management program are actions that would increase or decrease the costs of the fire suppression program. Rehabilitation costs would generally be lower in healthy plant communities.
- AMR includes the full range of suppression options but allows for some reduction in cost and effort depending on conditions affecting fire spread. AMR has the potential to reduce the cost of fire suppression over a period of time.

Actions that would cause further departure of plant communities from their natural fire regime and degradation of communities with respect to composition, structure, and diversity (e.g., Condition Classes 2 or 3) were considered to cause adverse effects.

- Impacts of AMR would be equivalent to a full suppression strategy in as many as 90–95% of the fires during the normal fire season when conditions are favorable for the rapid spread of wildfire.
- When a proposed number of acres are listed, the acreage was assumed to be a target to be achieved during the life of the PRMP (20 years) rather than on an annual basis.
- Acres proposed for treatment to reduce juniper under the vegetation management program were assumed to be included in the acres proposed for fuels reduction under the fire and fuels program.
- Areas treated for juniper removal with less than 60% cover would include perennials in the understory and therefore would respond more favorably to fuel reduction treatments (including prescribed fire) than those with a denser canopy and negligible understory (Tausch 2004). Prescribed fire might not be as effective at removing large woody material, and stands might need to be treated several times to achieve the desired results.
- Post-fire restoration and rehabilitation would be commensurate with pre-fire vegetation on site and associated condition class. For example, Condition Class 3, degraded Wyoming sagebrush communities converted to cheatgrass or medusahead, would require a more active rehabilitation and restoration program than Condition Class 1 low sagebrush communities with a diverse understory, which might require only passive restoration.

4.5.2 Incomplete or Unavailable Information

Information about the area's soils, climate, and topography can be used to predict the potential natural vegetation (PNV). PNV groups represent stable vegetation types that would become established on an

ecological site if all successional stages were completed without human-caused disturbances interference under present environmental conditions. Without these data, the departure of current vegetation from historical composition, structure, and fire regime (i.e., condition class) was based on current vegetation and extrapolated information from personal observation and historical photos.

Although all of the communities at risk in the WUI have been identified, the site-specific WUI boundaries have not yet been delineated. Therefore, the acreage and vegetation types that would be affected by WUI-prioritized treatments were not analyzed.

4.5.3 Analysis

Impacts would be considered adverse to fire and fuels if they:

- increase the potential for fire ignitions,
- increase fire size or intensity, or
- hinder suppression by limiting access or suppression actions.

Likewise, actions that would facilitate the return of communities to their natural fire regime with vegetation composition structure and composition intact (i.e., Condition Class 1) were considered beneficial.

- Beneficial effects would do the following:
 - decrease the potential for fire ignitions,
 - decrease fire size or intensity, or
 - improve suppression capability by improving access.

For the purposes of this analysis, the levels of effects on fire and fuels management were defined as follows.

Negligible: Vegetation fire regimes, fire suppression costs, and the risk of human-caused ignitions to vegetation would not change, the change would be below or at the level of detection, or if detected, the effects would be considered slight.

Minor: Vegetation fire regimes, fire suppression costs, and the risk of human-caused ignitions to vegetation would measurably change, but changes would be small and local.

Moderate: Vegetation fire regimes, fire suppression costs, and the risk of human-caused ignitions to vegetation would measurably change and would have appreciable consequences, but the effect would be relatively local.

Major: Vegetation fire regimes, fire suppression costs, and the risk of human-caused ignitions to vegetation would measurably and substantially change, would have substantial consequences, and would be noticed regionally.

Fire and fuels management actions involve the decisions of how, when, and where to suppress wildfires. Full suppression of wild fires reduces the frequency of medium-sized fires and results in increased fuels buildup over the long term. Over time, this buildup of fuels contributes to an increase in frequency of

large, intense wildfires—which degrade soil and water quality and aquatic habitats and encourage the invasion of noxious weeds.

AMR, including WFU, reduces fuels loadings over time to eventually return to natural fire regimes and Condition Class 1. These effects would be gradual and would increase over time as more areas are treated and lower intensity fires burn. Over time, one could expect increases in vegetation diversity and rangeland productivity and reductions in the potential for large, intense, damaging fires. In as many as 90 to 95% of the fires during a normal fire season, AMR would consist of a full suppression strategy. Therefore, many of the effects described for full suppression would also apply to most AMR fires.

If a fire starts in a WFU area and the conditions meet the prescription in the WFU burn plan (i.e., risk of the fire spreading out of control is very low), the fire could burn with only a minimal incident response (as outlined in the burn plan). The effect would be to reduce the cost of suppression, improve and maintain fire-adapted ecosystems, and reduce the size and intensity of future fires by reducing fuel loads. More acres would burn and more smoke would result than from a full suppression response.

Fuels reduction treatments would reduce hazardous fuels, particularly in the WUI, making these areas safer for residents. Costs of fire suppression in these areas are expected to decrease over time, as the probability of large, stand-replacing fires declines in response to reduced hazardous fuels. Over the long-term, the combination of fuels reduction, including prescribed burning, and fire management would facilitate the return of natural fire regimes and would increase the structural and biotic diversity of plant communities.

Most fuels reduction would target juniper. Because dense stands of juniper are somewhat fire resistant, restoration of these stands might actually convert the landscape to plant communities with more frequent fire intervals. But rehabilitation costs would decrease over time because fires are smaller and rehabilitation costs lower in healthy plant communities.

Post-fire rehabilitation actions that focus on restoring native plant communities would increase over the long term in plant communities that are diverse and have fire regimes within the historical ranges (Condition Class 1). Risk mitigation and education programs could contribute to decreased fuel loading in residential areas as communities become more aware of the natural role of fire in ecosystems and their role as residents in creating defensible space.

4.5.4 Analysis of the Preferred Alternative

The fire management strategy would continue to be full suppression across 282,304 acres of BLM-administered land. The effects of this action would be continued degradation of fire-adapted ecosystems. Lands that are subject to this strategy are lands that are outside the BLM's direct protection area and most WUI areas, where this is the most appropriate strategy because of human safety concerns. BLM would use an AMR, including confine/contain strategy, to treat 730,124 acres. AMR includes the full range of suppression options but allows for some reduction of fire suppression resources in response to conditions. This approach likely would reduce the cost of suppression over a longer timeframe. Using AMR would result in some fires being larger. Fuels would be reduced or maintained where fire is allowed to burn. Fire-adapted ecosystems would be maintained or restored. These effects would be gradual but would increase over time as more areas are treated and lower intensity fires burn.

Fuels treatment would occur at the rate of 600 to 10,000 acres per year; 199,684 acres have been prioritized for these fuels treatments with effects extending to the 10,339-acre WFU in Spanish Springs that also is prioritized for fuels treatment. Because these treatments emphasize prescribed fire, they are more likely to achieve restoration of fire-adapted ecosystems. They also would reduce surface fuels better

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than other treatment methods. Use of prescribed fire would reduce the cost of treatments on some acres; however, other treatment methods would still be used where needed. The amount of treatment is likely to affect fire behavior on BLM-administered lands in the field office area within 10 years, depending on the spatial arrangement. Rehabilitation efforts would emphasize native species, thereby aiding in establishment of native communities while allowing for the use of introduced species as an intermediate step to stabilize communities and facilitate the restoration process.

At up to 10,000 acres per year, the rate of juniper reduction would help restore ecosystems that have been encroached upon by juniper and would help convert them from Condition Class 3 to Condition Classes 2 or 1.

Because dense stands of juniper are somewhat fire resistant, restoring historical plant communities and their fire regimes might convert the landscape to a more fire-prone ecosystem with more frequent fire intervals. Such a conversion could increase the rate of fire spread and decrease the intensity of fires in these areas.

Building livestock exclosures is a potential action to meet riparian and water quality standards and to stabilize upland soils that are not meeting land health standards. This action could affect the fire and fuels program by resulting in buildup of fine fuels in exclosures. Given that this actions would affect only a small area, its effects on fire and fuels management would be negligible to minor.

Management actions to improve habitat – including the use of prescribed fire, fuels reduction in bald eagle nest stands, and juniper removal – to improve habitat would be coordinated with the vegetation, fire and fuels programs. Habitat improvements to restore and rehabilitate native plant communities would also result in more diverse and resilient plant communities on the landscape.

Habitat improvements would bring plant communities closer to conditions where a historical fire regime is expected. Using green stripping to protect priority habitat areas would aid in fire suppression by providing natural firebreaks.

Vegetation management actions would benefit the fire and fuels program. Benefits are expected from decreasing the fuels loading across the landscape, particularly through the juniper reduction program. Benefits are also expected through efforts to restore riparian, aspen, mountain mahogany, and oak communities.

Fuels reductions would lead to decreased fire size, intensity, and rate of spread. In addition, vegetation management actions would restore more diverse vegetation community types and seral stages to the landscape. A diverse mosaic of vegetation types and stages creates a less homogenous landscape and slows the spread of fires. For many of the vegetation communities the proposed actions (whether mechanical, biological, chemical, or prescribed fire) to improve ecosystem health are designed to restore the community to a more natural ecosystem—taking communities with a Condition Classes 2 or 3 and restoring them to a Condition Classes 1 or 2. Adverse effects include an increased chance of human-caused ignition during these actions and a risk that prescribed fire will escape.

Livestock grazing could decrease the fine fuels across a large area, which could result in the benefit of limiting fire spread. Reducing fine fuels could make carrying a prescribed fire difficult or could result in a burn needing to be conducted at the extreme of the prescription to achieve the desired results. Therefore, where fire might be used as an ecosystem restoration technique and fire is desirable, grazing could impair the use of prescribed fire or allowable wildland fire. In addition, if the fine fuel load is not sufficient to carry a fire, fire-intolerant juniper could become established and out-compete fire-tolerant grasses and forbs.

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Management actions for wild horses and burros would affect the fine fuels in much the same way as livestock grazing. Reducing wild horse and burro numbers to meet appropriate management levels (AMLs) would increase fine fuel loads in these areas and could increase fire spread and frequency in herd management areas (HMAs).

Management actions for energy and minerals could affect fire management by encouraging infrastructure that could pose fire risk and result in added protection needs. In addition, the potential for increased visitation would increase the potential for human-caused ignition. Building a new road would provide more access for human-caused ignitions and increase access for fire suppression. Roads could also act as a fuel break and could contain certain fuel types. Current energy and mineral uses and trends would suggest that these effects on fire and fuels management would be negligible to minor in the field office area.

Forestry management actions to reduce fuel hazards in commercial and low-site forests would moderately benefit fire and fuels by doing the following:

- improving forest health,
- increasing resistance to wildfire,
- reducing the potential for catastrophic wildfire, and
- increasing fire safety in WUI areas.

Mechanical treatments to reduce canopy fuels, in addition to hand treatments to reduce ladder fuels, would result in more benefits to the fire and fuels program.

Recreation actions could both benefit and harm fires and fuels. Creating more opportunities for recreation would increase human density and therefore the potential for human-caused ignitions. But some actions that would increase human use would result in benefits.

Creating new roads would provide more access for recreational users as well as increased access for fire suppression. Roads could also act as fuel breaks and contain certain fuel types. New developments such as campgrounds or interpretive sites could affect suppression by creating priority protection areas. But they also could provide beneficial resources such as water sources, fuel alteration, and safety areas.

Use of heavy equipment would be avoided or require special authorization in

- ACECs,
- National Register-eligible sites,
- WSAs, and
- other special management areas.

Restricting the fire management response allowed in ACECs would be commensurate with the level of protection required to preserve the special values in these areas. Resultant effects on the fire and fuels program in these areas would depend on the response method as described under the effects of fire and fuels management actions above.

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Where suppression would be restricted in cultural resource management areas (CRMAs) (such as by limits on retardant or heavy equipment use), effects on the fire and fuels program would be similar to those described for special management areas below.

Other cultural resources management actions that could affect the fire and fuels program are developing and maintaining interpretive sites and exclosures. Exclosures in some of these areas would limit livestock use in the area. This restriction would increase fine fuels in the exclosure, increasing the potential for fire spread. Interpretive sites encourage human use and could increase the potential for human-caused ignitions. These sites would also be likely to influence fire management during an incident by creating priority protection areas, which could increase the suppression cost of an incident.

Effects of rights-of-way and utilities management on the fire and fuels program include:

- increased potential for human-caused ignitions during construction and maintenance, and
- creation of priority protection areas during fire incidents.

In some instances the utility corridor might act as a linear fuel break. The main impacts on the fire and fuels program would result from management actions of the fire and fuels program itself, and the vegetation, forestry, and grazing programs. All of these programs would reduce fuel loads on the landscape and therefore decrease the probability of large, catastrophic wildfires over the long term. Actions in these programs are also designed to improve structural, seral, and biotic diversity of plant communities and would result in healthier plant communities with a more natural fire regime.

Over the long term, the combined effects of the proposed management actions would gradually convert degraded communities with Condition Classes 2 or 3 to communities with Condition Classes of 1 or 2. The timeframe for this conversion would depend on the current degree of departure from Condition Class 1.

760,837 acres of OHV travel would be ‘Limited to Designated Routes’, and 261,511 acres would be ‘Closed’ to OHV use. The result would be that risk of human-caused ignitions from OHV use would be minor.

4.5.5 Cumulative Effects

Increased use of prescribed fire and mechanical fuels reduction projects would ultimately result in smaller and fewer wildland fires because of reduced fuel loading. Fire severity and intensity would also decrease. These actions would also begin to include fire as part of natural ecosystem processes and result in more potential natural vegetation groups across the landscape. Since prescribed fires and fuels reduction would also be applied on the adjoining Lassen and Plumas National Forests, and BLM field office areas, a more natural form of wildland fire in the ecosystem would begin to occur, not just in the planning area but over several million acres in northeast California and northwest Nevada.

The fire and fuels program is heavily influenced by urban growth. Increases in human occupancy and density are likely to result in increased human-caused ignitions, which would increase the costs of a suppression program. The current program focuses on the WUI and prioritizes treatments along the edges of the growth zone. Growth increases the complexity of the treatments in these areas, as boundaries change and intermingled ownerships increase. Using fire in these areas is complicated by artificial boundaries (property lines) and perceived risk. The cost of treatment increases dramatically either through complex burn operations or the need to use other more expensive treatments.

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BLM shares the landscape with other federal and state agencies that are working toward many of the same goals. Many agencies share fire suppression responsibilities. (See discussion of direct protection areas in Chapter 3.) Fuels treatment is a priority of many agencies administering adjoining lands and is expected to increase dramatically over the planning period.

BLM's fire and fuels program competes with these other agencies for both treatment and suppression resources. A finite number of contractors treat fuels. Typically, much of the work has been done using suppression resources when they are not committed to an incident. As fires increase in frequency, not only locally but in the western United States, these resources become increasingly scarce; and there is an increased need for outside contract crews. These factors affect both the costs and the timing of fuels treatment operations. Fuels treatments throughout the field office area and beyond would result in the following:

- more fire-safe communities,
- reduced risk of large wildfires,
- healthier plant communities, and
- a slowing of juniper encroachment.

Without aggressive juniper reduction treatments, the fuel loads in the Great Basin are likely to double in the next 50 years (Tausch 2004).

Prescribed fire use requires compliance with air quality standards. With an expected increase in the amount of prescribed fire use by all management agencies, the competition for airshed space would increase. To accomplish a prescribed fire treatment, several factors with limited controllability must align.

Prescribed conditions are mostly weather related but also include fire resources availability (i.e., helicopters, engines, and crews). In addition, the airshed must be kept below a threshold of particulate matter (e.g., smoke), and sensitive areas (e.g., residences and airports) must be avoided. If other burns are occurring, a burn might not be able to be started until the other burns are complete. This competition affects the fuels treatment program by increasing costs due to delays, increased complexity, or the need to use a non burning treatment.

Invasive exotic species could quickly alter vegetation communities, changing their fire regime condition class. A location that once supported a relatively inflammable system could (with an understory of native perennials, for example) in the short term, alter to a much more flammable system (of invasive annuals such as cheatgrass). Not only would fire ignitions become more frequent, but fire size would be increased in these areas. This process affects suppression and potentially treatment costs if the area is to be restored. The increased need for follow-up treatments to maintain the desired ecosystem affects the cost of fuels treatments and restoration.

4.5.6 Mitigation Measures

Education will emphasize community protection procedures and public safety measures. ELFO fire managers are committed to providing fire education help to communities that have been or might be threatened by wildland fires. Active community participation and citizen-driven solutions are essential in reducing the risk of fire in the WUI. More specifically, the field office does the following:

- supports citizen education on fuel reduction and the effects of fire,
- develops community wildfire protection plans,

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- annually conducts volunteer firefighter refresher training, and
- provides equipment to rural and volunteer firefighters when funding is available.

Communities might take action to live safely in fire-prone areas by availing themselves of grant programs such as rural, state, and volunteer fire assistance and economic action programs, available through state and federal agencies.

To reduce fire risk, vehicles and equipment used to implement treatments and carry people and equipment to treatment areas would be restricted to authorized routes or equipped with spark arresters. Prescriptive treatments would be managed in high-use recreation areas and during special seasons (e.g., big-game rifle hunting in the fall) to reduce or eliminate resource use conflicts as needed. To reduce wildland fire risk after wildfires and prescribed burning, areas would be seeded with shrub/grass/forbs to reduce cheatgrass and other noxious weeds and non-native species in high-risk areas.

ELFO fire and resource managers work with communities, fire safety councils, and other government agencies to locate wildland fire hazards and create mitigation strategies, as well as to provide public education on fire ecology and fire as a natural ecosystem process.

4.5.7 Unavoidable Adverse Impacts

Wildland fire ignition risks from minerals development or recreation would be an unavoidable adverse impact. Recreation actions that increase public visitation would unavoidably impair fire management by increasing the risk of human-caused ignitions. In vegetation communities prone to annual invasive species, wildland fire might allow the area to be further overtaken by these species.

4.5.8 Short-Term Uses Versus Long-Term Productivity

Recreation decisions would potentially result in long-term impacts to fire management by increasing wildland fire ignition risks that result from increased visitor use in recreation areas. In addition, increased human presence in special recreation management areas may decrease the ability to control fuel loading through prescribed fire in these areas.

4.5.9 Irreversible and Irretrievable Impacts

There are no irreversible or irretrievable impacts to fire and fuels management resulting from the Preferred Alternative.

4.6 Potential Effects on Forestry

This section describes the potential direct, indirect, and cumulative effects on forestry management from implementation of the Preferred Alternative.

4.6.1 Methodology and Assumptions

Remote imagery analysis (Tetrattech, 2004) provided for planning area vegetation classification. Commercial forest characteristics were obtained from 1974 Sustainable Yield Unit 15 plot data and the 1977 timber production capability classification inventory.

Management actions were evaluated for how they would affect forest health and the use of forest resources. Forest health, as used here, refers to the ecological integrity of forested ecosystems defined as “the degree to which the biological and physical components (including structure, process, and composition) of an ecosystem and their relationships are present, functioning, and capable of self-renewal.” (BLM et. al., 1977).

4.6.2 Incomplete or Unavailable Information

Forests in the ELFO area have not been extensively surveyed for hazardous fuel loads though ocular inventories have found that excessive hazardous fuels exist throughout the field office area’s forest stands (Dockery 2005).

No recent forest inventory has been conducted to determine growing stock, growth and yield, or other conditions of the timber stands. The 1974 inventory provided for allowable cut calculations, and the 1977 forest inventory determined lands capable of commercial timber production. Examinations of stands for treatment recommendations were completed in 1985. Stand treatment scheduling including and annual harvest levels for the planning area is a level of detail unattainable with existing data.

4.6.3 Analysis

This analysis defined the levels of effects on forestry as follows:

Negligible: Forestry would not be affected, or the effects would be at or below the level of detection. Impacts would be so slight that they would not be of any measurable or perceptible consequence to the forests and woodlands.

Minor: The effects on forestry would be detectable but localized, small, and of little consequence to the forests and woodlands. Mitigating measures, if needed to offset adverse effects, would be simple and successful.

Moderate: The effects on forestry would be readily detectable and localized, with consequences to the forests and woodlands. Mitigating measures, if needed to offset adverse effects, would be extensive and probably be successful.

Major: The effects on forestry would be obvious and would result in substantial consequences to the forests and woodlands. Extensive mitigating measures would be needed to offset adverse effects, and their success would not be guaranteed.

4.6.4 Analysis of the Preferred Alternative

The Preferred Alternative emphasizes maintenance and restoration of forest ecosystems. The emphasis would be on thinning forests and woodlands to restore forest health and to approximate the historical fire regime; the level of harvest from forests or woodlands within the planning area.

Fuels reduction treatments would be applied on up to 10,000 acres per year. Mechanical fuels reduction treatments would decrease hazardous fuels in approximately 90% (9,500 acres) of the planning area's forests over the twenty-year planning period. This level of fuels reduction retains the risk of unwanted wildfire in untreated stands.

Under the Preferred Alternative the fire management strategy would continue to be full suppression across 282,304 acres of BLM-administered land with appropriate management response tactics for the remainder of the field office. This action would allow fires to consume some non-forest fuels that would decrease the risk of fire's spreading into forests.

Over the life of the PRMP, effects of forest management would extend to nearly all of the 18,500 acres of commercial and low-site forest. Up to 1,000 acres would be reserved from harvesting to protect other resources.

Eagle buffers around nest or roosting trees impose a limited operating season where these features are located. However, only one active bald eagle territory in the planning area would be affected by buffer restrictions. Forest stands within the range of the California spotted owl would be managed to retain stand structure and forest floor characteristics suitable for owl habitat.

Management emphases for protecting or restoring soil conditions would impose some operational restrictions. The restrictions for heavy equipment, tools used for recovering areas in degraded condition, and road placement would favor forest health by limiting activities to the most suitable soils, improving soil aeration, water infiltration, and subsurface plant growth. Conversely, limiting heavy machinery could limit some operations that improve forest health through removal of unhealthy trees, reducing fire hazard and freeing up primary resources (water and light) for less restricted growth of residual stands. Land and realty transactions that consolidate forests under ELFO management and that dispose of isolated and small forest parcels would reduce costs of forest management.

Rehabilitation plans for wildfire and aspen improvement projects, which include fencing aspen from livestock and wildlife, would promote the growth and establishment of the aspen clones.

VRM could have a moderate to major effect on juniper control in savanna pine forests where juniper is an increaser species. To restore the fire regime, removing most junipers would violate Classes II-III VRM objectives. The effects would be 93% of the acreage affected by VRM Classes II and III.

4.6.5 Cumulative Effects

The area of analysis for cumulative impacts to forestry is the area within the boundaries classified as coniferous forest and juniper woodland, black oak woodlands, and aspen-riparian shrub as shown on the Map VEG-1, Vegetation Classes. Forest management would not be affected by any resource management decisions outside these areas.

Cumulative effects to forestry largely result from fuels reduction activities and wildfire. The cumulative effect of juniper and conifer ingrowth affects the availability of water to the forest overstory, understory forbs, grass, and shrub species, and to the wildlife that inhabits the forests. Biomass accumulating on the

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ground as the lowest layer of vegetation creates additional fuel for fire. Increasing fuel levels increases the intensity and duration of fire. High intensity fire can damage organic soils and soil water absorption capacity.

Juniper expansion into conifer forest and aspen stands affects the growth, reproduction, and overall health of those forests. Bartos and Campbell (1998) have estimated that 60 to 90% of the aspen stands in the western United States have been taken over by other species due to fire exclusion since European settlement.

4.6.6 Mitigation Measures

- Use best management practices in compliance with Section 208 of the Federal Clean Water Act PL92-500 to reduce the short-term adverse impacts from forestry.
- Locate cultural resources and flag and avoid the sites to protect eligibility for National Register of Historic Places listing.
- Use limited operating periods and untreated zones to avoid impacts to nests, dens, and calving areas.
- Incorporate visual resource management into project design.
- Incorporate standard measures for noxious weeds (see ELFO's Noxious Weed Prevention Schedule [Appendix E]).
- Use interdisciplinary project design.

4.6.7 Unavoidable Adverse Impacts

No adverse impacts to forestry are unavoidable if mitigation measures are implemented.

4.6.8 Short-Term Uses Versus Long-Term Productivity

Short-term vegetation management activities, such as prescribed burning or mechanical treatments, would benefit the long-term productivity of the forests and woodlands.

4.6.9 Irreversible and Irretrievable Impacts

Irretrievable impacts to forestry would include the loss of soil and compaction in soils caused by vegetation treatments.

4.7 Potential Effects on Lands and Realty

This section analyzes the direct, indirect, and cumulative effects on lands and realty actions from the Preferred Alternative. The lands and realty program supports goals and objectives of other resource programs, while responding to public requests for land use authorizations and facilitating land ownership adjustments (e.g., acquisition, and disposal) under laws, regulations, and policies. Land use authorization, particularly ROW grants and permits, is a function of demand for the use. Other future development of adjacent federal, state, and private lands would likely result in more requests for and approval of land use authorizations for facilities such as, roads, utilities, and communication sites.

4.7.1 Methodology and Assumptions

The laws, regulations, and policies that govern public lands provide strict guidance covering two states under the jurisdiction of the ELFOFLPM. BLM policies for land tenure are based on the Federal Land Policy and Management Act (FLPMA). In accord with FLPMA, land tenure adjustments – including disposal or acquisition of public lands – must meet specific criteria and must serve the national interest. Processing land use authorizations, access (easement) acquisitions, acquisitions, and disposals often presents complexities for each transaction because of political sensitivities, special interests and conflicting laws (state versus federal).

BLM would manage major contiguous land bases within the ELFO jurisdiction as areas for retention.

BLM might seek to acquire lands to meet specific objectives, such as the following:

- private lands with unique characteristics of the geographic area (e.g., historic resources, ecologically critical areas, abandoned railroad alignments) next to or within large contiguous public lands bases;
- parcels in newly developed special management areas or newly designated ACECs if offered for sale by a willing seller and funding is available;
- parcels available for purchase and considered to have high resource and important public interest resources.

Land acquisition depends on resource management objectives, public requests for access or other realty actions, the presence of willing sellers, and funding to support acquisition.

BLM would manage its newly acquired parcels the same as similar adjacent parcels unless the site-specific NEPA compliance documentation and the record of decision call for different management prescriptions.

BLM would dispose of lands that have low or unknown resource values or that are isolated or fragmented from other public ownerships making them difficult to manage.

BLM would respond to public requests for land authorizations and acquire administrative and public access where needed. The IMP (BLM 1995) would apply to ROW applications in WSAs. No land use authorizations would be granted for disposal or storage of hazardous wastes. New rights-of-way facilities would be located within or next to existing ROWs to the extent possible.

The use of certain ROWs built on public lands before FLPMA would be recognized as valid even though authorities have since been repealed (e.g., ditches and canals under Act of July 26, 1866; highways roads and trails under R.S. 2477).

This analysis assumes that state and major county roads would continue to be maintained to current levels and that in general, county roads would not be abandoned. BLM facilities, mainly roads, would continue to be maintained, with priority placed on those most heavily used by the public.

This analysis also assumes that major utility line companies would focus first on maintaining and upgrading existing lines before undertaking new construction of major utility lines within the field office area. Demand for smaller distribution facilities to extend power or telephone services as rural development continues is expected to remain at current levels under all alternatives. But this demand could fluctuate depending on the degree of economic growth and development within and adjoining the field office area.

4.7.2 Incomplete and Unavailable Information

Classifying lands does not commit BLM to the sale or purchase of any specific parcel. BLM will consider the disposal or acquisition of selected parcels on a case-by-case basis. Lands actions are subject to evaluation under FLPMA and NEPA to determine suitability for disposal or acquisition. Determination of specific parcels or the full extent of disposal of public lands within the field office area is not within the scope of this PRMP.

If site-specific examination of lands selected for disposal reveals important resources or unique characteristics and the authorized officer determines that these resources are present, the lands will be designated as custodial (to remain under BLM management).

4.7.3 Analysis

It is difficult to apply impact intensity criteria (negligible, minor, moderate, and major impacts) to the acquisition/disposal process because of the complexities and uncertainties for each transaction. The impact intensity criteria of the levels of effects on the land use authorization process will be defined as follows:

Negligible: The effect would be barely detectable, the public would not be affected, and there would be no measurable change.

Minor: The effect would be slightly detectable, and the public might be affected.

Moderate: The effect would be readily apparent, there would be a measurable change that could result in a small but permanent change, and the public would be affected.

Major: The effect would be severely adverse or exceptionally beneficial, and the public would be affected.

4.7.4 Analysis of the Preferred Alternative

4.7.4.1 Land Ownership Adjustment

A continued demand is expected both from within and outside BLM for land ownership adjustments to improve the manageability of public lands and nonfederal lands. Land exchanges would continue. Because of the relative differences in appraised values between BLM and nonfederal lands, a net loss in acres of BLM lands is expected in most exchange transactions.

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Disposal of small tracts of public lands would not directly affect the environment because it would involve only a change in land ownership. But a change in ownership might have indirect or cumulative effects through later changes in the use of the lands that are bought, sold, or exchanged.

Regardless of the disposal or retention classification of lands in this PRMP, no land disposals would be approved if, during NEPA review, the lands are found to contain superior resources. Such lands would be reclassified as retention or custodial lands and would be subject to BLM's long-term management for their resources.

4.7.4.2 Access

Transportation and facilities management could require that easements be acquired for any BLM roads or other types of facilities on nonfederal lands. ROW reservations could be needed for BLM roads and other types of facilities to be located on public lands.

Demand for adequate access – the ability and legal right of the public, agency workers, and authorized users to reach public lands – is expected to remain high over the life of this PRMP. Easement acquisition would be the main means of acquiring access where needed. Existing or future decisions by some private landowners to deny public and BLM administrative use of traditional access routes to public lands could impede the public's ability to use the public lands and BLM to administer them. Such actions could result in the need for more access easements or land ownership adjustments to secure legal and physical access.

4.7.4.3 Acquisition and Disposal

The management of wildfire/fuels, soil, air, water and geologic, wild horse and burros, noxious weeds, visual resources would not affect the acquisition or disposal process.

The management of cultural resources could affect several aspects of land ownership adjustments and the acquisition of legal and physical access to public lands. These actions would require avoidance to prevent inadvertent damage to federal and nonfederal cultural resources by complying with Section 106 of the NHPA.

Cultural resource inventories would need to be completed before any federal action. The discovery of cultural or paleontological resources could require abandoning a proposed land ownership adjustment such as a land exchange or sale.

Any land ownership adjustment might have to be restructured or eliminated to prevent special status plants or important riparian or wetland vegetation from being harmed. If a site-specific examination of lands selected for disposal finds special status plants or important riparian and wetland vegetation and the authorized officer determines that such a plant or vegetation type is present, the lands will be designated as custodial (lands to be retained under the management of BLM). Once the determination is made, BLM could no longer dispose of them during the life of this PRMP.

BLM would continue efforts to consolidate public land holdings in the proposed Eagle Lake Basin and Bizz Johnson Trail ACECs to facilitate access to public lands and reduce the number of access easements needed. Consolidation would also reduce encroachment from adjacent property owners as a result of fewer miles of BLM boundaries. Designating these lands as retention areas (no disposal) would prevent land ownership adjustments.

The creation of two new SRMAs – Antelope/Shaffer/Bald Mountain and South Dry Valley – create new opportunities to consolidate public land holdings to facilitate access to public lands and reduce the

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number of access easements needed. Consolidation would also reduce encroachment problems on public lands from adjacent property owners as a result of fewer miles of BLM boundaries. Designating these lands as retention areas (no disposal) would prevent ownership adjustments.

The Bald Mountain portion of the proposed new SMRA was determined to be difficult and uneconomical to manage because of its location or other characteristics and is shown on the land tenure map (Map LANDS-1) of proposed disposal areas. Disposal of the area to a state or other entity, as a wildland management area would serve a public objective (such as expansion of communities and economic development) that outweighs other public objectives, including recreation and scenic values. If disposal actions are not feasible, the area would be managed as a SRMA.

The need to manage historic trails to protect the values for which they were designated would increase BLM's actions to obtain legal and physical access to public lands. Land ownership adjustments such as sales or exchanges may need to be restructured or eliminated from consideration to avoid disposing of public lands containing important historic trail segments. Where opportunities are created to obtain abandoned railroad grades to convert to trails for recreational use, BLM will need to investigate all prior rights (where they cross public lands) that would revert upon abandonment.

The need to manage scenic and backcountry byways to promote recreational driving and sightseeing would increase BLM's actions to obtain legal and physical access to public lands. Land ownership adjustments such as sales or exchanges may need to be restructured or eliminated from consideration to avoid disposing of public lands containing important byway segments or reserving the right of the public in the patent.

4.7.4.4 Land Use Authorizations

The demand for land use authorizations, such as ROWs, leases, and permits, is expected to continue within the planning area for the life of this PRMP. Demand for these land use authorizations would fluctuate directly with the degree of economic growth and development within and next to the field office area. Added future development of federal, state, and private lands would likely result in more requests for and approval of land use authorizations for facilities such as roads, utilities, and communications sites.

The management of wildfire/fuels, air quality, environmental justice, forestry products, and wild horse and burros programs would not affect the land use authorization process.

Fire management would generally help protect facilities on public lands authorized through the lands and realty program by reducing fuel loads and suppressing fires. But a slight possibility always exists of losing control of prescribed fire and damaging above-ground facilities.

Managing cultural resources could result in project redesign, abandonment, and/or mitigation of adverse impacts through data recovery. Such outcomes could require such actions as rerouting a proposed right-of-way or road easement, causing project delays and increased costs. But the effect is expected to be so small that there would be no measurable change.

Wildfire and fuels management effects are expected to be at a lower level of detection. There would be no measurable change in how lands use authorizations are granted. Management is expected to generally help protect facilities on public lands authorized through the realty program by reducing fuel loads and suppressing fires. But there is always a slight possibility of prescribed fire getting out of control and damaging above-ground facilities.

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The management of soil, air, water, and geological resources could affect land use authorizations such as ROWs, leases and permits, as well as BLM's actions to obtain legal and physical access to public lands. Proposals for facilities and actions that are projected to degrade these resources would be mitigated or sited in acceptable alternative locations. In more extreme cases, these proposals would be denied altogether. But the effect is expected to be so small that there would be no measurable change.

The management of wildlife and fisheries, and special status plants, would have several effects. If facilities proposed under land use authorizations would affect wildlife or fisheries, they might need to be mitigated, built in other locations, or dropped from consideration. BLM would need to use the latest version of *Suggested Practices for Raptor Protection on Power Lines* (Avian Power Line Interaction Committee 1996) and the U.S. Fish and Wildlife Service's Interim Guidance to Avoid and Minimize Wildlife Impacts from Wind Turbines (USFWS 2003) as stipulations within the grant before granting an ROW for those uses.

Noxious weeds and integrated weed management would continue as presently managed. The lands and realty program would continue helping prevent the introduction of noxious weeds and control known infestations on BLM-managed lands with mitigation measures in all land use authorization grants. Proposals for facilities and actions that are projected to degrade the resources would be mitigated, sited in acceptable alternative locations, or in more extreme cases denied altogether. But this effect is expected to be only slightly detectable and there would be only a small change.

Management of vegetation, including special status species, would have several effects. The need to protect special status species and riparian and wetland vegetation would affect land use authorizations. Facilities proposed to be built where these types of vegetation grow might need to be mitigated, built in other locations, or in extreme cases dropped from consideration. The need to protect certain vegetation types could also result in restructuring or eliminating a land ownership adjustment proposal such as an exchange or sale. Where fire is used to manipulate vegetation composition, there is always a slight possibility of its getting out of control and damaging BLM-authorized above-ground facilities.

VRM Class I and Class II objectives are the most restrictive in contrast ratings for all surface-disturbing activities under the VRM Preferred Alternative. Once the four classes are designated, a request for land use authorization would have to meet the criteria of the VRM class for the area: changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape. If the request does not meet the criteria, the proposal would need to be restructured, built in another location, or in extreme cases dropped from consideration. As an alternative, the PRMP could be amended to change the VRM class and allow the land authorization use.

Any renewable energy development proposed for public lands could result in requests for land use authorizations such as rights-of-way and permits. The management of leasable, salable, and locatable minerals would likely result in request for ROWs and permits for utilities and access.

BLM is expected to continue accommodating wind energy site testing and monitoring in acceptable areas and in conformance with this PRMP. The following designations would restrict a variety of land use authorizations, including wind energy site testing and monitoring:

- WSAs,
- ACECs,
- VRM Classes II and III, and
- other special management areas.

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Management for all WSAs within the ELFO's jurisdiction is described in detail in the BLM IMP (BLM 1995). Currently land use authorizations restrict new physical and legal access across public lands within the boundary of each WSA.

The proposed Eagle Lake Basin and Susan River, Bizz Johnson Trail ACECs would further restrict land use authorization until ACEC plans are formulated defining avoidance or exclusion areas. A measurable change could result in a small but permanent change in how land use authorizations are evaluated.

The effect of creating two new SRMAs – Antelope/Shaffer/Bald Mountain and South Dry Valley – could result in a small but permanent change in how land use authorizations are evaluated if they are within the SRMAs.

Before implementing the proposal to manage the Antelope Pit as a shooting area, BLM will need to accept or deny the request for relinquishment from the California Department of Transportation to reduce its ROW from 400 feet (total width) to 200 feet. Before accepting the relinquishment, BLM would need to inventory the lands for the presence of hazardous materials (lead) or contaminants that might cause remediation for cleanup.

Conflict in management approaches to travel would occur when actions are taken to close or rehabilitate routes through the PRMP or routes not designated for use in the PRMP. Owners of nonfederal land surrounded by public land managed under FLPMA would be allowed a degree of access across public lands that would provide for reasonable use and enjoyment of the nonfederal land. The use of certain ROWs built on public lands before FLPMA would be recognized as a valid use even though the authorities authorizing the use have since been repealed (i.e., ditches and canals, roads, and trails under R.S. 2477, etc.). But no regulations exist either to assert or recognize R.S. 2477 ROWs.

The need to manage national trails to protect values for which they were designated could affect land use authorizations such as ROWs as well as BLM's actions to obtain legal and physical access to public lands. Proposed facilities such as power lines might need to be mitigated (e.g., burial of line) or rerouted to protect these trail values.

BLM would continue to deter unauthorized use and to abate such uses through prevention, detection, and resolution. Upon settlement of trespass liabilities, BLM would resolve the unauthorized use of public lands through termination, authorization, or sale or exchange, as suitable.

BLM would continue to review withdrawals and classifications and revoke or terminate those no longer serving their purpose. Such actions would ensure that the public lands are not unnecessarily encumbered and are open to the widest possible array of uses consistent with other portions of this PRMP. Such a review would also ensure that withdrawals and classifications still serving their intended purpose would remain in place. Management proposed for new withdrawals would also ensure that such actions encumber the smallest area to achieve their purpose.

Land use authorizations such as ROWs and BLM access easements that cross livestock grazing areas could occasionally require mitigation that excludes livestock grazing during construction and rehabilitation phases of the project. Mitigation could also be required to facilitate livestock movement or provide for public safety (e.g., fencing, cattleguards) throughout the effective period of the authorization.

For health and safety reasons, BLM would not issue land use authorizations for uses involving the disposal or storage of materials that could contaminate the land. Lands proposed for acquisition or disposal would need to be inventoried for the presence of hazardous materials. The presence of

contaminants might lead to actions such as the modification or abandonment of a land ownership adjustment proposal, or remediation in the form of cleanup and removal of contaminants.

4.7.5 Cumulative Effects

Few non-BLM land disposal actions in the region are large enough to contribute to a cumulative effect on land ownership. Many small land sales are expected to occur in the cumulative assessment area. Although they might contribute to a cumulative effect on land tenure, these transfers are mostly between private landowners and are not likely to substantially change the use or management of the land.

Lands may be acquired by each of the BLM field offices in the cumulative assessment area. But the acreage of land that may be acquired cannot be determined with any certainty. Broad areas within each field office are classified for retention or acquisition, where BLM might seek to acquire lands to improve management efficiency. In addition, BLM might seek to acquire lands to meet specific objectives, such as improved access or resource management.

The number of land use authorizations, particularly ROWs and permits, is a function of demand for uses. Further development of adjacent federal, state, and private lands would likely result in more requests and approval of land use authorizations for facilities such as roads, utilities, and communications sites.

Existing or future decisions by some private land owners to deny public and BLM administrative use of traditional access routes to public lands could interfere with the ability of the public to use public lands and BLM to administer them. Such actions could result in the need for more access easements or land ownership adjustments to secure legal and physical access.

The Preferred Alternative would have the cumulative effect of reduced routing options for ROW facilities such as utilities and roads from

- designating ROW avoidance and exclusion areas on BLM-administered lands and
- similar restrictions on ROW development on adjacent lands, particularly National Forest system lands.

BLM would continue to process realty actions. Valid existing rights, such as the existing county road ROWs, would not be affected. Granting utility ROWs, where conforming to constraints, would meet the demand for such services along the U.S. Highway 395 corridor. Designating the Alturas Transmission Line route, described by the Western Utility Group (2003) as having the highest potential of being developed within ELFO area would simplify future development.

4.7.6 Mitigation Measures

There are no mitigation measures necessary for Lands and Realty.

4.7.7 Unavoidable Adverse Impacts

There are no unavoidable impacts for Lands and Realty.

4.7.8 Short-Term Uses Versus Long-Term Productivity

There are no short term uses that reduce the long term productivity for Lands and Realty actions.

4.7.9 Irreversible and Irretrievable Impacts

The Preferred Alternative accommodates land tenure adjustments that may result in the permanent loss of lands from public ownership if they enter private or state ownership. There are no irreversible or irretrievable impacts to Lands and Realty.

4.8 Potential Effects on Livestock Grazing

This section discusses the direct, indirect, and cumulative effects on livestock grazing from implementing the Preferred Alternative.

4.8.1 Methodology and Assumptions

Management objectives for livestock grazing might conflict with resource objectives for soil, water, vegetation, wildlife, and cultural resources. These conflicts would be resolved at the implementation planning level through consultation with the interested public and the livestock grazing decision / protest / appeal process. Mitigation measures to protect other resources would be incorporated into grazing permits.

The analysis considered effects on livestock grazing adverse if they would do any of the following:

- reduce the area authorized for livestock grazing,
- restrict the amount of forage (animal use months – AUMs) available for livestock grazing, or
- create higher costs to livestock operators using public land grazing permits.

Higher costs could be caused by the following:

- increased amounts of infrastructure (fences and water developments) that need to be built and maintained;
- grazing systems that require extensive herding, water hauling, or more pasture moves;
- seasonal use restrictions that reduce the length of time livestock spend on public lands;
- short-term livestock exclusion as part of restoration; or
- reduced flexibility to adjust to fluctuations in the livestock industry.

The analysis considered effects on livestock grazing beneficial if they would increase the amount of area or forage available for livestock grazing or reduce the costs to livestock operators using public land grazing permits.

The following are assumptions used in the impact analysis.

- Livestock grazing would continue on 54 allotments.
- Grazing authorization fluctuates annually in response to climatic variations. From 75 to 90% of all AUMs are applied for each grazing season.
- On average, 16 acres are required to support 1 AUM of forage (sustain one cow for a month).
- Wild horses consume about the same amount of forage as cattle.
- Closing roads to recreational OHV use would not restrict vehicle use required for permitted livestock use management.
- A reduction in AUMs would generally result in permittees reducing herd size; leasing other grazing lands; decreasing the amount of time they graze livestock on public lands; placing more grazing pressure (more animals for longer time) on their private lands; or selling a portion of their base properties.

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- Historic activities have contributed to non-achievement of land health standards in some areas. These activities included:
 - Unregulated grazing prior to 1960,
 - Repeated fires with no rest from grazing,
 - Unregulated wild horse and burro herds,
 - Unrestricted road construction, and
 - Recreational impacts in sensitive areas.

4.8.2 Incomplete or Unavailable Information

Adequate information is available to assess the impacts of the alternatives on livestock grazing.

4.8.3 Analysis of the Preferred Alternative

Livestock grazing would continue within the planning area, with authorized use expected to be 75 to 90% annually. Management direction for allotment monitoring, evaluation, and rangeland health assessments (and subsequent site-specific analysis) may result in changes in forage allocation and season of livestock use. In addition the construction of new range developments may be required to meet allotment and other resource goals and objectives.

About 2,200 acres of fenced exclosures would be maintained. Within these areas livestock grazing is infrequently authorized, and only when needed or compatible with meeting the site-specific resource objectives. New exclosures would generally be small (less than 10 acres) and would reduce the total area available to grazing less than one percent. Livestock losses due to occasional death loss of cattle trapped within exclosures would be rare.

BLM is not expected to require any allotments to be entirely unallocated, or retired, from livestock grazing as a result of resource use conflicts.

The approved Northeastern California and Northwestern Nevada Standards and Guidelines for Livestock Grazing (BLM 1988a, 1999b, 2000) require that controls on utilization be implemented, as suitable, on allotments that are not meeting or making progress toward meeting Land Health Standards as a result of current livestock utilization. The highest utilization allowance for native rangelands is now 40-60%, and this limit would not change.

Sagebrush and grassland communities are large and widespread and provide the bulk of the forage base for livestock in the planning area. The degree of impact to livestock grazing from actions to restore soils and native rangelands relate to the time needed for rest following treatment. Grazing may be excluded from one to several years after wildfire, prescribed fire, or other disturbance in areas that are seeded or allowed to regenerate naturally. This temporarily removes acreage from the allotment base, resulting in adverse impacts by reducing AUMs. However, in the long term, restoring native rangelands to healthy, productive communities dominated by native perennial species increases both forage quality and quantity.

Promoting the stabilization of approximately 100,000 acres of upland soils not meeting land health standards would require locally adjusted use areas and use periods. Sediment intrusion buffer zone size would not limit livestock operations in their ability to transport livestock within permitted allotments. Soil restoration work would have limited adverse short-term affects to livestock grazing but in the long-term would increase the capacity of the range to support grazing.

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Restoring special habitats (timber, woodlands, and riparian areas) would little affect livestock grazing. These areas are generally small, and scattered, and contribute little to the livestock forage base. About 4,000 acres of existing seedings would be maintained. Seedings designed for livestock forage benefit livestock grazing by:

- increasing the amount of forage available to livestock,
- simplifying livestock pasture moves,
- improving the condition of forage on native rangelands by deferring livestock use, and
- increasing the flexibility of livestock operations to adjust to restrictions needed to meet the objectives for other resources.

Wild horses can affect livestock grazing both directly and indirectly. Grazing by horses directly reduces the amount of forage and water available for livestock. The intensity of wild horse use is controlled by managing the number of wild horses that are in wild horse herd areas. But the season, duration, and frequency of wild horse use cannot be controlled. Therefore, impacts of wild horse use, particularly in some special habitats and natural concentration areas, occur annually. Reference

Most management actions for wildlife would result in similar effects on livestock grazing. Seasonal protection or buffers for raptor sites would be applied with inconsequential affects to livestock grazing. Habitat management, including restoration of sagebrush ecosystems would result in minor impacts to grazing at specific sites.

The *Conservation Strategy for Sage-Grouse and Sagebrush Ecosystems within the Buffalo Skedaddle Population Management Unit* encompasses the majority of the plan area. Maintenance of healthy habitat would require adjustments in season of use and utilization on some sites if monitoring shows biodiversity standards are not met. Negative grazing adjustments may also be applied to some sites to allow existing perennial grasses and forbs to compete with non-natives. Restoration activities in limited sage-grouse habitat, including reduction of invasive juniper, will improve and stabilize forage for grazing.

The ELFO would manage archaeological resources under Section 106 of the NHPA. Compliance with Section 106 would result in minor to major impacts to livestock grazing due to delays in or prevention of building new and/or maintenance/reconstruction of existing livestock handling facilities, seedings, and water developments. Delay in or prevention of completing these facilities would increase the cost of grazing livestock on public lands by requiring operators to use more expensive techniques (herding, water hauling) or facilities to manage livestock.

Energy and mineral exploration and extraction, and dispersed recreation can negatively influence livestock grazing. These activities increase the number of people and vehicles that access remote areas increasing the risk of livestock theft and vandalism of livestock handling and watering facilities. People also leave gates open, allowing cattle and wild horses to get into inappropriate areas. Impacts from current levels of dispersed recreation, and of energy and mineral exploration and extraction, are inconsequential. Closing roads to recreational OHV use would not restrict vehicle use required for permitted livestock use management.

Site-specific monitoring at the implementation (activity) plan level would determine

- future acres suitable for livestock grazing, and
- future adjustments in authorized AUMs, grazing systems, and the terms and conditions of permits.

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Needed changes would be made to meet the needs of special status species and other high-priority resources or to meet or maintain progress toward meeting land health standards.

About 2,000-2,500 acres of new exclosures would be needed to mitigate livestock impacts to special status species habitat, to meet the objectives of other high-priority resources (including NRHP archaeological sites), and to meet or maintain progress toward meeting land health standards. Exclosures would reduce the total acres grazed by livestock by less than 1% over the life of the plan (20 years).

To provide for livestock control, 60-80 miles of new or rebuilt fencing would be constructed over the life of the plan. New pastures that are created would provide for a greater ability to rest areas, favoring land health and forage production. Total fence maintenance requirements for the field office area would increase accordingly.

Under the Preferred Alternative, the ELFO would continue to annually authorize at least 52,250 AUMs of forage on 987,779 acres (97% of BLM-administered lands). Changes to grazing strategies within individual allotments would be made at the activity plan level, in response to site-specific monitoring.

Utilization levels would be reduced in allotments not meeting standards for land health, on a site-specific basis. Other areas needing reduced utilization may include the following:

- special habitat areas (riparian, aspen, mahogany, bitterbrush, mountain sagebrush),
- important wildlife areas (sage-grouse nesting and brood rearing),
- streams with fish,
- big game fawning/kidding/lambing/calving areas, and
- migration corridors.

Under the Preferred Alternative, wild horses would be maintained within AMLs in three herd areas within seven grazing allotments and 828,569 acres (81% of the area). Wild horse grazing, even at AML, would continue to reduce forage available to livestock in the planning area.

Under the Preferred Alternative, the 2,000-3,000 acres of existing good condition crested wheatgrass seedings would be maintained as crested wheatgrass seedings. These areas provide more forage for livestock than most of the surrounding native vegetation, and the seedings are integral to the grazing systems on 10 allotments.

4.8.4 Summary of Effects of the Preferred Alternative

The Preferred Alternative would balance adverse and beneficial impacts by increasing the amount, access to, quality, and dependability of livestock forage while implementing mitigation measures to reduce the impacts of livestock grazing on other resources. Crested wheatgrass seedings would be maintained, degraded lands with the most potential to produce livestock forage would be a high priority for restoration, and emphasis would be placed on increasing livestock distribution. There is a potential that an increase in livestock forage would be made available (long-term) through native vegetation restoration efforts. However, some areas would have reduced utilization limits, livestock grazing systems would closely control season and duration of use and up to 2,500 acres of new exclosures of additional exclosures would be constructed. These actions would increase the costs to the livestock operators of grazing livestock on public lands.

The amount of area grazed by wild horses would remain at about 81% of the planning area and wild horse grazing would continue to have moderate adverse impacts on livestock grazing opportunities. Dispersed recreation levels would be expected to increase, and the overall adverse impacts of additional visitors in remote areas on livestock grazing is expected to increase to minor to moderate levels within the life of the plan.

4.8.5 Cumulative Effects

The area of analysis for cumulative impacts on livestock grazing is defined as the ELFO area boundary and the livestock operations that include public land grazing permits within the area administered by the ELFO.

Since European settlement began in the mid 1800s, livestock grazing practices have changed dramatically. Initial livestock use of the area was completely unregulated and occurred on a first come, first served basis. The natural fire regime was intact, and additional fires were set by both Native American residents and European settlers, resulting in much larger areas of land dominated by native bunch grasses. There were few invasive plant species and meadow systems along riparian corridors were broad and productive. There were no fences, and virtually all of the lands were available for livestock use. As a result, the area was used by extremely large numbers of domestic sheep and cattle, and grazing management practices were relatively inexpensive.

Within a short time of initial settlement however, livestock grazing conditions began to change. The most productive lands were homesteaded, fenced, and placed in crop production. Repeated overgrazing of the uplands resulted in reduced natural fire events, and shrub and juniper dominated communities began to replace the grasslands. Livestock grazing and the construction of roads/trails along riparian corridors resulted in stream downcutting and dewatering of meadows. These factors, coupled with fire suppression and the extreme drought of the 1930s resulted in a reduction of the forage available for livestock grazing. The increasing competition for available grazing lands made livestock management much more difficult and undependable.

The Taylor Grazing Act in 1934 allocated grazing lands to individuals that controlled adjacent base properties, which increased the dependability of public land livestock grazing. The adjudication period in the 1960's reduced the number of livestock that were permitted to use the public lands, but the reduced use resulted in increased livestock forage production. Water developments and seedings further increased the forage available for livestock.

In the 1970s and 1980s, allotment management plans were developed. The management methods these plans implemented further improved livestock forage conditions. However, they also increased the time and costs of maintaining livestock grazing on public lands.

Since the 1960s, the restrictions being placed on livestock grazing have increased dramatically to accommodate other consumptive and non-consumptive uses of the public lands. The importance of managing the lands administered by the ELFO for healthy ecosystems, unstructured recreational experiences, wildlife habitat, special status plant and animal species habitat, and archaeological resources has increased, and is expected to increase into the foreseeable future. Livestock management to meet the objectives of these resources is becoming more tightly controlled, particularly in "special habitat" areas, such as aspen, riparian, grassland, and mountain brush communities. The cumulative impact on livestock grazing of meeting these objectives is increased cost to the livestock operations, either in a reduction in the amount of forage that livestock are allowed to harvest, or in an increase in operation costs due to additional herding and/or infrastructure to manage livestock while they are on public lands.

4.8.6 Mitigation Measures

Mitigation measures to protect other resources would be incorporated into grazing permits.

4.8.7 Unavoidable Adverse Impacts

Actions needed to restore land health, particularly prescribed fire and special habitat management, would have short and long term unavoidable impacts to livestock grazing. Treated areas would need to be rested from livestock grazing until vegetation is well established and can withstand livestock grazing. Some special habitat areas would need to be excluded from livestock grazing for extended periods of time. To meet land health and other resource objectives, livestock grazing management would need to be more tightly controlled in terms of season of use, duration of use, and periods of rest between uses, which could increase the costs to livestock operations grazing on public lands.

4.8.8 Short-Term Uses Versus Long-Term Productivity

Activities that directly disrupt or impact the soil surface (such as mining and facility construction, compaction by grazing animals and vehicles, exposure of soil surfaces to wind and water erosion, and accelerated erosion of meadow soils along riparian corridors) reduce the long-term productivity of vegetation in the disturbed areas. Activities, such as excessive or inappropriate livestock and wild horse grazing, compaction of heavy clay soils by grazing animals and vehicles, heavy grazing that reduces fine fuels and ladder fuels, and aggressive wild fire suppression contribute to the type conversion of native vegetation communities to non-native species, particularly annual grasses (cheatgrass and medusahead), or to invasive native species, particularly juniper. These type conversions also impact the long term productivity of vegetation in the planning area. Reduction in the productivity of vegetation adversely impacts the long-term productivity for livestock as well.

4.8.9 Irreversible and Irretrievable Commitment of Resources

None.

4.9 Potential Effects on Recreation and Visitor Services

This section analyzes the direct, indirect, and cumulative effects on recreation resources from implementing the Preferred Alternative.

4.9.1 Methodology and Assumptions

The following analysis compares the impacts on outdoor recreation through changes in recreational opportunities, settings, and access. Changes in the settings would result in a corresponding change in the opportunity to achieve a desired recreation experience in the preferred setting. The following assumptions were used in assessing the impacts of management actions for other resource programs on recreation.

One of the key issues affecting recreation activities is the growth of recreation use in the field office area. A market study prepared in 2002 for the northeastern California area identified non-motorized activities such as day hiking as some of the most popular activities, with vehicular-based activities such as driving and sight seeing also very popular. OHV use, while not high on the list of activities participated in by survey respondents, is a well-established activity on the existing network of rough dirt roads. OHV use occurs primarily as part of hunting access and back-country sightseeing. Recreational quad vehicle (four-wheel drive – 4WD) riding is also growing in popularity. There is demand for play riding areas close to communities, as well as for sightseeing riding on the existing dirt road network. Off-road motorcycle riding is an established use; although user numbers are not high, casual use is increasing at destination riding areas. Providing quality experiences for these activities, maintaining opportunities for high-quality non-motorized experiences, and avoiding user conflicts are key components of recreation resource management actions.

A route network for access and recreation will be designated in this PRMP that will be based on a global positioning system inventory completed in 2002. Approximately 1,700 miles of routes are located in the ELFO area, excluding highways.

All types of recreation use are likely to increase over the 20-year planning period. Demand would continue to increase from local community residents and groups as Lassen County, California and Washoe County, Nevada continue to grow (the projected annual growth for Lassen County is 0.4% and for Washoe County is 1.43%). Requests for event and commercial recreation permits would increase as more community groups, clubs, and commercial and educational organizations rely on BLM-administered lands that offer easy access on a daily basis.

Recreation management would be accomplished in a phased approach, with priorities to meet immediate demands and minimize resource damage. Implementation plans would be developed for new SRMAs and ACECs, if proposed. Areas closer to local population centers would be prioritized for project implementation.

A designated route system would provide better route information to visitors, enable higher quality recreation opportunities, and reduce conflicts among users. Potential enhancement in recreation experiences also depends on engineering and maintenance levels. Inadequate design or maintenance could lead to additional user-created roads as visitors bypass closures or poorly maintained roads and trails to access areas that were previously open. The management of areas with separate trails systems for motorized and non-motorized users would require a higher level of management intensity.

Identifiable management areas based on public land blocks, major topographic features, or major road boundaries would result in more effective plan implementation and public understanding of regulations.

The need for non-motorized trails would continue to increase, particularly trail opportunities relatively close to urban or residential areas.

4.9.2 Incomplete or Unavailable Information

Adequate information is available to assess effects on recreation resources at a plan level.

4.9.3 Analysis

For the purposes of this analysis, the levels of effects on recreation are defined as follows:

Negligible: The impact would be barely detectable, affecting the experience of few recreationists in the applicable setting.

Minor: The impact would be detectable, affecting the experience of many recreationists in the applicable setting.

Moderate: The impact would be readily apparent, affecting the experience of most recreationists in the applicable setting.

Major: The impact would be severely adverse or exceptionally beneficial, affecting the experience of nearly all recreationists in the applicable setting.

4.9.4 Impacts Common to All Recreation Resources

Identified management actions from cultural resources activities, such as inventory, evaluation, and categorization of sites are not anticipated to affect recreation opportunities or activities. Any restrictions to recreation activities, such as area closures, would be site specific and are anticipated to result in only minor, isolated impacts.

Fire management and fuels reduction activities are not anticipated to affect recreation activities, except for temporary localized disruptions because of area closures for prescribed fire or vegetation treatment. This resource program is not addressed further in this section.

Soils management includes implementing management practices, closing and rehabilitating roads where sensitive resources require closure or road realignment, and minimizing new road construction. These activities could disrupt route network connectivity, reduce motorized recreation opportunities, and prevent development of new routes to maintain the route network when others are 'Closed'. Other management practices such as grazing rest, maintaining existing enclosures, using prescribed burning, and installing erosion control structures are not anticipated to affect recreation opportunities.

Management actions to protect and restore riparian/wetland areas, vegetation communities and forest health, and wildlife habitats and populations would not affect recreation. Restoration of unhealthy vegetation communities would enhance habitat, which would sustain wildlife for viewing and hunting activities. In some cases, recreation could benefit from these actions by an improved physical setting and enhanced opportunities for recreation activities in a natural setting.

Management to reduce infestations and spread of noxious weeds also could benefit recreation by restoring the natural diversity of the native landscape and wildlife. Management of special-status species could

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adversely affect recreation if the management requires closures or restrictions on activities. The intensity of the actions required would determine the degree of effects, and specific management actions would be based on monitoring and evaluation.

Management initiated to protect the visual quality of WSAs, scenic trail corridors, recommended suitable WSR segments, and SRMAs would not directly affect recreation activities. Indirect benefits would be realized by protecting the natural setting of much of the ELFO landscape as VRM Class II and III areas, where the existing landscape character would be retained or partially retained. Undeveloped, natural-appearing landscapes are an important component of why and where people choose to recreate. Those landscapes provide settings for activities and experiences people seek, such as hunting, hiking, camping, trail riding, and wildlife viewing. The VRM Class I designation for all WSAs would further benefit visual resources by maintaining the natural character of the areas and ensuring that any activities are not visible in the landscape.

Closing or relocating roads to enhance water quality in streams and lakes could affect route network connectivity and reduce motorized recreation opportunities if new routes are not constructed to replace closed ones. The potential route closures generally would be the same as those identified to protect soil resources and would not represent additional miles of closures. The total impact of closures cannot be determined until specific sites of soil and water quality degradation are identified. Use of management practices to maintain water quality is not anticipated to adversely affect recreation opportunities or natural settings. This program is not addressed further in this section.

Management of wild horses and burros is not anticipated to adversely affect recreation because the management actions identified do not include restrictions or closures that would alter the existing recreation opportunities or settings.

Management relating to the extraction of mineral materials, oil and gas exploration and development, and production of locatable minerals are anticipated to result in minimal impacts on recreation resources. There are no active locatable mining operations on the ELFO lands, and only one split-estate geothermal resource has been developed as part of a cogeneration power plant. No other leasable resources have been developed. Saleable resources are the primary mineral extraction activity in the ELFO area and consist primarily of gravel pits. All of these activities are site specific and historically have not adversely affected recreation in the ELFO area. OHV riders utilize the abandoned gravel pits for play riding where the pits are located conveniently for recreation access.

WSAs would remain 'Closed' to saleable (such as sand and gravel) and leasable minerals (generally fluids). Although locatable minerals (hard rock minerals) are limited to relatively small sites, impacts on recreation resources could be substantial, depending on where the claims are located. Impacts on recreation resources from mineral development are anticipated to be minimal because BLM would manage WSAs to retain opportunities to experience recreation activities in a primitive setting. In addition, the WSAs in the ELFO area contain low mineral value. Impacts from mineral development also are not likely because BLM requires that any new locatable mineral claim in a WSA not cause surface disturbance of the WSA.

Impacts on recreation resources from forestry management actions are not anticipated to be significant because management actions generally would improve forest health but are not expected to restrict or alter recreation activities or natural settings.

In areas where recreation occurs, timber harvest would temporarily disrupt recreation activities during timber sale activity. This program is not addressed further in this section.

Current recreation experiences and activities are pursued with livestock grazing occurring on most BLM-administered lands; therefore, continued grazing management is not expected to affect those experiences and activities. Excluding livestock to improve riparian conditions along streams, along lake shores, and around springs has benefited the recreational use of those areas by improving the natural appearance of the landscape, improving wildlife habitat, and eliminating visitor/livestock interactions.

Identified management actions relating to land acquisition could directly benefit recreation resources. New areas would be made available for recreation activities, and permanent legal access would be provided to BLM-administered lands that are currently used for recreation but, in some cases, do not have legal access.

4.9.5 Analysis of the Preferred Alternative

4.9.5.1 Recreation Opportunity Spectrum

The Preferred Alternative would allocate about 23% of the field office area located within the most roadless portions of the WSAs to the primitive setting (core 'Primitive' areas). About 66% of the field office area would be allocated to a backcountry designation that combines 'Semi-primitive Motorized' and 'Semi-primitive Non-motorized' recreation opportunity spectrum (ROS) recreation classes. This allocation would retain the natural setting of the area for a wide variety of recreation opportunities and experiences; motorized vehicle use would be allowed on designated roads and trails within the backcountry designation.

4.9.5.2 Special Recreation Management Areas

Three existing SRMAs (Eagle Lake Basin, Bizz Johnson Trail, and Fort Sage) totaling about 65,510 acres would be retained and management of these areas would continue as under present management. Management actions associated with each area generally would benefit recreation by reducing user conflicts and providing appropriate facilities for a variety of activities.

The Bizz Johnson Trail SRMA would continue to be focused on non-motorized activities; prohibiting shooting within the fairly narrow canyon of the Susan River would increase public safety and help retain the naturally quiet setting. Because shooting on other BLM-administered lands would be permitted and hunting within the canyon is limited, the loss of opportunities in this area is not considered substantial. Increased attention on the interpretive and education aspects of the trail would enhance the visitor experience.

The Eagle Lake Basin SRMA would continue to be managed for multiple recreation activities, including provision of accessible fishing areas and wildlife viewing areas, and controlled and monitored camping. These management actions would benefit the recreation experience by continuing to provide primitive camping opportunities close to Eagle Lake, reducing user conflicts, protecting water quality, and limiting vehicle use to designated access and camping areas. Continuing the present management of prohibiting livestock grazing on the lake shore areas that are used for camping, fishing, and swimming also would continue to enhance the recreation experience in those areas by eliminating the waste, vegetation damage, and water quality degradation associated with grazing.

The Fort Sage SRMA would continue to be primarily managed for OHV use. Under the Preferred Alternative where use would be 'Limited to Designated Routes', existing opportunities for a variety of routes and challenges would be retained. In addition, opportunities for activities such as hiking, horseback riding, and mountain biking would continue to be provided in areas where OHVs are prohibited; these

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activities would benefit from proposed management actions to provide a quality non-motorized experience.

Designation of two new SRMAs, the Antelope/Shaffer/Bald Mountain SRMA (61,764 acres) and the South Dry Valley SRMA (46,813 acres), totaling 108,577 acres would provide additional emphasis and priority for management of recreational use of these two popular recreational activity areas.

The Antelope/Shaffer/Bald Mountain SRMA would enhance recreation experiences by preserving the undeveloped landscapes northeast of Susanville and north of Honey Lake Valley's most populated area. Benefits also would be realized from high-quality trail development for rural tourism, as the trails can be expected to become destination attractions for casual and event trail use.

Management of existing small OHV play areas at the mouth of Rice Canyon would continue to provide a play area close to town for motorcycles and quad vehicle riders. Closure of the Rice Canyon OHV play area to target shooting would improve the safety of the area for OHV riders. OHV users who would continue to be able to use the network of existing dirt roads in the area would benefit from the SRMA designation. Hang gliders also would benefit from development of a launch area on Antelope Mountain. Specialty uses of BLM-administered lands for model airplane flying and rifle range operations under special use permits issued by BLM would continue.

Beneficial impacts would include new miles of trails constructed for residents of the most populated area in Lassen County, where the demand for trail experiences continues to grow.

The South Dry Valley SRMA would result in beneficial impacts for motorcycle riders because of continued management of the area for motorcycle trail riding, with emphasis on development of sustainable trail alignments.

4.9.5.3 Travel Management

Development of new routes under the Preferred Alternative would provide specific new recreation opportunities and minimize resource damage or conflicts. New routes would enhance recreation by improving looped trail experiences in the Fort Sage and South Dry Valley SRMAs and by improving the access between back-country areas east of Painter Flat. Site-specific impacts could vary based on other resource management objectives for this action. Impacts on recreation associated with new routes would not be significant as the total miles of new routes would be relatively small compared to the 1,700 miles of BLM-administered roads in the ELFO area. Provision of more sustainable trail alignments and looped trails would benefit OHV enthusiasts. Enhancement of the natural resources through route realignment to provide for more sustainable routes and better resource protection where routes are in soils that are not well suited for vehicle traffic would result in a long-term benefit for motorized recreation experiences. Seasonal closures on Cleghorn Access Road, Tablelands, and Horse Lake Road may limit some opportunities and reduce visitor choices, but protection of sensitive species and prevention of soil loss and noxious weed spread would help to maintain the overall natural settings in these areas. The beneficial effects on recreation include retaining the opportunity to participate in activities in a natural setting and reducing resource damage, thereby avoiding the potential need for complete closure.

Closing over 7,000 acres of SRMAs and dispersed use areas to OHV use would directly affect recreation activities by limiting motorized opportunities, reducing user conflicts, and enhancing opportunities for achieving quality non-motorized recreation experiences. Approximately 25 miles of routes within these areas would be 'Closed' to OHV use, representing about 1% of the total miles of BLM-administered routes in the field office area. In the Eagle Lake Basin SRMA, vehicle closures have been in place for shoreline areas for over 10 years to maintain roadless shoreline; therefore, maintaining the closures would

not affect recreation opportunities. Because Willow Creek Canyon is currently roadless, officially closing the area to vehicle use would not affect recreation uses or opportunities. Managing travel in the Fort Sage SRMA as 'Limited to Designated Routes' would maintain the current route network and is not expected to affect travel or recreation opportunities.

Management of OHV use under the Preferred Alternative includes designating 419 acres as 'Open'. Closing about 25% of the BLM-administered lands in the field office area to cross-country vehicle use and approximately 58 miles of dirt roads to motor vehicle use (primarily in 'Primitive' core areas of the WSAs and in the Bizz Johnson Trail SRMA) represent a relatively small number of miles of routes compared to the rest of the routes (1,700 miles) that would remain 'available' for vehicle use; consequently, recreation opportunities are not expected to be affected. Developing a fully designated route system would maintain a wide range of recreation opportunities, improve customer service by identifying all routes open for use, and reduce user conflicts. Such a system also would provide direction for enforcement of route restrictions because each route would be clearly designated for specific vehicles, seasonal closures, or other use guidelines that would be clearly known and enforceable.

Limiting OHV events to designated roads and trails would preserve opportunities for participation in organized events and help maintain the landscape that attracts participants who enjoy events in a natural setting. Designated event routes could reduce potential conflicts with casual motorized and non-motorized users because the routes would be known event locations and recreation users could pursue opportunities in other areas during events.

4.9.5.4 Boating

Allowing only human-powered boating activities on the Upper and Lower Biscar Reservoir would not affect recreation opportunities and would maintain the quiet and natural setting for users of these small walk-in reservoirs. Unrestricted boating on Dodge Reservoir would continue to provide the full range of opportunities for water sport activities.

4.9.5.5 Trails

The existing 16 miles of non-motorized BLM-administered trails in the ELFO area would continue to provide non-motorized trail opportunities. Development of non-motorized trails would include 264 miles of new trails. The beneficial impacts on recreation would include providing a significant number of new recreation opportunities for local residents and visitors, dispersing activities over a larger area to avoid overcrowding, and reducing user conflicts. The expanded trail system would offer the opportunity for day trips as well as extended multi-day experiences in a variety of settings. The network also would provide strong community connection in the areas and could benefit the local economies through increased tourism.

4.9.5.6 Camping

Managing most BLM-administered lands to provide opportunities for self-contained camping would result in the potential for litter, resource damage, and wildfires caused by irresponsible campers. Beneficial impacts of managing these lands as 'Open' to self-contained camping include the opportunity for recreationists to enjoy the open space and beauty of public lands and to maintain flexibility in their choice of areas and settings that are not limited to developed facilities.

4.9.5.7 Hunting and Shooting Sports

Management of most BLM-administered lands as open for hunting and shooting would continue to provide a wide variety of recreational opportunities for hunting and shooting enthusiasts. Closing areas to shooting, such as the Bizz Johnson Trail and Susan River Canyon, would improve visitor safety. Because of the limited area, these closures are not anticipated to affect the overall opportunities for shooting sports.

Closing developed facilities and high-use areas to paintball activities would reduce the potential for injury to non-participants and the vandalized appearance of public land improvements. The closures would not affect paintball opportunities, as most other areas of BLM-administered lands would remain open for use.

As a preventative measure to protect developed facilities and natural areas that are popular for recreation because of their scenic values from damage by paintball play, all developed facilities and certain areas identified as popular for use because of their natural appearance would be 'Closed' to discharge of paintball guns.

4.9.5.8 Interpretation

Developing interpretive materials for the ELFO area would benefit recreation by expanding visitor understanding and enjoyment of BLM-administered lands through provision of information about the natural and historic resources that BLM manages. Development of interpretive brochures, displays, and presentations would enhance local resident's knowledge of BLM-administered lands and resources. These actions also could contribute to increasing rural tourism and rural economic diversification by providing destination attractions for people seeking education and interpretation experiences as part of visiting public lands.

4.9.5.9 Areas of Critical Environmental Concern

Designating seven new ACECs totaling 89,397 acres, (including expansion of the Pine Dunes RNA to 2,887 acres) would result in beneficial impacts by focusing management on protection of the unique resources for which the ACECs are proposed for designation.

Recreation also would benefit from reduced user conflicts the beneficial effects on recreation of preserving the natural setting for a variety of activities, except that they would occur over a larger area and the increased protection would further enhance recreation experiences. ACEC designations also could adversely affect dispersed recreation through use restrictions, which are shown in Table 2.12-1.

4.9.5.10 Historic National Trails

Managing the Nobles Emigrant Trail to protect the historic trail traces and surrounding landscape along the 38 miles of the trail on BLM-administered land would benefit recreation and interpretive opportunities by increasing use of the trail and increasing visitor understanding and enjoyment of the trail. The trail enhancements also could attract additional visitors to the area to participate in trail activities and could lead to seasonal use increases that would change the recreation experience from a more solitary or small-group activity to a more social one. With additional opportunities for interpretation and education, potential resource degradation may be offset by increased public awareness and appreciation gained for these resources.

Implementation of existing trail management plans would continue interpretive development of the Bizz Johnson Trail and increase visitor awareness of the historic resources of this 1911 railroad grade trail.

Acquisition of approximately 52 miles of the Modoc Railroad Grade in the ELFO area for an interpretive trail and clearing 7 miles of the Merriville-Bieber Wagon Road along Eagle Lake for a non-motorized trail would benefit recreation by increasing non-motorized trail opportunities and increasing community and visitor knowledge of these local and regional historic trail routes.

Development of better inventory information on two mid-1800s military patrol routes and two mid-1800s wagon routes, and interpretation of these historic routes would increase visitor understanding and enjoyment of these local and regional historic routes. Development of the interpretive and education aspects of all of these trails is expected to increase public appreciation of the resources and potentially lead to reduced degradation of the resources and facilities. Development of exhibits and a living history presentation at Susanville Depot would increase education and interpretive opportunities, attract local and non-resident visitors, and raise public awareness of other public land resources.

4.9.5.11 Wilderness Study Areas

Management identified to protect WSAs and maintain their wilderness characteristics would benefit recreation by maintaining opportunities for primitive, unconfined recreation activities and preventing further encroachment into WSAs by unauthorized activities that could degrade their natural settings.

4.9.5.12 Wild and Scenic Rivers

Designating 10.6 miles of Upper Smoke Creek as a WSR would result in permanent protection of this segment of Upper Smoke Creek as a free-flowing stream that would remain available for wildlife use, recreational enjoyment of visitors, and protection of cultural resources.

The river segments not recommended for designation as WSRs (segments of the Susan River between Susanville and the Lassen National Forest boundary, Willow Creek through the Tunnison WSA, and Lower Smoke Creek within the Dry Valley Rim WSA) would remain available for possible dam construction for water impoundment or diversion projects. Newly created reservoirs would provide a different array of recreational opportunities, including boating, swimming, and warm water fishing.

4.9.5.13 Scenic Byways and Vista Points

Development of scenic byway designations on six road loops through BLM-administered land in the ELFO jurisdiction and on Highways 139 and 395 would increase public awareness of the scenic resources that can be viewed on BLM-administered lands from these roads. Sightseeing traffic and rural tourism in the area likely would increase as people seek out new areas to explore.

Designation of vista points would result in beneficial effects on recreation by providing visitors with information on scenic high points in the ELFO area that could be reached by vehicle, by mountain bike, on a horse, or on foot. Development of route-specific maps and interpretive information about the vista points would increase public awareness of these scenic resources and likely would increase public use and enjoyment of these areas.

4.9.6 Summary of Effects of the Preferred Alternative

The Preferred Alternative allocates the most acreage to the VRM Class II designation, the second greatest acreage to VRM Class III designation, and the least acreage to VRM Class IV designation. The VRM classifications provide for strong protection of the existing landscape while allowing for visual change, provided that projects affecting the landscape meet the VRM objectives set for each VRM class.

Beneficial effects on recreation would result from protection of the natural setting of the landscape, including recommending approximately 10.6 miles of river corridor for designation as a “Wild” river, 83,000 acres of ACECs, historic trail segments, and selected vista points. The overall effect would be a higher level of visual protection of the natural setting.

Developing wild horse public viewing and information sites in the field office area and enhancing the Litchfield Corral to accommodate public groups for tours, viewing, and education would increase interpretive and wildlife viewing opportunities for local residents and recreation visitors and open the experience to a large number of visitors because it would accommodate organized groups.

The seasonal use area at the New Ravendale HMA would provide residents and visitors with increased education and viewing opportunities.

Restrictions on mineral leasing, saleable minerals, and locatable mineral development in the proposed ACECs would indirectly affect the recreation setting and experience opportunities on over 86,000 acres by maintaining the existing character of the areas and minimizing potential disturbance that could diminish the recreation experience. The WSAs would be ‘Closed’ to mineral leasing, and mineral sales and locatable mineral actions would be limited to no surface-disturbing activities (i.e., exploration would be allowed by methods that do not cause surface disturbance, but no development would be allowed).

Impacts on recreation resources from lands and realty actions would include improved public access to BLM-administered lands. Management associated with the issuance of ROWs, permits, and leases under the Preferred Alternative are not expected to significantly affect recreation. Military personnel maneuvers could affect recreation by restricting access or closing areas to recreation during the activities; however, such activities are limited by restrictions on military use of BLM-administered lands except under specific situations that would require BLM authorization. Although potential impacts cannot be determined until the area for the maneuvers is selected, any restrictions or closures would be short term, and potential impacts are anticipated to be minor. As described for visual resources, the natural settings would be significantly changed with development of wind energy farms, which would create strong visual contrasts in areas where wind turbines up to 200 feet high, transmission lines, and service roads would be located. Major utility or wind farm development could potentially result in substantial adverse impacts to recreation, depending on the site-specific location.

4.9.7 Cumulative Effects

People pursuing recreation experiences historically have used BLM-administered land and adjacent USDA Forest Service and California Department of Fish and Game lands for a wide variety of activities. Growth and development of local communities, as well as larger nearby population centers such as Reno, Nevada, will continue to increase demand for recreation activities on BLM-administered lands, leading to potential overcrowding and user conflicts. Lassen County and Susanville have recognized the need for access to open space and have developed trails plans in order to provide residents with access to recreation and to connect communities to their regional land base.

Recreation experiences can be diminished if the natural or social setting (the amount of contact with other visitors) of the activity is altered from expectations. Most adverse impacts from activities associated with BLM resource programs would be temporary and limited to the local area where the activities occur. Greater consideration of accommodating increased demand through designation of special recreation management areas, development of trails, and limitations on OHV use would result in beneficial effects. The significant increase in trail development, to accommodate anticipated increases in use, would result in beneficial cumulative effects when considered with plans for surrounding land uses.

4.9.8 Mitigation Measures

There would be no major adverse effect to recreation resources. Therefore, mitigation measures are not needed at this level.

4.9.9 Unavoidable Adverse Impacts

Some mineral development actions would have unavoidable, adverse impacts on recreation resources. Exploration and development would affect hunting areas and impact OHV use and non-motorized trails.

4.9.10 Short-Term Uses Versus Long-Term Productivity

Short-term use of recreation resources in the ELFO area would result in negligible impacts to the long-term productivity of the resource.

4.9.11 Irreversible and Irretrievable Impacts

No irreversible impacts to recreation resources or activities are expected.

4.10 Potential Effects on Social and Economic Conditions

This section describes the potential impacts on social conditions from implementing the Preferred Alternative.

4.10.1 Methodology and Assumptions

The analysis of effects on social conditions considers changes in the following issue areas:

- access to resources (e.g., recreation),
- quality of life,
- social relationships and community organization,
- community resiliency,
- attitudes and values, and
- sense of place (e.g., visual resources).

Management actions that could directly or indirectly affect recreational opportunities, tourism, property, aesthetics, and safety were assumed to affect communities in the ELFO area.

The analysis of the economic impacts of each alternative was based on the following assumptions:

- Quantitative impacts were limited to four management actions: fires and fuels, vegetation management, forestry, and grazing.
- For other management actions either the physical effects of those actions could not be estimated in enough detail to allow for a quantitative evaluation. For management actions that could not be estimated quantitatively, a qualitative evaluation was prepared.
- The economic evaluation for the ELFO area was limited to Plumas and Lassen, Counties, California, and Washoe County, Nevada.

The following procedure was used to estimate the economic effects of each management action. First, the change in regional spending for each action was estimated. These estimates included increases in spending in the local economy, such as hiring local firms to mechanically harvest juniper. We also estimated decreased spending resulting from actions such as reductions in grazing allotments.

The changes in regional spending that would indirectly affect the local economy included effects on personal income and employment. For example, a local firm hired to harvest juniper would purchase food and supplies in the local economy, indirectly benefiting other businesses. We estimated the indirect and induced effects on the regional economy using the IMPLAN model.

IMPLAN is an economic input-output model that can be used to estimate the economic impacts of a project or program on an individual county or on a regional, multi-county area. A single county represents the smallest economic unit that can be specified within IMPLAN. Portions of counties cannot be selected. The model originally was developed by the USDA Forest Service, and it is widely used throughout the U.S. to estimate economic impacts (IMPLAN 2004).

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To run the IMPLAN model, we had to first specify the counties involved with the project or plan. We assumed the local economy for the ELFO area to include Plumas, Lassen, and Washoe Counties. Although portions of other counties are included in this field office area, these three counties best represent the area where local impacts would be felt.

After defining the project area, we entered the direct impacts into the model. The model uses a system of multipliers to estimate the indirect and induced effects on the local economy, including the impacts on regional income and employment. IMPLAN defines the direct effects as the impacts of businesses purchasing from other businesses. Induced effects are those resulting from changes in household spending.

The approach used to estimate the economic impacts for the four management actions first involved estimating the direct costs of those actions. We estimated direct costs as described below. Once we estimated the increase and decrease in spending for each management action, we entered them into the IMPLAN model. We then used the model to estimate the change in regional personal income and employment from each management action.

4.10.2 Incomplete or Unavailable Information

Adequate information is available to analyze the effects on social and economic conditions at the PRMP level.

4.10.3 Analysis

For this analysis, we defined the levels of effects on economic conditions as follows:

Negligible: No changes would occur, or changes to socioeconomic indicators (changes in regional spending, income, and/or employment) would be below or at the level of about 3 percent. If detected, effects would be slight and short term.

Minor: The effect would be slight, but detectable, and would impose only minor increases or decreases to socioeconomic indicators, between 4 and 10 percent.

Moderate: The effect would be readily apparent and would impose increases or decreases in socioeconomic indicators between 11 and 25 percent.

Major: The effect would be severely adverse or beneficial changes in regional spending, income, and/or employment. These changes would be greater than 25 percent.

4.10.4 Social Conditions

4.10.4.1 Analysis of the Preferred Alternative

Management actions that result in full fire suppression in the short term would benefit residents and landowners who would otherwise experience the following:

- poor air quality and increased smoke,
- threats of fire to homes and businesses,
- endangerment of life from encroaching wildfires, and

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- other impacts of fire.

Management actions involving prescribed burning might result in the adverse effects from fuels management, such as

- poor air quality,
- potential loss of access for firewood cutting, and
- decreased opportunity for residents and tourists to enjoy areas that are in or near wilderness and are being treated by prescribed burning.

Use of heavy equipment and vehicles on local roads, such as detour roads and in staging areas close to communities, could temporarily disrupt daily commute patterns during both prescribed burning and fire suppression. But over the long term, the fuels reduction program would result in more fire-safe communities and decreased risk of wildfire and its impacts, particularly in the wildland-urban interface.

Management actions to remediate soils that do not meet land health standards could result in closing or rehabilitating some roads. Use of heavy equipment and vehicles on local roads and in staging areas close to communities could temporarily disrupt daily commute patterns during these activities.

Temporary closures during soil remediation management actions could limit access for fire suppression vehicles and could remove features that act as fuel breaks. Given the relatively small acreage that could be affected, such effects are considered minor.

Management actions that encourage community residents to participate in educational events, such as treating noxious weeds and managing plant communities, would increase knowledge and appreciation of plants and would benefit for the community.

Management actions to designate and protect native plant communities and woodlands could restrict access to public lands, having adverse social effects from decreased recreational opportunities. In the long-term, all segments of society would benefit from preserving native plants for future generations to enjoy.

Management actions that aesthetically change communities or nearby areas (e.g., fence building, prescribed burning [resulting in the loss of the original viewshed], and protective designation of native plant communities) could benefit or harm a community's sense of place.

Management actions that permit public use along streams and water bodies would have the following benefits:

- increasing recreational resources,
- increasing opportunities for water activities (e.g., fishing) for residents and tourists and for enhancing the rural lifestyle.

Land acquisition or disposal might result in the closing or rehabilitating of some roads, which could adversely affect communities by temporarily disrupting daily commute patterns or creating permanent detour roads. Land and realty actions might also provide access to previously inaccessible BLM-administered lands and increased opportunities to use these lands.

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Designating a ROS would permit a diverse range of recreational opportunities on BLM-administered lands. Improvements to recreational facilities (e.g., campground improvements, trail development and maintenance, and interpretive site development) would enhance opportunities for local communities and visitors. Management actions designating OHV use areas would optimize OHV recreational opportunities for communities and visitors in suitable areas and could enhance opportunities for other recreation activities (e.g., fishing and hunting) in other areas.

Management actions that would protect ACECs, historic national trails, WSAs, and WSRs would benefit the community and the region by creating public awareness of the natural values of these areas and ensuring the protection of these resources for future generations.

The effects of resource management actions on current social conditions are more beneficial than adverse. Beneficial effects include increased recreational opportunities and protection of resources that are of critical concern, native to the area, or are valuable to rural lifestyles. Adverse effects generally would be short-term or temporary, except for permanent closure of facilities (e.g., roads) or access restrictions to recreation.

4.10.4.2 Cumulative Effects of Social Conditions

The management actions would not result in any adverse cumulative impacts on local or regional social conditions. Local communities would continue to benefit from multiple-use management of public lands. Overall, the proposed management on BLM-administered lands would not substantially change extractive and other resource uses and would result in better resource protection. Federally and state-managed lands make up more than 68% of the land area in the ELFO area, with BLM-administered lands comprising 21%. Local communities rely on these public lands to maintain their economic livelihood and sense of place.

In addition to the social benefits accruing from extractive uses of natural resources – grazing, farming, timber, and mining – recreation and wildlife uses are becoming increasingly valuable to the local economy. With increased tourism, protection of natural resources and open space values that attract visitors to the area would become increasingly important as local and regional populations continue to grow.

Increased growth in the field office area would also result in converting open space to residential areas. Public lands would play an important role in maintaining the rural character and quality of life that are often responsible for attracting new residents to the area.

The proposed management actions were developed in anticipation of increasing populations and use of public lands. Ecosystems would be enhanced by protecting watersheds, viewsheds, and other natural values. State and federal agencies can continue to manage lands for uses that are compatible with the goals for economic development and rural lifestyle expressed in the land use plans for counties in the field office area. These agencies can continue to coordinate with local governments in the planning process and in managing public lands for multiple uses.

4.10.5 Economic Conditions

4.10.5.1 Analysis of the Preferred Alternative

Some of the proposed management actions would only slightly or not change regional economic activity. Small changes might result from one-time spending for labor, equipment, or supplies. Management actions for cultural resources, soil resources, vegetation, listed wildlife and plant species,

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visual resources and special designations would result in negligible impacts, and are not discussed further.

Fire and fuels management would focus on applying prescribed fire on 4,500 acres per year, and mechanical treatments of up to 3,500 acres per year. This work would generate 49 new jobs in the three-county study area (Table 4.10-1). The new jobs would increase total personal income in the economic study area by \$1.5 million.

Table 4.10-1 Estimated Changes in Employment and Income from Management Actions in the ELFO Area

Management Action	Direct Jobs	Direct Income (\$)	Indirect/ Induced Jobs	Indirect/ Induced Income (\$)	Total Jobs	Total Personal Income (\$)
Fire and fuels	30.9	1,001,000	18.1	539,000	49	1,540,000
Forestry	3.8	130,000	2.2	70,000	6	200,000
Grazing	0.0	0	0.0	0	0	NA
Total	34.7	1,131,000	20.3	609,000	55	1,740,000

Note: NA = Not applicable (because there is no change in jobs and no corresponding change in income).

Source: IMPLAN 2004.

Treating with prescribed fire most likely would include purchasing equipment and supplies. Total spending would depend on the total acreage treated. These purchases would result in a small economic benefit to the three-county study area.

Under the Preferred Alternative, approximately 608,000 acres would be ‘Open’ to exploration and possible extraction of leasable minerals, 1 million acres would be ‘Open’ for locatable minerals, and 634,000 acres would be ‘Open’ to saleable minerals extraction. Revenues from energy and minerals are not a substantial element of the local economy. But allowing entry to extract minerals and encouraging development of renewable energy sources could benefit local economic activity.

Forestry management under the Preferred Alternative would include annual harvesting of up 1,100 acres. Harvesting and processing this material would generate six new jobs and increase personal income by \$200,000 (Table 4.10-1). Forestry management actions would substantially benefit economic activity in the three-county study area.

Livestock grazing improvements would be implemented on an allotment basis, including changes in season of use, grazing periods, and exclusion of small areas containing unique resources. These changes would be localized and affect individual grazing permits. None of these changes would measurably change economic activity under the Preferred Alternative.

Up to 24,041 acres of public land would be sold or transferred. Lands under federal ownership in Washoe and Lassen Counties totaled 2.9 million and 1.6 million acres, respectively. During fiscal year 2000–2001, in-lieu payments to Washoe and Lassen Counties were estimated to total \$1.5 million and \$996,000, respectively (BLM 2004). The slight reduction in land held in federal ownership would not substantially reduce federal in-lieu payments received by the counties

Five SRMAs (two more than currently) totaling 175,000 acres would be designated, and 848,000 acres would be managed for extensive use. A total of 419 acres would be designated ‘‘Open’’, and

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approximately 262,000 acres would be 'Closed' to OHV use. Approximately 761,000 acres would be 'Limited to Designated Routes'.

Recreation opportunities and OHV use would potentially increase as a result of designating two more special recreation management areas. Several additional recreation attractions would also increase, including:

- six more scenic byways for sightseeing driving
- 264 miles of non-motorized trails for various combinations of hiking, mountain biking and equestrian uses
- 52 miles of an existing abandoned railroad grade would be part of the designated non-motorized trail routes (with some of this route likely to be joint motorized and non-motorized use also).

These additional recreation opportunities would benefit the local economy as a result of increased recreation-related spending on goods and supplies and on expenditures for food and lodging. The extent of such expenditure is not quantified and therefore estimates of impacts area not stated here. However, such expenditures already occur as a result of visitor use to the three existing special recreation management areas (the Bizz Johnson Trail, Eagle Lake, and Fort Sage OHV area,) all of which are destination recreation attractions (see Chapter 3.10, Recreation, for existing visitor use figures).

With more emphasis on SRMAs, it is expected that more visitors would travel to, and stay in the planning area, while using these new designated recreation areas, byways, and trails.

The existing destination attractions of the Eagle Lake and the Bizz Johnson Trail and Fort Sage OHV Area already demonstrate that visitors from the metropolitan areas (within 2 to 6 hours driving time) are willing to travel to this area for casual use. In addition, others visitors from even further away also make the trip for casual and special event use of public lands for fishing, hunting and trail uses. The various additional recreation designations are expected to increase the visitor use of public lands and the associated economic benefit of rural tourism.

4.10.5.2 Summary of Effects of the Preferred Alternative

Table 4.10-1 summarizes the combined effects on employment and income from the management actions proposed by the Preferred Alternative. When combined, these actions would generate 55 new jobs and \$1.7 million in annual personal income. Total employment in the three-county study area would increase by 0.02%, and total personal income would increase by 0.01%. Although not quantified, the other management actions discussed above would also slightly increase regional economic activity. The increase in economic activity in the three-county study area from management actions under the Preferred Alternative would be small.

The potential reduction of in-lieu payments to the counties from the sale or transfer of federal lands in the field office area would not be substantial, and losses in county revenues might be offset by potential increases in property tax revenues.

The total combined effect of management actions to regional economic activity under the Preferred Alternative would be negligible.

4.10.5.3 Cumulative Effects of Economic Conditions

Table 4.10-2 summarizes the cumulative effects on employment and income under the Preferred Alternative when combined with the proposed management programs for the Alturas and Surprise Field Office areas. When combined, management actions would result in an increase of 166 jobs and an increase in personal income of \$4.7 million. (Although not quantified, the other management actions discussed above also would increase regional economic activity.) This cumulative effect represents an increase in employment of 0.06% and personal income of 0.04%. The combined increase would not substantially reduce economic activity. Jobs and income generated by fire and fuels, vegetation, and forestry management actions in each field office would be responsible for most of the change in economic activity.

Table 4.10-2 Cumulative Effects on Income and Employment in the ELFO Region

Field Office – Alternative	Management Action	Total Jobs	Total Personal Income (\$)
Eagle Lake – Preferred Alternative	Fuels	49	1,540,000
	Forestry	6	200,000
	Grazing	0	NA
	Total	55	1,740,000
Surprise – Preferred Alternative	Fuels	17.7	507,031
	Vegetation	7.6	217,239
	Forestry	0.5	15,207
	Grazing	0	NA
	Total	25.8	739,477
Alturas – Preferred Alternative	Fuels	68.7	1,840,016
	Vegetation	2.4	63,133
	Forestry	13.5	364,347
	Grazing	0	NA
	Total	84.6	2,267,496

Notes: NA = Not applicable (because there is no change in jobs, there is no corresponding change in income).

Total regional cumulative effects would be the sum of the Preferred Alternative for the ELFO and the totals for the Alturas and Surprise Field Offices.

Source: IMPLAN 2004

4.10.6 Mitigation Measures

None.

4.10.7 Unavoidable Adverse Impacts

None.

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4.10.8 Short-Term Uses versus Long-Term Productivity

None.

4.10.9 Irreversible and Irretrievable Impacts

None.

4.11 Potential Effects on Soil Resources

This section describes the potential impacts on soil from implementing the Preferred Alternative.

4.11.1 Methodology and Assumptions

The following discussion addresses key soil concepts and parameters that are fundamental to understanding the discussions of existing conditions and impacts to soil resources.

The main indicators for evaluating the overall condition of soil are soil/site stability and hydrologic function. These indicators are part of BLM's Land Health Assessment (LHA) and are used to assess soil health in the context of BLM's Standards and Guidelines. Soil/site stability ratings reflect the capacity of a representative site to limit redistribution and loss of soil (including nutrients and organic matter) by wind and water. Hydrologic function reflects the capacity of the site to capture, store, and safely release water from rainfall, runoff, and snowmelt (where relevant). It also includes the ability to resist a reduction in this capacity; and ability to recover this capacity following degradation.

The LHA provides 12 indicators that are used to rank soil/site stability and hydrologic function into five categories:

1. slight to no deviation from what would be expected on a reference site,
2. slight to moderate deviation,
3. moderate deviation,
4. moderate to extreme deviation, and
5. extreme deviation.

For consistency with other assessments, ratings 1 and 2 are considered to be in 'Proper Functioning Condition' (PFC), rating 3 is considered 'Functioning at Risk', and ratings 4 and 5 are considered 'Nonfunctional'.

Soil health is influenced by the following processes:

- **Soil compaction** results from vehicles, construction equipment, people, animals, and livestock traveling over trails or land. Compaction can lessen the amount of precipitation that can infiltrate into soil and increase runoff, erosion, and sedimentation—in turn decreasing soil/site stability and hydrologic function, as well as soil productivity and plant vigor and diversity.
- **Interception of precipitation** results when precipitation falls on vegetation. When vegetation is removed, precipitation falls directly on the soil, increasing surface erosion and sedimentation, and decreasing the amount of time between initial precipitation arrival and peak surface runoff—in turn decreasing soil/site stability and hydrologic function.
- **Infiltration** is the process of precipitation entering and traveling through soil. Infiltration reduces the peak runoff during precipitation events by extending the period of runoff after a precipitation event. Infiltration also filters precipitation and reduces erosion and sedimentation. Most importantly, infiltration provides for moisture availability, which allows for the continued development of the soil profile. If infiltration is reduced, runoff and erosion will increase and soil/site stability and hydrologic

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function—as well as soil moisture availability, soil productivity, and plant vigor and diversity—will decrease.

- **Runoff** can affect the amount of erosion and sedimentation, as well as flooding—both onsite and offsite. If runoff is increased, all of these effects can increase and soil/site stability and hydrologic function—as well as soil moisture availability, soil productivity, and plant vigor and diversity—will decrease.
- **Erosion and sedimentation** affect soil/site stability and hydrologic function. Erosion and sedimentation can destabilize the surface and subsurface cohesion of the soil. Increased sediment entering water bodies' increases turbidity, increases width-to-depth ratios, and consequently increases temperature and dissolved oxygen (DO) saturation levels, and creates an adverse habitat for aquatic animals and plants.

Major soil disturbing activities include mechanical and manual treatments of vegetation, livestock and wild horse grazing, road building, recreation activities, and construction of structures such as buildings, fences, and exclosures.

If not properly managed, these activities can lead to erosion and sedimentation, with associated degradations in soil/site stability and hydrologic function, as well as soil productivity and plant vigor and diversity.

Instream structures present a form of streambed and streambank disturbance that can mobilize sediment and weaken the soil structure. Because of the direct mechanism for exposure to such contaminants, instream work is of particular concern. Long-term effects would be related to increases or decreases in flows and sediment transport, with associated effects on geomorphology and soil/site stability and hydrologic function—as well as riparian function and instream habitat.

Livestock distribution can increase or decrease the effect of livestock, depending on their location and density. If livestock are concentrated in small areas or along fencelines, soil disturbance from trampling would be greater than in some other areas, with associated effects related to soil disturbance and compaction. Soil organic matter, root structure, and soil biota can all be compromised. In particular, Vertisols (which exhibit shrink-swell characteristics) are at a high risk for soil degradation.

Concentration of livestock and wild horses and burros in riparian areas can destroy streambanks. Such concentration is possible where there are no alternative water supplies or where exclosures are not used. Altered drainage patterns could result from such ground disturbance as building roads, harvesting timber, and installing instream structures. Altered drainage patterns can increase erosion and sedimentation and, in turn, decrease soil productivity.

Increased erosion and sedimentation from roads can occur when improperly maintained drainages near roads concentrate runoff from roads and cause erosion and sedimentation. Erosion and sedimentation can also impair soil productivity and stability by removing soil organic matter and other stabilizing components of the soil profile.

Vehicles can cause erosion and sedimentation. If vehicles are driven on soils, they compact the soil. If they are driven irresponsibly off roads, they can accelerate erosion and sedimentation and, in turn, decrease soil productivity.

Visitation to interpretive centers increases ground-disturbing activities and soil compaction from foot and vehicle traffic in soil beneath and immediately next to interpretive centers and associated trails. Areas of greater disturbance might experience reduced soil productivity.

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Projects could be improperly located if visual and soil considerations are not properly balanced. If projects are not sited properly, erosion and sedimentation can increase.

The analysis boundary for considering impacts to soil resources includes all lands under the jurisdiction of BLM's ELFO. Impact analysis focused on the potential of proposed actions to degrade soil. In analyzing effects, the following was assumed:

- Recreation use of the field office area would continue to increase.
- BLM polices, including the Standards and Guidelines would be achieved and applied as suitable.
- Adverse effects on soil throughout the ELFO area would be reduced by management practices and adherence to Standard 1 of the Standards and Guidelines (see below).
- No net loss of soil productivity or fertility would result from the Preferred Alternative. If soil productivity were decreased in one area, the decrease would be offset by offsite restoration or mitigation.
- BLM will conform to the latest California Department of Transportation and Uniform Building Code building code standards, county general plan seismic safety standards, county grading ordinances, and National Pollutant Discharge Elimination System requirements.
- Effects are quantified by their relationship to Standard 1 (see below). Standard 1 would either be readily achieved or not readily achieved. Furthermore, achieving Standard 1 would require either (1) varying degrees of effort (e.g., "the least," "a lesser," "a greater," or "the greatest" amount of effort), where effort is defined as project-specific mitigation or additional time to reach Standard 1 following project implementation. The term "beneficial" denotes that implementing management actions would increase soil/site stability and hydrologic function. The term "adverse" denotes that implementing management actions would decrease soil/site stability and hydrologic function.

The most applicable criteria for determining the extent of impacts to soil resources are listed below. These criteria are set forth in Standard 1 of Rangeland Health Standards and Guidelines for Northeastern California and Northwestern Nevada, which states: "Upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate, and landform, and exhibit functional biological, chemical, and physical characteristics."

This statement means that, "Precipitation is able to enter the soil surface and move through the soil profile at a rate appropriate to soil type, climate, and landform; the soil is adequately protected against human-caused wind or water erosion; and the soil fertility is maintained at, or improved to, the appropriate level."

The criteria to meet the standard include the following:

- Ground cover (vegetation, litter, and other types of ground cover such as rock fragments) is sufficient to protect sites from accelerated erosion.
- Evidence of wind and water erosion, such as rills and gullies, pedestalling, scour or sheet erosion, and deposition of dunes, is either absent or, if present, does not exceed what is natural for the site.
- Vegetation is vigorous, diverse in species composition and age class, and reflects the potential natural vegetation or desired plant community for the site.

Implicit in all of the proposed management actions is BLM's intention to implement management practices to meet this standard or make significant progress toward meeting this standard.

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As a result, the main effects will be the time it takes to reach land health goals (or how much effort is required to reach land health goals) rather than whether the action would prevent meeting these goals.

4.11.2 Incomplete or Unavailable Information

Adequate information is available to analyze the impacts to soil resources at the land use plan level.

4.11.3 Analysis

This analysis defined the levels of effects on soil resources management as follows:

Negligible: The effects on soil productivity or fertility would be at or below the level of detection.

Minor: The effects on soil productivity or fertility would be small, as would the area affected. If mitigation is needed to offset adverse effects, it would be relatively simple to implement and would likely be successful.

Moderate: The effect on soil productivity or fertility would be readily apparent and would change the soil character over a relatively wide area. Mitigating measures would probably be needed to offset adverse effects and would likely succeed.

Major: The effect on soil productivity or fertility would be readily apparent and long term and would substantially change the character of the soils over a large area. Extensive mitigating measures to offset adverse effects would be needed, and their success could not be guaranteed.

Short Term: The effect is expected to occur within 1 to 5 years of implementing the action.

Long Term: The effect that would occur after the first 5 years of implementation but within the life of the PRMP (projected to be 20 years).

4.11.4 Analysis of the Preferred Alternative

Major soil-disturbing activities that are expected to occur are:

- Grazing by livestock and wild horses,
- recreation and OHV use,
- wildland fire use and fuels treatments,
- road building and maintenance, and
- juniper treatment and timber harvest.

As a result of soil-disturbing activities in areas having soils with limitations, impacts include vegetation and soil loss, soil erosion and soil compaction, decreased infiltration, and increased runoff.

Fire use and fuels management would have short-term, adverse impacts to soil through prescribed burning or fuels reduction. Prescribed burning and fuels reduction would increase erosion, runoff, and compaction rates through vegetation loss, use of heavy machinery, and temporary hydrophobic soil conditions following fires.

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Other post-fire erosion and compaction (i.e., a short-term, direct, adverse impact) would result from fire such suppression activities as the digging of firelines and the bulldozing of roads.

Over the long term, however, these fire management activities would reintroduce the natural fire return interval, thereby decreasing or eliminating the occurrence of catastrophic rangeland fires and promoting more productive rangelands with less soil degradation. The Preferred Alternative would implement AMR for wildland fire management on 730,039 acres and WFU on 10,339 acres. These actions would reduce fuel loads and create a natural fire regime with reduced potential for catastrophic fires that could adversely affect soil resources. Fuels treatments would occur on up to 10,000 acres annually, resulting in the beneficial effects from those treatments. Standard 1 would be most readily achieved due to the large areas subject to AMR, prescribed fire, and fuels treatment.

Reducing catastrophic fires would limit the aggressive fire suppression needed for wildfire control, thereby reducing indirect impacts to soil and water resources. Moreover, the vegetation component that would become established over the short and long term would improve soil structure and decrease erosion, compaction, and runoff rates. Fire could benefit soil fertility by increasing nutrient cycling. High-intensity wildland fires in localized places could sterilize soil and reduce overall productivity, but the overall adverse effects would be minor.

Livestock grazing and wild horse use in areas with sensitive soil types could degrade these soils in both the short and long term through ongoing soil compaction, erosion, sedimentation, and degrading of stream channel condition (Fleischner 1994). Conversely, closing areas to grazing would result in long-term benefits to soil because erosion, sedimentation, and increased runoff from direct trampling would be avoided. Soil compaction or erosion or both would occur in areas where livestock concentrate (e.g., watering areas, salt licks, fencelines, and corrals) and vegetation has been reduced or removed. Other livestock developments could increase such impacts. But some of these developments might mitigate more widespread adverse effects to soil by concentrating livestock use in specific areas. Livestock use could effect or benefit soil fertility and production. The nature of the effects would depend on changes in nutrient cycling (e.g., reduced litter accumulation, incorporating manure), seedbed characteristics, abundance and type of soil biota or soil biological crusts, and soil moisture.

Livestock grazing management would be aimed at meeting soil and land health standards, to reduce potential adverse impacts to soil resources. Up to 80% of all grazing allotments and 90% of all grazed lands would receive periodic rest or deferment from grazing annually. Fencing would be constructed on up to 80 miles to facilitate livestock distribution. Up to 2,500 acres of new enclosures would be built to protect sensitive resources. Areas of critical environmental concern (89,397 acres) would be designated in which livestock grazing would be carefully monitored to protect unique and important resources. Overall, livestock use would result in short- and long-term minor to moderate adverse effects to soil resources.

Under the Preferred Alternative the ELFO would allow motorized use on approximately 1,700 miles of routes. Recreation uses that could degrade soils include the following:

- establishing corridors along existing roads and trails wide enough to allow for road maintenance,
- vehicle pullouts and camping, and
- developing new motorized or non-motorized routes.

These actions could degrade soil in the short term by increasing erosion, sedimentation, and runoff from the ground disturbance of road building and from the use of vehicles in these areas (Snyder and others 1976).

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Recreation uses that could benefit soil include closing existing roads in response to harmful ecological impacts and emergency vehicle closures where OHVs are determined to be disturbing or threatening to disturb soil. All of these actions would reduce soil disturbance in areas of existing or future soil degradation, benefiting soil and speeding recovery to PFC in those areas.

Management of the existing portions of Eagle Lake Basin, Bizz Johnson Trail, and South Dry Valley SRMAs would restrict OHV use and benefit soil. Managing WSAs to retain wilderness character would generally reduce erosion, soil compaction, and sedimentation, thereby benefiting soil.

Most of the field office area is designated as ROS 'Primitive' or 'Backcountry' to emphasize recreation opportunities in natural settings. OHV use is restricted, and the potential for soil impacts of cross-country use is very low. OHV closures would occur within approximately 21,000 acres. Such restrictions would substantially reduce soil disturbance from cross-country travel. The benefits to soil from this restriction would be muted somewhat by the exceptions for off-road travel (i.e., for woodcutting and game retrieval). Other travel actions would include the closure of 58 miles of routes, the construction of 15 new miles of motorized routes, and 264 miles of non-motorized routes. This alternative would involve the greatest amount of new trail construction, with the correspondingly highest potential for effects from construction and use of trails. The overall impact to soil would be minor to moderate adverse effects.

Forestry uses include hand and mechanical harvesting of timber and treatment of juniper, and managing forestlands using a mix of silvicultural practices. Ground disturbance from these activities, through the use of heavy wheeled or tracked vehicles, could disturb the soil in the short and long term, decreasing infiltration and increasing runoff, erosion, sedimentation, and soil compaction (Riekerk 1989). Impacts would be mitigated as timber operations and juniper treatments would be required to implement measures to protect soil.

Direct adverse effects to soil from road maintenance and use would include road edge disturbance, isolated erosion, and compaction. The effects on soil from soil displacement and dust production would be local, minor, and long term. Building and maintaining trails, as well as recreational use of these trails, would involve some soil loss, compaction, and erosion, resulting in site-specific negligible to minor long-term damage to soil resources.

Weed control employing herbicides or mechanical means would cause negligible to minor short-term disturbance to soil chemistry, structure, productivity, and abundance through herbicide applications, equipment disturbance and compaction, and wind erosion. The long-term benefits of weed control and a restored sagebrush steppe community would include stabilized soils and improved or restored natural fertility, productivity, and function. Such benefits would be long term and moderate.

All activities that could disturb soil would employ best management practices (BMPs) to further reduce the potential for adverse effects. Additionally, these activities would not result in a net loss of soil productivity because an equivalent improvement in soil productivity would be required elsewhere when an activity degrades soil productivity.

Cultural resource management attention would be focused on the development of 17 CRMAs and two new ACECs, which likely would include measures that would indirectly benefit soil resources—such as access restrictions and use of exclosures. In addition, the ACEC designation would limit OHV use to designated routes, which would greatly benefit soil resources where they are currently being affected by off-road travel.

Development of new transportation and utility ROW projects would be excluded from sensitive areas such as WSAs and avoided in ACECs; hence the soil in these sensitive areas would be subject to fewer

disturbances. Co-locating new facilities, minimizing corridor width, and maximizing use of existing communication sites would concentrate potential soil disturbances in existing affected areas, resulting in a benefit to soil resources by reducing the opportunities for soil disturbance in new locations.

Most portions of the field office area—except for WSAs, ACECs, and WSRs—would be ‘Open’ to mineral development; however, since the potential for large-scale development is generally low in the field office area, impacts on soil resources are not expected to be significant.

4.11.5 Summary of Effects of the Preferred Alternative

The Preferred Alternative would result in minor adverse impacts to soil, and moderate beneficial effects. Management actions for soil and water resources are most explicitly aimed at maintaining and improving progress toward PFC and would most benefit soil. Building exclosures and closing areas for protection of vegetation, wildlife and archeological concerns would offer extended benefits to soil as a byproduct. Special designations with use restrictions (i.e., ACECs and WSAs) would limit adverse effects to soil resources.

Minor adverse impacts would result from ground disturbing activities, such as increased public access, livestock and wild horse grazing, and potential minerals development. No net loss of soil productivity would be allowed; hence impacts are not expected to be significant.

Prescribed fire and vegetation treatments would adversely affect soils in the short term but would lead to improved long term ecosystem health. Moderate beneficial impacts would be realized as several enhanced protection measures are put into place.

Leasable minerals development would be ‘Closed’ within WSAs and the Eagle Lake ACEC. Actions associated with the designation of seven ACECs would reduce soil disturbance associated with ROW development, cross-country travel, and surface disturbance associated with mining.

OHV use within 99% of the field office area would be ‘Limited to Designated Routes’, limiting adverse impacts to soils from cross-country travel. Most of the field office area is designated as ROS ‘Primitive’ or ‘Backcountry’ to emphasize recreation opportunities in natural settings. Other travel actions include the closure of 59 miles of routes, the construction of 15 new miles of motorized routes, and 264 miles of non-motorized routes.

4.11.6 Cumulative Effects

In the area surrounding BLM holdings, agricultural practices include livestock grazing and some dryland farming. These land uses have, in some cases, led to the erosion of soil by disturbing native vegetation and leaving soil surfaces exposed. For analyzing cumulative impacts all lands in the ELFO area’s watersheds, as well as any upland conditions to which the project alternatives could contribute were considered.

Other activities outside the field office area that would also contribute to cumulative effects include:

- converting sagebrush and other habitats to agricultural or residential use,
- invasions of noxious weeds,
- juniper treatments,
- logging and road building,

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- water development, and
- wildfire.

Cumulative effects would also be expected outside the field office area where recreation, utilities, housing development, or road building actions take place and disturb soil surfaces.

Cumulative effects within BLM-administered lands would be expected mainly where upland soils on BLM-administered lands do not meet land health standards, and from soil disturbing construction projects, such as trail and road building. However, all resource uses with the potential to degrade soil would employ BMPs to reduce potential adverse effects. These actions, in combination with the large amounts of vegetation restoration treatments planned under the Preferred Alternative, would result in overall benefits to soil resources. These actions taken by BLM would help to balance out any small-scale adverse impacts occurring within the area of analysis. Overall, the regional cumulative effects resulting from actions both within BLM and from other land uses would be minor to moderate adverse impacts, and moderate beneficial impacts.

4.11.7 Mitigation Measures

All resource uses with the potential to degrade soil would employ best management practices (BMPs) to reduce potential adverse effects. Where adverse effects cannot be avoided and where they would not naturally recover, BLM would mitigate them by providing improvement equal in value to the area disturbed elsewhere within the spatial scale described in each alternative.

4.11.8 Unavoidable Adverse Impacts

Resource uses of most concern would be those involved with livestock grazing, wild horses and burros, new road construction, and OHV use, due to the potential for localized and widespread soil disturbance. Actions with similar but smaller adverse effects are related to forestry, issuing rights-of-way, and mineral extraction, because of the smaller areas that would be subject to disturbance from those actions. Fire and fuels management also have a great potential to disturb soil, but the benefits of natural recovery of soil after fire and fuels treatments would outweigh this adverse effect.

4.11.9 Short-Term Uses Versus Long-Term Productivity

Vegetation treatments would result in short-term disturbances to soil, but would generate enhanced long-term productivity.

4.11.10 Irreversible and Irretrievable Impacts

Effects to soil such as building permanent roads, campgrounds, facilities, and livestock water sources would result in the permanent conversion of the productive soil base from a growing medium to that of a construction material. However, this productive soil loss would be mitigated as described in 4.11.7.

4.12 Potential Effects on Special Designations – Areas of Critical Environmental Concern

This section describes impacts on areas of critical environmental concern (ACECs) from implementation of the Preferred Alternative.

4.12.1 Methodology and Assumptions

This analysis considers effects according to changes in ACEC numbers, size, location, and use restrictions. When assessing the effects resulting from other resource programs on ACECs, the following assumptions were made:

This PRMP will not provide detailed direction for every aspect of ACEC management. Specific guidelines for each ACEC will be completed after the Record of Decision is signed. Guidelines will generally be more restrictive than those that apply to the surrounding area.

One of the most important aspects of ACEC management is the protection of unique resources, with the growth of recreation uses a market study of northeastern California conducted in 2002 identified non-vehicular activities—such as day hiking—as very popular in the region; however vehicle-based activities such as auto-based site-seeing and recreational driving were also very popular. Use of OHVs is a well-established activity on the existing network of rough dirt roads, primarily for hunting access and backcountry sight-seeing (see the travel management section.) The key management challenge is to provide adequate public access and quality motorized and non-motorized recreational experiences while avoiding user conflicts and protecting resources and the environment.

All types of recreation are likely to increase over the 20-year planning period of this PRMP. Demand will continue to increase from individuals and groups as local and neighboring counties (particularly Lassen, Modoc, Plumas, and Shasta, in California, and Washoe County, Nevada) continue to grow. Projected annual growth is 0.4% for Lassen County and 1.43% for Washoe County. Requests for special event and commercial recreation permits will increase as more clubs, community groups, commercial, and educational organizations come to rely on BLM-administered lands for easy access on a daily basis.

ACECs require special management to protect relevant and important resources. Implementation plans will be specifically developed for each new ACEC. Priority will focus on those that are most degraded and those that are closest to population centers.

4.12.2 Analysis

For the purpose of this analysis, effects on ACECs are considered “adverse” if they would introduce or perpetuate any impairment of resources or values that the ACEC is designed to protect. Conversely, effects are considered “beneficial” if they would introduce changes that support or strengthen public land resources and ACEC values.

Negligible: Changes in ACEC resources and values would occur at a level so low they would have no perceptible influence on relevant and important resources.

Minor: Changes in ACEC resources and values would be measurable and perceptible, but highly localized.

Moderate: Effects on ACEC resources and values would be appreciable and easily perceptible, but somewhat localized.

Major: Effects on ACEC resources and values would be substantial, obvious, and widespread.

4.12.3 Incomplete or Unavailable Information

Adequate information is available to assess effects on ACEC resources and values at the resource management plan level.

4.12.4 Impacts Common to All ACECs

The following impacts apply to all ACECs. Management actions such as inventory, evaluation, and categorization of sites are not expected to affect ACEC resources, values, or recreational activities. Restrictions associated with ACEC management—such as area or road closures—would be site-specific and imposed only when required to preserve or enhance ACEC values and resources. These are expected to have uniformly beneficial effects on ACEC values and resources.

Fuel reduction and fire management activities are not expected to have adverse effects on ACECs beyond temporary and localized disruptions to public access from road closures during prescribed fire or other vegetation treatments. There will be no further discussion of fuel and fire management in this section, except where the size of treated areas are substantial, or where prescribed fire and other fuel treatments are expressly used to enhance ACEC resources and values.

Soil management includes various soil conservation, erosion control, and road maintenance practices. This may include closing and rehabilitating roads where sensitive resources are threatened. It also involves minimizing new road construction and may require some road realignment. These activities will, in certain locations or at certain times, disrupt route network connectivity, reduce recreational access and opportunities, and prevent the development of new routes—including some that would have reestablished previously-existing route connectivity. Road closures or relocations to enhance the quality of stream or lake water could also impair route network connectivity and would reduce OHV recreation within ACECs if new routes are not built to replace those that are ‘Closed’.

However, road closures are often beneficial for hunting, fishing, hiking, and wildlife-viewing by reducing human-related disturbances, providing a more natural setting, and enhancing natural resources.

Benefits will accrue to ACECs from measures designed to protect and restore riparian areas, wetlands, forests, and vegetation communities. Restoration of unhealthy vegetation and other conservation measures will enhance habitats and wildlife populations. Such treatments will generally improve natural and visual characteristics and will have minor to major long-term benefits for ACEC values and resources.

Weed control treatments are also expected to have minor short and long-term beneficial effects by restoring the native landscape and its natural diversity, and benefiting wildlife. Management actions for special status species could have moderate beneficial effects for ACECs by restricting or closing them to practices or activities that are harmful to these species.

Management interventions that protect the visual integrity of WSAs, scenic trail corridors, historic trails, proposed WSR segments, and SRMAs will have significant effects on ACEC values and activities.

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In conformity to BLM national policy, ACECs are designated VRM Class II; however, if created within a WSA, they are managed as Class I because of the Wilderness IMP. An undeveloped, natural-appearing landscape is a very important component of the visual appeal of these areas for hiking, hunting, wildlife-viewing, camping, trail-riding, and other recreational pursuits. For the most part, effects are indirect, but would have minor to major long-term benefits for ACECs by preserving their natural setting, thereby protecting associated values and resources.

Mineral and energy development – especially extraction of locatable or salable minerals or oil and gas exploration and development – could have minor to major adverse impacts on ACEC values and resources. However, it is highly likely that impacts will be minor because of the low potential for these kinds of development. Also, some proposed ACECs are within WSAs and are therefore ‘Closed’ to salable (decorative rock and cinders) and leasable (oil and gas) mineral exploration and development. Although locatable (hard rock) minerals are limited to relatively small sites, impacts on ACEC values and resources could be substantial, depending on the location of claims.

Impacts on ACECs from forest management practices are expected to have some negligible adverse effects from timber harvesting. However, timber cutting within ACECs would be designed for the *sole* benefit of ACEC resources and values; therefore, adverse effects would be short term. Long-term ACEC benefits would justify timber harvest since enlightened forest management will ultimately improve forest health and support ACEC values. Timber harvest activities that focus on forest health and aesthetics would also be sensitive to site-specific issues associated with old-growth or large trees. Such considerations could temporarily disrupt vehicular access or public use of the ACEC.

Livestock grazing occurs within most proposed ACECs. This use is expected to continue with minor to moderate, long-term adverse effects on ACECs. By way of mitigation, mandatory rest from grazing and exclusion of livestock to improve conditions around springs, and along stream banks and lake shores, would have minor to moderate beneficial effects by improving natural appearance, benefiting native plants, improving wildlife habitat, protecting cultural values, and minimizing visitor/livestock interaction.

Management actions identified for land acquisitions under this PRMP would have direct benefits for ACECs. Effects could be negligible to major, depending on the size and location of acquisitions. Land acquisitions would support ACEC values and resources.

Development of new roads and trails in ROS-designated, ‘Semi-primitive Non-motorized’ areas would be limited to resource protection (primarily road or trail realignment) or would support new recreation opportunities by creating trails with non-motorized designations. Road or trail realignment, and judicious new road development, would be designed to protect resources and maintain natural settings by shunting motor vehicle traffic to routes that traverse less vulnerable areas. Overall, this management would have negligible impacts to ACECs.

Managing ACECs to provide opportunities for self-contained camping would tend to concentrate use and increase the potential for litter, resource damage, and wildfires caused by irresponsible campers. Campers on BLM lands currently enjoy freedom and flexibility in their choice of areas and settings and are not limited to developed facilities. Managing public lands as ‘Open’ to self-contained camping would have negligible beneficial effects, primarily by dispersing use.

Development of interpretive materials, displays, and presentations would enhance local resident and visitor understanding of natural history, cultural and historic values, and ACEC purposes. This would have minor benefits for ACECs by expanding public understanding and enjoyment of BLM-administered lands, resources, and values protected under this program.

Such efforts may lead to increased rural tourism and contribute to diversification of the local economy; since ACECs provide an attractive destination and educational efforts would increase awareness and appreciation.

Management decisions and actions protecting WSAs and, therefore, affecting the ACECs proposed within them, would – assuming eventual designation of the WSA – have negligible benefits for ACEC resources and values and no adverse effects. WSA management basically focuses on preventing unauthorized and unsuitable encroachment that could degrade the natural character of the environment. In either case, recreation would be primitive and non-mechanized and an unaltered natural environment would be maintained. However, should any or all of the WSAs containing (proposed) ACECs be denied wilderness status and released from further study, existence of the ACEC would ensure continued protection of ACEC values and resources within the bounds of the ACEC. Under this scenario, major long-term positive benefits would result.

4.12.5 Analysis of the Preferred Alternative

4.12.5.1 Pine Dunes Research Natural Area/ACEC

The site is a unique, isolated ponderosa pine grove established in a sand dune complex populated by sagebrush-steppe species from the surrounding area. The closest pine stand is 20 miles north. The Preferred Alternative would result in negligible adverse impacts, and moderate benefits to the existing Pine Dunes Research Natural Area.

BLM would seek to acquire (from willing sellers) an additional 2,127 acres of adjoining sand dune habitat (including the area containing the other 24 pines.) This acquisition would add further protection for sand dune habitats on the eastern side of the Madeline Planes. The entire area (2,287 acres) would then become the Pine Dunes Complex RNA/ACEC.

Beneficial effects from a greatly enlarged RNA/ACEC would include protecting the majority of the soil/vegetation associations that form this unique dune habitat—not just the area where additional ponderosa pines are located. The enlarged RNA/ACEC would be managed under VRM Class II criteria. This means that the existing character of the landscape must be retained. Visual changes may be seen, but should not attract the attention of the casual observer.

There would be no adverse impacts from livestock or wild horse grazing, timber harvesting or woodcutting as these uses would remain ‘Closed’. The area would also remain withdrawn from locatable mineral development and ‘Closed’ to saleable mineral development.

4.12.5.2 Eagle Lake Basin ACEC

The area has high cultural resource value derived from a concentration of prehistoric Native American sites, an historic wagon road, and the remnants of three historic water-exportation attempts. It also has great scenic and recreational value (primarily fishing, camping, water sports, and historic trail appreciation). Lastly, the lake contains a unique fishery and the area contains important wildlife habitats. The size of the ACEC would be 34,320 acres. The (endemic) Eagle Lake rainbow trout fishery and the lakeshore’s substantial marshy areas (supporting large numbers of waterfowl, western grebes, ospreys, and bald eagles) especially enhance visitor enjoyment of the area and provide readily accessible viewing opportunities from the shore and from the water.

The Preferred Alternative would result in negligible adverse and moderate beneficial impacts to the Eagle Lake Basin. ACEC designation would include prioritization for the acquisition of private in-holdings and

adjacent lands. Additional funding would be sought to prevent development of shoreline areas, provide public access for fishing and wildlife-viewing, protect cultural resources and wildlife habitat, and develop literature and interpretive sites for visitors. OHVs would be ‘Limited to Designated Routes’ throughout the area and undeveloped shorelines will be ‘Closed’ to motor vehicles, thereby limiting impacts to well-established routes.

With ACEC designation, the entire Eagle Lake Basin would be ‘Closed’ to leasable mineral development in order to permanently protect its outstanding scenic qualities, fish and wildlife resources, and prehistoric and historic cultural resources. A prohibition on sub-surface drilling (for leasable minerals) would help protect the quality and quantity of groundwater crucial to preserving the basins closed hydrology.

Trail construction would be increased to 31 miles of new trails. Non-motorized designations would apply, in order to increase their value for appreciation of scenic beauty, wildlife-viewing opportunities, and interpretation of nearby historic sites. The Merrillville-Bieber Wagon Road segment (along the Eagle Lake shoreline) would be cleared of brush and rock-fall, thereby opening the trail adjacent to Eagle Lake (where wildlife-viewing opportunities are good and historic trail interpretation would take place).

There would also be increased emphasis on juniper removal, especially as a biomass fuel. However, scenic quality would still be protected under VRM Class II criteria (except for trailheads or facilities, which would be Class III). This means that visual design principles would be employed to create natural-appearing openings and irregular edges. A few (juniper) trees would be left scattered throughout the thinned areas.

Fuel reduction, timber harvesting, and woodcutting would continue—providing such actions were conducted in a manner that would protect or enhance (identified) relevant and important ACEC criteria. Management actions would incorporate stipulations to ensure such protection. Of special concern is the quality and quantity of groundwater, crucial to preserving the basins closed hydrology and Eagle Lake trout fishery.

ACEC designation would not significantly alter grazing practices because changes made within the last 20 years have eliminated grazing from most (publicly owned) shoreline areas, significantly improving these habitats. Other additional actions are improving the condition of riparian and upland areas in conformity to the land health standards that now form the basis of BLM grazing management.

4.12.5.3 North Dry Valley ACEC

There are numerous and varied sites associated with prehistoric lakeshore hunting and habitation areas, as well as quarry sites and caves that are unique to the region. There are also historic gravesites and homestead remnants. A special riparian area exists at Laird Spring that is important to wildlife and significant as an archaeological site. There are unique soils associated with the winterfat shrub. Finally, there are expansive vistas across the Smoke Creek Desert and numerous steep escarpments, which are doubly important as raptor nesting sites.

The Preferred Alternative would designate 10,156 acres as the North Dry Valley ACEC. The Preferred Alternative would result in negligible adverse and moderate beneficial impacts to the Eagle Lake Basin. ACEC designation would focus management emphasis on protecting the relevant and important ACEC criteria. BLM would then develop a management plan to achieve this end. Livestock grazing would continue, but will be managed to achieve land health standards.

Livestock grazing could be permitted annually—subject to the availability of natural forage and water. Due to the arid nature of the Dry Valley, there is little naturally occurring water and forage; therefore, grazing is often limited to short seasons of use. Compliance with land health standards would be mandatory. This could preclude grazing in dry years.

Use by wild horses and burros would also continue, and management would achieve AMLs by 2008. OHVs would be ‘Limited to Designated Routes’, thereby limiting impacts to well-traveled routes. The area would remain ‘Open’ to mineral development; however, future mineral activity is unlikely due to the volcanic basalt geology that dominates much of the area. If mineral development is proposed, BLM would impose stipulations to protect or mitigate impacts on natural and cultural resources.

4.12.5.4 Buffalo Creek Canyons ACEC

The ACEC would preserve unique volcanic landforms of the high-desert (4,300 to 5,600 feet). The setting is of special scenic interest because of the large number of side canyons that drain into the North Fork of Buffalo Creek (1,000 feet deep in its lower reaches). The area contains a historic wagon road (the Buffalo Hills Toll Road) that passes through a primitive landscape largely unchanged since the 1800s when the route was in use. The area provides excellent opportunities for scenic and historic sight-seeing in a rugged and primitive landscape. Spring and riparian areas are found in the bottoms of many side canyons and within the main drainage of the North Fork. It is a popular area for upland bird hunting and primitive camping.

Designation of the Buffalo Creek Canyons ACEC (36,515 acres) is recommended under the Preferred Alternative, in order to protect the imposing, scenic character of this canyon complex and retain the natural setting of the historic Buffalo Hills Toll Road. ACEC designation would focus management efforts toward retaining the areas undeveloped character, which is largely unchanged since the toll road’s construction in the 1870s. It would also aid in promoting the recreational use of the area (primarily hunting and historical sight-seeing).

Designation would lend justification and vital support for BLM efforts to acquire (from willing sellers) and manage numerous springs and riparian areas currently under private ownership and surrounded by publicly owned uplands. The ability to manage these critical water sources would empower BLM efforts to achieve land health standards through an improved ability to control grazing by wild horses and burros, as well as by domestic stock.

The Preferred Alternative would result in negligible adverse and moderate beneficial impacts to the Buffalo Creek Canyons area. Lands within the Buffalo Hills and Poodle Mountain WSAs would receive ROS ‘Primitive’ classification, upon ACEC designation. This would provide long-term protection and preservation of the area’s ‘Primitive’ and undeveloped scenic character—with or without wilderness designation. Management under VRM Class II (retention of existing landscape character) will also help in this regard.

OHVs would be ‘Limited to Designated Routes’, thereby restricting impacts to well-established travel routes. Existing routes are all “designated”—so this limitation would not impose restrictions on established public access routes for hunters, campers, and site-seers, while protecting the surrounding roadless areas from development of new routes.

Livestock grazing could continue on a yearly basis—subject to compliance with the standards and guidelines for land health. There is also significant adverse impact from wild horses and burros. Current management aims to achieve AMLs by 2008. Herd reduction is necessary to protect native vegetation and achieve numbers that can be sustained by available forage.

Timber harvesting and woodcutting are not an issue, since the ACEC contains no commercial stands and western juniper occurs as scattered trees, mostly outside (proposed) ACEC boundaries.

Mineral development is currently limited by the WSA status of the area. Locatable mining claims can be filed under the Wilderness IMP, but no surface-disturbing activities can take place. Saleable mineral extraction (decorative rock, sand, and gravel) and leasable mineral development are not permitted. If wilderness designation is denied, provision would be made to preserve the area's primitive and undeveloped scenic character through imposition of restrictive stipulations on locatable (hard rock and placer) and saleable mineral activities. The ACEC would also be 'Open' to mineral leasing without wilderness designation; however, protection would be afforded by NSO stipulations.

Without wilderness designation, there is a possibility of water-related development within the ACEC-- such as groundwater pumping or a dam on Buffalo Creek. Any such proposal would be evaluated according to its effects on the relevant and important criteria for which the ACEC was established, and a decision made on this basis.

4.12.5.5 Aspen Groves

The Preferred Alternative would result in negligible adverse and moderate beneficial impacts to quaking aspen, California black oak, and silver buffaloberry stands. No ACEC designation would be applied. However, the Preferred Alternative proposes several management actions to protect these unique vegetation resources without the ACEC designation. These include:

- Continue monitoring and treatment of aspen stands in cooperation with David Burton, University of California, Davis.
- Develop an implementation plan for management and monitoring of California Black Oak.
- Manage these unique stands in accordance with the following stipulations:
 - Maintain healthy aspen and California black oak stands using science-based ecosystem maintenance activities including periodic disturbances to maintain vigor in understory grasses and forbs & retain or replace tree overstory as appropriate. Use functional/structural groups including biological soil crusts as indicators.
 - Restore 'Healthy/Lacking Key Attributes', 'At Risk', and 'Unhealthy' aspen and California black oak stands through the active use of prescribed fire, appropriate wildland fire response, use of herbicides, and conifer removal, as appropriate. Sufficient rest from grazing, and recreation use would be applied to allow newly restored stands to grow to a height that will be out of the reach of domestic livestock and wild horses and burros.

In addition a strong emphasis on improving land health within these communities would be emphasized. Wildlife actions would aim to create multi-age stands of quaking aspen, and oak woodland habitats on up to 3,150 acres.

4.12.5.6 Susan River ACEC

The Susan River is the largest and longest free-flowing stream east of the Sierra between the Truckee River and the Oregon border. It has high scenic value because of its free-flowing condition and the Susan River Canyon. There is a historic railroad grade with 11 (railroad) bridges and two tunnels. It possesses an outstanding diversity of aquatic, riparian, and upland habitats resulting from its location at the juncture of three geographical provinces (the Sierra Nevada, Cascade Mountains, and Great Basin).

An ACEC (2,495 acres) would be designated on eight miles of the Susan River under the Preferred Alternative. ACEC designation directs management efforts toward protecting the free-flowing character of the entire eight-mile segment, along with other relevant and important ACEC criteria. The Preferred Alternative would result in negligible adverse and moderate beneficial impacts to the Susan River area. Public lands adjacent to the Susan River are unavailable to livestock grazing; therefore, there will be no grazing impacts in these areas.

Lands adjacent to the Susan River would be managed in compliance with BLM's standards and guidelines for land health and according to PFC for riparian areas. The scenic quality of the eligible area would be managed primarily under VRM Class II to protect scenic resources (except for trailheads or facilities, which would be Class III).

The ACEC would be a ROW avoidance area. ROWs would not be issued within the Susan River Canyon—except to benefit the Bizz Johnson Trail. However, 'grandfathered' ROWs acquired with canyon lands would continue to be used.

Timber harvesting within the eligible area would be limited to actions which improve forest health and reduce the potential for catastrophic wildfire.

Full suppression would be used to fight wildfires because of proximity to Susanville and homes on the north rim of the Susan River Canyon.

With ACEC designation, the area would be withdrawn from mineral entry to prevent damage to the relevant and important ACEC values of the Susan River and adjacent canyonlands. However, it would remain 'Open' for recreational mining (hand panning) and for mineral leasing, with NSO stipulations to prevent surface disturbance (diagonal drilling would be permitted beyond the canyon rim). Although there have been mineral claims (never developed and allowed to expire) on nearby private lands, the area has low mineral potential and mineral development is not expected.

4.12.5.7 Willow Creek ACEC

The Willow Creek ACEC has exceptional scenic quality (VRM Class II or Class I while it remains a WSA or if it receives wilderness designation) and abundant cultural resources (NRHP and Native American sites).

An ACEC (2,130 acres) would be designated on 4.75 miles of Willow Creek under the Preferred Alternative (this coincides with the segment flowing through the Tunnison WSA). ACEC designation directs management efforts (reinforcing a decision made in this PRMP) toward protecting the free-flowing character of the entire 4.75-mile segment, along with other relevant and important ACEC criteria. However, if the Tunnison WSA is denied wilderness status, the ACEC designation could be revised if Lassen County (or another entity) proposes a *scientifically viable* reservoir project and can obtain the necessary permits and funding—and sufficient political support. Under these conditions, BLM planning regulations allow amendments to land-use plans.

With ACEC designation, the area would be withdrawn from mineral entry to prevent damage to the relevant and important ACEC values of Willow Creek and adjacent canyonlands. However, it would remain 'Open' for recreational mining (hand panning) and for mineral leasing, with NSO stipulations to prevent surface disturbance (diagonal drilling would be permitted beyond the canyon rim). Impacts from mineral activities are expected to be negligible.

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Impacts from livestock and wild horses would be negligible to minor. Livestock will continue to be excluded from riparian areas through a combination of fencing tied into natural rimrock barriers. However, livestock will continue to have access to water by means of water-gap fencing in appropriate locations. These locations will be carefully monitored to ensure compliance with BLM land health standards.

Timber harvesting and wood cutting would not be permitted, except under conditions that would preserve wilderness values, improve the natural setting, and conform to the requirements of the Wilderness IMP. If the area is ultimately denied wilderness designation, timber harvesting and woodcutting would be allowed. However, compliance with BLM land health standards would still be required.

Full suppression would be mandatory for wildfires due to the proximity of homes in the Honey Lake Valley; therefore, a natural fire régime could not be reestablished and fuels must be reduced by other means.

Scenic qualities would be maintained under VRM Class I criteria (preserving the primitive, undeveloped character of the landscape) for BLM management activities and permitted uses (while the area is a WSA or receives wilderness designation). If the area is denied wilderness status, it will be managed under VRM Class II criteria (preserving the natural appearance of the landscape).

BLM would acquire public access to Willow Creek when land or easements can be purchased from willing sellers.

4.12.5.8 Lower Smoke Creek ACEC

The Lower Smoke Creek ACEC has exceptional scenic quality (VRM Class II or Class I while it remains a WSA or if it receives wilderness designation), contains a portion of the Nobles Emigrant (National Historic) Trail. The area also has an important (and recovering) riparian area containing a diversity of aquatic and riparian wildlife—notably the Lahontan assemblage of native fish (that require special management consideration).

An ACEC would be designated on 3.2 miles of Lower Smoke Creek under the Preferred Alternative (this segment is mostly contained within the Dry Valley Rim WSA). The Preferred Alternative would result in negligible adverse and moderate beneficial impacts to the Lower Smoke Creek area. ACEC designation directs management efforts toward protecting the free-flowing character of the creek, along with other relevant and important ACEC criteria.

With ACEC designation, the area would be withdrawn from mineral entry to prevent adverse impacts on Lower Smoke Creek, and adjacent canyonlands, from the physical and visual effects of mining. While the Dry Valley Rim WSA exists (the WSA includes most of the segment eligible for ACEC designation), there would be no mineral leasing. However, if the WSA is denied wilderness status, the area would become available for mineral activities, with NSO stipulations to prevent surface disturbance; thus protecting the scenic quality, cultural resources, and riparian areas of Lower Smoke Creek Canyon (diagonal drilling would be permitted from outside the ACEC). Recreational mining would be limited to hand panning.

Impacts from livestock grazing and wild horses would be negligible to minor. Livestock are kept out of the creek in most areas by fencing. When livestock are permitted alongside the creek, guidelines for land health will be rigidly enforced, in order to ensure the continued recovery of riparian areas. Wild horses do not significantly affect Lower Smoke Creek because they are excluded by fencing and natural barriers.

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OHVs would be ‘Limited to Designated Routes’ (primarily short pull-offs from the Smoke Creek Road used for parking or camping. This would limit adverse impacts to areas of established use, and prevent proliferation of new routes.

Moderate benefits would result from continued improvement of the riparian area along Lower Smoke Creek. BLM has secured a Nevada water right (1998) for wildlife and recreation on Lower Smoke Creek. As a result, the riparian area will continue to improve from a minimum flow of 5 cubic feet per second (cfs) (previously not sustainable because of upstream water diversions).

Impacts from timber harvesting and woodcutting would be negligible due to a scarcity of trees in the area (just a few cottonwoods grow along the creek).

Minor to moderate benefits would result from proposed acquisition (from willing sellers) of additional segments of Lower Smoke Creek. These actions would aid riparian recovery, provide additional public access, and protect sites associated with the Nobles Emigrant Trail.

Scenic qualities would be maintained under VRM Class I criteria (preserving the primitive, undeveloped character of the landscape) within the Dry Valley Rim WSA. VRM Class II criteria (preserving the natural appearance of the landscape) would be designated for the area north of the Smoke Creek Road and adjacent to Smoke Creek. If the Dry Valley Rim WSA is denied wilderness status, the entire area would be managed under VRM Class II criteria for BLM management activities and permitted uses.

4.12.6 Cumulative Effects

Growth and development of local communities, as well as larger nearby population centers, such as Reno, Nevada and Redding, California, will increase demand for recreational activities on BLM lands—potentially leading to overcrowding and use conflicts. Recreational experiences, in ACECs and elsewhere, can be preserved or enhanced if addressed during land use planning. When viewed in terms of foreseeable activities and interventions on surrounding lands, adverse cumulative effects on ACEC resources and recreation under the Preferred Alternative are not expected to be significant.

As land-use intensifies and recreational demands increase, the value of maintaining natural settings and preserving natural resources will be correspondingly greater.

Most adverse impacts related to activities connected with BLM resource programs would be temporary and limited to the localities where the activities occur. Designation of ACECs, and the protection they afford, will have moderate value in accommodating increasing recreational demand while simultaneously preserving natural settings and ACEC values vital to maintaining quality recreational experiences and protecting sensitive resources. OHV limitations, and restrictions to ROWs and mineral and energy development under the Preferred Alternative would have moderate value in protecting natural settings and values that the ACECs are designed to preserve.

4.12.7 Mitigation Measures

There would be no major adverse effects on ACEC resources under the Preferred Alternative; therefore, exceptional mitigation measures would not be required.

4.12.8 Unavoidable Adverse Impacts

Unavoidable adverse impacts are not anticipated from the proposed management actions.

4.12.9 Short-Term Uses Versus Long-Term Productivity

Short-term uses include fencing to temporarily exclude livestock or protect archaeological resources and some road closures for fire or fuel management interventions or forestry practices. These would have negligible adverse effects on ACEC resources and activities. Actions such as these will have significant, long-term benefits for soils, water, vegetation (including special status plants), wildlife, and culture resources and will enhance recreational activities such as hunting, fishing, wildlife-viewing, and rural tourism generally.

4.12.10 Irreversible and Irretrievable Actions

There are no irreversible or irretrievable actions.

4.13 Potential Effects on Special Designations – Historic Trails

The ELFO has one designated historic trail within its administrative jurisdiction, the Nobles Emigrant Trail. Nine other historic linear features, such as railroad grades and wagon, military, and toll roads have not been evaluated for designation. This section describes the direct, indirect, and cumulative effects on the Nobles Emigrant Trail, specifically, and the other historic trails, as a whole, of the Preferred Alternative.

4.13.1 Methodology and Assumptions

The physical and visual features of a trail are the resources that characterize it. Presence and condition determine whether a trail can or should be designated as a national historic trail. Sufficient physical and visual characteristics were present to justify designating the Nobles Emigrant Trail. The characteristics of the other historic trails have not been inventoried.

In determining potential effects to the historic trails, we must consider the present condition of the trails. The physical features of the trails have been eroded through the cumulative effects of years of

- no use, hence the physical features have disappeared,
- livestock grazing, and
- motor vehicle use that has either turned the historic trail into a road or obliterated its linear features.

In most cases subsurface features remain, many undiscovered. Occasional water developments, fencelines, or modern ranch houses are the few human features that were not present, at least not in their present form, when the original trails were used. We don't know how the existing vegetation differs from that present during original trail use, but in most locations the plant communities are the same as in the past.

Although the general locations of the historic trails, including the Nobles Emigrant Trail, have been mapped, the specific locations have not been inventoried and mapped. Some linear features, such as wagon ruts, have been documented. Along these and other sections where only the general location is known, the current landscapes are similar to the undeveloped land viewed by the original trail users.

For railroad lines, alterations that resulted from building and using a railroad are considered part of the physical features of the historic railroad grade.

4.13.2 Incomplete or Unavailable Information

Although the general locations of the original trails have been mapped, the exact locations of certain segments of the Nobles Emigrant Trail and other historic trails have not been specifically inventoried or mapped. For example, for the historic trails that lie next to the WSAs, the trail would receive a higher level of protection if the actual alignment is found to be within the WSA. Conversely, if the trail alignment is found to lie outside a WSA, the other land use decisions would potentially have a higher level of effect on the trail. This analysis was based on the best estimate of trail locations.

4.13.3 Analysis

The present condition of the historic trails, as described above, is the baseline for analyzing effects to them and the landscapes integral to them. Considering this baseline, we made the following assumptions:

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- The analysis considered effects on the Noble's Emigrant Trail and other historic trails **adverse** if they would harm or eliminate the physical or visual characteristics that led to or would support designation as a national historic trail.
- The analysis considered effects on the Noble's Emigrant Trail, and other historic trails, **beneficial** if they added to or improved the physical or visual characteristics that led to or would support designation as a national historic trail.

The levels of effects used in this analysis are defined as follows.

Negligible: The physical or visual characteristics of the area that supported, or would support, national historic trail designation would change, but the change would be too small to be of any measurable or perceptible consequence.

Minor: The area's physical or visual characteristics that supported, or would support, national historic trail designation would change, but the change would be small and, if measurable, would be highly localized.

Moderate: The physical or visual characteristics of the area that supported, or would support, national historic trail designation would change. The change would be measurable but would remain localized.

Major: The physical or visual characteristics of the area that supported, or would support, national historic trail designation would change, and the change would be perceptible, measurable, and widespread.

4.13.4 Analysis of the Preferred Alternative

Proposed management actions that could adversely affect historic trails include the following:

- Vegetation manipulations, including seeding, mechanical and biological treatments and prescribed burning;
- Construction and maintenance of water developments, fences, and erosion control structures;
- Maintenance and modification of travel routes;
- Issuance of special use permits; and
- Issuance of utility corridor ROW, leases, or other land use rights or authorizations.

The specific geographical locations and scope of these actions would be determined in the future. Implementation-level planning and interdisciplinary NEPA analysis would be conducted to determine potential effects to historic trails and the significance of these effects.

Wildland fires on or within the viewshed of historic trails would affect not only the physical features of the trail but also the visual resources surrounding the trail. Only a small section of the Modoc Line falls within the area proposed for wildland fire use. The rest of the historic trails fall within either the full suppression or AMR areas.

Known cultural and historic resources are protected from the disturbance of suppression, regardless of fire response category the trails lie within. Therefore, although the adverse effects from a wildland fire itself might be moderate to major, the adverse effects from suppression would be adverse but negligible.

The combination of proposed management actions to protect historic trails and the minor effects of the proposed actions to manage vegetation, fuels, rangelands, and travel along the historic trails, overall would result in negligible adverse effects and moderate benefits.

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Historic trails within or next to WSAs would receive minor to moderate benefits from the protection that the WSA management affords their physical and visual resources. BLM's ELFO would manage WSAs to meet VRM Class I objectives, as required by BLM policy. Such management would have minor benefits to the visual resources of portions of the Nobles Emigrant Trail, the Buffalo Hills Toll Road, the Military Patrol Road, and the Merrillville-Bieber Wagon Road by ensuring that any change to the characteristic landscape of WSAs from management would be very low and would not attract attention. If Congress releases the WSAs from interim management status, the underlying VRM classes would guide management of the visual resources in these areas.

The Bizz Johnson SRMA, 2,756 acres, would be 'Closed' to OHVs to protect natural, cultural, and historical resources. This closure would benefit portions of the Fernley-Lassen Branch Line, Bizz Johnson segment, because the trail's physical features would be protected from indiscriminate OHV use.

The Nobles Emigrant Trail would be inventoried, and management and interpretive plans would be developed. A moderate benefit would result from the following:

- mapping of the specific location of the trail,
- developing a comprehensive management strategy for the trail, and
- educating the public on this historic linear feature.

The following historic trails would be inventoried and mapped:

- Merrillville-Bieber Wagon Road, Willow Creek segment;
- Merrillville-Bieber Wagon Road, Eagle Lake segment;
- Fort Churchill to Fort Bidwell Military Road and Stage Route;
- Buffalo Hills Toll Road;
- Military Patrol Road;
- Fernley-Lassen Branch Line; and
- Modoc Line.

BLM would recommend eligible trails for designation as national historic trails and develop management plans. All the trails would be interpreted. Moderate benefits would result from mapping the specific location of the trails, developing a comprehensive management strategy for the trails, and educating the public on these historic linear features.

BLM would grant wind energy authorizations on a case-by-case basis, outside of WSAs and ACECs (avoidance areas) and other areas with important resources. The placement of a wind energy complex within the viewshed of a historic trail would have minor to moderate adverse effects on the trail's visual resources.

The Preferred Alternative proposes the following actions for CRMAs. Increased management attention would slightly (minor) benefit these trails.

- The Laird Spring CRMA would remain at 240 acres.
- The size of the Eagle Lake Basin CRMA would increase by 3,265 acres.
- CRMAs would be developed at the following sites:

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- Smoke Creek Desert Shoreline (2000 acres), which contains portions of the Military Patrol Road;
- Little Mud Flat, which contains portions of the Nobles Emigrant Trail; and
- Pete's Creek, which contains portions of the Modoc Line.

Hazardous fuels reduction treatments and western juniper control are proposed on up to 10,000 acres per year. The specific locations and methods depend on many factors that cannot be determined at the PRMP level. Treatments proposed in the following areas would affect, at the least, the visual resources of the following historic trails:

- Eagle Lake Basin: Merrillville-Bieber Wagon road, Eagle Lake segment;
- Tunnison Mountain: Merrillville-Bieber Wagon Road, Willow Creek segment;
- Bizz Johnson SRMA: Fernley-Lassen Branch Line, Bizz Johnson segment;
- The Spanish Flat and North Horse Mountain areas: Modoc Line;
- Dodge Reservoir area: Military Patrol Road;
- Upper Smoke Creek area: Military Patrol Road; and
- Skedaddle Mountain: Nobles Emigrant Trail.

Adverse effects to the physical features of these trails or trail segments would be eliminated through implementation planning. As the landscape recovers, visual resources would slightly (minor) benefit as the vegetation moves toward a more natural ecological condition. The NEPA process would determine the effects to historic trails from the fuels treatments, if these adverse effects are significant, and whether the long-term benefits to other resources justify the short-term visual adverse effects to historic trails.

All or portions of the following trails fall within VRM Class II areas, which cover 50% of the field office area:

- Nobles Emigrant Trail,
- Merrillville-Bieber Wagon Road (Eagle Lake segment),
- Fernley-Lassen Branch Line (Bizz Johnson segment),
- Military Patrol Road, and
- Buffalo Hills Toll Road.

The other historic trails lie within areas managed under VRM Class III (43%) and VRM Class IV (7%).

The Preferred Alternative would apply VRM Class II to the Nobles Emigrant National Historic Trail corridor. This management action would moderately benefit the Nobles Emigrant Trail. VRM Class II objectives would apply from where the trail enters the ELFO area along the Smoke Creek Desert northeast of Smoke Creek Canyon and extending 38 miles westward to a point 1 mile east of the junction of the Nobles Trail and Alturas Powerline northeast of the Viewland Historic Trail Marker on U.S. Highway 395. Along the Nobles Trail segment described above, BLM would manage 'seen' areas along both sides of the trail as VRM Class II areas as follows:

- up to 3 miles wide on either side of the trail in flat areas and

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- up to 5 miles wide on either side of the trail in areas where slopes extend gradually up and away from the trail or to the limits of visibility if those limits are less than 5 miles from the trail.

Under the Preferred Alternative 391,339 acres would be ‘Open’ to leasable minerals extraction under standard terms and conditions. A total of 79,678 acres would be ‘Open’ with permanent no surface occupancy restrictions. A total of 414,679 acres would be ‘Closed’, including the WSAs and the Eagle Lake Basin. These restrictions protect all or portions of the following trails:

- Nobles Emigrant Trail,
- Fernley-Lassen Branch Line,
- Military Patrol Road,
- Fort Churchill to Fort Bidwell Military/Stage Road, and
- Buffalo Hills Toll Road.

A total of 1,014,361 acres would be ‘Open’ to locatable minerals extraction; and 8,406 acres would be recommended for withdrawal. Areas withdrawn would protect portions of the Nobles Emigrant Trail, the Military Patrol Road, and the Fernley-Lassen Branch Line.

The Preferred Alternative proposes 634,002 acres ‘Open’ to the extraction of saleable minerals, which include cinders, sand, and gravel. A total of 388,765 acres, including the WSAs, would be ‘Closed’ to saleable minerals. These ‘Closed’ areas would protect the Nobles Emigrant Trail, the Fernley-Lassen Branch Line, and the Military Patrol Road.

Forestry actions would be implemented on 1,332 forested acres within the Bizz Johnson Trail SRMA. Implementation planning and an interdisciplinary NEPA analysis would determine all potential effects to the Fernley-Lassen Branch Line within the SRMA, if these harmful effects are significant, and whether the long-term benefits to the other resources justify the short-term adverse visual effects to the historic trail.

Invasive juniper would be treated on the 1,734 forested acres of Tunnison WSA. Implementation planning and an interdisciplinary NEPA analysis would determine all potential effects to the Merrillville-Bieber Wagon Road, Willow Creek segment, if these harmful effects are significant, and whether the long-term benefits to the other resources justify the short-term adverse visual effects to the historic trail.

Lands containing portions of any historic trails would be selected for acquisition. Acquiring portions of historic trails would have a minor to moderate effect on historic trails.

The ELFO would seek to dispose of BLM lands shown on Map LANDS-1, BLM-Administered Lands for Potential Disposal, through various methods. If site-specific examination of lands selected for disposal reveals important resources or unique characteristics and the authorized officer determines that these resources are present, BLM will designate the lands as custodial (lands to be retained under BLM’s management). Map LANDS-1 shows four parcels proposed for disposal that are likely to contain portions of the following trails:

- Modoc Line,
- Merrillville-Bieber Wagon Road,
- Wendel-Flanigan Railroad Line, and
- Susanville-Wendel Railroad segment.

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Disposing of these parcels could be a moderate to major adverse effect. But if a site-specific examination finds that these or other historic trails cross these parcels, then the parcels would be classed as custodial, and the adverse effect would no longer apply.

BLM would review and use all utility corridors in the Western Regional Corridor Study (Western Utility Group 2003) unless environmental analysis finds potential significant impacts to resources. A Priority 2 corridor in the Western Regional Corridor Study would cross the Nobles Emigrant Trail and the Modoc Line. The corridor would probably disturb these trails because linear utilities, either overhead or underground, are easily detectable by the human eye. Moreover, activities involved in installing and maintaining the utility could disturb or destroy physical features. Implementation planning and an interdisciplinary NEPA analysis would determine all potential effects to the affected trails, if these harmful effects are significant, and whether the long-term benefits to the other resources justify the short-term adverse visual effects to the historic trails.

The following OHV area designations would apply to the Preferred Alternative:

- ‘Open’: <1%,
- ‘Limited to Designated Routes’: 74%, and
- ‘Closed’: 26%.

Under the Preferred Alternative, OHVs must remain on designated routes in most of the field office area. This would result in a minor to moderate beneficial impact to historic trails, by reducing damage to linear features from cross-country use of vehicles.

The Preferred Alternative would designate the following ACECs: Pine Dunes, Susan River, Lower Smoke Creek, Eagle Lake Basin, North Dry Valley, and Buffalo Creek Canyon. These designations would direct more management attention to portions of the following trails:

- Military Patrol Road,
- Fernley-Lassen Branch Line,
- Nobles Emigrant Trail,
- Merrillville-Bieber Wagon Road,
- Fort Churchill-Fort Bidwell Military/Stage Road, and
- Buffalo Hills Toll Road.

These designations would negligibly benefit historic roads. BLM’s securing public title or access on abandoned railroad grades would be a minor to moderate benefit to historic trails by securing public access and in some cases protecting the trails.

The proposed combination of actions to protect historic trails and the minor adverse effects of the proposed actions to manage vegetation, fuels, rangeland, and travel in the areas along the historic trails would have overall negligible adverse effects and moderately beneficial effects under the Preferred Alternative. The greatest beneficial effects or probability of beneficial effects to the characteristics of the Nobles Emigrant Trail, or to the other historic trails, from other resource management decisions would also occur under the Preferred Alternative because it has the highest percentage of acres protected by CRMAs; SRMAs; ACECs; VRM Classes I, II and III; and OHV area designations of ‘Limited to Designated Routes’ or ‘Closed’.

The Preferred Alternative represents a collaboration of actions designed to reach the desired condition of the other natural resources while ensuring protection for the Nobles Emigrant Trail as well as the other historic trails in the field office area.

4.13.5 Cumulative Effects

The area of analysis for cumulative effects to the Nobles Emigrant Trail includes not only the portions of the trail on public land administered by the BLM ELFO but also private land within the administrative boundary of the ELFO, and the western portion of public land administered by the BLM Winnemucca Field Office. The analysis area for cumulative effects to the other historic trails is limited to the ELFO area.

The historic trails on the field office area were travel routes through a high-desert setting. As the country began to be settled, the main historical uses were range for livestock and hunting. Scattered throughout the field office area on private land are fencelines, ranch headquarters, and water developments such as wells and reservoirs. Interconnecting all of these human imprints was a network of roads – many just two tracks over rocky ground – for access to and management of livestock operations. Roads also provided access to traditional hunting and fishing locations.

As technology provided better vehicles, the number of roads increased, often extending up higher into the mountains. And the roads improved. Power transmission lines were installed. Throughout these changes, livestock use of the land continued, much of it on BLM grazing allotments.

In more recent years, a high-voltage transmission line visible from both the Nobles Emigrant Trail and the Modoc line were installed, running north and south through the field office area. A buried natural gas line also crosses the Nobles Emigrant Trail, running north and south.

Public hunting and other recreational pursuits, specifically OHV use, has increased the human presence as well as the effects in the setting of the historic trails. Grazing management practices have shifted to allow more rest time on the allotments. Many recent actions on BLM-administered land have been designed and implemented to help the land recover to a more natural ecological state.

All of the management actions proposed by the Preferred Alternative are designed to provide for the recreational needs of the public while helping the land recover to a more natural ecological state.

Cumulative effects to the trails would result not only from incremental direct effects to the physical features of the trail but also through incremental changes in the landscape surrounding the trails. Many of the vegetation manipulations would have short-term effects on the visual resources surrounding the trails. But the long-term effects would be visual resources that more closely represent what was seen when the trails were originally in use.

Proposed management actions are not expected to result in cumulative adverse affects to historic trails. Implementation planning would involve an interdisciplinary process that would determine the trail's historic physical features that would need protection from the action. Such planning would also analyze the effects to visual resources. Then, using principles of visual resources management, interdisciplinary planning would design the project to avoid moderate effects to the visual resources. With this planning, no proposed actions would cumulatively affect either the Nobles Emigrant Trail or the other trails within the field office area.

Future actions would probably include installing wind farms throughout the field office area and building a coal-fired electrical generation plant on the west side of the BLM Winnemucca Field Office jurisdiction.

4.13.6 Mitigation Measures

No major adverse effects would occur on the characteristics of the Nobles Emigrant Trail, which led to its designation as a national historic trail or to the characteristics of the other historic trails that would support their designation as national historic trails. Therefore, mitigation measures are not needed at this level.

4.13.7 Unavoidable Adverse Impacts

Indiscriminate looting of the physical features of the trails and illegal off-highway vehicle use would destroy the physical features of the trails, such as original wagon ruts. Although these activities would be the target of law enforcement efforts, they are unavoidable in the planning process.

4.13.8 Short-Term Uses Versus Long-Term Productivity

Most of the proposed actions do not involve direct use of the Nobles Emigrant Trail or of the other historic trails themselves. Rather, they are actions integral to the management of other resources along the historic trails. None of the proposed actions would favor short-term uses over long-term productivity. But the less short-term protection afforded the historic trails, the less long-term benefit to the public.

4.13.9 Irreversible and Irretrievable Actions

Historic physical features of the trails, including cans, bottles, structures, and wagon ruts are finite resources. The activities on the land throughout history, including looting, livestock grazing, and motor vehicle use, have resulted in the ultimate loss of many physical features of these historic trails.

4.14 Potential Effects on Special Designations – Wild and Scenic Rivers

This section describes potential impacts from implementing the Preferred Alternative on the outstandingly remarkable values that qualified river segments within the ELFO as eligible for designation under provisions of the Wild and Scenic Rivers Act.

4.14.1 Methodology and Assumptions

The analysis in this section includes impacts to four segments of three rivers that were determined by BLM to be eligible for possible designation under the Wild and Scenic Rivers Act using eligibility criteria specified in the Act (See Appendix L).

The eligible segments are (all distances are approximate):

- 8 miles of the Susan River (beginning 1.5 miles upstream from Highway 36 at Devil’s Corral, going downstream approximately 8 miles to near the edge of Susanville in the Hobo Camp Area);
- 8 miles of Willow Creek (where it flows through the Tunnison Wilderness Study Area);
- 10.6 miles of Upper Smoke Creek (beginning above Smoke Creek Reservoir where it flows through public land and the Twin Peaks Wilderness Study Area), and
- 3.2 miles of Lower Smoke Creek (in Smoke Creek Canyon along the Smoke Creek Road where it flows through the Dry Valley Rim Wilderness Study Area.).

River evaluation procedures established in the Wild and Scenic Rivers Act require that once a river segment is determined to be eligible, the segment is evaluated against three classification criteria (Wild, Scenic, or Recreational) to determine the most applicable classification for each eligible segment. The classifications (see Appendix L) are defined as:

- **Wild** – “Those rivers or sections of rivers that are free for impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.”
- **Scenic** – “Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.”
- **Recreational** – “Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past”. (Quotes from WSR Act, Section 2 a (1), (2), (3).

BLM planning regulations require BLM evaluate the impacts of designating all of the eligible river segments as suitable for designation under the Wild and Scenic Rivers Act. The primary effect of designating a river as Wild, Scenic, or Recreational under the Act would be that the designated river segment(s) could be legislatively established as a permanent free flowing river segment and no water diversions or water impoundments (dams) would be allowed on the designated river segment in the future. Various other restrictions would apply depending upon whether the river is designated as Wild, Scenic, or Recreational.

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Management of most river segments would not change significantly under Wild and Scenic Rivers Act designation from that resulting from other proposed management actions that would protect stream and riparian habitat, aquatic and riparian wildlife species, cultural resources, scenic resources, and river based recreation.

The primary difference between designation and non-designation would be that without designation, all river segments would remain available for possible water diversions and water impoundments (dams), subject to future demand for and economic, social, and political support.

All eligible segments of the rivers being considered for WSR designation would continue to be managed under interim protective measures required by the Act until such time that the Record of Decision is completed. At that time all river segments not recommended as suitable for designation would be released from the interim protective requirements. Any river segments recommended as suitable for designation would remain under interim protective management to assure that the values that qualified the river segment as eligible are not adversely affected by future activities. A suitability report will then be prepared by BLM and forwarded to Congress through the Secretary of Interior and the President.

Once Congress receives the suitability report, the rivers remain under interim protective management until Congress acts to designate or not designate the recommended suitable river segments. If Congress acts and designates the suitable segment, protective provisions of the Wild and Scenic Rivers Act apply and a management plan is prepared for the designated river segments. In this PRMP, there are provisions to protect the river corridors under a mixture of existing plans and policies. Protection would be provided for sensitive habitats, riparian areas, water quality, high scenic values, and cultural values and there would be provisions to provide for recreational use of rivers and streams.

4.14.2 Incomplete or Unavailable Information

Adequate information is available to analyze the effects on river segments determined to be eligible for WSR designation at the land use plan level.

4.14.3 Analysis

This analysis defines the levels of effects on river segments determined to be eligible for designation under the Wild and Scenic Rivers Act as follows:

Negligible: The characteristics of the area that supported designation could change, but the change would be so small that it would not be of any measurable or perceptible consequence.

Minor: The characteristics of the area that supported its designation would change, but the change would be small and, if measurable, would be highly localized.

Moderate: The characteristics of the area that supported its designation would change. The changes would be measurable but would remain localized.

Major: The characteristics of the area that supported its designation would change, and the changes would be perceptible, measurable, and widespread.

4.14.4 Susan River

4.14.4.1 Analysis of the Preferred Alternative

The Preferred Alternative would result in both moderate beneficial impacts and possible major adverse impacts to the outstandingly remarkable values of the Susan River (as identified through the Wild and Scenic Rivers Act study process). The Susan River would not be recommended suitable for WSR designation, but would be managed under provisions of the Susan River ACEC, and the BLM Bizz Johnson Trail Management Plan, that applies to all of the public lands within the Susan River Canyon. Recreational use of the river would continue with primary uses being fishing, swimming, water uses (i.e., inner tubing and river floating on small paddle craft), sightseeing and nature study. Associated uses that benefit from the free flowing river are non-motorized trail uses of the adjacent Bizz Johnson Trail. The varying flows and seasonal changes along the river greatly enhance the scenic value of a visitor's experience on the trail because of the trail's close proximity to the river.

The Preferred Alternative could have major adverse impacts on the outstandingly remarkable values of the Susan River if a dam were built on the river flooding a portion of the free flowing segment of the Susan River behind the dam. This impact would be possible because management actions would not preclude a dam in the future. Any dam on the Susan River above or below Devil's Corral would adversely impact the Susan River's Outstandingly Remarkable Values that qualified it as eligible under the Wild and Scenic Rivers Act – the canyon's high scenic quality, high level of river use and associated Bizz Johnson Trail use, the high quality riparian area along the river, the associated upland habitat adjoining the river, the species dependent upon the riparian and upland habitats and the distinctive geology of the area along the river. Flooding of the river behind a dam would destroy the scenic river corridor and associated riparian habitat and river based aquatic habitat. If a dam were built below Devil's Corral in an area of the Susan River Canyon where the Bizz Johnson Trail was flooded, the historic values of the 1913-1914 railroad grade trail and its railroad bridges and tunnels would also be destroyed. Recreational use of the trail would also be eliminated in the flooded area.

Outstandingly remarkable values of the eight miles of eligible segment of the Susan River that would be impacted are:

- high amounts of river and non-motorized trail use of the Bizz Johnson Trail adjacent to the river,
- high scenic values throughout the Susan River Canyon,
- high geologic values where three geologic provinces meet – the Sierra, Cascades and Great Basin,
- high historic values of the Fernley and Lassen Railroad grade (now the Bizz Johnson Trail) and its nine bridges and two tunnels along this segment of the river, and
- high diversity of biologic values in the aquatic, riparian, and upland areas.

The Preferred Alternative would also result in moderate beneficial impacts from several management actions implemented to preserve and protect scenic quality, biologic, historic, and geologic resources. Scenic resources would be protected through the management of the Susan River Canyon as a VRM Class II area. Cultural resources would be protected through compliance with Section 106 of the NHPA. The historic Fernley and Lassen Railroad grade, bridges and tunnels would be managed to protect these historic features and structures as part of the Bizz Johnson Trail, a National Recreation Trail, providing both historic protection and functional use as part of the trail.

Wildfires would be managed using full suppression methods because of the close proximity of the Susan River canyon to the Susanville urban interface and to residents on portions of the north and south rims of

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the canyon. Campfires would be limited to designated areas (currently at the Hobo Camp picnic area and at the Cheney Creek campsite where fire rings are available).

Fuel reduction projects (such as understory removal and timber stand thinning in appropriate areas) would occur to improve the effectiveness of fire suppression.

Native and non-native fish and other aquatic species would be managed under criteria of BLM's Land Health Standards for Northeastern California, 2000, Standards 2 and 4 to improve the development of woody riparian and other riparian species to improve streambanks and increase stream shading.

Water quality would be protected through compliance with BMPs to meet BLM and state water quality standards.

Livestock grazing is not permitted on BLM lands within the Susan River Canyon. A combination of gap fences and non use by livestock permittees on adjacent private lands has kept livestock out of the canyon since the 1980s. However, additional fences are needed to keep livestock from drifting into the canyon from adjacent private lands when grazing is reauthorized on those lands.

Timber harvests would be limited to actions identified to improve the forests ability to withstand wildfires and insect damage so that the trees and other vegetation are not as likely to be consumed in a wildfire. Careful layout and administration of forest thinning projects would improve the forest's ability to withstand fires and improve fire fighters ability to stop wildfires that start within the canyon. Fuels treatment and thinning would help maintain the scenic quality of the canyon by helping to reduce the likelihood that a wildfire would burn up the canyon, adversely impacting scenic resources. All timber harvest activities would be required to meet BLM's VRM Class II. VRM guidelines allow time for ground cover vegetation to become established after a project is completed and therefore, projects may be apparent to casual observers in the short-term but would become less apparent and meet VRM Class II standards in three to five years.

No new ROWs would be issued unless no other alternative locations are feasible, and then only if such rights-of- way would not adversely impact the canyon's natural, cultural, historic, and scenic resources.

No motor vehicle use would be allowed except for BLM administrative, maintenance and emergency access needs on the Bizz Johnson Trail and existing dirt roads. Quiet low speed motorized wheelchairs and other conveyances for the disabled would be allowed. Only non-motorized floating craft would be allowed in order to maintain the quiet non-motorized character of the canyon.

Recreational visitor use would continue to be high. The Susan River and adjoining Bizz Johnson Trail receive the highest amount of visitor use on public lands in Northeast California (86,179 visitors in fiscal year 2004). High recreational use is related to the direct and easy accessibility of the Susan River from Susanville via the Bizz Johnson Trail, and access roads to trailheads and the Hobo Camp picnic area at the mouth of the canyon adjacent to Susanville. High use is also related to the river and canyon's high scenic values. Natural and historic resources include many geologic features associated with the Great Basin, Sierra and Cascade ranges, historic structures of the 1913/1914 Fernley and Lassen Railroad grade (includes 11 bridges and two tunnels). This route of the Bizz Johnson Trail contains other pre-railroad historic features found within the Susan River Canyon, including remnants of old hand built wagon roads.

The majority of the 8 miles of land along the eligible segment of the Susan River is in public ownership (BLM). Ongoing efforts to acquire approximately 0.8 miles of undeveloped land along the streambank on one or both sides of the river would continue under existing provisions of the Bizz Johnson Trail

Management Plan. These acquisitions would increase BLM's ability to provide for public access along the majority of the eligible segment of the river.

4.14.4.2 Cumulative Effects

One dam, McCoy Flat Reservoir is located on the Susan River upstream of the Susan River Canyon. A second dam, Hog Flat Reservoir is located on a tributary to the Susan River approximately two miles from the McCoy Flat. Water releases from these reservoirs are fully controlled by Lassen Irrigation district and augment flows in the Susan River throughout the late spring and summer, benefiting aquatic species in the river and recreational use of the river as long as the flows continue. Maintaining the Susan River as free flowing through the Susan River Canyon would not affect the releases from the two irrigation company reservoirs upstream of the canyon. Maintaining six or eight miles of the Susan River Canyon where BLM administered public land is located as free flowing would also not preclude dam construction upstream of those segments on private or Lassen National Forest land.

4.14.4.3 Mitigation Measures

None.

4.14.4.4 Unavoidable Adverse Impacts

Dams could be built on the Susan River resulting in unavoidable adverse impacts to the Susan River's free flowing values and river related recreational, historical, scenic, geologic, and biological values.

4.14.4.5 Short-Term Uses Versus Long-Term Productivity

The Susan River would remain available as a free flowing river in the short term but could be impounded behind a dam in the long term if future economics of water use justified development of a dam. Long term productivity of a dam could increase available water for irrigation and extend flows of water through the Susan River Canyon benefiting stream fishing, river floating, kayaking, and swimming and generate hydroelectric power.

A dam on the Susan River could also substantially alter the scenic quality of the Susan River canyon, reducing the appeal of the Bizz Johnson Trail in the area where the dam was built. Steep sloped bare dirt banks of a low reservoir during low water periods would not appeal to visitors who have in the past enjoyed the seasonal variety, color, and wildlife of the lush riparian area along the river.

Water flow studies by private engineering firms and the California Department of Water Resources indicate that the firm yield of the proposed reservoirs is far less than the average yield indicating that there would be substantial variation in pool elevations of a reservoir on the Susan River. In addition, because the primary justification for a reservoir on the Susan River would be for irrigation use, water would be drawn down annually leaving little water volume in the reservoir during average to low water years with resulting limited use for reservoir recreation.

4.14.4.6 Irreversible and Irretrievable Impacts

If a dam were built on the Susan River there would be irretrievable and irreversible impacts to the river segment that was periodically inundated by seasonal water storage behind the dam. Adverse impacts would occur to the flooded river segment's aquatic species, scenic values of the riparian area along the river, recreational uses of the river for stream fishing, river floating and kayaking, and scenic enjoyment of the river canyon from the Bizz Johnson Trail. If a dam was built below Devil's Corral and impounded water up

the drainages of Williams and Willard Creeks and the Susan River, three year round residences would have to be relocated or they would be flooded.

4.14.5 Lower Smoke Creek

4.14.5.1 Incomplete or Unavailable Information

Lower Smoke Creek is affected by water use on Upper Smoke Creek. The Smoke Creek Reservoir, located in California just upstream of the Nevada line, was built in 1947. The current owner has applied for and received a water storage permit and is working to perfect a water right for water storage and use of Upper Smoke Creek water.

Calls to the Washoe County Water Rights Manager indicated that water rights have been established on Smoke Creek in Nevada for generations (Behmaran, September 9, 2005). However, Nevada does not maintain water right records for Upper Smoke Creek in California; it only maintains records for the area of Smoke Creek in Nevada downstream of Smoke Creek Reservoir where the impounded water is distributed for irrigation on a systems of meadows on private property.

Smoke Creek Reservoir is backed up behind a 28-foot high, 1,500-foot long earthen dam that spans an open meadow area of Smoke Creek. The dam impounds up to 980 acre feet of water located mostly on private property in California, approximately 9 miles upstream of the eligible segment of lower Smoke Creek in Nevada. All of the impounded water is used for irrigation upstream of the eligible segment of Lower Smoke Creek in Nevada except for 5 cfs water right established by BLM on July 13, 1998, through Nevada Division of Water Resources certificate #14970. BLM's water right was established to provide for a sustained minimum 5 cfs flow for wildlife and recreation use of Lower Smoke Creek. Clarification on this has been received from the California Division of Water Rights as follows: "*Condition #12 in permit 021019 states that Permittee is not required to release previously stored water in order to provide water for satisfaction of BLM's right under Certificate 14970. What this means is, at times when there is no flow from Smoke Creek into the reservoir, Permittee does not have to release water from storage to satisfy the 5 cfs requirement. However, if there is flow from Smoke Creek into the reservoir, Permittee must bypass sufficient flow at the dam such that, in combination with accretions into Smoke Creek between the Dam and the BLM's place of use, there is 5 cfs flow at the BLM's place of use on Smoke Creek. During times of flow upstream of the reservoir, Permittee will have to bypass all of the flow into the reservoir until the 5 cfs requirement is met.*"

There are no records of past, present, or future plans for dams on Lower Smoke Creek in Nevada below Smoke Creek Reservoir. Water rights have been established on Smoke Creek for generations. Smoke Creek water rights in Nevada are likely to be fully appropriated through establishment of vested water rights established prior to 1905 and that any further use of water in Smoke Creek would require a determination by the Nevada State Engineer as to whether there is any surplus water in the basin (Smoke Creek watershed, an interstate watershed) that would be available for use beyond that already established.

There are limited visitor use data for Lower Smoke Creek due to the remote location of and lack of BLM field staff to collect visitor use data. Visitor use figures are based on Washoe County Road Department average daily traffic estimates for the adjacent Smoke Creek Road and on known types of uses that occur along Lower Smoke Creek.

Much of the visitor use is related to through traffic and sightseeing along Smoke Creek Road, hunting, and to a smaller extent, historic trail viewing. The timing of much of the visitor use is related to hunting seasons set by the state of Nevada. All visitor uses are limited by the distance from population centers and the accessibility of the area based on weather. Most of Washoe County's 383,453 residents live within the

Reno/Sparks area, which is 75 to 100 miles from Lower Smoke Creek, and accessible by paved and gravel roads. Much of the use of Lower Smoke Creek comes from the Reno/Sparks area and from visitors passing through Lower Smoke Creek Canyon on the way to Gerlach, Nevada, a small town of a few hundred people. Gerlach is host to various events on the adjacent Black Rock Desert that attract people from all over including some who pass through Lower Smoke Creek. The largest event, Burning Man Festival, attracts over 30,000 people each Labor Day Weekend and some pass through Lower Smoke Creek Canyon and camp in the area also.

The Washoe County Road Department maintenance foreman in Gerlach, Nevada estimated average daily traffic on Smoke Creek Road at 20 vehicles per day (Minto, November 20, 2003). This figure may seem high during low use periods however, the figure is higher during hunting season and on popular weekends when there are many people sightseeing in the desert.

4.14.5.2 Analysis of the Preferred Alternative

The Preferred Alternative would result in both moderate beneficial impacts and a slight chance of major adverse impacts to the outstandingly remarkable values of Lower Smoke Creek as identified through the Wild and Scenic Rivers Act. Lower Smoke Creek would not be recommended suitable for WSR designation, but would be managed under provisions of the Lower Smoke Creek ACEC and the Dry Valley Rim WSA. Several proposed and ongoing management actions would protect and enhance river related values of Lower Smoke Creek to maintain the high scenic quality that occurs along the immediate foreground area within Lower Smoke Creek Canyon, improve the fishery of Lower Smoke Creek, improve riparian and upland habitat areas, and protect the historic trail resources of Nobles Emigrant Trail. This action would also leave the possibility open for a dam on Lower Smoke Creek that would have major adverse impacts on the outstandingly remarkable values of Lower Smoke Creek if a dam flooded a portion Lower Smoke Creek.

The Preferred Alternative would continue many existing BLM policies and legal responsibilities that protect Lower Smoke Creek's outstandingly remarkable values identified in the eligibility evaluation of the Wild and Scenic Rivers Act (BLM Manual 8351.3, 31). BLM management actions would include:

- Managing the area as a VRM Class I area to protect the high scenic values (as long as Lower Smoke Creek is within the Dry Valley Rim WSA) and as a VRM Class II area if the area is released from WSA status by Act of Congress;
- Applying BLM Land Health Standards that require BLM manage for 'Healthy' riparian and upland habitats which includes keeping livestock and wild horses out of the creek most of the year through a combination of fences tied into natural rock rim barriers;
- Complying with the requirements of the NHPA to protect historic and cultural resources; and
- Upholding BLM's WSA interim management policies to preserve the wilderness values within Dry Valley Rim WSA until Congress Acts to designate part or all of the area as Wilderness or release it back to multiple use management.

Many existing BLM policies and legal requirements are protecting Lower Smoke Creek's outstandingly remarkable values. However, these management policies and laws may not prevent construction of a dam on Lower Smoke Creek if future efforts by proponents of an additional reservoir were successful, and BLM amended its land use plan to accommodate a dam and reservoir. BLM land use planning regulations provide for land use plan amendments to accommodate changing physical, social, and political conditions.

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While this action leaves the possibility open for a dam and reservoir on Lower Smoke Creek, a new dam and reservoir is not likely to occur because there is little if any surplus water that is not already appropriated by upstream use for irrigation of meadows below Smoke Creek Reservoir. Flows in Lower Smoke Creek, estimated to be between 2 to 10 cfs during most of the year, are releases from water that is captured and stored in Smoke Creek Reservoir for irrigation use on meadows below the reservoir.

The upstream user is permitted storage and use of up to 1,300 acre-feet per year (California water use permit 012019). With this amount of use from Upper Smoke Creek, a low flow stream that enters Smoke Creek Reservoir and a minimum flow water right granted to BLM by the State of Nevada through Lower Smoke Creek of only 5 cfs, there would be little, if any, water available for another reservoir. A new dam for another reservoir would require thorough analysis of all available water in the watershed. Such an action would affect an interstate water basin/watershed and would involve both California and Nevada in a complex process.

Current efforts to secure ground water from the Smoke Creek watershed in Nevada are underway by Granite Fox Power, LLC, a part of SEMPRA Corporation that is planning to develop a large coal fired power plant (Granite Fox Power Plant) west of Gerlach, NV near Squaw Creek. This power plant would rely on a network of ground water wells drilled on private land at the mouth of Smoke Creek, in addition to wells at the mouth of Buffalo Creek and Squaw Creek, to provide 16,000 acre-feet of water annually for power plant use (SEMPRA has filed for 24,000 acre-feet per year from these three watersheds). Granite Fox Power LLC has filed for water rights to 14,779 acre-feet of water annually to be pumped out of the proposed wells on property along the edge of the Smoke Creek Desert at the lower end of Lower Smoke Creek Canyon.

A dam constructed on Lower Smoke Creek for irrigation or wetlands use would adversely impact the outstandingly remarkable values that qualified the 3.2-mile segment of the creek as eligible under the Wild and Scenic Rivers Act.

These values include:

- high geologic, scenic, riparian, and biologic values
- a historic trail along Lower Smoke Creek, and
- recreational uses associated with the free flowing stream - wildlife viewing, camping, and hunting along the creek and to a limited extent, stream fishing.

Flooding a segment of Lower Smoke Creek behind a dam would destroy the small scenic river corridor, the stream's aquatic habitat, and associated riparian habitat, and replace it with a reservoir bordered by rock and dirt banks that would be eroded by fluctuating reservoir levels and wave action. If the primary use of the reservoir was for water storage and release of water to downstream users, reservoir levels would drop each year. During periods of low reservoir volume and following water release for irrigation use, there would be little water left for recreational use. Large areas of bare dirt banks and water ringed rocks would become exposed in place of the scenic canyon walls. Recreational use of the canyon bottom would be eliminated in the flooded area. Historic trail traces and associated resources would be destroyed in the flooded area. If a wetland reservoir was constructed, water levels would not fluctuate as much as with an irrigation reservoir but there would still be water loss to evaporation during the hot summer months and subsequent lower water levels.

In years of low runoff a constructed reservoir would only partially fill up. This would result in the reservoir having low pool elevations. Growth of annual grasses and forbs on the exposed reservoir banks would occur subject to slope and aspect of the reservoir banks. Scenic quality would change with the elimination of the

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seasonal color variations of the riparian area and the scenic interest associated with the flows of the river. River dependent fish and associated flowing water dependent species would be replaced by reservoir adapted species. Stream fishing would be replaced by reservoir fishing.

Construction of a reservoir would provide additional types of recreation within the Lower Smoke Creek Canyon – reservoir fishing, waterfowl hunting, a small amount of swimming, and a small amount of small craft boating. Vehicle access over long approaches on gravel roads would limit the size, type, and number of boats brought in on trailers--with most boats likely to be carried on roof racks.

Transportation and recreational use of the Smoke Creek Road would continue. Primary uses are for traffic from California Highway 395 to Washoe County's Sand Pass Road and on to Gerlach, Nevada. Other than through traffic, much use in the spring and fall is vehicle based sightseeing, and in the fall, camping in association with upland bird hunting for dove, quail and chukar and to a lesser extent, for antelope and deer. A small amount of fishing also occurs. Historic trail enthusiasts also travel the route of the Nobles Emigrant Trail and stop at the historic sign post markers (one historic sign marker is within the 3.2-mile eligible segment of Lower Smoke Creek and two markers are upstream and down stream of the eligible segment along Smoke Creek Road).

Native Americans would be consulted in all BLM management actions affecting cultural resources. Cultural resources would be protected through compliance with section 106 of the National Historic Preservation Act.

Wildfire suppression would be handled using appropriate management response. Suppression could range from wildland fire use to full suppression subject to conditions at the time of a wildfire.

Native and non-native fish and other aquatic species would be managed under criteria of BLM's Land Health Standards for Northeastern California, Standard 2 and 4 to improve development of woody riparian and other riparian species to improve stream banks and increase stream shading.

Water quality would be protected through compliance with best management practices to meet BLM and state water quality standards.

Scenic resources would be protected through management of the Dry Valley Rim WSA, surrounding Lower Smoke Creek. The WSA would be managed as VRM Class I to preserve the existing scenic quality of the area and the area outside the WSA would be managed as a VRM Class II area (management actions may be seen but should not attract attention of the casual observer).

There would be no impact to livestock and wild horse grazing because most of Lower Smoke Creek is physically unavailable to livestock grazing through a combination of fencing and impassable rock rims. Most livestock grazing is excluded from Lower Smoke Creek to enable continuing progress to be made toward riparian goals, desired future condition and objectives established to meet land health standards. Livestock and wild horses are allowed to access the creek in areas above and below the fenced out area.

BLM would seek to acquire undeveloped private lands from willing sellers upstream and downstream of the eligible segment of Lower Smoke Creek in all alternatives of this PRMP. If acquired, these lands would provide recreational access along Smoke Creek and would be managed to improve aquatic, riparian, and upland habitats along the creek.

Proposed wildlife actions in Chapter 2 of this PRMP include construction of new waterfowl nesting islands through impoundment of waters where appropriate. (See Wildlife, Goal 5: "Maintain waterfowl nesting islands at Biscar Reservoir, Round Corral Reservoir, Pilgrim Lake, and Snowstorm wetlands. Evaluate

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these and other sites for new island construction and additional nesting structures.”). Although Lower Smoke Creek is not specifically identified for water impoundment, wildlife actions under Goal 5 would allow the possibility for a new wetland on Lower Smoke Creek if future efforts by BLM or others initiated analysis of a wetlands project on Lower Smoke Creek.

Many beaver ponds on Lower Smoke Creek are providing wetland habitat for a variety of wetland species but are not providing nesting islands. Although there have been past wetlands projects in the ELFO jurisdiction, there is no record of any proposed wetlands/waterfowl projects on Lower Smoke Creek (Don Wannebo, BLM Engineering Technician, September 14, 2005).

If there is interest for a wetlands project in the future and a suitable site is located, the Preferred Alternative leaves the option open for dam construction on Lower Smoke Creek if all requirements for water impoundment were satisfied, and a decision was made based on NEPA analysis to authorize the project.

Mineral values are considered low in the area of Lower Smoke Creek due to the volcanic geology throughout the area (andesite and lahar layers on the south side of the creek and andesite and basalt layers to the north). No past evidence or record of hard rock or placer mining has occurred along Lower Smoke Creek and it is unlikely that such mining would occur in the future due to the basalt geology of the area. Some sand and gravel mining has occurred for local road work to the north and south of Lower Smoke Creek along ancient Lake Lahontan terraces.

Mineral extraction along all 3.2 miles of Lower Smoke Creek would not occur because it is within the Dry Valley Rim WSA. These restrictions would continue as long as the WSA designation remains in place and the WSA is not designated as Wilderness. If Dry Valley Rim is designated as Wilderness, no mining would occur. If it is not designated as Wilderness, Lower Smoke Creek Canyon would be released back to multiple use management and would be available for mining claims and mineral development under provisions of the mining laws for leasable, locatable, and saleable minerals. Standard stipulations that would be applied to any mining operation would require protection of the area’s high scenic quality (VRM Class II), cultural resources, water quality, and wildlife values. However, there would be some sights and sounds of mining activity if mining claims were filed and a plan of operation were approved by BLM.

There would be no impact from timber harvest because there are no commercial timber resources along Lower Smoke Creek.

The current land use provisions used to manage Dry Valley Rim WSA and to protect its wilderness values will have beneficial impacts on Lower Smoke Creek. BLM will continue efforts to acquire lands from willing sellers along the creek for public access for hiking, sightseeing, cultural resource viewing, wildlife viewing, hunting, and fishing.

Beneficial impacts would also result from management actions to improve land health including riparian and aquatic habitat conditions. Livestock are excluded from the eligible segment of the creek most of the year and are closely monitored when grazing does occur to ensure sure that grazing practices meet land health standards and guidelines for riparian and upland areas.

In summary, the Preferred Alternative would result in mostly beneficial impacts to Lower Smoke Creek. However, there is a slight possibility of adverse impacts to the outstandingly remarkable values of Lower Smoke Creek if a dam were built and the impounded storage water behind the dam flooded the creek’s riparian area, aquatic habitat, the Noble Emigrant Trail, and recreation resources upstream of the dam.

4.14.5.3 Cumulative Effects

Lower Smoke Creek has been altered above the eligible segment by Smoke Creek Reservoir (approximately 1.5 miles long) and along approximately seven miles of the creek that flows through meadows where agricultural diversions occur below Smoke Creek Reservoir. Smoke Creek was also impacted by past grazing practices for over 100 years beginning in the mid 1800s. Beginning in the 1980s, a healthy and functioning riparian area became reestablished along Smoke Creek, as a result of BLM removal, through court action, of grazing privileges from a livestock permittee who had historically violated the season of use provisions of his grazing permit and significantly impacted the habitat along Smoke Creek. Since the mid 1980s, livestock have been excluded from most of Lower Smoke Creek through fencing tied into natural rock rims, and riparian area recovery and associated aquatic habitat improvement has occurred. Current grazing however is not affecting most of the eligible segment of Lower Smoke Creek because livestock are fenced out of the creek and riparian area during most of the year, and monitored carefully when allowed to graze.

Flows in Lower Smoke Creek also periodically dried up due to water diversions upstream on the former livestock permittee's lands. By designating Lower Smoke Creek as an ACEC, the continued recovery of Lower Smoke Creek from past grazing practices would continue. BLM's 5 cfs water right established in 1998 would continue to provide a minimum flow needed to support the riparian area and wildlife habitat along Lower Smoke Creek.

Lower Smoke Creek Canyon is a rugged primitive area that is sought out by current day visitors for sightseeing from Smoke Creek road, wildlife viewing, historic trail viewing, hunting, and desert stream fishing. Past impacts have been mainly historic and are still evident in the remnants of the Nobles Emigrant trail and the contemporary Smoke Creek Road.

4.14.5.4 Mitigation Measures

No mitigation measures would be required under the Preferred Alternative because BLM management actions would protect the scenic, geologic, biologic, and historic resources of Lower Smoke Creek unless a dam were proposed for construction. If a dam were proposed, the appropriate environmental analyses would be required, evaluation of the impacts of a dam would occur, and applicable mitigation measures would be required based on the size, location and impacts of the proposed dam on affected resources.

4.14.5.5 Unavoidable Adverse Impacts

A dam or dams could be built on Lower Smoke Creek, resulting in unavoidable adverse impacts to the Lower Smoke Creek's free flowing values and river related geologic, scenic, biologic, historic, and recreational values.

4.14.5.6 Short-Term Uses Versus Long-Term Productivity

Lower Smoke Creek would remain available as a free flowing river in the short term but could be impounded behind a dam in the long term if future economics of water use justified development of a dam.

Long-term productivity of a dam could increase available water for irrigation or domestic use and extend flows of water through the Lower Smoke Creek Canyon, however, the amount of water available is expected to very limited due to low average annual flows and only periodic storm flows in this desert environment.

A dam on the Lower Smoke Creek could also substantially alter the scenic quality of the Lower Smoke Creek canyon, reducing the appeal of the canyon where the dam was built. Steep sloped bare dirt banks and water stained rocks visible during low water periods would not appeal to visitors who have in the past enjoyed the seasonal variety, color, and wildlife of the lush riparian area along the river. Justification for a reservoir on the Lower Smoke Creek would be expected to be for irrigation or domestic use and water would be drawn down annually leaving little water volume in the reservoir during average-to-low water years with resulting limited use for reservoir recreation.

If a wetland reservoir were developed, water would not be expected to be drawn down but would be lost to evaporation during the summer and fall. Wildlife could be expected to benefit from a wetland reservoir, particularly if nesting islands were constructed. However, multiple beaver dams on Lower Smoke Creek already provide substantial surface area for wildlife and the thick riparian area provides large nesting areas for some species of birds and waterfowl.

4.14.5.7 Irreversible and Irretrievable Impacts

If a dam were built on Lower Smoke Creek there would be irretrievable and irreversible impacts to the river segment that was periodically inundated by seasonal water storage behind the dam. Adverse impacts would occur to the flooded river segment's aquatic species, scenic, and historic resources within the flooded area, including remnant traces of the Nobles Emigrant Trail.

4.14.6 Upper Smoke Creek

4.14.6.1 Incomplete or Unavailable Information

Adequate information is available to analyze the effects of wild and scenic river designation for the eligible segment of Upper Smoke Creek (at the PRMP level of analysis).

A California water use decree (Superior Court decree) governing water use on Upper Smoke Creek could not be located. However, water rights have been established on the Nevada portion of Smoke Creek for generations (Behmaran, 9-9-05.) The Water Rights Division of the California Department of Water Resources has records showing that Rock Springs Ranches (formerly Smoke Creek Ranch) has a water storage permit (# 021019) for 1,300 acre-feet in Smoke Creek Reservoir (Nesmith, 9-29-05) and is in the process of perfecting that storage permit and associated water diversion permits from Smoke Creek. Water storage rights were established by the original owners of Smoke Creek Ranch when they developed Smoke Creek Reservoir. The water rights and ranch were acquired by Rock Springs Ranches in the 1990s.

Smoke Creek Reservoir is formed by an earthen dam 1,500 feet in length that crosses an open meadow and impounds (up to) 1,300 acre-feet of water on (mostly) private property in California below the eligible segment of Upper Smoke Creek. The reservoir is adjacent to the California/Nevada state line and about two miles above Smoke Creek Ranch and its associated irrigated meadows.

There are no records of past, present or future plans for dams on Upper or Lower Smoke Creek above or below Smoke Creek Reservoir. Smoke Creek water rights (in Nevada) are likely to be fully appropriated through vested water rights prior to 1905 and any additional use of water from Smoke Creek would require a determination by the Nevada state engineer (Smoke Creek is an interstate watershed) as to the possibility of surplus of water (beyond that established by Smoke Creek Ranch and acquired by Rock Creek Ranches) (Widmer, 9-20-05.)

There are limited visitor-use data for Smoke Creek due to its remote location and the difficulty of procuring visitor used data by BLM staff. Visitor use figures are based on BLM and California Department of Fish and Game (CDFG) estimates based on known uses on Upper Smoke Creek (Bales, 9-22-05). Most visitor use is related to hunting and, to a smaller extent, stream fishing and cultural resource appreciation. Therefore, visitation is primarily occurs during California hunting and fishing seasons. Visitation is limited by distance from population centers and road conditions (generally muddy or snow-covered from November through March.) Susanville (population 12,000) is the nearest population center and the largest city in Lassen County but is more than 60 miles distant. However, many users come from outside Lassen County.

4.14.6.2 Analysis of the Preferred Alternative

The Preferred Alternative would result in major beneficial long term effects as the entire eligible segment (10.6 miles) of Upper Smoke Creek would be recommended suitable for a ‘wild’ designation under the Wild and Scenic Rivers Act. Protecting the scenic qualities, high cultural resource value, and free-flowing character of this river segment will greatly enhance the recreational value of the creek, as well as the entire Upper Smoke Creek basin. Dam construction would not be permitted within this river segment. The substantial recreational and economic benefits this would bring far outweigh the limited benefit of additional water storage. Upper Smoke Creek has little water and a high percentage of the flow has long since been appropriated by down-stream users.

The following management actions and resource uses would be allowed:

- Valid existing water rights are not affected by federal WSR designations. Jurisdiction over water is determined by specific legislation dealing with that issue. The course of water through the WSR segment would be unimpeded as it passes through the designated segment to downstream users.
- Wilderness qualities will be protected under the wilderness IMP, along the 6 mile portion flowing through the Twin Peaks WSA, until such time as Congress either designates the area as wilderness or returns it to multiple-use management.
- The area would be managed for non-mechanized (no mountain bikes or OHVs) recreation in a primitive setting, with little or no on-site facilities, including trails (unless these become necessary to mitigate visitor-caused resource damage), in order to retain its primitive recreational character for current uses such as hunting, wildlife-viewing, hiking, sight-seeing, cultural resource appreciation, and fishing.
- Recreation in the Upper Smoke Creek drainage would be monitored to determine impacts on cultural resources. Closer attention to visitor use and activities--plus increased law-enforcement patrols--may be necessary to adequately protect cultural resources.
- OHVs would not be permitted. In any case, there is no motor vehicle access or trails along the entire 10.6 miles of Upper Smoke Creek (except for one rough access route to and across Upper Smoke Creek) due to the rough, rocky terrain. Another rough dirt road provides nearby (but out of sight) access on a volcanic bench above Smoke Creek Canyon between Shinn Ranch and Smoke Creek Reservoir.
- Vehicular access on the (only) dirt road crossing Upper Smoke Creek (in T33N R16E Section 25) would remain available for motorized public access—subject to continued willingness on the part of the private landowner to allow its continued use.
- Vehicle access (on a rough dirt road) to the upper end of the Smoke Creek drainage (at Big Spring) would remain open to the public, as BLM has secured an easement through this area.

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- Walk-in public access across private land along the first 1.2 miles of Upper Smoke Creek (below Big Springs and along the private section midway along the creek) would be subject to the willingness of the landowners to allow public access along the creek.
- Vehicular access south of Smoke Creek (along the boundary road between the Twin Peaks and Five Springs WSAs) would remain open for public use. This rough, rocky dirt road provides the nearest access to Smoke Creek from south of the Smoke Creek Canyon south rim.
- Upper Smoke Creek would be withdrawn from mineral entry for an average distance of ¼ mile on either side of the creek. This means the area would be ‘Closed’ to mining, mineral leasing, and removal of saleable minerals (e.g., sand, gravel, decorative rock). However, mineral withdrawal could be less than ¼ mile in areas where the creek is confined within a canyon and more than this where the creek is flanked by more open areas. Mineral closure along the creek would average ½ mile on either side of the creek.
- In a similar manner, ROWs would not be issued for ¼ mile on either side of the creek with the actual widths subject to the same constraints previously discussed for mineral closures. ROW closure would also average ½ mile on either side of the creek.
- Livestock grazing would continue where it is currently authorized. However, most of Smoke Creek is physically unavailable to grazing through a combination of fencing (located above and behind canyon rims) tied into natural rock outcroppings. Fencing was installed in order to protect and enhance cultural resources, riparian areas, wildlife, and scenic values.
- In areas where grazing would continue (i.e., fenced water-gaps along Smoke Creek providing watering access for livestock and wild horses and on uplands away from the creek and outside the fenced area), it would be managed to maintain identified WSR values.

A wide variety of (previously mentioned) popular recreational activities will benefit from WSR designation by retaining the free-flowing nature and unaltered natural surroundings of this pristine creek. Smoke Creek supports a small rainbow trout fishery and Lahontan assemblage of native species in an arid setting. Visitor use is estimated at 1,000 to 3,000 visitors yearly; especially hunters, fishermen, hikers, and those viewing cultural resources and wildlife. Figures are based on BLM and CDFG estimates (Bales, 9-22-05).

Upper Smoke Creek attract visitors not only to the creek; but to its upland basin--because the creek provides water and the surrounding uplands provide habitat for wildlife. It is the wildlife that attracts much of the visitor use. Hunters from throughout California have traveled to this area for years for one or two-day sage grouse hunts (with one or two bird season limits.) Similarly, antelope and deer hunters apply for annual hunts in the area (Lassen, Zone 4 and deer hunters in Zone X5b) – despite overwhelming odds against drawing permits – because so many hunters seek the opportunity to hunt in this region, particularly its centerpiece, Upper Smoke Creek. Desert enthusiasts and those seeking solitude in wide-open spaces cherish Upper Smoke Creek basin for its remote setting, spectacular scenery, wildlife-viewing opportunities, and archaeological sites.

It is difficult to determine whether WSR designation will increase visitor use of Upper Smoke Creek. Factors such as water volume and other river characteristics, travel distance, and road conditions will likely determine visitor use as much as WSR designation (Interagency Wild and Scenic Rivers Coordinating Council, May 1997). The river and adjacent lands will continue to be used for big-game and upland bird hunting, hiking, cultural resource appreciation, wildlife viewing, sightseeing, and a small amount of fishing.

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Cultural resources will be protected through compliance with Section 106 of the NHPA. As established in a 2005 memorandum of understanding (between the BLM ELFO, Lassen National Forest, and the Susanville Indian Rancheria), Native Americans will be consulted for management actions related to cultural resources.

Wildfires would be managed according to AMR. AMR encompasses the full range of response from monitoring to full suppression, according to prevailing conditions and identified resource objectives.

Native and non-native fish and other aquatic wildlife will be managed according to BLM's Land Health Standards for Northeastern California and Northwestern Nevada, in particular standards 2 and 4. Restoration and enhancement of riparian vegetation (particularly woody varieties) would be emphasized in order to stabilize streambanks and increase shading.

Water quality would be protected through compliance with (BLM) BMPs to satisfy BLM and state water quality standards.

The scenic resources of Upper Smoke Creek would be managed under VRM Class II criteria (i.e., management interventions are visible but should not attract the attention of a casual observer.)

Thinning of western juniper in the upper three miles of the watershed would take place if it is needed to meet land health standards. However, this must be done in such a way that the outstanding and unique values of the creek (scenic quality, cultural resources, and recreation) are not compromised. It must also meet VRM Class II standards. For trees, this means total removal of above-ground portions of cut or girdled trees using the most feasible method (including burning.)

BLM would seek to acquire undeveloped private lands from willing sellers throughout the length of Upper Smoke Creek (above Smoke Creek Reservoir) for all alternatives in order to provide recreation access and harmonize management with adjacent public lands in order to improve aquatic, riparian, and upland habitats along the creek.

4.14.6.3 Cumulative Effects

Upper Smoke Creek has been altered below the eligible segment by Smoke Creek Reservoir (approximately 1.5 miles long, with 98 surface acres, 980 acre-feet capacity, and annual storage of up to 1,300 acre-feet) and along seven miles of the creek flowing through meadows and agricultural diversions below Smoke Creek Reservoir. Smoke Creek has also been affected by livestock grazing for more than 100 years. BLM was forced to remove (through court action) grazing privileges from a long-time livestock permittee who had consistently violated the season-of-use provisions of his grazing permit and badly degraded habitats along Smoke Creek. Since this time (1980s), livestock have been excluded from most of Upper Smoke Creek using fencing tied into rimrock. A healthy and functioning riparian area is becoming reestablishing along Smoke Creek, together with associated aquatic habitat improvements. Continued recovery from past grazing abuse would be assured by WSR designation—and it would be permanently protected from water diversions and dams.

Upper Smoke Creek Canyon is rugged, primitive, and scenic. For these reasons it is highly valued by current-day visitors for hunting, hiking, wildlife-viewing, cultural resource appreciation and desert stream fishing. There is abundant evidence of prehistoric humanity and impacts are still evident in cultural resources seen along the creek. Severe livestock grazing impacts have occurred, but are now eliminated from most of the creek.

If Upper Smoke Creek were designated a WSR, about 30 % of Smoke Creek's 36 miles would be permanently protected as a free-flowing stream and the primitive characteristics that attract visitors would be permanently protected. Native wildlife would benefit from a natural, free-flowing stream that would continue to provide healthy and productive aquatic, riparian, and upland habitats for a wide variety of sagebrush-steppe species that rely on its waters.

4.14.6.4 Mitigation Measures

Mitigation measures would not be necessary for the eligible segment of Upper Smoke Creek if it receives WSR protection, since there would be no adverse impacts requiring mitigation.

4.14.6.5 Unavoidable Adverse Impacts

There are no unavoidable adverse impacts.

4.14.6.6 Short-Term Uses Versus Long-Term Productivity

Long-term preservation of the free-flowing character of the entire eligible segment (10.6 miles) of Upper Smoke Creek would be assured by WSR designation under the Preferred Alternative. Its waters would flow unimpeded through this segment with most of the flow being appropriated by (existing) downstream water-right holders. The area's wildlife and cultural resources, and its outstanding recreational opportunities and unique characteristics, would be permanently protected.

Conceptually, a dam could supply additional water for irrigation and regulate the flow of water through Upper Smoke Creek Canyon, thereby improving stream fishing below the dam and generating some hydroelectric power. However, benefits from these uses, though unknown, are likely to be negligible because the small volume of water flowing in the creek is mostly appropriated and stored behind Smoke Creek Reservoir for down-stream irrigation. Therefore, little is available for additional storage behind another dam.

An irrigation dam on Upper Smoke Creek would greatly impair its scenic qualities in the area of the reservoir and dam, substantially reducing the appeal of the canyon. Riparian vegetation would be eliminated and replaced by mud banks. Following annual irrigation draw-down, 'bathtub ring' staining would be obvious on canyon walls beneath the high-water level. Wildlife relying on creekside riparian habitats would also be displaced.

An analysis of 39 years of river flow data (from 1951 to 1990) on the Susan River and Willow Creek was conducted by the California Department of Water Resources as part of a study of surface water storage potential (i.e., reservoirs) in Lassen County. This study found that the *firm* yield of proposed reservoirs is *far less* than the average yield because of the large variation in runoff from year to year (Lassen County Water Resources Assessment Study, 1992).

This would result in substantial variations in pool depth for Lassen County reservoirs – including Upper Smoke Creek – resulting in the bare dirt banks and 'bath-tub ringed' rocks and canyon walls described above. It is noteworthy that this study, which analyzed all major watersheds in Lassen County, did not analyze Upper Smoke Creek due to its low flow volume and storage potential.

However, if it were determined that enough water is available for a wetland reservoir on Upper Smoke Creek, nesting islands would be built to provide habitat for waterfowl production. Such a reservoir would not fluctuate as much as a one built for irrigation and substantially less variation in water pool depth would be less harmful to aquatic and terrestrial wildlife since water loss would result from evaporation

and mandatory release for down-stream water-right holders. Recreational users would also be able to fish, hunt, boat, swim, and view wildlife on the reservoir.

4.14.6.7 Irreversible and Irretrievable Impacts

If Upper Smoke Creek were designated a wild and scenic river, water diversions and dams could not be built and the area would be 'Closed' to mineral development, hence no irreversible or irretrievable impacts would occur.

4.14.7 Willow Creek

4.14.7.1 Incomplete or Unavailable Information

Adequate information is available to analyze the effects of wild and scenic river designation for the eligible segment of Willow Creek (at the PRMP level of analysis.)

4.14.7.2 Analysis of the Preferred Alternative

The Preferred Alternative would result in both moderate beneficial impacts and possible major adverse impacts to the outstandingly remarkable values of Willow Creek (as identified through the Wild and Scenic Rivers Act inventory process). The eligible segment of Willow Creek would not be recommended as administratively suitable for inclusion in the National WSR System. Management of the creek would continue under the provisions of the Willow Creek ACEC, and the Tunnison Mountain WSA. Proposed actions would protect the scenic, cultural, and recreational values of Willow Creek and Willow Creek Canyon. The Preferred Alternative also protects wilderness values in the entire Willow Creek Canyon because of the Tunnison Mountain WSA.

Many BLM policies and legal protections for Willow Creek's outstanding and unique WSR values would continue. These include:

- Management under VRM Class II (to protect its high scenic value);
- Application of BLM land health standards (promoting healthy riparian and upland habitats--including exclusion of livestock and wild horses);
- Compliance with the NHPA (protecting cultural and historic resources); and
- Compliance with BLM's WSA interim management policy (IMP) to preserve its wilderness character as part of the Tunnison Mountain WSA (until such time as Congress chooses to act and render a ruling on wilderness designation.)

Proposed management actions would protect and enhance the riverine character of Willow Creek, preserving its scenic quality and improving its fishery. Management interventions would also benefit riparian and upland vegetation and safeguard cultural resources. Nonetheless, a dam would still be possible on the upper portions of the creek. If this is permitted, it would have major adverse impacts on (identified) WSR values (i.e., outstanding and unique scenic, recreational, and cultural values).

A dam on Willow Creek would adversely impact the creek's outstanding and unique values that (presently) qualify it for eligibility under the Wild and Scenic Rivers Act. These features include the canyon's remarkable scenic quality, outstanding recreation opportunities based on its free-flowing character (e.g., fishing, streamside hiking, and nature study by local school groups), and archaeological sites within the canyon. Flooding of the segment behind a dam would destroy the scenic river corridor and

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associated river-based aquatic and riparian habitats; replacing this with a reservoir bordered by bare rocks and mud banks eroded by fluctuating water levels and wave action.

Because the primary use would be for storage of irrigation water for the Honey Lake Valley, pool depths would drop precipitously each year, heightening these effects. During draw-down, and periods of low reservoir volume, there would be little water left for recreation and formerly scenic canyon walls would lack vegetation and show obvious ‘bathtub ring’ stains.

The native, river-dependent fish and other aquatic wildlife that require flowing water would be replaced by reservoir-adapted species. Canyon-bottom recreation would be eliminated in the flooded area. Rock art and other cultural resources would be destroyed.

Mineral extraction is not a possibility while the Tunnison Mountain WSA exists (or if designated a wilderness area.) However, if Congress decides against wilderness designation it will revert to multiple-use management. Under the Preferred Alternative the Willow Creek ACEC would be recommended for withdrawal from locatable mineral development. The area would also be ‘Closed’ to saleable mineral development. The ACEC would apply no surface occupancy requirements for mineral leasing (although diagonal drilling would be allowed from off-site areas not visible from canyon rims.)

ROWs would be avoided through Willow Creek Canyon, unless no feasible alternative exists. Even so, an approved ROW must satisfy VRM Class II standards, as well as land health and water quality standards.

Cultural resources would be protected (in compliance with Section 106 of the NHPA). Rock art appreciation by individuals, and small and large (school) groups, would continue at the Belfast Petroglyphs and other locations along Willow Creek. Its use as a special heritage area by Native Americans would also continue.

Recreational use of the river would continue with primary uses being fishing, hiking, sightseeing, rock art appreciation, upland bird hunting, wildlife viewing, and nature study. Full suppression would be the appropriate management response for wildfires, because of the proximity of the Honey Lake Valley WUI.

Native and non-native fish (and other aquatic wildlife) would be managed according to criteria established in BLM’s Land Health Standards for Northeastern California and Northwestern Nevada, particularly standards 2 and 4. Efforts would focus on improving the condition of riparian (especially woody) vegetation to stabilize stream banks and increase shading. Water quality would be protected through employment of BLM’s BMPs in order to meet BLM and state water quality standards.

Timber harvesting would not be permitted within the WSR area. In any case, timber is very limited in the area proposed for WSR designation, so this would not effect timber production.

Most of the land (8 miles) along the eligible segment is in public (BLM) ownership. Efforts to acquire approximately 1.25 miles of undeveloped land spanning Willow Creek would continue. These acquisitions would increase BLM’s ability to provide legal public access along the entire eligible segment to meet the needs of recreational uses and protect aquatic, riparian, and upland habitats.

Management of Willow Creek as an ACEC would protect and enhance the high scenic, recreational, and cultural values of the canyon and adjacent uplands. This is likely to have moderate beneficial impacts on Willow Creek—but could also have major adverse effects if water diversions, or especially a dam, were built on a segment of Willow Creek, thereby flooding upstream riparian areas.

4.14.7.3 Cumulative Effects

If a dam were built on Willow Creek, another segment of free-flowing river would be lost to the State of California (where free-flowing river segments are short and limited in number and free-flowing rivers virtually non-existent). Each incremental loss of a free-flowing section to yet another dam and reservoir destroys miles of scarce habitat for river-dependent species, radically alters the natural landscape, and eliminates river-based recreation. Willow Creek has already been altered for agriculture (upstream) in the Willow Creek Valley. The Willow Creek Canyon, however, is a rugged, primitive area that has not been significantly altered by human activities.

4.14.7.4 Mitigation Measures

None.

4.14.7.5 Unavoidable Adverse Impacts

Dams and water diversions could be built on Willow Creek. This would result in unavoidable adverse impacts to Willow Creek's free-flowing character destroying cultural resources and significantly impairing its scenic and recreational value.

4.14.7.6 Short-Term Uses Versus Long-Term Productivity

Willow Creek would be protected as a free-flowing river in the short term. In the long-term, however, it could be subject to impoundment behind a dam. A dam could increase water availability for irrigation and extend its flow through Willow Creek Canyon, benefiting stream fishing below the dam and generating hydroelectric power.

A dam and reservoir would radically alter the scenic quality of Willow Creek canyon, greatly reducing its appeal. Steeply sloped; muddy banks and horizontally stained rocks would be highly visible during low water. This would not appeal to visitors—especially those who cherish the seasonal variety, color, and wildlife of the exuberant riparian area, (formerly existing) adjacent to the river. Flow studies (by the California Department of Water Resources) indicate that the firm yield from a reservoir on this site would be far less than the average yield. This means that there would be large variations in pool depths. In addition, because the primary justification would be for irrigation, annual draw-down would leave little water in the reservoir during years of average-to-low water, thus limiting its value for reservoir-based recreation.

4.14.7.7 Irreversible and Irretrievable Impacts

If a dam were built on Willow Creek there would be irretrievable and irreversible impacts to the river segment periodically inundated for seasonal water storage. Adverse impacts would apply to the flooded segment's aquatic and riparian species, scenic qualities, stream-based recreation (especially stream fishing), and would destroy cultural resources within the flooded area (petroglyphs, pictographs, and other cultural features).

4.15 Potential Effects on Special Designations – Wilderness Study Areas

The ELFO administers the Tunnison, Skedaddle Mountain, Dry Valley Rim, Five Springs, Twin Peaks, Buffalo Hills, and Poodle Mountain WSAs. Portions of the Buffalo Hills and Poodle Mountain WSAs are managed by the BLM Surprise and Winnemucca Field Offices, respectively. This section describes the direct, indirect, and cumulative effects on WSAs resulting from implementation of the Preferred Alternative.

4.15.1 Methodology and Assumptions

The wilderness characteristics of “roadlessness”, “naturalness”, and “solitude” characterize the WSAs and support their designation as wilderness. These characteristics were inventoried for each WSA and are described in detail in the California Statewide Wilderness Study Report (BLM 1990) and the Nevada BLM Statewide Wilderness Report (BLM 1991a). Since these reports were published, the WSAs have been managed under the BLM IMP (BLM 1995). The management guidelines included therein are designed to protect the wilderness values in each WSA and to ensure that Congress’s prerogative to designate these areas as wilderness is not impaired.

In determining potential effects to the WSAs, we used the baseline of the inventories detailed in the California Statewide Wilderness Study Report (BLM 1990) and the Nevada BLM Statewide Wilderness Report (BLM 1991a). We then evaluated all resource management decisions for each of the alternatives to determine if they would affect the WSAs’ characteristics.

WSAs would be managed under BLM’s IMP, which protects their wilderness values pending congressional action, subject to valid existing rights.

All proposals for uses or facilities within WSAs would be reviewed to determine whether the proposal meets the nonimpairment criteria. The nonimpairment criteria are as follows.

- The use, facility, or activity must be temporary. Therefore, a temporary use that does not disturb the land’s surface or permanently place facilities may be allowed if such use can easily and immediately be terminated upon wilderness designation.
- When the use, activity, or facility is terminated, the wilderness values must not have been degraded so far as to significantly constrain the area’s wilderness suitability for preservation as wilderness.

The only permitted exceptions to the nonimpairment criteria are the following

- wildfire or search and rescue emergencies,
- reclamation to minimize impacts of violations and emergencies,
- uses and facilities that are considered grandfathered or valid existing rights under the IMP,
- uses and facilities that clearly protect or enhance the land’s wilderness values or are the least needed for public health and safety, and
- reclamation of pre-FLPMA impacts.

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The minimum tool concept would be applied to any approved actions within WSAs. Any actions would be accomplished using methods and equipment that have the least impact on the quality of a person's or group's wilderness experience, as well as on the physical, biological, and cultural resources within the WSA.

Pre-FLPMA developments may continue to be used and maintained in WSAs to keep them in an effective, usable condition. But developments cannot be modified to where they exceed the physical and visual impacts existing at the time FLPMA passed (1976). New, temporary developments would need to satisfy the nonimpairment criteria and truly enhance wilderness values. New, permanent developments must satisfy the nonimpairment criteria, enhance wilderness values, and not require motorized access if the area were designated as wilderness. Because pre-FLPMA facilities such as waterholes, spring developments, guzzlers, and fences are considered grandfathered, they may be maintained periodically using motorized equipment, if through analysis, that method is found to be the minimum tool needed for maintenance.

Management of the WSAs under the IMP prevents moderate to major adverse effects and provides minor to moderate benefits to the wilderness characteristics in each WSA.

4.15.2 Incomplete or Unavailable Information

Adequate information was available to analyze the effects of resource management decisions on WSAs at the PRMP level.

4.15.3 Analysis

In evaluating the effects of the resource management decisions, we made the following assumptions:

- The analysis considered effects on the WSAs as *adverse* if they would harm or eliminate the wilderness characteristics that would support designation as wilderness.
- The analysis considered effects on the WSAs as *beneficial* if they would add to or improved the wilderness characteristics that would support designation as wilderness.

The levels of effects used in this analysis are defined as follows:

Negligible: Wilderness characteristics that support wilderness designation would change, but the change would be too small to be measurable or of any perceptible consequence.

Minor: Wilderness characteristics that support wilderness designation would change, but the change would be small and, if measurable, would be localized.

Moderate: Wilderness characteristics that support wilderness designation would measurably change, but the change would remain localized.

Major: Wilderness characteristics that support wilderness designation would substantially change, and the changes would be perceptible, measurable, and widespread.

4.15.4 Analysis for the Preferred Alternative

Management actions proposed for land use authorizations, vegetation management, livestock grazing, and fuels treatments would potentially affect lands within WSAs. But the specific location and extent of these actions cannot now be specified, so the impacts are indeterminate. Using the WSA inventories and the IMP, implementation planning for these actions would determine the probable effects to the wilderness characteristics. A determination would be made as to whether the effects are significant. If so, an evaluation would determine if the short-term effects to the wilderness characteristics would be worth the project's long-term benefits. The proposed action could also be modified in response to IMP guidance to ensure that the action complies with the Interim Management Policy's nonimpairment criteria and minimum tool requirement.

VRM Class I objectives would apply to all WSAs until Congress designates them as wilderness or releases them from BLM's IMP requirements. VRM Class I status protects the WSAs' visual wilderness characteristics. VRM principles applied during the implementation planning phase of proposed projects prevents adverse effects and increases the benefits of projects designed to improve wilderness characteristics.

BLM would gather wild horses in the following WSAs:

- Twin Peaks (2 sites),
- Five Springs (1 site),
- Skedaddle Mountain (1 site),
- Dry Valley Rim (1 site), and
- Poodle Mountain (2 sites).

Five of these sites were in use during the original inventories. The two new sites, in Twin Peaks WSA, were used successfully to gather wild horses as part of wildland fire restoration and rehabilitation efforts within the past three years. All gather sites are on or next to roads that provide access for trucks pulling stock trailers. The sites are also where geographic features aid in the herding of the animals into the trap site and to avoid undue stress on the horses, especially the young.

During a gather, portable panels would be set up at the gather site for about 10 days. The surface disturbance, which would be limited to trampled vegetation, would amount to up to one acre at each site. Each site would be used for one out of three years, depending on such factors as the number of horses to be removed, the location of the horses, and the number of young horses subject to gathering. Wild horse gathers would result in minor adverse impacts to wilderness characteristics in the form of trampled and crushed vegetation by vehicles removing horses and by the horses themselves as they approach the trap site. On the other hand, removing wild horses from the range slightly (minor) benefits wilderness characteristics because fewer horses on the range reduce the impacts on the vegetation and water sources.

The highest level of beneficial impacts to wilderness characteristics would result from the following proposed actions:

- ACECs within WSAs,
- 'Limited to Designated Routes' designation for lands within WSAs,
- route closures in the ROS 'Primitive' areas within WSAs,

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- WSR designations within or next to WSAs, and
- land acquisitions in WSAs.

Lands within Willow Creek Canyon, Lower Smoke Creek, and Buffalo Creek Canyons would be designated ACECs. These ACECs would include the following acres of lands within the detailed WSAs:

Tunnison WSA	Willow Creek ACEC	1,825 acres
Dry Valley Rim WSA	Lower Smoke Creek ACEC	630 acres
Buffalo Hills WSA	Buffalo Creek ACEC	12,500 acres
Poodle Mountain WSA	Buffalo Creek ACEC	23,000 acres

The Willow Creek Canyon ACEC would be ‘Closed’ to off-highway vehicles, and all three ACECs would be recommended for withdrawal for locatable minerals. Tunnison WSA, which would contain most of the Willow Creek Canyon ACEC, is currently ‘Open’ to OHV use. The vehicle closure would better protect wilderness characteristics because it would prevent negligible adverse effects from indiscriminate OHV use, which is minimal due to the rocky terrain. The result would be minor benefits to the visual resources as existing roads and trails revegetate.

Upper Smoke Creek, from BLM land below Big Spring to the where it leaves BLM land 1.2 miles above Smoke Creek Reservoir (10.6 miles), would be recommended as suitable for wild river designation. Lands within 1 mile of Upper Smoke Creek would be withdrawn from mineral entry. This action would protect wilderness characteristics within Twin Peaks WSA from minor to major adverse effects, such as those of impoundments or locatable mining. The Preferred Alternative would manage Upper Smoke Creek in the Twin Peaks WSA to emphasize fisheries because of the creek’s biological potential and habitat capabilities.

WSAs would be within the ‘Limited to Designated Routes’ OHV area designation. BLM’s Interim Management Policy requires that WSAs be managed, at a minimum, in the OHV area designation ‘Limited to Existing Roads and Trails’. This designation requires that all motorized vehicles remain on existing routes. An existing route inventory can be used to track proliferating routes within the WSAs. But OHV riders have no idea if a route is on the inventory or if it was created at a previous time by illegal riding off existing routes. The ‘Limited to Designated Routes’ OHV area designation requires that routes within these areas be designated for use and that the public remain on routes that are designated on the ground through signing or on a map. Management of the WSAs within the ‘Limited to Designated Routes’ designation would better protect WSAs from the adverse impacts of off-route riding.

ROS ‘Primitive’ areas would be established within each WSA. About 45 miles of existing roads and ways within these ‘Primitive’ areas would be ‘Closed’ as shown below:

- Tunnison WSA 1.0 mile
- Skedaddle Mountain WSA 19.3 miles
- Dry Valley Rim WSA 4.7 miles
- Five Springs WSA 3.2 miles
- Twin Peaks WSA 7.8 miles
- Buffalo Hills WSA 8.0 miles
- Poodle Mountain 1.0 mile

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Minor to moderate benefits would result from the closure of routes within the WSAs. Closure would eliminate adverse effects to visual resources from the roads. And the land would return to a more native ecological condition as the vegetation, recovers.

The Preferred Alternative would close 2,130 acres to OHV use in Willow Creek Canyon, mostly in the Tunnison WSA. This closure would protect wilderness characteristics because it would prevent negligible adverse impacts from indiscriminate OHV use. However, such adverse impacts would be minimal because of the rocky terrain. The end result would be minor beneficial effects to visual resources as existing roads and trails are revegetated.

The following are actions proposed in WSAs by the Preferred Alternative:

- Installation of 6 miles of non-motorized, non-mechanized trails within the Tunnison WSA.
- Installation of 19 miles of non-motorized, non-mechanized trails within the Skedaddle Mountain WSA.
- Installation of 37 miles of non-motorized, non-mechanized trails within the Dry Valley Rim WSA.
- Installation of 19 miles of non-motorized, non-mechanized trails within the Twin Peaks WSA.

Implementation level planning would determine the specific location, the method of construction, and the level of construction for these trails to ensure that the project complies with the IMP's non-impairment criteria and minimum tool requirement. Compliance with the IMP will ensure that the installation of the trails will only result in a negligible or minor adverse effect to the WSA while providing a slight (minor) benefit by providing an experience for people who prefer to follow designated trails.

All WSAs would be 'Closed' to mineral leasing to prevent minor to major disturbance to wilderness characteristics such as from new roads, facility construction, and significant ground disturbance.

All WSAs would be 'Open' to exploration for and development of locatable minerals but would be limited to activities that do not require reclamation, unless the operation had established grandfathered uses or valid existing rights on October 21, 1976. The grandfathered uses and valid existing rights are protected under the IMP. Closing the WSAs to non-grandfathered mining requiring reclamation would prevent minor to major adverse effects to wilderness characteristics. Such effects could include new roads, facility construction, and significant ground disturbance.

All WSAs are 'Closed' to saleable mineral disposal. This action would prevent minor to major adverse effects to the wilderness characteristics such as new roads, facility construction, and significant ground disturbance.

BLM would acquire private lands within WSAs with unique characteristics of the geographic area (e.g., historic resources, ecologically important areas, abandoned railroad alignments). This action would result in minor to moderate benefits to wilderness characteristics. Not only would more wilderness characteristics be acquired, but also they would be protected from potential disturbance by construction. WSAs, ACECs, WSRs, and other special management areas would be designated for retention in federal ownership. This action would prevent the loss of wilderness characteristics.

Lands acquired within or adjacent to WSA boundaries are not subject to the IMP but would be managed to protect their wilderness characteristics. This action would have minor to major benefits because more acres of wilderness characteristics would be secured and the land would be managed to protect these values.

Vegetation management actions implemented to meet land health standards would continue, where allowed under IMP guidelines, to restore areas to more natural conditions than currently exist. These actions would improve wilderness characteristics. In the short term they might degrade wilderness characteristics by damaging or charring vegetation and leaving indications of mechanical plantings. But in the long term they would benefit vegetation and visual resources within WSAs.

Other actions under this alternative affecting wilderness characteristics include the following:

- Conducting fuel-reduction treatments on the 1,734 forested acres of Tunnison WSA;
- Building or rebuilding 60 to 80 miles of fencing to improve livestock distribution to maintain and enhance land health;
- Fencing riparian/wetland areas (springs and seeps) and creeks where current livestock management is not meeting or making progress toward meeting properly functioning condition or the land health standards.

Under the Preferred Alternative, Willow Creek and Lower Smoke Creek would not be recommended as suitable for wild river designation and would not be protected from the damage of impoundments and locatable mineral mining.

In summary, some actions might affect the wilderness characteristics of the WSAs. But these effects would be determined during implementation-level planning. All actions would be held to the IMP's nonimpairment criteria and minimum tool requirements, which would avoid moderate to major adverse effects. In addition, some projects might result in short-term adverse impacts to the wilderness characteristics. But the goal of the project would be to benefit wilderness characteristics in the long term. The interdisciplinary NEPA analysis would determine if these short-term effects are justified. Overall, PRMP-level decisions implemented under the Preferred Alternative would have negligible adverse and minor to moderate benefits to the WSAs.

4.15.5 Cumulative Effects

The area of analysis for cumulative effects relating to WSAs includes the land areas within the WSAs. The baseline for analysis consists of the inventories detailed in the California Statewide Wilderness Study Report (BLM 1990) and the Nevada BLM Statewide Wilderness Report (BLM 1991).

Management under the IMP has avoided any past actions that would have a cumulative effect on the wilderness characteristics of the WSAs.

No proposed actions under the Preferred Alternative would adversely affect the WSAs, as implementation-level planning includes an interdisciplinary approach. The interdisciplinary approach would use the IMP to analyze all proposed actions and their potential effects to ensure that wilderness characteristics are not adversely affected.

Future actions would be analyzed by an interdisciplinary team using the Interim Management Policy to ensure that wilderness characteristics are not harmed by any proposed actions.

4.15.6 Mitigation Measures

The Preferred Alternative would not result in adverse effect on the wilderness characteristics that would support the designation of the WSAs as wilderness. Therefore, mitigation measures are not needed at this level.

4.15.7 Unavoidable Adverse Impacts

Unavoidable adverse impacts could result from illegal OHV use, which destroys or disturbs wilderness characteristics.

4.15.8 Short-Term Uses Versus Long-Term Productivity

The Preferred Alternative would not result in short term or long term major adverse effect to the wilderness characteristics that would support the designation of the WSAs as wilderness.

4.15.9 Irreversible and Irretrievable Actions

No irreversible or irretrievable actions included in the alternatives would affect WSAs.

4.16 Potential Effects on Travel Management

BLM administers motorized and non-motorized travel access on lands in the field office area. This section describes the direct, indirect, and cumulative effects on travel resulting from implementation of the Preferred Alternative.

4.16.1 Methodology and Assumptions

The modes of travel considered in this analysis included the following:

- 4WD vehicles,
- all-terrain vehicles,
- motorcycles,
- snowmobiles,
- watercraft,
- foot,
- bicycles, and
- livestock.

The travel route network consists of:

- state highways,
- county roads,
- 4WD roads,
- non-motorized trails,
- lakes, and
- reservoirs.

In determining potential effects to the travel route network, the baseline is the road inventory that was conducted in 2002. All resource management decisions were evaluated to determine if they would affect this travel route network.

4.16.2 Incomplete or Unavailable Information

All the information required to analyze the effects of resource management decisions at the PRMP level was available.

4.16.3 Analysis

In evaluating the effects of the resource management decisions, the following assumptions were made:

- The analysis considered effects on travel management and access *adverse* if they would restrict or eliminate public access.

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- The analysis considered effects on travel management and access *beneficial* if they would increase or establish public access.

The levels of effects used in this analysis are defined as follows.

Negligible: The extent of public access would change, but the change would be so small that it would not be of any measurable or perceptible consequence.

Minor: The extent of public access would change, but the change would be small and, if measurable, would be highly localized.

Moderate: The extent of public access would change, and the change would be measurable but would remain localized.

Major: The extent of public access would change, and the change would be perceptible, measurable, and widespread.

4.16.4 Impacts Common to all Travel Management

Exclosures would be constructed to protect cultural resources, improve wildlife habitat improvement, and restore riparian areas. These actions would eliminate public access into the fenced areas except by foot and would inflict minor adverse impacts if any exclosures are in areas 'Open' to OHV use. These actions would only negligibly affect access in areas where motorized travel is 'Limited to Designated Routes' because such travel would already be limited to the roads. If the fenced areas include designated routes, public access would be maintained.

Road closures during prescribed fires or wildland fire suppression would only negligibly impair travel access.

Management activities would be restricted in all perennial and intermittent drainages, where these activities would disturb watershed function or processes. Activities that compact and damage soils (e.g., grazing, OHV use, maintenance activities) would be limited to periods when soils are dry and firm enough to mechanically support the activity and resist compaction damage. Negligible to minor adverse effects would result from these restrictions in areas designated as 'Open'. Travel access would not be affected in areas designated as 'Closed' or 'Limited to Designated Routes'.

Lockable vehicle barriers would be installed in accord with the Cleghorn Nesting Territory Habitat Management Plan (Hawks 1982) on roads providing access to the area near the Cleghorn bald eagle nest. The barriers would restrict public access from January 1 to August 31. This action would negligibly block access because other roads going to the same area would not be closed.

OHV use in the habitat of *Loeflingia squarrosa* var. *artemisiarum* would be 'Limited to Designated Routes'. This action would eliminate motorized travel access into these areas. It would negligibly impair access if these plants are in designated 'Open' areas. But this action would not affect areas 'Limited to Designated Routes' because motorized travel is already limited to roads or trails. Non-motorized travel would not be affected.

Modifications to the travel route network such as road building, re-routes, and hill climb development would be subject to VRM considerations in the planning process.

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VRM restrictions would disrupt the travel network from a negligible to a minor extent by possibly requiring that the route or hill climb be located in a less desirable place.

All land ownership adjustment transactions, including acquisitions and disposals, would maintain or improve public access. This decision would have negligible to major benefits, depending on the transaction. Acquiring easements from willing landowners to gain access to public lands would have negligible to major benefits, depending on the easement acquired.

Issuing new ROW authorizations might have negligible benefits to public access if new roads are built or major benefits to public access if BLM authorizes the county to build a new highway.

89,397 acres would be designated as ACECs. With a few exceptions where motorized travel is allowed on designated routes, this action would eliminate motorized travel access within these areas. But the effect would be negligible because motorized travel is already limited to the roads in those areas.

Acquiring private lands from willing sellers along two creeks within ACECs would have a minor benefit to public access at these sites.

- Willow Creek (along the creek, especially at the sheep bridge site)
- Lower Smoke Creek (above and below the BLM lands).

The IMP (BLM 1995) requires that unauthorized routes in WSAs be obliterated. This decision reaffirms congressional direction and BLM policy to restrict motorized and mechanized uses to existing roads and ways within WSAs. Eliminating motorized public access to these areas would impair motorized access to a minor degree. Maintaining areas for non-motorized travel would have minor benefits

Securing public title or access to abandoned railroad grades within the field office area would have minor to major benefits. Securing an easement on a short section of a railroad grade would be a minor benefit. The acquisition of key parcels of land upon which the significant railroad grades are located would be a major benefit to public access.

4.16.5 Analysis of the Preferred Alternative

4.16.5.1 Motorized Uses

Under the Preferred Alternative, 419 acres would be designated as 'Open' to motorized travel, and about 74% of the field office area would be 'Limited to Designated Routes'. Approximately 26% of the field office area would be 'Closed' to motorized vehicle use. These area designations would not restrict non-motorized travel but apply only to motorized use.

Mechanized use in WSAs is 'Limited to Existing Roads and Ways' under BLM policy. This decision would restrict motorized travel and would have a moderately adverse effect.

Within the field office area, all of the roads and trails (1,700 miles) that were located during the 2002 route inventory would be designated for use by 4-wheel drive vehicles, motorcycles, all-terrain vehicles, or some combination of all three types. The designations would be based on their current use and design. Negligible adverse impacts would result from this decision because once a travel route is designated for a specific type of vehicle; other types of vehicles cannot use the road or trail.

This designation would restrict some types of motor vehicles from certain roads or trails. But effects would only be negligible because the road or trail design usually restricts the use.

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About 15 of miles road and trails designed for motorized use would be built. This decision would have a minor benefit to motorized travel.

The Preferred Alternative would seasonally close 35 miles of roads designed for motorized use. This decision would have a minor adverse effect on motorized travel.

About 45 miles road and trails designed for motorized use would be permanently 'Closed' within the ROS 'Primitive' areas designated under the Preferred Alternative. This decision would have a moderately adverse effect on motorized travel. The closures proposed are dead-end roads extending into WSAs.

Over-the-snow vehicle travel would be 'Open' to the entire field office area except for areas 35 miles designated as 'Closed'. This decision would result in minor adverse effects to snowmobile travel only. The Preferred Alternative would allow snowmobiles to cross the Susan River on the Bizz Johnson Trail where the trail crosses the river west of the Devil's Corral Trailhead. This decision would moderately benefit snowmobile travel by providing access across the Susan River.

4.16.5.2 Non-Motorized Uses

The Preferred Alternative proposes the construction of 264 miles of new non-motorized trails. Building new trails would be a minor to major benefit, depending on the trail location, because it would create new travel access for enthusiasts who prefer to travel on trails rather than cross country. In addition, the development of the Modoc Line would be a moderate to major benefit because it would create non-motorized travel opportunities between population centers in Lassen and Modoc Counties. Non-motorized travel between Susanville and Alturas, California, is now limited to the shoulder of a state highway.

4.16.5.3 Other Uses

Travel by watercraft would not be restricted on Eagle Lake and Dodge Reservoir. Only human-powered watercraft and electric trolling motors would be allowed on Buckhorn and Round Corral reservoirs. Travel on Upper and Lower Biscar Reservoirs and the Susan River would be limited to human-powered watercraft. This decision would result in minor adverse effects to motorized travel on the restricted reservoirs.

The Recreation Opportunity Spectrum (ROS) decisions would affect motorized travel at the following levels:

Primitive – 23%: Within 'Primitive' areas, motorized vehicle travel is not allowed. About 58 miles of roads would be 'Closed' as a result of this decision. (See effects to motorized travel under this action.)

Backcountry – 66%: 'Backcountry' under the Preferred Alternative combines 'Semi-Primitive Non-Motorized' and the 'Semi-Primitive Motorized' categories. Within the 'Backcountry' areas, motorized vehicle travel would not be allowed except by permit. The ROS category restricts motorized travel to the existing or designated routes. But so do the travel management decisions under this action; therefore, this decision would have no adverse effects.

Roaded Natural – 11%: In 'Roaded Natural' areas, motorized travel would be limited to corridors along the existing or designated routes. The ROS would not affect public access in these areas.

4.16.5.4 Summary of Effects of the Preferred Alternative

The effects to travel access from decisions include negligible to minor adverse impacts from actions inherent to managing livestock grazing, riparian areas, cultural resources, wildlife habitat, visual resources, and sensitive and endangered species management as well as moderately adverse effects from designating seven new ACECs.

Land and easement acquisitions would provide negligible to major benefits to both motorized and non-motorized travel depending on the land adjustment. Adverse impacts to non-motorized travel would be negligible.

Restricting OHVs to designated routes would result in beneficial effects by protecting the environment, enhancing existing non-motorized recreation experiences and reducing user conflicts. Building new trails would also result in minor to moderate benefits to non-motorized travel.

The effects of other actions to motorized travel would result in moderate adverse effects due to the following:

- temporarily and permanently closing routes,
- switching to a designated travel route network, and
- eliminating cross-country motorized vehicle access.

4.16.6 Cumulative Effects

For cumulative effects to the travel route network, the baseline is the road inventory conducted in 2002 and includes private and National Forest-administered land adjoining BLM-administered land in the field office area.

No past actions since the 2002 inventory have cumulatively affected the travel route network. Also, no known present actions on private land would adversely affect travel opportunities. Lassen and Plumas National Forests are engaged in travel management planning, which would change the motorized travel area designations on most of the land administered by these two forests from 'Open' to 'Limited to Designated Routes'.

The proposed decisions which would cumulatively affect travel access in this planning effort are the following:

- The change in motorized travel area designations from 'Open' to 'Limited to Designated Routes' on BLM land in the field office area.
- A total of 45 miles of roads would be 'Closed' within the proposed ROS 'Primitive' areas. Up to 264 miles of non-motorized trails would be built in the field office area. 89,397 acres would be designated as ACECs.
- No reasonably foreseeable future actions would cumulatively affect travel access.

4.16.7 Mitigation Measures

The Preferred Alternative would not result in a major adverse effect to travel access. Therefore, mitigation measures are not needed at this level.

4.16.8 Unavoidable Adverse Impacts

There are no unavoidable adverse impacts.

4.16.9 Short-Term Uses Versus Long-Term Productivity

No short-term uses of the travel network would affect long-term productivity.

4.16.10 Irreversible and Irretrievable Actions

There are no irreversible or irretrievable actions.

4.17 Potential Effects on Vegetation

This section describes the direct, indirect, and cumulative effects on terrestrial vegetation. The description of effects on vegetation in this section will focus on the six major vegetation alliances:

- Juniper Woodlands
- Aspen/Oak/Mountain Mahogany Woodlands
- Sagebrush-Steppe (with or without juniper encroachment)
- Perennial Grasslands
- Annual Grasslands
- Riparian/ Wetlands

Vegetation alliances dominated by commercial forest species are discussed in “Forestry”, Chapter 4.6. “Noxious Weeds” and “Special Status Species” are discussed separately in Chapters 4.17 and 4.18, respectively.

The goal for vegetation management under the Preferred Alternative is to restore and support healthy ecosystems in conjunction with expected land uses, vegetation and wildlife habitat needs, and riparian conservation strategies. Allowable land uses and activities will emphasize ecosystem sustainability and health throughout the planning area. In addition, proposed actions incorporate fire’s role in the ecosystem and establish guidance for fire suppression and fuels treatments, particularly in the wildland urban interface, and in the sagebrush-steppe ecosystem. Ecosystems will be managed to re-introduce an approximation of natural disturbance cycles through the use of prescribed fire, mechanical, and other methods.

4.17.1 Methodology and Assumptions

Vegetation health results from a complex interplay of climate, geology, landform, soils, microbes, animals, land uses, and management activities. Important vegetation factors include: species presence, distribution, density patterns, seral stages, alliances and associations, and vegetation health.

Impacts to terrestrial vegetation and biodiversity are most simply defined using a combination of biotic features such as structure and function, stable states of vegetation alliances, associations and ecological sites, and abiotic factors such as soil and climate that influence those features. A description of key influencing factors follows:

Elevation/Precipitation: Precipitation zones within the area follow elevational changes. Impacts occurring above 5,500 feet elevation are mitigated (minor to moderate impacts) by the 10 + inches of precipitation. Those impacts that occur below 5,500 feet are normally more severe (moderate to major impacts) because the 6 to 8 inches of precipitation do not allow vegetation to quickly recover, or is success guaranteed for recovery efforts.

Soil: Soil depth, texture, and mineral composition influence the function and structure of alliances and associations. These soil features most directly influence the function, structure, production, and potential of ecological sites. Impacts to vegetation on deep loamy soils in a high precipitation zone normally have a less adverse impact (minor to moderate) than adverse (moderate to major) impacts to vegetation in shallow, more clay-based soils. Adherence to a policy of “no net loss of soil productivity” also influences

impacts to vegetation. With a “no net loss of soil productivity” policy in place and being followed, there should be no net loss of terrestrial vegetation across the landscape.

Structure: Multi-layered native perennial vegetation such as a tree or shrub overstory with multiple understories of deep rooted shrubs, perennial forbs, and grasses provides the greatest vegetation diversity and resilience to impacts. A mountain big sagebrush/perennial forb/perennial grass association or ecological site on deep loamy soils within a high precipitation zone is less adversely affected (minor to moderate) than a Wyoming big sagebrush association with a mid- to shallow-rooted perennial forb/perennial grass understory (moderate to major). Replacing the perennial grass understory with shallow-rooted annual grasses normally increases the severity of potential impacts from one level to the next. A moderate impact becomes a major impact, and a minor impact increases to a moderate impact.

Function: Terrestrial vegetation performs functions beyond providing cover for wildlife. Several forb species provide nitrogen fixing in the soils where they grow, increasing the health of the vegetation association and ecological site.

Biological soil crusts, dominated by mosses in this area, perform several functions, including soil surface protection, increasing moisture infiltration, and nitrogen fixing. A healthy mountain big sagebrush association with a deep-rooted perennial forb and grass understory normally has such great diversity of species that litter replaces biological soil crusts functions.

A Wyoming big sagebrush association with mid- to shallow-rooted perennial forbs and grasses requires biological soil crusts to retain the soil surface, aid in nitrogen fixing, and provide an increased infiltration of moisture. Within lower elevation and precipitation areas biological soil crusts are important features whose presence, absence, or removal is a critical factor in evaluating impacts.

Stable States: Conversion of perennial vegetation alliances, associations, and ecological sites to annual vegetation or an annual vegetation understory is most often found in lower elevation and precipitation sites. These annual vegetation sites have crossed an ecological threshold. Within this scenario, impacts that perpetuate annual vegetation domination or increase are considered a major impact. In higher elevation and precipitation sites the influence of annual vegetation is more easily corrected naturally or with human intervention. The vegetation alliance, association, and ecological sites would normally function dynamically as it shifts within normal ecological stability.

Two events in the last century have significantly altered the vegetation composition and fire frequency in the Great Basin: introduction of domestic livestock and introduction of noxious weeds. Introduction of livestock in the Great Basin resulted in the overgrazing of rangelands, which weakened native plants and degraded rangelands. Degradation of the rangelands subsequently favored the spread of noxious weeds adapted to shorter duration disturbance regimes.

4.17.2 Land Health Assessment Ratings

Terrestrial vegetation within the ELFO area has been classified into four land health ratings from data collected as part of BLM’s LHA:

- ‘Healthy’ terrestrial vegetation alliances, associations, and ecological sites.
- ‘Healthy, Lacking Key Attributes’ terrestrial vegetation alliances, associations, and ecological sites.
- ‘At Risk’ (of becoming ‘Unhealthy’) alliances, associations, and ecological sites.
- ‘Unhealthy’ alliances, associations, and ecological sites.

Results from data collected as part of BLM's LHA indicate that two main factors are responsible for plant communities rated as 'At Risk' of becoming unhealthy:

- The degradation of function/structural groups, and
- The presence of invasive plants (nonnative invasive species, predominantly cheatgrass and medusahead, as well as the encroachment of native western juniper).

Overall, health ratings show that plant mortality/decadence, litter amount, annual production, and reproductive capability of perennial plants are 'Healthy', but trending away from 'Healthy' toward an 'At Risk' state. Surface disturbances associated with resource management actions have the potential to remove or substantially disturb and change the species composition in vegetation communities, directly affect special-status plants and their habitat, and promote the introduction or spread of noxious weeds and invasive species.

Management objectives for certain land uses (i.e., livestock grazing, wildlife habitat use, energy and mineral exploration and production, rights-of-way, outdoor recreation, timber production) sometimes conflict with the physical and biological requirements of native and desirable non-native terrestrial vegetation. These conflicts will be resolved through one of the following interventions:

- managing uses to benefit terrestrial vegetation,
- adhering to the "no net loss of soil productivity" policy,
- stabilizing and rehabilitating vegetation after disturbance,
- closing disturbed areas to use until they have recovered to a healthy condition, or
- mitigating permitted projects, activities, and leases.

4.17.3 Incomplete or Unavailable Information

LHAs have been completed for more than 200,000 acres of the ELFO area. The results provide valuable information about the specific area the data was collected in. The exact land health rating (i.e., 'Healthy', 'Healthy/Lacking Key Attributes', 'At Risk', and 'Unhealthy') of all areas within the field office has not yet been verified. As more land health assessments, watershed-based implementation plans, and specific project clearances are completed, site-specific data gaps will be filled in. There is enough information to analyze impacts to terrestrial vegetation within the scope of this PRMP.

4.17.4 Analysis

Effects on vegetation resources can be direct (i.e., the immediate removal of vegetation or communities) or indirect (i.e., effects become evident in the future because of slow changes). In addition, direct and indirect effects can be short term (i.e., effects have immediately observable changes) or long term (i.e., changes occur over many months or years and are not immediately observable). Direct effects on vegetation resources can occur as a result of ground disturbance implemented to achieve a desired action. Indirect effects on vegetation communities can occur as a result of a multitude of factors relating to a management action, environmental conditions, or both. When describing effects on vegetation resources, existing data may allow only a qualitative assessment of the effects of a particular action because the effects occur on a landscape level and are not easily measured (e.g., in terms of acreages affected). Where possible, this document describes effects quantitatively or provides a relative description of effects.

This analysis defined the levels of effects on terrestrial vegetation management as follows:

Negligible: No native vegetation would be affected, or some individual native plants could be affected as a result of the alternative, but native plant communities would not be affected. The effects would be on a small scale.

Minor: The action would affect some individual native plants and also affect a relatively minor portion of the plant community. The use of standard operating procedures to offset adverse impacts, including special measures to avoid affecting terrestrial vegetation, would be required and would be effective.

Moderate: The action would affect many individual native plants and would also affect a sizeable segment of the plant community over a relatively large area. The use of standard operating procedures to offset adverse effects could be extensive, but the procedures probably would be successful.

Major: The action would have a considerable effect on native plant populations, and the effects would cover a relatively large area. The extensive use of standard operating procedures would be needed to offset the adverse effects, and their success would not be guaranteed.

4.17.5 Impacts Common to All Vegetation Alliances and Plant Communities

Management actions for the following resource programs would result in specific minor to moderate adverse effects, and substantial beneficial effects to vegetation resources: fire and fuels; soil and water resources; vegetation and noxious weeds; forestry and juniper control; livestock grazing; wild horse and burro use; energy and minerals or utilities development; cultural resources, recreation, and wildlife habitat management.

4.17.5.1 Wildlife Habitat Management

Proposed vegetation management actions will result overall in viable, healthy, productive, and diverse populations of native and desired plant and animal species—including special-status species. Proposed wildlife habitat management actions identified in Section 2.25 *Wildlife and Fisheries* are consistent with many actions identified for vegetation management. Actions focus on protecting, enhancing, and restoring the diversity and distribution of desirable communities; providing for their continued existence and normal function; and restoring degraded landscapes and decadent communities. In most cases, the desired habitat qualities for special-status and native wildlife species are identical to the qualities desired for healthy vegetation communities. Management of vegetation communities for the benefit of wildlife habitat is therefore considered a beneficial effect on vegetation communities.

4.17.5.2 Wildland Fire Management and Prescribed Burning

Periodic natural fire cycles have been a major factor in shaping the composition, structure, and distribution of all plant communities within the planning area. Today, in an effort to protect human life and property, most fire starts are aggressively suppressed. Most researchers agree that reintroduction of fire into ecosystems is essential to help maintain bio-diversity and ecological integrity of fire adapted systems.

The Review and Update of the 1995 Federal Wildland Fire Management Policy (USDA/USDI 2001) states that fire is a natural process and that it must be reintroduced into the ecosystem on a landscape scale. Reintroduction of fire (or treatments that mimic fire) on the landscape generally is considered to result in a beneficial effect on fire-adapted vegetation communities in the long-term. The long-term goal

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of the fire management program is to maintain a variety of seral stages across all vegetation communities on the landscape.

Wildfires typically result in more adverse effects than prescribed burns, because wildfires generally cover larger areas, remove more vegetation, and burn hotter than controlled burns. High-heat burns also can damage soil organisms, microbiotic crusts, and plant root systems. This could result in long-term adverse effects on vegetation communities by reducing future plant recruitment and growth rates.

Aggressive suppression of wildland fires will favor later successional, non-fire-dependent communities and could lead to greater potential for future high-heat fires. In some cheatgrass-invaded sagebrush communities, wildfire can result in type conversion, when newly burned areas are colonized from adjacent areas already invaded by cheatgrass (John Glenn, 2004). Rehabilitation efforts will be implemented following wildfire to minimize invasion by cheatgrass. Rehabilitation, stabilization, and restoration of burned lands are considered beneficial actions that help to reestablish vegetation communities, protect soils, and minimize the potential for noxious weed and annual invasion (Zeilinski 2004).

It is widely accepted that a reduction in the current levels of juniper encroachment in sagebrush communities can improve wildlife habitat, increase water quality and available soil moisture, and result in more productive rangelands—creating a beneficial effect on land health (Miller, Bates, Svejcar, Pierson Jr., Eddleman, 2005). Juniper management would focus on mechanical and prescribed fire treatments, with operations designed to improve ecosystem health and to protect water quality and wildlife values. These management actions would result in short-term disturbance to vegetation with net beneficial effects of restoring the native plant community over time.

Proposed fuels management actions would include a variety of treatment types, including an emphasis on prescribed burning, which would result in beneficial effects on vegetation communities by creating a mosaic of disturbance regimes, seral stages, and stand structures. Potential adverse effects associated with prescribed burns include a long-term decrease in sagebrush species, a short-term increase in annual weeds, and a long-term increase in grass species (especially cheatgrass). Careful planning of the fire prescription will determine the appropriate outcome of each individual burn. Prescribed fire would result in moderate long-term beneficial effects on sagebrush-steppe communities by increasing the age and species diversity within, promoting thicker vegetation growth, enhancing nutrient cycling, and resulting in fewer decadent stands of trees and shrub communities.

General effects of prescribed fire on vegetation include:

- Immediate reductions in the total amount of vegetation, followed by rapid re-growth. This increases density and vigor of vegetation, especially grasses and forbs. Species composition and proportions may change in the long term. Recolonization begins with a high proportion of herbaceous species. Later, over a period of years, woody species (shrubs and trees) emerge as increasingly dominant through the process of succession.
- Reduction of some fire intolerant species and increases of some fire-tolerant or fire dependant species. Shade-intolerant species replace shade tolerant species in the short term.
- Changes in nutritional and physical characteristics of the soil and corresponding effects on plant growth due to a potential nutrient “flush,” particularly phosphorus and potassium. Long-term net loss of nutrients and organic matter may occur with fire.
- Reduction in the potential for intense wildfire. Prescribed burning reduces surface and ladder fuels in a controlled fashion. Wildland fire in unmanaged or fire excluded areas may have severe and long-term effects on vegetation and soils (Neary, Ryan, DeBano, 2005).

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- Potential for introduction or spread of noxious weeds and other invasive early seral or non-native species. Examples would be cheatgrass, mustards, thistles, and rabbitbrush. Site evaluations and application of precautionary measures such as avoidance, proper timing, weed control, native seeding, etc. would minimize this risk (Bates, Miller, Sharp, 2005).
- Changes in livestock and wildlife forage use patterns and animal distribution that would affect vegetation. Succulent plant palatability increases after burning. More open habitats attract pocket gophers, which increases effects on soils and plants.

4.17.5.3 Livestock Grazing and Wild Horse Use

Existing policy directs BLM to properly manage livestock grazing in order to meet land health standards. Individual grazing allotments will be evaluated for several Standards & Guidelines based on ecosystem and watershed health criteria. If grazing is not meeting these criteria, then livestock management will be adjusted (i.e., adjusted AUMs, season of use, and/or grazing intensity).

Grazing by domestic livestock and wild horses can affect soil, vegetation, and ecological processes. Effects on soil depend upon the intensity, duration, timing, and frequency of the grazing event, and the type of soil. Effects include compaction (which can decrease water infiltration and increase erosion) and some local displacement which can increase erosion from wind and water. Grazing can also result in beneficial effects by incorporating organic material and seeds into the soil, increasing nutrient cycling and germination of native plants. Grazing also reduces overall plant biomass, compared to lands that are not grazed, hence reducing the chances for catastrophic wildfires (Smith, 2000).

Grazing by livestock, wild horses, wildlife, rodents, insects, or fire will cause defoliation of individual plants. This, in turn can have two consequences: 1) reduced leaf area and thus reduced photosynthesis, or 2) increased photosynthesis if defoliation removes dead leaves that were shading and retarding new growth. By carefully managing the timing, intensity, duration and frequency of defoliation treatments, grazing management can promote increased frequency of one plant form over another. However, where animals are allowed to graze for too long of time in one area, individual plants will become over stressed from repeated defoliation, and will become weakened over time. Providing rest or deferment (rest during a prescribed period) is important during the growing season to allow plants to recover from grazing defoliation, in order to remain vigorous and capable of reproducing.

Grazing by livestock and wild horses primarily affects sagebrush-steppe associations, grassland associations, and riparian/ wetland associations. Some localized overuse of forage will most likely occur, primarily in riparian and wetland areas and near watering areas. When forage plants are overused, desirable native species can be replaced by less desirable species that produce little or no forage value. A decline in soil condition, plant cover, and species composition also can encourage the invasion and growth of noxious weeds. Early spring grazing also would adversely affect vegetation resources by the trampling of wet soils, uprooting of seedlings, and damage to mature plants.

Wild horses and burros can cause a relatively large effect on vegetation communities if the herds are not managed. They typically congregate around riparian areas, wetlands, and springs. Because they are onsite all year, they can over-utilize these sites, creating adverse effects on vegetation resources. Generally, management actions that are intended to prevent potential effects of wild horses and burros (i.e., fencing off springs and riparian areas) are identified under standard management measures for other resource management programs. These actions would reduce or prevent effects of wild horses and burros in certain habitats and locations (such as springs and riparian areas), but effects would persist in other areas in spite of the application of standard management measures. Although most existing horse herds are currently above the existing AML, the proposed action is to manage herds at or below AML. By definition,

maintaining horses within the established AML range will cause no net beneficial or adverse effect on vegetation resources.

4.17.5.4 Forestry, Fuels Treatments, and Juniper Control

Heavy equipment used in thinning operations for forestry and woodland management would cause some soil compaction and displacement with corresponding effects on plant survival and growth. Compaction and displacement would be minimized by designating skid trails, specifying low-impact equipment, logging over snow and/or frozen ground, suspending operations during periods of high soil moisture content, and closely monitoring operations. Compaction could also be reversed on some sites by scarifying skid trails, temporary roads, and landings. Compaction also diminishes gradually over time through natural processes such as freeze and thaw action, root penetration and other biotic activity.

For some early successional plant species, soil disturbance during mechanized harvest activities would have the effect of preparing a receptive seed bed by exposing mineral soil and reducing plant competition. For these species, disturbance aids in seed germination and survival. Removal of trees, shrubs, logs, and organic matter would reduce shade and protective cover, altering the physical and micro-climatic characteristics of the site that affects plant habitat. Wildlife and micro-biota (plant and animal) composition would also change, which would further affect plant communities.

The response of the understory plant community to juniper cutting varies across a variety of sites and treatment techniques. Most of the published literature concerning juniper ecology generally supports an inverse relationship between overstory juniper canopy cover and understory plant cover. Closed juniper stands may virtually exclude all herbaceous vegetation (Tausch and Tueller, 1998). Increases in western juniper density appear to have the greatest effect on plant community composition and structure on sites with shallow soils or south facing slopes. On these drier sites, canopy cover of fully developed juniper woodlands frequently ranges from 20 to 30 percent with less than five percent cover of shrubs, grasses, and forbs, and nearly 70 percent bare ground (Miller and Wigand, 1994). Dramatic declines in understory vegetation and diversity are observed when canopy cover reaches 30-35 percent, especially when there is a hardpan 12 to 24 inches below the surface (Borman, 1995). Most of the literature attributes the low understory cover on these sites to competition with juniper for limited water and nutrients. Plant species richness and seed reserves also decline as juniper dominance increases on a site (Koniak and Everett, 1982). Overall productivity of a site may be decreased when bare ground allows overland flow of water and erosion to carry away topsoil nutrients.

4.17.5.5 Site Rehabilitation and Restoration

Restoration projects using mechanical treatments are designed to produce long-term positive ecological effects. Mechanical vegetation treatments are implemented to achieve two main objectives: 1) restoration of plant communities, habitats, and watersheds; and 2) reduction of natural fuels for protection of life and property. Depending on the specific treatment, equipment used, site conditions, and plant community involved, these activities have the potential to improve long-term condition, composition, and structure of vegetation. Most of the long-term vegetation changes occur with a response to a reduction of plant competition for a limited supply of sunlight, water, nutrients, and physical space.

Site rehabilitation and integrated weed management is often needed where a ground disturbance has occurred. Methods of rehabilitation of damaged sites would include mechanical, manual, chemical, and biological techniques. Manual and biological effects on vegetation will not be discussed because they are relatively minor in terms of acreage treated compared to treatments using motorized/mechanical methods. Site rehabilitation and management of noxious weeds and invasive annuals is commonly needed where ground disturbance such as mining, logging, road construction, utilities and other rights-of-way, and

visitor-created roads/ trails has occurred. Natural events such as wildland fire and soil erosion would also be considered for rehabilitation.

Rehabilitation of disturbed sites and management of weeds restores overall ecosystem and watershed health with spin-off benefits to all other resources including soils, water quality, vegetation, wildlife, and visual quality.

4.17.5.6 Soil and Water

Maintenance of healthy productive soil is required to meet management goals for vegetation. The goals of the soil resources management program are to promote long-term soil health and productivity, and to provide earth materials for activities (i.e., roads, trails, and livestock water, facilities). To meet these goals, a variety of standard management measures would be applied to all project activities, including: incorporation of livestock grazing rest in pastures or use areas in accordance with new projects such as prescribed burning or seeding, decrease in hot season-of-use in riparian areas, intensive woody riparian plantings, vegetation manipulation, upland erosion control structures, and installation of drainage structures. In addition, gathering wild horses or adjustment of AML numbers, maintenance of existing exclosures, prescribed burning or mechanical vegetation treatment, soil treatment or seeding, installation and maintenance of existing erosion control structures, closure and rehabilitation of selected roads, minimizing new road construction, and minimizing ground-disturbing activities (such as heavy machinery operation near perennial and intermittent drainages or where soils are not in PFC) could affect vegetation communities.

Some soil management measures may result in minor, direct, short-term effects on vegetation resources through surface disturbance and subsequent vegetation removal, the long-term result of these actions would be an increase in soil productivity and site stability. Increased soil productivity and site stability would benefit vegetation resources through maintaining or improving hydrologic function, chemical and biological soil development processes, and nutrient cycling.

Proposed water resources management actions involve managing and protecting streams (and associated riparian and wetland communities), wetlands, and springs by implementing a variety of measures (including implementing management practices, adjusting current grazing management strategies, and road closure activities). These management actions would result in long-term benefits to selected riparian and wetland systems by allowing vegetation diversity and structure to redevelop in selected systems. The increased availability of water along normally dry stream channels could result in an increase in the extent of riparian and wetland vegetation along the stream banks. Increases in levels of water and rates of flow through stream corridors also may benefit shrub associations located along the upland border of riparian areas.

In summary, water resources management actions would increase infiltration on upland sites, increase groundwater recharge, increase spring flow, reduce peak flows during flood events, and increase the stability of base flows during late summer and winter. Although some of the water resources management actions (particularly bioengineering measures) would result in direct short-term effects through surface disturbance or vegetation removal, the long-term result would be an increase in hydrologic function and sediment regime for water-dependent ecosystems. Therefore, the long-term effect of water resources management actions on vegetation, particularly riparian and wetland communities is expected to be beneficial.

4.17.5.7 Recreation

Surface disturbance activities associated with proposed recreation resources management are likely to result in minor site-specific effects to vegetation resources. Limitations on recreation activities (i.e., limits on OHV use) as part of special recreation management areas or within other special designations are anticipated to benefit vegetation communities by limiting potential ground disturbance.

Recreation management actions that would result in varying degrees of loss or short-term disturbance of vegetation communities include:

- Construction and public use of interpretive sites would result in direct and indirect disturbance or loss of sensitive native communities (riparian and wetland communities) that occur in or adjacent to the interpretive sites. Vegetation would be affected directly during construction of the interpretive facilities, by public use of these areas (trampling of vegetation) and by surface disturbances resulting in the spread of existing or introduction of new noxious weeds that could degrade the community.
- Establishment of trails that are planned for interpretive and tourism development could result in the loss or disturbance of vegetation communities.
- Construction of exclosures could result in both adverse and beneficial effects on vegetation communities by protecting resources that may co-occur with cultural resources sites.

The overall potential effects of these types of management actions to all plant associations are expected to be negligible to minor and short term because specific projects would involve the protection of sensitive vegetation communities and implementation of noxious weed prevention guidelines. Additionally, potential conflicts would be identified through an interdisciplinary process and appropriate actions would be taken to monitor, avoid, protect, or mitigate potential effects.

4.17.5.8 Energy and Minerals / Utility Corridors

Proposed energy and minerals actions and utility corridors could potentially result in both short-term and long-term effects on vegetation communities. These effects would result from direct removal of vegetation and indirect disturbances (e.g., the introduction or spread of noxious weeds).

Energy and minerals management actions could result in the following potential effects on vegetation communities:

- Expansion of existing or creation of new community pits could result in the disturbance or loss of native vegetation communities, including sensitive vegetation communities. This action also could result in the introduction or spread of existing noxious weeds that could further degrade the surrounding land health.
- Public collection of decorative rock (flat rock) in remote areas may involve driving vehicles outside designated roads. Impacts of flat rock collecting on vegetation are considered minor and can be managed through the permit issuance process, based on monitoring of collection sites.
- Energy and mineral exploration and development activities could result in the long-term disturbance or loss of vegetation communities. Overall, the severity of the effects on vegetation resources depends on the amount of the mineral extraction action, the location of the action, and the success of the reclamation efforts. Specific extraction activities would require individual permitting and NEPA analysis, which would identify appropriate measures to minimize effects and reclaim conditions following mining completion.

4.17.6 Analysis of the Preferred Alternative

The Preferred Alternative is expected to result in minor to moderate adverse impacts to vegetation, and moderate to major beneficial effects. The goal for vegetation management is to maintain and restore healthy ecosystems (where practicable) in conjunction with proposed land uses. Vegetation would be beneficially affected by a combination of treatments from the fire and fuels, livestock grazing, vegetation restoration, and wildlife habitat restoration actions.

Impacts from livestock and wild horse grazing, and recreation and travel activities would continue as described, but would be mitigated on a site-specific basis.

As identified above, effects to vegetation are generally indirect and long term, and are based on anticipated treatments subject to additional, site-specific analysis. Prescriptive treatments that will be utilized (individually or as a combination) to maintain or restore plant communities include:

- Controlled grazing by livestock and wild horses (deferment, time control, rest, AML)
- Mechanical treatments
- Prescribed fire
- Seeding or planting
- Forest Improvement Practices
- Riparian Improvement Practices
- Integrated Weed Management (IWM)
- Wildland Fire Management AMR

Table 4.17-1 shows the anticipated vegetation treatments by vegetation alliance, for each land health category.

4.17.6.1 Sagebrush-Steppe Communities

Healthy

Approximately 579,000 acres (64%) of big sagebrush and low sagebrush communities that are rated as 'Healthy' or 'Healthy, Lacking' would be maintained and improved through controlled grazing by livestock and wild horses. Areas that are in a healthy condition will be grazed in a manner that provides an opportunity for herbaceous perennial plant seedling establishment (grass and forbs), and facilitates understory vigor. Livestock grazing deferment or periodic rest would be required on 60 – 80% of all grazing allotments and 80 – 90% of all grazed lands annually. This will assure that forage plants and communities are allowed time to recover from grazing stresses. Anticipated results are an increase in grass and shrub vigor, which will aid in the recovery of the vegetative components of land health. In addition, providing rest or deferment will improve soil condition and organic matter, which will decrease the potential for establishment of invasive grasses and juniper, and may result in re-establishment of native grasses, forbs, and shrubs.

The Preferred Alternative promotes an ecological approach to the restoration of sagebrush-steppe and mixed shrub communities by approximating the natural fire régime in these fire-dependent alliances--plus other measures--to encourage succession toward the desired plant community. The appropriate management response to wildland fire suppression will be used to suppress wildfire in these 'Healthy' communities, resulting in an eventual improvement of fire regime condition class.

Table 4.17-1 Anticipated Vegetation Treatments by Vegetative Alliance and Land Health Rating

Vegetation Alliance	Healthy or Proper Functioning Condition		Healthy, Lacking Key Attributes		At Risk		Unhealthy or Non-Functioning	
	Acres	Treatment Type	Acres	Treatment Type	Acres	Treatment Type	Acres	Treatment Type
Coniferous Forest	14,000	Forestry Improvement	4,000	Forestry Improvement	4,000	Forestry Improvement	0	---
Juniper Woodlands	0	---	4,000	Appropriate Mgt. Response; Prescribed fire; Forestry Improvement	9,837	Appropriate Mgt. Response; Mechanical treatment; Integrated Weed Management	7,000	Appropriate Mgt. Response; Mechanical treatment; Integrated Weed Management
Aspen/Oak/ Mountain mahogany Woodlands	1,000	Controlled grazing (livestock and wild horses); Prescribed fire, Mechanical treatment	3,000	Controlled grazing (livestock and wild horses); Prescribed fire; Mechanical treatment	200	Prescribed fire; Mechanical treatment; Controlled grazing (livestock and wild horses)	0	---
Shrub-Steppe	279,000	Controlled grazing (livestock and wild horses); Appropriate Mgt. Response	300,000	Controlled grazing (livestock and wild horses); Appropriate Mgt. Response; prescribed fire	100,000 – 150,000	Prescribed fire; Mechanical treatment; Controlled grazing (livestock and wild horses)	4,000 - 8,000	^{2/} Integrated Weed Management; Seeding/Planting
Shrub-Steppe with Juniper Encroachment	6,000	Controlled grazing (livestock and wild horses); Prescribed fire, Mechanical treatment	16,000	Mechanical treatment, prescribed fire, juniper control	32,000	Mechanical treatment, Prescribed fire, juniper control	10,000	Mechanical treatment, Prescribed fire, ^{2/} Integrated Weed Management; ^{2/}
Perennial Grasslands	1,000	Controlled grazing (livestock and wild horses)	5,000	Controlled grazing (livestock and wild horses)	100	Seeding/Planting; Controlled grazing (livestock and wild horses); Integrated Weed Management	10- 50	^{2/} Integrated Weed Management Seeding/Planting;
^{1/} Annual Grasslands	0	---	3,000	Controlled grazing (livestock and wild horses); Integrated Weed Management	200 - 800	^{2/} Integrated Weed Management	500 - 3000	^{2/} Integrated Weed Management; Seeding/Planting;
Riparian/ Wetlands	120 (63 miles)	Controlled grazing (livestock and wild horses)	0	---	30 (34 miles)	Controlled grazing (livestock and wild horses); Riparian Improvement Practices; Integrated Weed Management	0	---

^{1/} Annual grasslands are communities previously dominated by perennial grasses, that have since degraded across an ecological threshold to a steady-state community comprised of non-native invasive grasses and forbs.

^{2/} Current technology is not available to successfully restore these lands to native perennial species.

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Wyoming big sagebrush occupies the more arid sites in the planning area. LHAs show that 29% of these are in 'Healthy' condition; Tisdale (1994) states that shrub canopy cover within Wyoming big sagebrush communities generally varies between 5-25%. Higher canopy cover occurs in communities in declining ecological condition containing few perennial herbs in the understory. Goodrich et al. (1999) found that once Wyoming big sagebrush reaches 15% canopy cover herbaceous understory production declines 3.8% with every 1% increase in sagebrush canopy cover. Sites approaching or exceeding 20% shrub canopy usually have been overgrazed and contain depleted understories. Wyoming sagebrush communities often contain a high percentage of bare ground and sparse but variable forb cover (Tisdale 1994). Perennial forb cover is usually <10% and highly dependent on amount and timing of precipitation (Kindschy 1991).

The Wyoming big sagebrush communities will be managed to maintain a shrub canopy of approximately 15% to 20%, with a diverse assemblage of forbs and grasses. This will result in a more diverse and vigorous community and improvement of habitat for wildlife (e.g., sage-grouse). The ELFO would manage sage-grouse habitat under the guidelines of the Buffalo Skedaddle Sage-grouse Conservation Strategy (Northeast California Sage-Grouse Working Group, 2006) (see Appendix H). Generally, this management would be similar to the management proposed for all other shrub communities (i.e., vegetation manipulation, habitat restoration, and protection of appropriate stands). Beneficial effects on sagebrush steppe and shrub communities are expected as a result of this management approach because it would prevent fragmentation of communities and would provide for their frequency, distribution, and ecological integrity across the landscape.

Mountain big sagebrush communities usually occupy higher elevation sites than Wyoming sagebrush. These cooler and wetter sites can provide important nesting and brood rearing habitat for sage-grouse, other sagebrush obligates, and other native wildlife species. Land health assessments show that 63% of these are in 'Healthy' condition. A well developed perennial grass and forb layer usually characterizes a healthy mountain big sagebrush community. Shrub canopy cover varies between 15-40% but can reach up to 50% in wetter communities with deep loamy soils and north aspects. This cover type, often the most preferred sagebrush type by sage-grouse during nesting (Gregg 1991), can provide excellent upland bird nesting cover, and an abundance of succulent forbs.

Low sagebrush (*Artemisia arbuscula* ssp. *arbuscula*) is the most common low sagebrush species in northwestern Nevada, and northeastern California. Sandberg bluegrass is the dominant herbaceous plant, forb species are usually diverse, and bare ground is commonly >50% (Passey et al. 1982). Land health assessments show that 77% of these are in 'Healthy' condition. The implementation of appropriate grazing management and appropriate management response to wildfires would result in maintaining shrub canopy cover between 5 and 20%.

Shrub height and herbaceous production is highly variable within this type. Low sagebrush communities would be managed to maintain the current healthy condition in order to provide excellent habitat for wildlife, particularly when it forms a mosaic with mountain or Wyoming big sagebrush.

At Risk

Land health assessments show that 28% of sagebrush-steppe associations are rated as 'At Risk'. These communities are typically characterized by the degradation of function/structural groups (perennial bunch grasses, perennial forbs and shrubs) and the presence of invasive plants (predominantly cheatgrass and western juniper). Approximately 11% of sage-steppe communities are lower elevation Wyoming sagebrush and low sagebrush communities that have been invaded by and are at risk of type-conversion to cheatgrass. These plant associations have a fire return interval of 10 years or less.

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There is a high potential for stand-replacing wildfires to totally convert these habitats (important for sage-grouse and pronghorn) to plant associations dominated by cheatgrass.

These areas will be grazed by livestock in a manner that provides an opportunity for herbaceous perennial plant seedling establishment (grass and forbs). Livestock grazing deferment or periodic rest will be required on 60 – 80% of all grazing allotments and 80 – 90% of all grazed lands annually. This will assure that forage plants and communities are allowed time to recover from grazing stresses. Anticipated results are an increase in perennial grass and shrub vigor, which will aid in the recovery of the vegetative components of land health. In addition, providing rest or deferment will improve soil condition and organic matter, which may result in re-establishment of native grasses, forbs, and shrubs.

These ‘At Risk’ communities are difficult to successfully restore back to a native plant community, especially at low elevations and precipitation zones (Alexander III, 2003). Tightly controlled livestock grazing, prescribed fire, and seeding of native plants – coupled with full suppression of high-intensity wildfires – can slow, and in some cases reverse, type-conversion to exotic annual grasslands. Herbicides and other chemical compounds effective in selectively controlling annual grasses may soon prove safe and effective for use on public lands (Dewey, 2003).

Approximately 17% of sage-steppe communities are rated ‘At Risk’ due to high levels of encroachment by western juniper. Juniper reduction in these areas would focus on mechanical and prescribed fire treatments on up to 32,000 acres, with operations designed to improve ecosystem health and to protect water quality and wildlife values. The response of the understory plant community to juniper cutting varies across a variety of sites and treatment techniques. Removal of trees, shrubs, logs, and organic matter would reduce shade and protective cover in the short term, altering the physical and micro-climatic characteristics of the site that affects plant habitat. Wildlife and micro-biota (plant and animal) composition would also change, which would further affect plant communities.

Selected areas for juniper cutting within the planning area would be expected to show an increase in perennial forbs and grasses. If perennials are sparse or if annual weeds were abundant before treatment, juniper reduction and associated ground disturbance may open the site to increased dominance by annual grasses and forbs (Evans and Young, 1985). Sagebrush-steppe restoration would result in short-term minor adverse effects on some native plants and special status species due to direct mortality from prescribed burns, herbicide application, or seeding (drilling) treatments. However, successful projects would lead to long-term moderate to major beneficial effects. Project-level design would help limit off-site impacts--such as adverse effects on non-target vegetation. Herbicides would be selected specifically for targeted species and applied in limited areas by certified applicators. Prescribed fires would follow pre-approved burn plans to strictly control conditions under which fire is used. The risk of type conversion and subsequent loss of ecological diversity and site stability that would result without restoration or rehabilitation treatments would pose major long-term adverse impacts.

Unhealthy

Land health assessments show that 8% of sagebrush-steppe associations are rated as ‘Unhealthy’. These communities have crossed an ecological threshold to another steady state plant community, such as annual grasses and forbs, or a high canopy cover of western juniper (>35%). Recovery of these ‘Unhealthy’ sagebrush-steppe communities involves a highly expensive human intervention requiring a combination of mechanical and other treatments. Seeding success in these communities has proven to be low to very low due to poor soil conditions, low available water holding capacity, and little annual precipitation during the growing season (Alexander III, 2003).

Few methods are effective in restoring these communities at low elevations and precipitation zones. Tightly controlled livestock grazing, prescribed fire, and seeding of native plants – coupled with full suppression of high-intensity wildfires – can slow, and in some cases reverse, type-conversion to exotic annual grasslands. Results from these actions are expected to improve species composition, biodiversity, and soil condition on approximately 4,000 to 18,000 acres.

4.17.6.2 Perennial Grasslands

Approximately 6,300 acres of perennial grassland communities occur in the ELFO area on BLM-administered lands. These are primarily seasonally dry meadows and meadow and seep communities. (The latter are described under “Riparian/ Wetland Associations” below.) There are also 5,000 acres of the pasture and cropland type mapped on BLM-administered lands in the ELFO area. Pasture and cropland consists of agricultural crops or fallow fields, crested wheatgrass seedings associated with weedy annuals, or repopulating shrubs removed by fire and reseeded to crested wheatgrass.

Healthy

A total of 6,000 acres (96%) of perennial grasslands that are rated as ‘Healthy’ or ‘Healthy, Lacking’ would be maintained and improved through controlled grazing by livestock and wild horses. Areas that are in a healthy condition will be grazed in a manner that provides an opportunity for herbaceous perennial plant seedling establishment (grass and forbs), and facilitates plant vigor. Livestock grazing deferment or periodic rest would be required on 60 – 80% of all grazing allotments and 80 – 90% of all grazed lands annually. This will assure that grasslands are allowed time to recover from grazing stresses. Anticipated results are an increase in grass vigor, which will aid in the recovery of the vegetative components of land health. In addition, resting or deferring allotments will improve soil condition and organic matter, which will decrease the potential for establishment of invasive species.

At Risk

LHAs show that only 1% of perennial grasslands are rated as ‘At Risk’. Plant communities rated ‘At Risk’ of becoming unhealthy are typically characterized by the degradation of function/structural groups (perennial bunch grasses, perennial forbs and shrubs) and the presence of invasive plants (predominantly cheatgrass).

Most native herbaceous species found in the Great Basin are capable of withstanding fire effects unless the fire burns very hot and kills the grass at the crown and roots. Herbivory by livestock and wild horses and burros, if not properly managed, can overuse herbaceous plants, resulting in their removal from the stand. This adverse impact can result in replacement of native perennial herbaceous species with invasive annuals. The persistence of annual grasses (primarily cheatgrass) is expected to continue in these ‘At Risk’ communities whether or not livestock grazing occurs. This persistence is attributable primarily to the ability of annual plants to produce seed every year, store many years of seed in surface litter and soil, and germinate earlier than the remaining perennial plants. The invasion and dominance of annuals was accelerated by the loss or reduction of native perennial bunchgrass/shrub communities.

The experience of BLM technical staff indicates that annuals will persist, but that it is possible to slow or reduce their spread by applying intensive grazing management techniques in the surrounding areas. BLM staff members have focused their efforts on designing a grazing strategy that recognizes areas where annuals dominate a plant community or site as well as areas where annuals are a minor component. Improvement has been observed in both situations, evidenced by increased vigor and seed production of native perennial plants.

BLM has prioritized its efforts by stabilizing and improving the native plants that surround disturbed areas. Improvement in surrounding areas has created a natural barrier that has slowed the spread of annuals. BLM recognizes that many past and present factors stimulate and retard the spread of annuals, but efforts appear to have had some positive influence.

Unhealthy

LHAs show that 3% of perennial grasslands are rated as ‘Unhealthy’. These communities have crossed an ecological threshold to another steady state plant community, such as annual grasses and forbs. Recovery of these ‘Unhealthy’ grassland communities involves a highly expensive human intervention requiring a combination of mechanical and other treatments. Rehabilitation and restoration efforts would be undertaken on 10 to 50 acres of these ‘Unhealthy’ grassland communities. Beneficial impacts would range from minor to moderate depending on the extent and success of treatments as well as follow-up maintenance or other required treatments.

4.17.6.3 Annual Grasslands and Herbaceous Communities

Healthy, Lacking Key Attributes

Approximately 3,000 acres (14%) of annual grasslands that are rated as ‘Healthy, Lacking’ would be maintained and improved through controlled grazing by livestock and wild horses, and through integrated weed management. Areas would be grazed in a manner that provides an opportunity for herbaceous perennial plant seedling establishment (grass and forbs), and to facilitate plant vigor. Livestock grazing deferment or periodic rest would be required on 60 – 80% of all grazing allotments and 80 – 90% of all grazed lands annually. This will assure that grasslands are allowed time to recover from grazing stresses. Anticipated results are an increase in grass vigor, which will aid in the recovery of the vegetative components of land health. In addition, resting or deferring allotments will improve soil condition and organic matter, which will decrease the potential for establishment of invasive species.

Unhealthy

LHAs show that 66% of annual grasslands and herbaceous communities are rated as ‘Unhealthy’. These communities have crossed an ecological threshold to another steady state plant community, such as annual grasses and forbs (primarily cheatgrass and invasive forbs). Degraded perennial and annual grasslands have a fire return interval of 10 years or less. There is a high potential for stand-replacing wildfires to totally convert these habitats (important for sage-grouse and pronghorn) to plant associations dominated by cheatgrass.

Few methods are effective in restoring these communities. Recovery of these ‘Unhealthy’ grassland communities involves a highly expensive combination of mechanical, chemical, and other treatments. Tightly controlled livestock grazing, prescribed fire, and seeding of native plants – coupled with full suppression of high-intensity wildfires – can slow, and in some cases reverse, type-conversion to exotic annual grasslands. Herbicides and other chemical compounds effective in selectively controlling annual grasses may soon prove safe and effective for use on public lands. Rehabilitation and restoration efforts would be undertaken on 500 to 3,000 acres of these ‘Unhealthy’ grassland communities. Beneficial impacts would range from minor to moderate depending on the extent and success of treatments as well as follow-up maintenance or other required treatments.

4.17.6.4 Coniferous Forest

Forestlands (22,000 acres) would be managed to improve forestland health through a variety of silvicultural practices. The forestry program is intended to manage for healthy forests while providing adequate, sustainable supplies of forest products. The operations would be designed to protect water quality, improve and protect wildlife values, and improve forest health. Although the silvicultural practices used for forest management may result in short-term direct effects on vegetation through disturbance, removal, or alteration of community structure, the long-term effects are likely to benefit vegetation community health. Beneficial effects on vegetation communities would result from management of forested riparian areas, control of noxious weed species, and restoration of selected roads to avoid future indirect effects on adjacent communities (e.g., erosional effects). For additional effects, see Chapter 4.6 Forestry.

4.17.6.5 Juniper Woodlands

LHAs show that 20% of true juniper woodlands are ‘Healthy’, 47% are ‘At Risk’, and 33% are rated as ‘Unhealthy’. These unique communities are little understood but presumed to be very important for the ecological and genetic stability of arid-land ecosystems (Miller, Tausch and Waichler, 1999). The stage of woodland development (and canopy cover) affects fuel loads, wildlife habitat, management operations, cost of conversion, and response to treatment. As trees gain dominance and shrubs and herbaceous vegetation decline, fuel structure changes, which contributes to significant increases in the length of mean fire return intervals (historically, 12–25 years; now greater than 100 years). Dense tree-canopied woodlands are now becoming susceptible to intense crown fires. The intensity of these fires can lead to dominance by exotics, further altering the successional dynamics of the site. During the early to middle stages of development, when these woodlands contain understories of native shrubs and herbs, they can successfully be treated by various methods—particularly prescribed fire.

Prescribed fire and mechanical treatments would be used to maintain and restore approximately 20,000 acres of juniper woodlands. Cutting juniper would be primarily limited to younger trees (generally less than 150 years old) occupying the interspace areas between the larger, older trees. Understory vegetative response would be more subdued due to the less intensive treatments, the deeper soils, and type of plant communities involved. Thinning juniper would be expected to increase the health and longevity of the remaining trees. Mechanical treatments would mimic natural processes that historically maintained these juniper woodlands in their late-seral condition.

4.17.6.6 Other Woodlands

Aspen

Beneficial effects on aspen communities would occur as a result of the proposed management actions to maintain the 1,191 acres of ‘Healthy’ and ‘Healthy/Lacking’ aspen stands, and the restoration of 210 acres of ‘At Risk’ aspen communities. Areas that are in a healthy condition will be grazed in a manner that provides an opportunity for aspen regeneration, herbaceous perennial plant seedling establishment (grass and forbs), and facilitates understory vigor.

Using site-specific treatments on sites rated ‘At Risk’ is expected to result in beneficial effects on aspen communities by tailoring the appropriate treatment used to soil properties (taxonomy, pH, exchangeable potassium, organic matter, and nutrients), stand type (i.e., non-regenerating, conifer encroached, regenerating clones), and condition of the aspen stand.

Cutting and burning – separately or in combination – would be used in aspen stands with conifer encroachment to create early-succession conditions. Cutting and burning is beneficial because it promotes

‘suckering’ and creates diverse, multi-aged stands (Shepperd, 1996.) Generally, treatment of aspen communities to aid in regeneration is considered a beneficial effect of the vegetation management program.

Oak Woodlands

Black oak woodlands are found on 1,298 acres within the planning area, and are 100% rated as ‘Healthy, Lacking’. The understory is composed of a moderate to open shrub and grass layer. Dominant species are Jeffrey pine, ponderosa pine, and California black oak. The plant community will be managed for a diversity of species, including curleaf mountain mahogany, big sagebrush, rubber rabbitbrush, serviceberry, gooseberry, blue wildrye, squirreltail, Sandberg’s bluegrass, hot rock penstemon, mules ears, and arrowleaf balsamroot.

Treatments to maintain or improve oak woodlands would be through prescribed fire or mechanical treatments to reduce conifer encroachment and to provide canopy gaps. This would aid recruitment (Fry, 2002); encourage mixed-aged stands; reduce insects; and discourage competition from conifers. There would be moderate, short-term adverse impacts from fires (direct effects from fire and fireline construction) and minor to major, long-term beneficial impacts to stand sustainability.

Mountain Mahogany Association

Approximately 1,500 acres of this association are found on BLM-administered lands in the ELFO area, and 100% of the stands are rated as ‘Healthy’ or ‘Healthy, Lacking’. Curleaf mountain mahogany grows on rocky ridges and steep slopes with thin soil. This plant can form nearly closed single-dominant species communities or be a secondary component in other tree-dominated communities (Sawyer and Keeler-Wolf 1995). Curleaf is intolerant of fire. Because the species’ seeds have low establishment success in the shallow, rocky soils in which the plant grows, plant reproduction rates are slow. Rabbits, rodents, and mule deer feed on mahogany seedlings, further reducing reproductive success.

In mountain mahogany stands, conifers would be manually removed and “flash fuels” (annual grasses) reduced with herbicides. Management actions would promote seed emergence and seedling survival in mountain mahogany stands. This has a beneficial effect by stimulating regeneration and creating diverse, multi-aged stands (Davis and Brotherson, 1991; Ibáñez, 1999.)

In select older, decadent stands of Curleaf Mountain mahogany a combination of low-intensity burns and bulldozing would be used to promote seedling and sapling survival. Fire would be used to create conditions favorable for seedling establishment. Bulldozing, selective shearing, and pruning would be used in combination to promote seedling survival (Davis and Brotherson, 1991).

Maintaining taller vegetation adjacent to treated stands (such as mountain big sagebrush) would also aid seedling survival (Schultz, et al, 1996.) There would be moderate to major, short-term adverse impacts on mahogany and non-target vegetation, but long-term minor to major beneficial impacts to mountain mahogany stands.

4.17.7 Riparian/Wetland Associations

The Preferred Alternative would emphasize inventory, recovery, and establishing desired future condition on most riparian sites. Emphasis will be on adjusting existing grazing strategies where livestock grazing is limiting progress toward land health goals, PFC, and desired future condition.

Proper Functioning Condition

BLM Riparian Inventory (BLM 1995 to 2002) assessments show that 84% of lotic (flowing water) sites and 85% of lentic (standing water) sites are rated as PFC. The Preferred Alternative implements actions to maintain areas currently at PFC, and to improve areas that are currently rated as 'Functioning at Risk, Upward or Static Trend' to PFC. The results would be that an additional 4% of Lotic sites (for a total of 88%), and an additional 2% of Lentic sites (for a total of 87%), would be in PFC. Figure 4.17-1 illustrates these changes.

Functioning at Risk

BLM Riparian Inventory (BLM 1995 to 2002) assessments show that 14% of lotic (flowing water) sites and 6% of lentic (standing water) sites are rated as 'Functioning at Risk, Upward Trend'. The Preferred Alternative implements actions to improve these areas to PFC. Results would be that 11% of lotic sites and 9% of lentic sites would be rated as 'Functioning at Risk, Upward Trend'. Figure 4.17-1 illustrates these changes.

Proposed management actions would also improve the amount of lotic sites rated as 'Functioning at Risk, Static Trend' by 5%, and would reduce the amount rated as 'Functioning at Risk, Downward Trend' to 0%.

BLM would focus its effort on management changes on sites now 'Functioning at Risk, Static to Upward Trend'. Site assessments and photo studies have shown that these sites respond positively to management changes. BLM will continue its existing management where sites are being protected and are recovering and progress is being made, as shown by improved condition and trend.

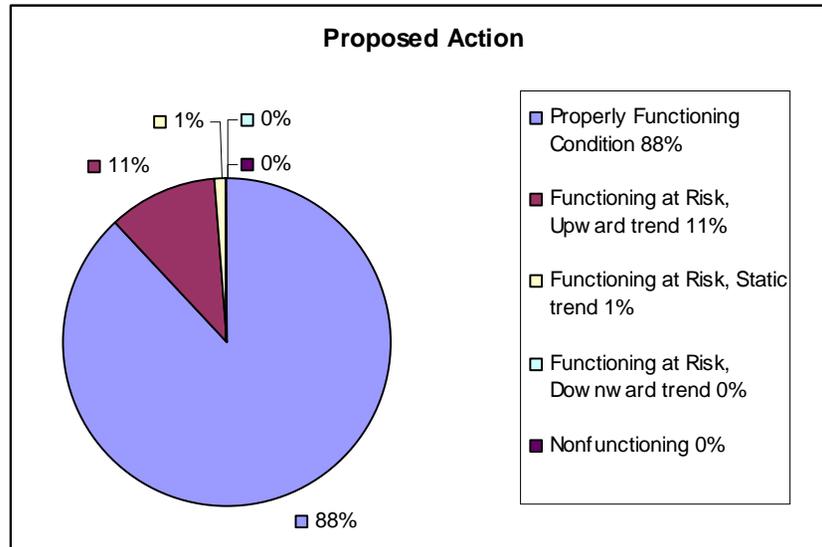
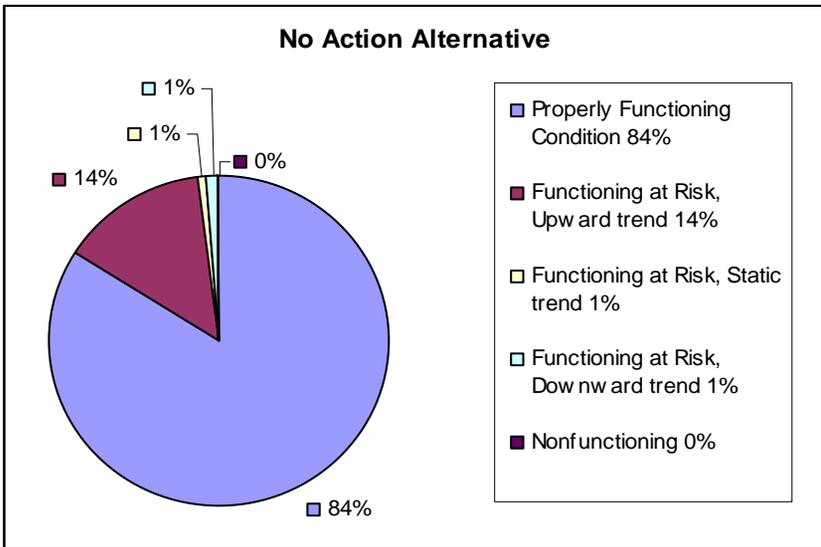
Grazing by livestock and wild horses can have adverse impacts to riparian/wetland associations. Some localized overuse of forage will most likely occur in riparian and wetland areas and near watering areas due to the higher quality and longer growth period of forage, compared to adjoining upland areas. When forage plants are overused, desirable native species can be replaced by less desirable species that produce little or no forage value. A decline in soil condition, plant cover, and plant species composition also can encourage the invasion and growth of noxious weeds or other invasive plants. Early spring grazing also would adversely affect vegetation resources by the trampling of wet soils, uprooting of seedlings, and damage to mature plants.

Proposed management actions to improve and protect streams (and associated riparian and wetland communities), include adjusting current livestock grazing management strategies, managing wild horses within established appropriate management levels, and preventing ground disturbance within streams and riparian areas. Livestock management will include:

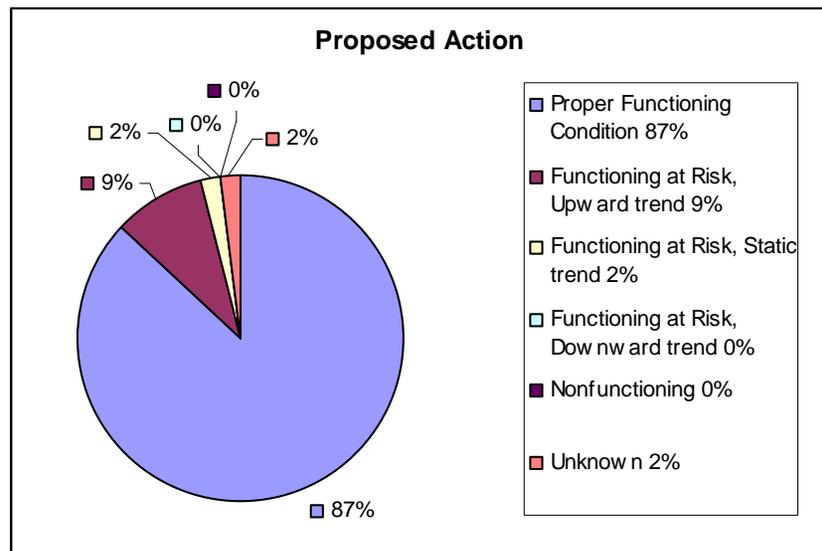
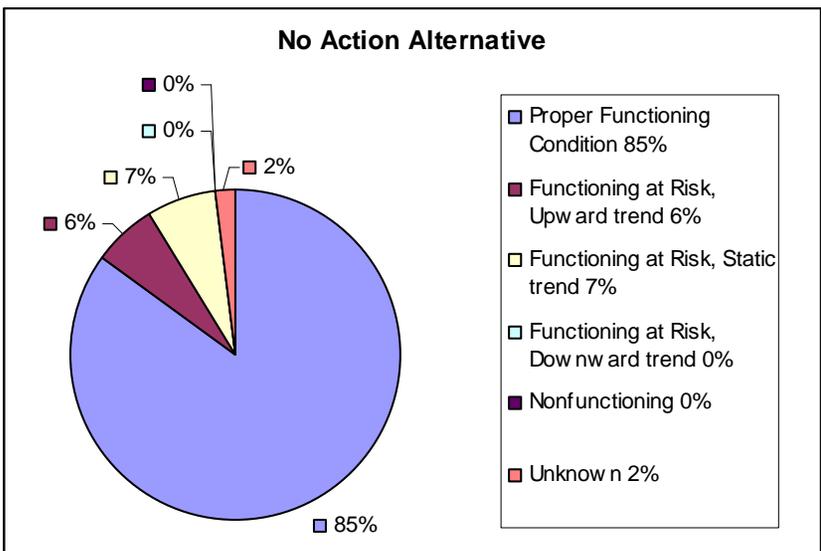
- intensive grazing strategies with routine monitoring and adjustments for drought,
- range improvements (fences, offsite water, new water pumping technologies including solar and wind, herding, and
- season of use adjustments,
- maintaining existing enclosures, and
- constructing protective fencing where needed.

Figure 4.17-1 Riparian Condition Classes

Lotic (Flowing Water) Sites



Lentic (Standing Water) Sites



Livestock salting sites will be located ¼ mile from riparian areas to discourage damaged by livestock. Implementation of improved grazing practices to meet land health standards and construction of up to 90 miles of new cross fencing is expected to result in long-term benefits to vegetation communities that have been identified as ‘At Risk’ of becoming unhealthy.

Western juniper and other undesirable woody vegetation will be removed from riparian areas, where they have encroached into the riparian plant community. Roads having a negative impact on riparian areas will be re-routed, eliminated, and/or rehabilitated.

These management actions would result in long-term benefits to riparian and wetland communities by allowing vegetation diversity and structure to redevelop in these systems. The increased availability of water along normally dry stream channels could result in an increase in the extent of riparian and wetland vegetation along the stream banks. Increases in levels of water and rates of flow through stream corridors also may benefit shrub associations located along the upland border of riparian areas.

4.17.8 Cumulative Effects

A variety of environmental processes and management actions occurring on adjacent BLM lands, private, USDA Forest Service, and California Department of Fish and Game (CDFG) lands surrounding the ELFO area may result in cumulative effects on vegetation resources when considered in context with any of the proposed alternatives. A number of actions or activities occurring on lands adjacent to BLM-administered lands have been identified as affecting vegetation resources. These actions or activities include conversion of lands to agricultural use (e.g., alfalfa), conversion of lands to residential use, invasion of lands by noxious weeds, juniper treatment, logging, road construction, water use, and fire (both wildfire and prescribed fire).

The area of analysis for cumulative impacts on vegetation resources is defined as the ELFO area boundary. Major uses over the next 20 years are likely to continue and in some cases increase for the following reasons:

- Domestic livestock grazing would continue to affect 98%, or less of the areas, with actual grazing use differing depending by grazing system.
- Fish and wildlife development and use would continue at its current or an increased rate depending on the condition of habitat, which is influenced by terrestrial vegetation health.
- Mineral exploration and production are not expected to increase because of the lack of mineral resources except for sand and gravel.
- Outdoor recreation would increase as more people want to recreate away from metropolitan crowds find the area.
- Timber production would continue at its current or lower level, perhaps becoming a fuels management activity more than commercial enterprise.
- Wild horses and burros would be maintained at viable population levels.
- Wildland fires would continue to change the vegetation landscape, requiring, in some cases, human-driven emergency stabilization and rehabilitation.

The continued management and protection of large tracts of land as open space is considered a beneficial cumulative effect to vegetation because it offsets the conversion of lands from agricultural or residential use and maintains large contiguous patches of native plant communities.

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Lands adjacent to BLM-administered lands are being invaded by noxious weeds at a similar rate, or higher rate, to the rates occurring on BLM-administered lands.

The continued coordination across administrative boundaries with private and public agencies throughout the region as part of BLM's Integrated Weed Management Program considered a beneficial cumulative effect.

In addition to juniper encroachment on BLM-administered lands, encroachment is also occurring on adjacent public and private lands. Harvesting of juniper (both for fuelwood and biomass) is occurring on public and private lands at some level. While the harvest results in additional ground disturbance and the potential for the introduction of noxious weeds, BLM's focus on reduction in juniper in the region is considered a major beneficial cumulative effect.

Extensive removal of juniper, even-aged forest management, and some of the more intensive WUI treatments would result in substantial and long-term changes to the ecosystem. In these areas, successive treatments would allow early seral grass and shrub communities to dominate or co-dominate. Multiple conifer thinnings over decades would accelerate growth rates and greatly affect the residual stand structure. Thinned forest stands would begin displaying old and late-successional stage characteristics earlier than unmanaged stands. Cumulative effects on wildlife habitat could be both beneficial and detrimental depending on the specific species involved. Generally, wildlife diversity and abundance would be expected to increase over time. Watershed, overall ecological function, and visual quality would also be expected to improve.

A net export of biomass from some sites could occur with large-scale juniper cutting/harvest or broadcast burning and with successive forest thinning/harvest or underburning. These activities would cause a decrease in organic matter and nutrients, possibly resulting in a slight degradation of site quality over the long-term. Nitrogen losses would be greater with prescribed fire than with timber harvest. This effect could be offset, at least partially limiting prescribed fire, or by leaving fine woody material (tops, branches, foliage) on-site during harvest for organic matter retention and nutrient cycling.

The effects of logging, road construction, and water use on vegetation resources are difficult to describe and quantify, however they are not expected to result in significant cumulative effects on vegetation resources. Fire management on private and USDA Forest Service lands can result in cumulative effects on vegetation resources. Although fire generally is considered beneficial to vegetation resources, airshed concerns are growing and may result in less prescribed burning on private and USDA Forest Service lands. In addition, a lack of CDF involvement in prescribed burns on private lands may lead to fuel buildups and the potential for more extreme wildfires.

The proposed action would be effective in reducing or reversing cumulative effects due to the emphasis on restoration toward historic conditions and range of major vegetative community types. Sagebrush-steppe condition and structure (and habitat for associated wildlife species) would be improved by these treatments. Health, longevity, and range of old-growth juniper and coniferous forests would also be enhanced. There would be moderate cumulative impacts on the vegetation resources within the ELFO area. Most of these impacts would be beneficial as BLM promotes management to maintain and make significant progress toward meeting land health standards.

4.17.9 Mitigation Measures

All allowable land uses could potentially affect vegetation resources. Mitigation measures would be required to ensure the continued health of the land. The primary actions that are necessary to mitigate impacts on vegetation include:

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- Ensuring that livestock grazing is managed to meet the Rangeland Health Standards for upland soils, streams, water quality, riparian/wetland, or biodiversity. This would be accomplished by adjusting livestock season of use, intensity of use, and duration of use through livestock allotment management plans.
- Wild horse AMLs would be established to ensure that wild horse grazing is part of a thriving natural ecological balance. Wild horse intensity of use would be controlled by maintaining wild horses within AMLs.
- Impacts from recreational use would be reduced by controlling the timing and areas 'Open' to OHVs.
- Unnecessary and redundant roads, particularly those that impact special habitat areas, would be closed and rehabilitated.
- Disturbance associated with water development (reservoirs, wells, and springs), wild fire suppression, commercial woodcutting, vegetation restoration, fences, roads, campgrounds, interpretive sites, bioengineering projects, and mineral extraction sites would be limited to the smallest practical area.

4.17.10 Unavoidable Adverse Impacts

Livestock and wild horse grazing, recreation, fuels management, wood harvesting, and mineral exploration and extraction would continue to occur, at some level, under all of the alternatives. All of these activities have short term adverse impacts on vegetation, regardless of the level of use. Therefore, under all of the alternatives, there will be isolated areas and times that vegetation within the planning area receives minor to moderate adverse impacts as a result of authorized activities.

4.17.11 Short-Term Uses versus Long-Term Productivity

Activities that directly disrupt the soil surface (such as mining and facility construction) reduce the long-term productivity of vegetation in the disturbed areas. Even with careful rehabilitation, soils in the Great Basin are very slow to recover from disturbance and it is frequently impossible to restore the native vegetation communities on rehabilitated sites, even in the extended term (20-50 years). Similarly, activities that impact soils (such as compaction by grazing animals and vehicles, exposure of soil surfaces to wind and water erosion, and accelerated erosion of meadow soils along riparian corridors) reduce long term productivity.

If the lower elevation/precipitation areas are allowed to degrade across thresholds, particularly into non-native annual grasslands, long-term productivity (100+ years) would be impaired. Within the higher elevation/precipitation areas the adverse impacts should be short-term (40+ years). Any use that would cause a vegetation alliance, association, or ecological site to regress across a threshold must be adjusted immediately to ensure continued stable-state vegetation dynamics.

4.17.12 Irreversible and Irretrievable Impacts

The type conversion of native vegetation communities to non-native species, particularly annual grasses (cheatgrass and medusahead) may not be reversible. Restoration of vegetation communities on sites in which the soil has been disrupted, compacted, or subjected to accelerated erosion may not be possible.

4.18 Potential Effects on Noxious Weeds

This section describes the direct, indirect, and cumulative effects on native vegetation in relationship to the spread and control of noxious weeds and other invasive, undesirable species. The introduction and spread of noxious weeds and undesirable plants on BLM-administered lands contribute to loss of rangeland productivity, increased soil erosion, reduced species and structural diversity, and loss of wildlife habitat. In some instances, invasive species may even threaten human health and welfare from increased fire danger.

4.18.1 Methodology and Assumptions

This analysis uses information from existing literature, data from the ELFO, and the documents/policy/laws provided for managing noxious and invasive weeds from state and federal agencies. Field data, existing weed management plans, and the professional judgment of BLM botanists and cooperating agency weed specialists have also been used to assess impacts.

Data collected as part of BLM's LHA found that many native plant communities are 'At Risk' of becoming unhealthy due to the presence of nonnative invasive species (predominantly cheatgrass and medusahead), as well as native increaser species such as western juniper. Surface disturbances can remove or substantially disturb and change the species composition in vegetation communities, or, directly promote the introducing or spread of noxious weeds. Depending on the extent of these actions and BLM's ability to implement and monitor resource protection and reclamation, surface disturbances could contribute to the further decline in these land health indicators.

Several resource management programs could substantially affect vegetation resources, both directly through removal or disturbance and indirectly through modification of one or more ecosystem parameters. The result would be a long-term change in the resource. The interaction between resource management actions and ecosystem parameters is highly complex and is difficult to discern within the context of a large-scale planning effort such as this PRMP. Adding to this complexity are management actions that occurred historically, affect ecosystem parameters (both directly and indirectly), and are still an evident and active process on the current landscape (i.e., the introducing of grazing and noxious weeds).

The Carson-Foley Act (Public Law 90-583) and the Federal Noxious Weed Act (Public Law 93-629) direct weed control on public lands. To reduce and prevent the spread of noxious weeds while all management actions are being implemented, the ELFO implements the goals and actions described in *Partners Against Weeds* (BLM 1996) and The National Invasive Species Management Plan (National Invasive Species Council 2001). The goals and actions include the following:

- Prevention and detection—Develop a prevention and early detection program.
- Education and awareness—Generate internal and external support for noxious weed control.
- Inventory—Ensure that adequate baseline data are available on the distribution of weeds.
- Planning—Include provisions for noxious weed management in all BLM-funded or authorized actions.
- IWM—Determine the best methods for an integrated approach to weed management and implement on-the-ground operations. Noxious weed management tools will include a combination of biocontrol, manual, mechanical, and chemical control methods.
- Coordination—Ensure that noxious weeds are managed efficiently and consistently across jurisdictional and political boundaries.

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- Monitoring, evaluation, research, and technology transfer—Ensure that sufficient data are available to
 - evaluate management actions,
 - provide a basis for making informed decisions,
 - assess progress toward management objectives,
 - develop new and more effective management methods.

In addition to BLM policy on noxious weed management, the ELFO has developed standard management measures for noxious weeds in the *Noxious Weed Prevention Schedule* (Appendix F). BLM applies this prevention schedule for all actions with the potential to introduce or spread noxious weeds on lands it administers in the ELFO area.

4.18.2 Incomplete or Unavailable Information

Adequate information exists on many of the noxious weeds and invasive plants found in the ELFO area (listed in Table 2.18-1) for the following:

- general populations,
- habitat requirements,
- areas of likely spread, and
- physiology of plant species and consequences of management actions.

Information is limited, however, for population status, trends, and distribution of certain noxious weed and invasive species.

4.18.3 Analysis

The ELFO would minimize and prevent the spread of noxious weeds while implementing certain management actions by following the general measures described in the ELFO Noxious Weed Prevention Schedule (Appendix F), Partners against Weeds (BLM 1996), and The National Invasive Species Management Plan (National Invasive Species Council 2001). In this analysis, effects that would reduce the introduction or spread of noxious weeds on the landscape are considered beneficial to native vegetation, whereas effects that would result in the introduction or spread of noxious weeds are considered adverse to native vegetation.

This analysis defined the levels of effects on noxious weeds as follows.

Negligible: The effects on native vegetation from noxious weeds or other invasive species would be at or below the level of detection. Effects would be so slight as to not be of any measurable or perceptible consequence to the population of native plant species, and would be generally be temporary or short term (last less that a single year or season).

Minor: The effects on native vegetation from noxious weeds or other invasive species would be detectable but localized, and of little consequence to the population. Effects would generally be temporary or short term, but in some cases might be long term. Mitigation measures needed to control noxious weeds or other invasive species, if needed to offset adverse effects, would be simple and successful.

Moderate: The effects on native vegetation from noxious weeds or other invasive species would be readily detectable and localized with consequences at the population level. Effects may be short term or

long term. Mitigation measures needed to control noxious weeds or other invasive species, if needed to offset adverse effects, would be extensive and would probably be successful.

Major: The effects on native vegetation from noxious weeds or other invasive species would be obvious and would result in substantial consequences to species populations in the field office area or region. Effects may be short-term, but would likely be long-term. Extensive mitigation measures needed to control noxious weeds or other invasive species would be needed to offset adverse effects, and their success would not be guaranteed.

Short Term: Lasting less than a single year or season.

Long Term: Lasting longer than a single year or season.

4.18.4 Analysis of the Preferred Alternative

Management actions for the following resource programs would substantially affect the distribution, spread, and control of noxious weeds: terrestrial and aquatic wildlife, soil, and water resources, vegetation; cultural resources; fire and fuels; forestry; grazing; utilities and rights-of-way, travel, recreation, and wild horse and burros.

The Preferred Alternative would result in negligible to minor adverse impacts, and moderate to major long-term beneficial impacts. Prevention and control of noxious weeds will continue to be a priority. BLM's integrated weed management program (IWM) applies a variety of control methods and uses, including restoration and rehabilitation. Because effects from noxious weed invasion have far-reaching ecological implications for many other resources, management actions that guide the control and elimination of these species from the landscape are considered beneficial.

Under the Preferred Alternative, vegetation resources would continue to be managed to achieve land health standards using site-specific management techniques. Grazing by domestic livestock and wild horses can affect soil, vegetation, and ecological processes. Effects on soil depend upon the intensity, duration, timing, and frequency of the grazing event, and the type of soil. Effects include compaction (which can decrease water infiltration and increase erosion) and some local displacement which can increase erosion from wind and water. These disturbance actions can also cause the spread and distribution of noxious weeds. Livestock and wild horses can also serve as vectors for weed transport as seeds or other plant parts attach to their hair.

Livestock grazing would be managed to improve land health in upland and riparian sites. Closing sensitive areas to grazing and managing rangelands using the Standards and Guidelines would benefit native vegetation and the control of noxious weeds. Vegetation resources would continue to be managed to achieve land health standards using site-specific management techniques. These site-specific techniques vary, but typically would be used on a case-by-case basis to minimize the effects or potential effects of an action. The continued use of these techniques would benefit native vegetation. Terrestrial and aquatic wildlife management actions would help control noxious weeds and benefit native vegetation.

Disturbances from the construction and use of roads, facilities, trails, rights-of-way, or other surface disturbing activities could introduce or spread noxious weeds around a local area.

The extent of potential invasive species occurrences and infestations is difficult to predict and would be influenced by many factors:

- extent of disturbance,

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- extent of existing weed infestations that would provide a source of seed material,
- movement of equipment into and out of weed-infested areas,
- effectiveness of measures to prevent infestations, and
- amount of time between the disturbance and site restoration.

Infestations of some species can reduce the carrying capacity for livestock (e.g., medusahead grass). Monotypic occurrences of one species of weed can affect the multi-structure of native plant communities, leading to a reduction or possible elimination of use by wildlife (e.g., yellow star thistle).

To minimize and prevent the spread of noxious weeds during the construction and use of roads, facilities, trails, ROWs, or other surface disturbing activities, the ELFO would implement the following general measures that are described in *Partners against Weeds* (BLM 1996) and *The National Invasive Species Management Plan* (National Invasive Species Council 2001):

- Prevent new species from being established by managing the pathways of dispersal (vehicles, people, gravel and fill material, and seed material).
- Support early detection of new infestations or individual occurrences.
- Implement control and management strategies to prevent spread or lessen effects of the infestation. Depending on the species and degree of infestation, the ELFO may implement an IWM approach that involves eradication, population suppression, or limiting dispersal of an invasive species. Selection of an IWM strategy for a particular area would depend on the species and environmental effects of available control methods. These treatments may include a combination of manual, chemical, biological, and cultural methods.
- Restore disturbed areas to keep invasive species from spreading or causing greater environmental disturbances. Restoration would involve the use of locally suitable native species. Ideally, the seed mix would be certified weed free and would consist of locally collected plant material.
- Educate contractors and other persons on construction projects on noxious weed issues and methods that should be implemented to avoid seed or plant part dispersal. These methods may include
 - reducing the extent of disturbances,
 - cleaning vehicles after leaving a known infestation (and, in some cases, before construction), and
 - restoring areas immediately after construction.

Invasive plants and fire are closely interrelated. Wildland fires are widely recognized as the cause of noxious weed introduction, invasion, and spread. This invasion results from the interaction of complex factors, including the level of infestation before the fire, presence of noxious weeds on adjacent lands, and introduction of noxious weed seed and plant parts from fire suppression equipment. In many cases, sagebrush and other shrub communities become infested with noxious weeds such as medusahead and cheatgrass following fires. Changes in invasive plant dominance can affect landscape flammability, and changes in fire frequency can affect landscape invisibility (Brooks and Pyke 2001).

Invasive grasses such as cheatgrass and medusahead can create large amounts of continuous fine fuels where little previously existed. These fine fuels increase the spread rate and frequency of fire, especially in years of higher than average rainfall. Although these shrub communities can often recover from a single burn, the introducing of invasive species creates more dry fuels and biomass, which increases the burn interval and intensity of fires in the community. The result of this repetitive burning is typically a

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type conversion to an annual plant community with a short fire return interval. In some areas, early seral-stage perennial grass would dominate, with some shrubs slowly returning.

Although full suppression of wildland fires does not directly result in an adverse short-term effect on native vegetation from noxious weeds, the long-term consequences of this management action would likely be adverse because of an increase in noxious weeds on the landscape. AMR is similar to full suppression in methods. But allowing communities to burn naturally under appropriate conditions might result in slightly less adverse effects on noxious weeds than full suppression.

The relation of noxious weeds and fire is complex and depends on the species in question, the time of year the burn occurs, and the intensity of the burn, among other factors. Other actions relating to fuels management and rehabilitation, stabilization, and restoration of burned areas also may affect noxious weeds. The building of firelines, fuel breaks, and temporary access roads could introduce noxious weeds species into previously uninfested areas. These effects typically would be reduced and avoided by using the ELFO's Noxious Weed Prevention Schedule (Appendix F) and other standard management measures.

BLM will use standard management measures to achieve desired results for soil stability and productivity. Several of these measures could affect noxious weed invasion and encroachment following treatments by direct removal (vegetation manipulation) or indirect removal (seeding, closure and rehabilitation of roads, minimizing new road building, and limiting grazing). Although soils management actions involve ground disturbance, which could introduce or spread noxious weeds, standard management measures used to restore stability and productivity are considered benefits to vegetation communities.

Actions that promote healthy vegetation communities also benefit native vegetation because healthy vegetation communities better resist noxious weed invasion and encroachment. Managing vegetation communities to benefit wildlife habitat would also benefit native vegetation.

The Preferred Alternative will apply standard management measures on a case-by-case basis to achieve desired results for restoring and maintaining hydrologic processes. Although water resources management actions involve ground disturbance, which could introduce or spread noxious weeds, standard management measures to restore and maintain hydrologic processes are considered beneficial effects because intact and functioning hydrological processes promote healthy native vegetation communities, which resist noxious weed invasion and encroachment.

Recreation management actions could substantially disturb vegetation resources. A total of 264 miles of new trails would be built and maintained, which could have a highest potential for introducing noxious weeds into the ELFO area. Increased human presence as a result of recreation is known to result in the introducing and spread of noxious weeds. The main vectors of noxious weed introduction and spread include OHV use and dispersed recreation activities. Actions undertaken in the ELFO area by BLM and independent contractors must adhere to the Noxious Weed Prevention Schedule, but not private citizens visiting public lands. Public education is a goal of IWM and would reduce the effects of recreation on noxious weeds. But recreation activities generally lead to an increase in noxious weeds on the landscape.

OHV use on 99% of the field office area would be 'Limited to Designated Routes', and several areas 'Closed'. Limits on OHV use would benefit vegetation communities by limiting direct disturbance to vegetation, soil disturbance (thereby decreasing erosion), and indirect disturbance caused by increased human presence, limiting the potential for introducing or spreading noxious weeds.

Building and maintaining utilities, transportation, and telecommunications corridors, and other rights-of-way are known to be the principal vectors for noxious weed introduction and spread in the field office area. Although implementing the ELFO's Noxious Weed Prevention Schedule would reduce the

introducing and spread of noxious weeds, this schedule is not 100% effective. All future utilities, transportation, and telecommunications projects would be subject to additional NEPA analysis. The NEPA documents would require implementing the general measures described in the ELFO Noxious Weed Prevention Schedule (Appendix F), Partners against Weeds (BLM 1996), and The National Invasive Species Management Plan (National Invasive Species Council 2001).

4.18.5 Cumulative Effects

Under the NEPA, cumulative effects consist of the impact on the environment that results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or nonfederal) or person undertakes such other actions.

A variety of environmental processes and management actions occurring on private, USDA Forest Service, and CDFG lands surrounding the ELFO area may result in cumulative effects on native vegetation and noxious weeds. Essentially, all vegetation resources have the potential to be affected by other environmental processes and management actions occurring outside BLM's influence. The continued coordination across administrative boundaries with private and public agencies throughout the region as part of BLM's IWM is considered a beneficial cumulative effect.

Western juniper encroachment into sagebrush communities is occurring on BLM-administered lands, and adjacent public and private lands. Treatments are being implemented to reduce invasive juniper, including mechanical harvest (both for fuelwood and biomass), and prescribed fire, on both public and private lands. While these treatment methods may result in more ground disturbance and the potential for introducing noxious weeds in the short term, the overall reduction in juniper in the region is considered a beneficial cumulative effect to native communities.

4.18.6 Mitigation Measures

All proposed projects will have a noxious weed clearance before being implemented. If an infestation is detected, measures will be taken to provide an integrated weed management (IWM) plan. The ELFO Prevention Schedule will be incorporated into the project to prevent the introduction and spread of noxious weeds.

4.18.7 Unavoidable Adverse Impacts

Increased recreation and OHV use might result in unavoidable adverse impacts due to increased human presence, which is known to result in the introducing and spread of noxious weeds. Education on the spread of noxious weeds will help prevent such, but monitoring will also be necessary.

4.18.8 Short-Term Uses Versus Long-Term Productivity

None.

4.18.9 Irreversible and Irretrievable Impacts

Noxious weed infestations would not result in any irreversible and irretrievable impacts to native vegetation on lands managed by BLM's ELFO because BLM would apply integrated weed management and preventative measures of the Noxious Weed Prevention Schedule.

4.19 Potential Effects on Special Status Plants

BLM is directed to maintain viable populations of threatened, endangered, and BLM special status (i.e., BLM sensitive) species (as listed in Table 3.20-1). BLM reviews all project proposals before implementing them to determine whether they would affect BLM special status species. Project recommendations are incorporated into the project in accord with the California BLM's Special Status Plant Policy (CA BLM Manual Supplement H-6840-1, Special Status Plant Management). The intent of this management approach is to prevent actions that would contribute to the listing of species under the Endangered Species Act.

4.19.1 Methodology and Assumptions

This analysis uses information from existing literature, data from BLM's ELFO, and the documents/policy/laws provided for managing sensitive plant species from state and federal agencies. Also used to assess impacts are the professional judgment of BLM and cooperating agency botanists and existing plans and field data.

4.19.2 Incomplete or Unavailable Information

Information is limited for population status, trends, and distribution of some special status plant species in the ELFO area. As a result, in certain cases, the planning approach is to determine where and how resource management and uses might conflict with sensitive plant populations and consider mitigation to reduce or eliminate actual or potential conflicts. Adequate information exists on the following:

- general potential for occurrence of plant species,
- habitat requirements,
- physiology of plant species, and
- consequences of management actions.

4.19.3 Analysis

This analysis considers an effect *adverse* if an action

- reduces population density or size or
- harms natural habitat quality.

This analysis considers an effect *beneficial* if an action

- maintains or increases individuals of a species or populations and
- protects existing populations.

This analysis defined the levels of effects on special status plants as follows:

Negligible: The effects on special status plant species would be at or below the level of detection. Effects would be so slight as not to be of any measurable or perceptible consequence to the population of the sensitive plant species, and would be generally be temporary or short term (last less than a single year or season).

Minor: The effects on special status plant species would be detectable but localized, and of little consequence to the population. Effects would generally be temporary or short term, but in some cases might be long term. Mitigation measures, if needed to offset adverse effects, would be simple and successful.

Moderate: The effects on special status plant species would be readily detectable and localized with consequences at the population level. Effects might be short or long term. Mitigation measures, if needed to offset adverse effects, would be extensive and would probably be successful.

Major: The effects on special status plant species would be obvious and would result in substantial consequences to species populations in the field office area or region. Effects might be short term, but would likely be long term. Extensive mitigation measures would be needed to offset adverse effects, and their success would not be guaranteed.

Short Term: Lasting less than a single year or season.

Long Term: Lasting longer than a single year or season.

4.19.4 Analysis of the Preferred Alternative

Management for special status plants is oriented toward providing habitat conditions that meet individual species' requirements. BLM will develop conservation agreements or species management guides as needed to protect and monitor special status plants. Consistent with BLM policy on special status plants, the ELFO would ensure that management actions do not contribute to the decline of a special status plant. The Preferred Alternative will maintain and encourage viable populations of threatened, endangered, and BLM sensitive species known to occur on lands administered by the field office.

BLM will review all project proposals before implementing them to determine whether they would affect special status plant species. BLM would incorporate project recommendations into the project if needed to avoid or minimize impacts on these species.

The Preferred Alternative would result in negligible adverse effects and moderate benefits to special status plants. The continued management of special status plants to ensure that they do not decline in abundance and distribution is considered a beneficial effect of vegetation management actions. Continued monitoring of special status plants would also provide indirect benefits. Added knowledge on the status, distribution, and ecology of special status plants would be useful for guiding future management efforts.

Little information exists on the effects (adverse or beneficial) of fire on special status plants. The ELFO has determined the effect of fire on one special status plant: Baker's globe mallow (*Iliamna bakeri*). This species occurs in sagebrush, juniper, and mountain mahogany-dominated communities and responds positively to fire by increasing in prevalence after fire. Research is needed to determine whether prescribed burns, under site-specific resource/ecological guidelines, would enhance special status plant habitat. The results of this research would be used to guide management of these habitats and their associated species in the future.

Generally, the analysis assumed that a special status plant within a community adapted to periodic fire (such as sagebrush steppe) would benefit from periodic burning, while a special status plant in a community that is not as adapted to periodic fire (such as a sparse low sagebrush community) would experience an adverse effect. This assumption is somewhat misleading, however, because other factors unrelated to the fire management actions – such as a noxious weed invasion – may influence the

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frequency of burns within a particular community not adapted to periodic fires and alter the community having the special status plant habitat. Detailed information on the effect of fire on special status plants is lacking, therefore this section provides a general analysis of the effects of the fire and fuels management actions under each alternative. Fire suppression can also affect special status plants. (See Ch 4.17 Vegetation and Ch 4.18 Noxious Weeds for discussions of the potential effects of fire suppression.)

The ELFO would use mechanical and manual treatments to reduce hazardous fuels and juniper cover on up to 3,500 acres per year. Before all projects are implemented, special status plant inventories and clearances would be completed. Special status plant populations would be avoided, and treatments would be designed to improve ecosystem health and to protect water quality and wildlife values. The management actions proposed would disturb vegetation in the short term but would result in the net beneficial effects of restoring the native plant community over time.

Fuels and juniper treatments would also be implemented using prescribed fire on up to 4,500 acres per year. The reintroduction and use of fire and natural disturbance regimes on the landscape are considered beneficial because the ecosystem is adapted to these disturbance regimes and in many cases requires them to establish healthy communities.

Little information is known about the effects of grazing on special status plants. Although the grazing of some plant species by native ungulates is thought to be part of their natural ecology, the large-scale introduction of livestock 150 years ago has changed the duration, intensity, and season-of-use with which many species may have evolved. The effects of these changes are unknown.

Livestock and wild horse use can adversely affect occurrences of special status plants in several ways. Grazing removes plant material and may prevent flowering and fruiting. Trampling can damage or destroy plants. Trampling can also affect the habitats of special status plants, for example, by compacting the soil or damaging streambanks. Although most effects of grazing on special status plants would be harmful, grazing might benefit some plants by removing or reducing the vigor of competing plants and preventing the establishing of shrub cover in open herbaceous habitats.

Impacts from livestock use, including both grazing and trampling, have been recognized as a threat or potential threat (as described below) to the following special status plants:

- *Astragalus agrestis*: The species could be affected by grazing.
- *Astragalus argophyllus* var. *argophyllus*: Sites are not grazed; consequently, this plant may be out-competed by saltgrass.
- *Astragalus geyeri* var. *geyeri*: The species is threatened by livestock trampling in spring and early summer.
- *Dalea ornata*: Impacts of livestock are unknown.
- *Iliamna bakeri*: The species is grazed and browsed by livestock and wildlife but is threatened by competitive shrubs.
- *Ivesia aperta* var. *aperta*: The species is adversely affected by grazing, although grazing is light on BLM-administered land.
- *Ivesia webberi*: The species is not currently grazed by livestock, but trampling would adversely affect it.
- *Loeflingia squarrosa* var. *artemisiarum*: The species is likely to be affected by trampling. Especially in spring or early summer; trampling could cause moisture regime changes that could harm this plant.

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- *Mimulus evanescens*: Trampling is a threat; the species occurs at edges of open water and moist areas where livestock use is concentrated.
- *Oryzopsis exigua*: One site is not noticeably grazed but could be affected by livestock.
- *Phacelia inundata*: The species is threatened by livestock trampling.
- *Polyctenium williamsiae*: The species is threatened by livestock grazing.
- *Rorippa columbiana*: The species is threatened by trampling; it occurs in vernal wet flats where livestock use could be concentrated.
- *Thelypodium howellii* var. *howellii*: The species could be affected by grazing; one site is fenced.

Although direct effects on special status plants are not expected as a result of management actions for utilities and right-of-way development, indirect effects on special status plants could result. As described in Chapter 4.18 Potential Effects on Noxious Weeds, building and maintaining utility, transportation, and telecommunications corridors are known to be the main vectors for noxious weed introduction and spread in the ELFO area. Although implementation of the ELFO's Noxious Weed Prevention Schedule would reduce the introduction and spread of noxious weeds, it would be not 100% effective. Non-native invasive plant species or noxious weeds are known to outcompete and replace native plants (including special status plants) following invasion. For this reason, effects related to building and maintaining utilities, transportation, and telecommunication corridors are considered adverse.

Competition or habitat change resulting from the spread of noxious and invasive weeds is recognized as a specific threat to the following species in the ELFO area (the competing noxious weed is shown in parentheses).

- *Astragalus anxius* (medusahead) – The level of impact is unknown.
- *Dalea ornata* (medusahead) – The impact is unknown, but *D. ornata* grows in areas of dense medusahead infestation.

The ELFO will aim to reduce or eliminate the introduction and spread of noxious weeds using IWM. An IWM approach to managing noxious weeds has been shown to provide benefits.

Vegetation resources will continue to be managed to achieve land health standards, using site-specific management techniques. Juniper encroachment into sagebrush communities has been recognized as a barrier to achieving land health standards. The Preferred Alternative includes measures to reduce the current amount of juniper on the landscape to reduce or eliminate the rate of encroachment. Some treatment is proposed in vegetation communities (including juniper communities) under the fire and fuels program.

The ELFO would implement vegetation management actions that would provide more protection and long-term benefits to special status plants. The following management actions would result in long-term benefits to special status plants:

- Develop and implement habitat management plans, genetic studies, and biological evaluations.
- Prevent the disposal of parcels <160 acres if it would result in eliminating species or listing them under the federal Endangered Species Act.
- If a species is in decline, adopt management to stop all activities that could contribute to its decline and prepare a biological evaluation, if needed.
- Establish long-term monitoring studies of rare plants and habitats.

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Recreation and travel management actions could affect special status plants, particularly off-highway vehicle use. Although several special status plants are thought to be in the area of OHV use, recreation and travel management are not expected to substantially affect special status plants.

4.19.5 Cumulative Effects

Cumulative effects to special status plant populations would be minor as a result of BLM implementing project clearances and mitigation measures. The effects would be from ground disturbances created by new road and trail construction; juniper reduction; fuels management; energy and minerals; forestry; livestock grazing; off-highway vehicles; and utilities, transportation, and communications projects.

4.19.6 Mitigation Measures

All proposed ELFO projects will have a special status plant inventory before being implemented. If a population is found, measures will be taken to protect that population and avoid any damage to it.

4.19.7 Unavoidable Adverse Impacts

No unavoidable adverse impacts will effect the known or suspected populations of special status plants on lands managed by BLM's ELFO.

4.19.8 Short-Term Uses Versus Long-Term Productivity

None.

4.19.9 Irreversible and Irretrievable Impacts

There will be no irreversible and irretrievable impacts to the known or suspected populations of special status plants on lands managed by BLM's ELFO. This is a regulated program, and BLM will follow federal and state policy.

4.20 Potential Effects on Visual Resources

This section describes the direct, indirect, and cumulative effects on visual resources and scenic quality from implementing the Preferred Alternative.

4.20.1 Methodology and Assumptions

Proposed management actions likely to have the greatest effect on visual resources in the ELFO area are activities associated with roads, fire, grazing, vegetation management, energy and minerals development, recreation, and utilities and rights-of-way.

The following assumptions were used to evaluate visual impacts.

- Visitors to BLM-administered lands or residents living next to BLM-administered lands are sensitive receptors for impacts on visual quality. Visitors and residents generally would have equal or higher expectations for scenic quality than at present.
- Activities that cause the most contrast and are the most noticeable to the viewer were generally considered to have the greatest effect on scenic quality.
- Surface-disturbing activities may affect scenic quality in the ELFO area. These activities include vegetation clearing, prescribed burns, chemical treatments, road and trail maintenance or construction, parking lot construction, energy and minerals development, and utility right-of-way development or upgrades. These activities can affect visual resources by changing vegetative patterns; changing species composition; changing landform shape, texture, or color; or introducing non-natural features that provide contrast with the surrounding landscape character.
- The severity of an adverse visual effect depends on a variety of factors, including the size of a management action, the location and design of roads and trails, the treatment of residue or slash from vegetative harvest or mechanical treatments, and the overall visibility of the disturbed areas.
- In some cases, vegetative treatments can improve visual quality by opening pleasing views or by softening or blending contrasting vegetative boundaries caused by development or past management practices, particularly on steep slopes or prominent landforms.
- All proposed projects that would result in surface disturbances would be consistent with established VRM management guidelines and reflect the value of visual resources.
- It was assumed that management activities would meet VRM classes and that opportunities exist to meet management goals while focusing on retaining the natural landscape.

4.20.2 Incomplete or Unavailable Information

Adequate information is available to analyze the effects on visual resources at the plan level.

4.20.3 Analysis

Negligible: The impact to scenic quality would be barely detectable, affecting the experience of few visitors in the applicable setting.

Minor: The impact to scenic quality would be detectable, affecting the experience of many visitors in the applicable setting.

Moderate: The impact to scenic quality would be readily apparent, affecting the experience of the majority of visitors in the applicable setting.

Major: The impact to scenic quality would be severely adverse or exceptionally beneficial, affecting the experience of nearly all visitors in the applicable setting.

4.20.4 Analysis of the Preferred Alternative

The Preferred Alternative would result in minor adverse and moderate to major beneficial impacts to scenic quality. Approximately 50% of the field office area would be managed as VRM Class II, and approximately 52% would be designated as VRM Class III (see Map VRM-1). Class I designations apply only to WSAs, and change of the WSA status would require an action by Congress. Only 7% of the field office area would be managed as VRM Class IV. The existing character of the visual landscape will be protected under management as VRM Class I (preservation), Class II (retention of the existing landscape character), and Class III (partial retention of the existing landscape character). The lands that would be managed under VRM Class IV criteria (major modification of the existing landscape) would permit new developments that could greatly alter the existing landscape.

Management actions associated with water resources, wild horses and burros, grazing, and lands and realty would result in negligible effects on visual resources. Management actions that include ground-disturbing activities have the greatest potential to affect visual resources. The fire and fuels, soil resources, terrestrial and aquatic wildlife, vegetation, and forestry programs have the potential to result in short-term adverse effects on visual resources. Because the ground-disturbing activities associated with these resource programs primarily are involved with restoring healthier and more diverse native plant communities to the landscape, these programs would benefit visual resources over the long-term. With respect to recreation resources, designation of special management areas and limitation of OHV use to roads and trails in most areas also would result in reduced impacts on visual resources in these areas over time. Cultural resource management would result in short-term, isolated disturbances. Utilities, transportation, and telecommunications infrastructure and energy and minerals development also would adversely affect visual resources. Site-disturbing activities would be designed to comply with the VRM designation where the facilities are sited as a means of reducing adverse effects.

Proposed management actions to protect cultural resource by restricting, reducing, or eliminating ground-disturbing activities—such as OHV travel, fire suppression, minerals development, and recreational staging areas—would benefit visual resources by maintaining the existing natural setting at cultural resource sites.

Wildland fire and fuels management actions including prescribed burns, mechanical treatments, and WFU, may result in short-term visual impacts because of burned vegetation and other land disturbance. Adverse impacts could occur from wildland fire management from cross-country travel of heavy equipment to construct fire lines or for mechanical vegetation treatments. Additional impacts could result from hazardous fuels reduction treatments on up to 4,500 acres per year. Impacts could be significant in certain locations. The use of AMR on 730,124 acres would reduce the potential for impacts on visual resources because VRM objectives could be considered in developing response, and cross-country heavy equipment use would be limited. Impacts generally would be site specific and temporary, and mitigation measures used to meet VRM class objectives would minimize impacts and help retain the natural landscape.

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The use of AMR and implementation of fuels reduction treatments is expected to result in a long-term increase in the health of native plant communities. This would help retain the naturalness of the landscape and would result in beneficial visual effects.

Management to protect and restore riparian/wetland areas, sagebrush vegetation communities, and wildlife habitats and populations would indirectly benefit visual resources by maintaining and enhancing the natural character of the landscape. Fencing 'at-risk' riparian areas could adversely affect the visual setting in localized areas because of the visual intrusion in the landscape. However, the accelerated recovery of the riparian areas would result in a long-term benefit for visual resources by enhancing the natural character of the areas. Restoring unhealthy vegetation communities and reducing infestations of noxious weeds would benefit visual resources by restoring the natural diversity of the native landscape. Short-term adverse effects would result from these actions due to the use of machinery and the disturbance associated with vegetation manipulation, but these effects are not considered significant. Potential road construction for juniper management would cause negative visual impacts, but they would be localized and not significant, as the disturbed area would be restored with native species in order to reduce future juniper encroachment. The protection of special-status plants by restricting land-disturbing activities and land disposal actions would benefit visual resources by limiting the area where development could occur and by reducing the potential for altering the visual setting in some areas.

WSAs (380,359 acres) comprise about 37% of BLM-administered lands in the field office area, and would be managed under VRM Class I. Management of WSAs would not affect visual resources because all proposals for uses or facilities within WSAs would be reviewed to determine whether the proposal meets the Class I VRM objectives and the non-impairment criteria. These criteria limit the types of activities and impacts that may occur on these lands, which ensures that adverse impacts on visual resources do not occur. The natural setting would benefit because visual intrusions into the landscape would be prevented. Acquisition of lands within Twin Peaks, Dry Valley Rim, Tunnison, and Skedaddle WSAs could indirectly benefit visual resources by eliminating potential development by private landowners within the WSA, thereby retaining its natural character. Closing 45 miles of roads and ways within WSAs would increase the protection of the visual character of the WSAs and would benefit visual resources by eliminating most potential for activities that could alter the natural setting. Construction of 68 miles of non-motorized trails within selected WSAs would follow VRM Class I requirements, and is not expected to alter visual quality in the long term.

Under the Preferred Alternative, 419 acres would be designated 'Open' to OHV use. The areas would be limited to former gravel mining areas that do not exhibit visual or other resource values. Approximately 21,000 acres would be 'Closed' to OHV use. Designating approximately 74% of the field office area (761,000 acres) as 'Limited to Designated Routes', and the remaining areas as 'Closed' to OHV use would provide a significantly higher level of protection of visual resources from impacts associated with cross-country travel than under current management. These restrictions would reduce the potential impacts of these activities by reducing vegetation loss, soil exposure, and erosion caused by cross-country travel.

Travel management would also close and rehabilitate 58 miles of roads which would improve the visual character of certain locations by removing road scars and promoting growth of natural vegetation. These enhancements generally would be limited in area and would not affect overall scenic quality. Approximately 264 miles of non-motorized trails would be built, which is a substantial increase from current management levels. Trail construction could increase the potential for adverse effects on visual resources and for disrupting the natural character of the landscape. Designing projects to meet VRM class objectives would reduce potential impacts.

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Grazing by livestock and wild horses and burros is not anticipated to directly affect visual and scenic quality because these actions do not include ground-disturbing activities and generally would not cause visual intrusion in the landscape. However, grazing would result in secondary effects, such as trampling, compaction, grazing of vegetation, and channel incision, that would degrade the visual quality of the landscape. Livestock, and in particular, wild horses can affect the visual setting at watering areas, where severe vegetation and soil damage can occur. These impacts would be site specific, generally would be limited in area, and are not considered significant. Constructing up to 80 miles of new fencing for livestock grazing management could affect visual resources because of new visual intrusions on the landscape. Fencing is not generally a highly visible intrusion, and planning under VRM objectives is expected to ensure that visual impacts are not significant.

Managing 11,020 acres as commercial forest is expected to result in minimal impacts on visual resources because the variety of management methods would minimize effects that could occur under a single practice, such as clearcutting. Management actions also would occur only in about 1% of BLM-administered lands; effects on the overall visual setting are not expected to be significant. Forestry management would implement lumber and biomass harvest on 1,100 acres, resulting in the potential to affect the visual character of some areas. Planning harvest activities within VRM class objectives is expected to reduce the concentration of harvest activities in certain areas, which would reduce the potential for adverse effects.

Management activities relating to the extraction of mineral materials, oil and gas exploration, and the development and production of locatable minerals have the potential to change the natural character of the landscape. Existing WSAs would remain 'Closed' to mineral development and leasable mineral entry, and locatable mineral development would be restricted to those that do not require reclamation. The visual character of these areas would be retained. A total of 484,201 acres would be 'Closed' or subject to no surface occupancy restrictions for leasable minerals. Approximately 389,000 acres would be 'Closed' to saleable minerals, and 8,400 acres would be withdrawn from locatable mineral activities. These closures would protect the visual setting and retain the natural character of the landscape in large areas of the field office, including areas of critical environmental concern, other sensitive resource areas, and important recreation areas. Substantial portions of the field office area would remain 'Open' for mineral activities, and projects would be planned to meet VRM objectives in order to reduce the adverse effects of surface-disturbing activities. The potential for large-scale mining development in the field office area that could affect the visual landscape is generally considered low in most areas; consequently, minerals development is expected to result in minimal impacts on visual resources.

The Preferred Alternative specifies that utility corridor and communication site locations would be limited as much as possible to existing locations. This would benefit visual resources by promoting the use of certain areas for more than one project. By reducing the potential for projects to be implemented in multiple areas, the area subject to visual intrusions would be decreased. ROWs would be excluded from WSAs and avoided in ACECs, which would retain the visual setting of these unique areas. Wind energy development is expected to increase in the near future.

Continuation of existing recreation activities—except for OHV use—in areas other than WSAs, SRMAs, and other special management areas is not anticipated to cause increased degradation of resources and would not result in impacts on the visual landscape. Negative impacts on visual resources from OHV activities—especially cross-country travel—could occur, if the use caused increased soil erosion or loss of vegetation. Construction of trails in the Bizz Johnson SRMA and motorized trails in the Eagle Lake Basin SRMA would cause temporary visual disturbances from construction activities. Planning routes to meet VRM class objectives would reduce the potential for new routes to affect the natural character of the landscape.

Recreation management actions under the Preferred Alternative would designate approximately 90% of the field office area as 'Primitive' or 'Backcountry'. The 'Backcountry' designation represents a combination of the 'Semi-primitive Motorized' and 'Non-motorized' classes but focuses more closely on managing the semi-primitive areas for a variety of uses. Visual resources are expected to benefit indirectly from the increased emphasis on the 'Primitive' and 'Semi-primitive' designations compared to current management, because this management would reduce the potential for alterations of the visual setting and would maintain the natural character of the landscape. The 'Semi-primitive Motorized' areas would cover approximately 196,000 acres. Visual resources are expected to benefit indirectly from the increased emphasis on 'Primitive' designations because recreation management activities would reduce the potential for alterations of the visual setting and focus on maintaining the natural character of the landscape.

Designating seven ACECs (comprising approximately 89,000 acres) would benefit the visual resources of the areas by maintaining the natural character of the landscape and the scenic values that led to their designation. Management actions to protect approximately 38 miles of the Nobles Emigrant Historic National Trail would result in beneficial effects for visual resources by retaining the natural setting of the trail. Restrictions placed on projects to minimize impacts on the trail's visual setting also would benefit the surrounding areas through reduced visual intrusions.

The 10.6 miles of Upper Smoke Creek that would be recommended suitable for designation as a WSR would be managed as VRM Class II, with associated benefits to visual resources by retaining the natural landscape in the river and canyons. Additional benefits to the visual setting would be achieved by excluding livestock from streambanks, and closing the area to OHV use.

Land acquisitions would generally not affect visual resources because acquired parcels would be managed under the same VRM class as adjacent parcels. Disposal of lands would be limited to parcels that do not have high resource values or are not easily managed. The impacts are not expected to be significant because the area represents a small portion of the field office jurisdiction and the disposed parcels do not add value to other resources—including the natural visual character of the area.

The construction of nesting islands in Eagle Lake and the Susan River would alter the view of the waterbodies from some locations. As the habitat matured, the islands would appear to be a natural component of the aquatic system and would enhance the visual resources by increasing the habitat character and attracting additional wildlife. Development of additional reservoirs would affect visual resources by creating a new visual component in the landscape. Adverse impacts are expected during reservoir construction and could be mitigated with planning activities to conform to VRM class objectives. The new features generally would enhance the visual character of the area by introducing waterbodies to the landscape, which is a primary component in the VRM inventory and classification system.

4.20.5 Cumulative Effects

Land uses on areas surrounding BLM lands, as well as on BLM lands, have the potential to adversely affect visual resources. There have been historically significant effects to the natural setting, and the visual landscape has been subject to incremental impacts as activities and development have gradually altered the visual setting. Known activities in the affected area that would affect visual resources include conversion of native landscapes to agriculture and residential uses, road construction, logging, and juniper and vegetation treatments. Continued community growth and development would lead to increased demand for energy and building materials, potentially increasing the need for utilities and mineral materials.

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Given the relatively low population density in the field office area, overall growth and demand for material is not expected to be significant. However, an increase in demand for wind and other renewable energy sources is expected to increase.

During the completion of environmental analysis for specific projects, BLM would consider the potential impacts on visual resources for the specific project in conjunction with impacts from adjacent uses. The potential for new developments to exacerbate any adverse effects would also be evaluated.

Proposed management actions would generally result in incremental beneficial effects to visual resources on surrounding (non-BLM) areas. Beneficial effects would primarily result from: 1) reduced OHV cross-county use, 2) concentration of utility developments into corridors, and 3) removal of existing utility facilities that have been abandoned. Most adverse impacts associated with BLM resource programs would be temporary and would be limited to the local area where the activities occur. The cumulative effects on visual resources are not expected to be significant when considered in combination with other land uses and reasonably foreseeable activities in the field office area.

4.20.6 Mitigation Measures

All surface-disturbing activities would be subject to the VRM Class objectives of the area within which the activity takes place. The visual resource contrast rating system is used as a guide to analyze the potential site-specific impacts of surface disturbance as well as facility design and placement. Surface-disturbing activities and facilities would then be designed to mitigate their visual impacts and conform to the area's assigned VRM Class objective. Mitigation would include camouflage coloring, facility design, placement, and/or topographic screening.

4.20.7 Unavoidable Adverse Impacts

Energy and minerals exploration and development, trail construction, certain vegetation and fuels treatments, and wildland fire management could cause both short-term and long-term, unavoidable adverse impacts on visual quality.

4.20.8 Short-term Use Versus Long-term Productivity

Unrestricted OHV use in 'Open' areas would cause long-term losses in scenic quality if it occurs in highly visible or visually sensitive areas. The short-term adverse impacts of prescribed fire and other vegetation treatments would have long-term beneficial impacts on visual quality by improving the form, color, and line of vegetation, improving the vegetation mosaic, and reducing the potential for visual quality degradation from wildland fire.

4.20.9 Irreversible and Irretrievable Impacts

Some cultural resources, such as petroglyphs, pictographs, and prehistoric and historically important structures, are considered to have a visual resource component. Unauthorized activities that cause damage to or loss of these resources would have irreversible impacts on the resource.

4.21 Potential Effects on Water Resources

This section describes the potential impacts on water resources from implementing proposed management actions under the Preferred Alternative.

4.21.1 Methodology and Assumptions

The potential for proposed management actions to affect water resources was evaluated, mainly through the framework of the Approved Northeastern California and Northwestern Nevada Standards and Guidelines for Livestock Grazing (July, 2000). The following standards were used in this analysis: Standard 2 (Streams) and Standard 3 (Water Quality).¹ In addition, the analysis considered water quantity (for both surface water and groundwater) and flooding, as directed by Executive Order 11988 (Floodplain Management).

This analysis considered an effect on water **adverse** if it would do the following:

- **Standard 2 – Streams:** prevent or impair significant progress toward stream channel form and function that is characteristic of the soil type, climate, and landform.
- **Standard 3 – Water Quality:** prevent or impair significant progress toward water that has characteristics suitable for existing or potential beneficial uses. To support beneficial uses, surface water and groundwater should comply with the objectives of the Clean Water Act and other applicable water quality requirements, including meeting the California and Nevada state standards.
- **Water Quantity:** alter surface flows or aquifer volume so as to impair existing or future consumptive or instream uses.
- **Flooding:** result in incompatible floodplain development, not conform to the standards and criteria of the National Flood Insurance Program, or impair natural and beneficial floodplain values.

The following key water resources concepts are fundamental to understanding the discussion of environmental consequences. Key factors related to stream form and function include channel gradient, pool frequency, width to depth ratio, roughness, sinuosity, and sediment transport. All of these factors should be able to function naturally and be characteristic of the soil type, climate, and landform. Key indicators include the following:

- Gravel bars and other coarse-textured stream deposits are successfully colonized and stabilized by woody riparian species.
- Streambank vegetation is vigorous and diverse, mostly perennial, and holds and protects banks during high streamflow events.
- The stream water surface has a high degree of shading, resulting in cooler water in summer and reduced icing in winter.
- Portions of the primary floodplain are frequently flooded (inundated every 1 to 5 years).

¹ Standard 1, Upland Soils, and Standard 4, Riparian and Wetland Sites, while relating to water resources, are not discussed in this section. They are discussed in the “Soil Resources” and “Vegetation” sections of this chapter, respectively.

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Water quality in a typical surface water body is influenced by processes and activities that take place in upstream areas of the drainage basin or watershed. In a natural system, surface water quality depends mainly on the mineral composition of the rocks in the upper source areas of the stream, as well as the types of rock and sediments that groundwater passes through on its way to the stream. Farther downstream, the water quality becomes more influenced by land use and land management activities, including discharges from both point and nonpoint sources. The analysis considered the following key constituents: sediment, temperature, nutrients, pathogens, and dissolved oxygen. The analysis did not consider other constituents, such as pH and conductivity, because of their low potential to be affected by the proposed management actions.

Sediment is generated when soils are disturbed and discharged directly to a water body or carried to the receiving water in overland runoff. High concentrations of suspended sediment in surface waters cause many adverse consequences, including the following:

- increased turbidity or impaired water clarity,
- reduced light penetration,
- reduced ability of predators that rely on sight to capture prey,
- clogged gills of fish and aquatic invertebrates,
- reduced spawning,
- reduced survival of juvenile fish, and
- reduced angling success.

Other impacts, such as smothering the benthic community and changes in the composition of the bed substrate, result when sediment is deposited in slow-moving receiving waters. Suspended sediment is also an efficient carrier of toxic organic substances and trace metals because these substances can bind to sediment particles. Once sediment falls out of suspension, pollutants in enriched bottom sediments can be remobilized under suitable environmental conditions and pose a risk to benthic life. Note that in areas starved of sediment (e.g., areas downstream of reservoirs or other artificial impoundments) increases in sediment can benefit channel geomorphology and development of aquatic habitat.

Elevated water temperatures can substantially affect organisms adapted to a cold water environment. A rise in water temperature of only a few degrees over ambient conditions can reduce the number of or eliminate sensitive invertebrates and fish. In general, sustained summer water temperatures exceeding 20°C (68°F) are considered to be stressful – and perhaps lethal – too many cold water organisms in the ELFO area. Large daily fluctuations in temperature can also result in adverse effects.

Nutrients are needed for photosynthesis for supporting the requirements of organisms at higher trophic levels. In freshwater aquatic systems, the main nutrients are phosphorus and nitrogen. In particular, phosphorus is a controlling factor on photosynthesis in aquatic systems. High concentrations can stimulate the growth of plants and algae. Excessive growth of plants and algae can do the following:

- reduce the aesthetic appeal of the water for recreational users,
- clog the habitat used by other aquatic organisms,
- cause large daily swings in DO concentrations, and
- cause other nuisance conditions.

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Excessive levels of phosphorus and nitrogen that lead to undesirable algal blooms are part of a process known as eutrophication. Waterborne pathogens could result in various adverse effects on warm-blooded animals drinking the water and even some possible adverse effects on human contact recreation activities. The main indicator of pathogens is the presence of coliform bacteria, which are microorganisms that live in the intestines of both warm- and cold-blooded animals, including humans. These bacteria enter the hydrologic system through fecal material that enters into water bodies. The presence of fecal coliform bacteria in water shows that fecal material has entered the water body. The presence of fecal coliform can also show that other harmful bacteria or viruses might be present. Some of the results of these bacteria or viruses in the water body could be exposure of people using the water to typhoid fever, bacterial gastroenteritis, and hepatitis A. Fecal coliform bacteria in water bodies on BLM-administered lands are usually a result of nonpoint sources of human and animal waste.

The amount of oxygen that can be dissolved in water differs with temperature. Cold water can contain more DO than warm water. The amount of DO present in relation to the amount that could be dissolved at a given temperature is referred to as the saturation level, which is expressed as a percentage. Decomposition of organic matter by microorganisms depletes levels of DO in slow-moving receiving waters and lakes and reservoirs. The degree of potential DO depletion is measured by the biochemical oxygen demand test, which measures the amount of oxidizable matter. Factors resulting in increased DO levels include the following:

- physical mixing and agitation of the water (aeration),
- photosynthetic production of oxygen by aquatic algae and plants, and
- lower water temperatures.

When DO levels drop too low, waters can become uninhabitable for aquatic organisms and might result in fish kills.

Water quantity is related to the volume of flow and/or storage in a given water body. For groundwater, water quantity is expressed as aquifer volume. Groundwater resources should be sufficient to support beneficial uses, which can include domestic and agricultural supply. Surface water flows might also support the following:

- domestic and agricultural consumptive uses,
- recreational activity,
- biological resources (such as fish passage), and
- water quality.

The Federal Emergency Management Agency (FEMA) provides information on flood hazard and frequency on its Flood Insurance Rate Maps. FEMA delineates zones to show flood hazard potential. In general, flooding occurs along waterways, with infrequent localized flooding also occurring because of constrictions of drainage systems or surface water ponding. Flooding generally benefits the natural ecosystem, but it can imperil humans, livestock, wild horses and burros, and property.

Floodwaters can also mobilize and direct contaminants into previously uncontaminated waters. Human activity, such as increases in soil compaction or impervious surfaces such as pavement, can reduce the ability for precipitation to infiltrate into soil and increase the speed of conveyance—altering the timing and increasing the peak runoff during precipitation events.

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Assessments and data used to compare water quality condition with the indicators above are maintained in several databases and linked to GIS layers. Water quality data are maintained in the Excel Water Quality database in the ELFO. California Irrigation Management Information System data were used to help normalize water temperature data.

Each state maintains a database of water rights assertions and actions. In addition, BLM's field offices maintain a Water Source Inventory database, which is partially complete.

In analyzing effects on water resources, we made the following assumptions.

- Short-term effects are those expected to occur within 1 to 5 years of an activity's being implemented. Long-term effects are those that would occur after the first 5 years of implementation but within the life of the PRMP (projected to be 20 years).
- Adverse effects on water resources throughout the ELFO area would be minimized through the use of standard management practices and adherence to Standards 2 (streams) and 3 (Water Quality) of the Standards for Rangeland health standards and Guidelines for Northeastern California and Northwestern Nevada (Appendix B) as well as BLM's source water and groundwater exportation policies.
- All BLM actions are required to meet or make significant progress toward meeting these standards, which are achieved by implementing the standard management practices and other BLM standards. Consequently, substantial harm to water resources is not possible. The discussion of effects, therefore, focuses on the rate of progress toward meeting standards, except for wild horses and burro management actions, for which implementing regulations could have adverse effects.
- Because of the programmatic nature of proposed management actions for water resources, we have discussed the impacts qualitatively. In some cases, more specific analysis would be required to precisely determine the extent of potential impacts. We would conduct such analysis when a management action is clearly defined.
- Air quality management actions relate mainly to use of fire. For this reason, we have discussed potential effects with the effects from fire and fuels management actions.

The management actions that could lead to the effects described above includes the following on-the-ground activities:

Ground disturbance can result from many activities, including

- mechanical and hand treatments of vegetation;
- livestock and wild horse grazing,
- energy and mineral development;
- harvesting of timber;
- road construction;
- recreation activities, including OHV use; and
- installing fences and exclosures.

If not properly managed, this ground disturbance could lead to erosion and sedimentation into waterways, with such degrading of water quality as increased turbidity and smothering of habitat.

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- Streambed disturbance can mobilize sediments and increase turbidity downstream. Construction activities in streams can also introduce the potential for releases of construction-related hazardous materials. Because of the direct mechanism for exposure to such contaminants, instream work is of particular concern. Long-term effects would be related to increases or decreases in flows and sediment transport, with effects on geomorphology and stream health.
- Reservoirs and instream structures can affect storage and flows in surface water bodies. If a new reservoir is built, storage in that area would increase, and flows downstream could decline.
- Livestock distribution can increase or decrease the effect of livestock, depending on their location and density. If livestock are concentrated in small areas or along fence lines, the effect of animal waste and soil disturbance from trampling would be greater in those areas—with associated effects related to soil disturbance and compaction, as well as increased concentrations of nutrients and pathogens. Concentration of livestock in riparian areas can destroy streambanks and remove riparian vegetation. Such concentration can occur where alternative water supplies are not available or where exclosures are not used. Similar effects can result from the activities of wild horses and burros.
- Altered drainage patterns could result from ground-disturbing activities, such as road building, timber harvesting, and installing instream structures. Altered drainage patterns could increase erosion and sedimentation or violate water quality standards by directing contaminants into previously uncontaminated waters.
- Roads and vehicles can produce a variety of contaminants that can wash into water bodies during precipitation events. Such contaminants include oil and grease, gasoline, heavy metals, and sediment. Improperly maintained ditches and culverts for roads can concentrate runoff from roads and cause erosion. Off-road vehicles can also cause erosion.
- Herbicides, if improperly applied, can cause violations of water quality standards. Residual traces of herbicides can be washed into soils and water bodies during precipitation events.
- Water transfers can result in water being removed from a system and in net decreases in water quantity, or they can otherwise degrade beneficial uses.
- Public visitation could mean an increase in ground-disturbing activities from foot and vehicle traffic. Water quality standards could also be violated if an increase in vehicle traffic leads to an increase in contaminants washing off roads into the water bodies. Water bodies could be directly polluted by littering, indiscriminant discharges from recreational vehicles, or direct influx of body waste to a lake or stream.
- Increased use of trails could lead to increased erosion and sedimentation.
- Improper locating of projects could result in adverse effects to many of the factors listed above.

4.21.2 Incomplete or Unavailable Information

The water quality database contains all water quality data collected since 1979. Although the data were collected and analyzed using protocols approved or accepted by the U.S. Environmental Protection Agency and U.S. Geological Survey, the quality of the work varies considerably with the experience of the field and analytical people. Because of funding constraints, there has been no regular monitoring program, and consistency differs from year to year.

Beginning in hydrologic year 2002, the ELFO began a conscientious effort to collect at least a baseline minimum of water quality information on all perennial and important intermittent streams. This effort resulted in the collection of indicator variables generally sufficient to suggest where water quality conditions probably are and are not meeting the water quality indicators listed above. This

information would also be used to direct BLM's future water quality data collection to data gaps. Because of time constraints, the data used in this report have not been validated and probably reflect a worst-case scenario.

Other areas where data gaps could be filled include the following:

- More water quality data is needed to determine the condition of other waters, including springs, intermittent streams, lakes, and ponds.
- On the basis of existing data, follow-up data collection is needed on waters that might not meet standards or the needs of desired beneficial uses, mainly the desired assemblage of aquatic species.

4.21.3 Analysis

This analysis defined the levels of effects on water resources management as follows:

Negligible: Any chemical, physical, or biological effects would not be detectable, would be well below water quality standards or criteria, and would be within desired water quality conditions.

Minor: Chemical, physical, or biological effects would be detectable but would be well below water quality standards or criteria and within desired water quality conditions.

Moderate: Chemical, physical, or biological effects would be detectable but would be at or below water quality standards or criteria. Desired water quality conditions would be altered on a short-term basis.

Major: Chemical, physical, or biological effects would be detectable and would be frequently altered from the desired water quality conditions and/or chemical, physical, or biological water quality standards or criteria would be exceeded on a short-term basis.

4.21.4 Analysis of the Preferred Alternative

Major water-disturbing activities that are expected to occur include the following:

- livestock and wild horse grazing,
- recreation and OHV use,
- fire use and fuels treatments,
- road construction and maintenance, and
- juniper treatment and timber harvest.

As a result of these activities include:

- hydrologic modifications through soil erosion and soil compaction,
- decreased infiltration and increased runoff, thereby degrading water quality and quantity through increased sedimentation and streambank alteration.

Forestry and juniper management include harvest, fuels management, and reforestation. The ground-disturbing aspects of these activities in the short term can decrease infiltration and increase runoff, erosion, turbidity, soil compaction, and sedimentation (Riekerk 1989).

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However, timber and juniper operations would have to implement measures as needed to protect water quality. Where forestry and juniper actions improve ecosystem condition, long-term benefits would accrue to water quality, stream channel condition, and flooding as a result of improved natural functioning of forested areas and reductions in catastrophic fires through fuels management.

If not properly managed, fires can increase erosion and sedimentation and result in other declines in water quality, such as the following:

- increases in organic carbon,
- releases of other contaminants from burned material, and
- decreased infiltration that results in increases in peak runoff and flooding.

Fire can therefore degrade stream channel condition, lower water quality, intensify flooding, and lower water quantity. These effects are particularly acute during and following catastrophic fires. In general, use of AMR, WFU, and fire and fuels management actions would benefit water in long term by reducing the potential for catastrophic fires.

The large area proposed for the full range of fire suppression options (282,304 acres) and small acreage proposed for WFU would reduce the potential for catastrophic fire over the field office area. The area of fuels treatment (4,500 acres per year for prescribed fire, 3,500 acres per year for mechanical treatment) would help promote the natural fire regime that would produce a natural vegetation component and enhanced soil structure to indirectly support natural hydrologic and water quality processes.

Prescribed burning might moderately increase erosion and runoff on a short-term basis, but long-term benefits would outweigh any adverse effects. The resulting long-term benefits to water resources from removing juniper would compensate for these adverse effects.

Mechanical treatment of juniper and harvesting timber on 1,100 acres/yr, and reforestation efforts could result in major short-term adverse effects on water resources such as decreased infiltration and increased runoff, erosion, soil compaction, and sedimentation. The result would be decreases in streambank stability and water quality. BLM would design timber and juniper operations to protect water resources. In addition, over the long term, artificial regeneration and establishing of the natural sagebrush-steppe community would increase vegetation cover, with corresponding benefits to water resources over a major area.

Livestock grazing and wild horse use introduce the potential for ongoing soil compaction, erosion, sedimentation, and degrading of stream channel condition where exclosures are not established (Fleischner 1994). The presence of livestock and wild horses could also degrade water quality when animal wastes are washed into water bodies, increasing nutrient (Belsky, et al 1999) and pathogen levels (Bohn and Buckhouse 1985). Where allotments are failing to meet land health standards, appropriate guidelines would be implemented as stated in the Standards and Guidelines.

Developing water sources is expected to generally protect water quality by reducing direct use of springs by livestock and would also benefit water supply and stream channel condition. All of these activities would result in long-term benefits, particularly where the activities are focused in areas not meeting land health standards. Overall, livestock and wild horse use would result in short- and long-term minor to moderate adverse impacts on hydrology and water quality.

Recreation, in general, can lead to surface disturbance; release of human-related contaminants such as nutrients, bacteria, and trash; and other effects from vehicle use. Water-based recreation represents a

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direct mechanism for contaminating water bodies. However, when recreation is properly managed (e.g., restricted to suitable locations and activities), substantial adverse effects on water resources and water quality would be avoided. Specific actions with potential adverse effects include new trail and facility construction, with short-term effects from construction and longer-term effects from the use of these areas.

BLM would implement measures to reduce short-term effects so that they would not be significant. In addition, as discussed above, proper siting and management would reduce long-term adverse effects.

OHV use would be largely ‘Limited to Designated Routes’, which would minimize adverse impacts to certain roads and to water resources where OHVs travel cross country. A total of 261,511 acres would be ‘Closed’ to OHV use for cultural, riparian, wildlife, and wilderness characteristics concerns. This closure would provide more water resource protection. About 237,953 acres would have ROS designations of ‘Primitive’. These designations would have major short and long-term benefits to water resources by eliminating motorized vehicle use.

Managing the existing Eagle Lake Basin and Bizz Johnson Trail SRMAs, and the Pine Dunes RNA, including restrictions on OHV use, would continue, with resulting benefits to water resources. Managing WSAs to retain their wilderness character is generally expected to minimize erosion, soil compaction, and sedimentation—thereby improving water quality and hydrologic function. The ACEC designation for 89,397 acres would provide more protection for water resources and would result in moderate short- and long-term benefits to water quality and hydrology. In addition, the Preferred Alternative recommends 10.6 miles of wild and scenic river segment of Upper Smoke Creek. This designation would have corresponding benefits to water resources in those areas.

Granting ROWs would not degrade water quality; however building facilities within ROWs could cause adverse effects such as ground disturbance. Such construction could do the following:

- decrease infiltration;
- increase soil compaction, erosion, sedimentation, and runoff; and
- release of construction-related hazardous materials.

Before allowing any major construction, BLM would perform project-specific environmental analysis to determine potential water quality effects and suitable mitigation.

Weed control by herbicides or mechanical means would cause negligible to minor short-term disturbance to soil chemistry, structure, productivity, and abundance through herbicide applications, equipment disruption and compaction, and wind erosion. Methods for herbicide application would follow label requirements, which would ensure that any effects from herbicide use would be minimal. The long-term benefits of weed control and a restored sagebrush-steppe community would include stabilized soils and improved or restored natural fertility, productivity, and function. Such benefits would be long term and moderate in intensity and would indirectly benefit water resources.

Management actions for soil and water resources are aimed at maintaining and improving progress toward PFC and would most benefit water resources. Enclosures and closures of areas for wildlife and archeological concerns would offer extended benefits to water resources as a byproduct.

Other types of management actions that would result in beneficial effects are as follows:

- limiting or prohibiting activities near intermittent and perennial streams in areas not meeting land health standards or where such activities would disrupt watershed function or processes;

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- managing livestock grazing patterns;
- controlling invasive species;
- preventing compaction of shrink-swell soils;
- establishing buffers around sensitive sites; and
- limiting ground-disturbing activities near water bodies and where soils are not in PFC.

These actions would also marginally reduce harmful flooding and improve water supplies by encouraging soil water retention and later release over the season.

Additional focus on a variety of management practices to achieve PFC would result in increased progress toward meeting land health standards. Exclosures around springs, riparian areas, and contributing uplands would result in additional beneficial effects. Assertion of instream flow and riparian rights would result in benefits to flows overall. Water resources management actions represent a coordinated and comprehensive approach to water resources management, and are anticipated to result in benefits.

Measures to improve fish and wildlife habitat and to support special-status species would benefit water quality over the long term. The indirect benefits of habitat rehabilitation, increased water availability, managing grazing practices, use of exclosures, and OHV restrictions are improved soil stability, hydrologic function, and overall beneficial use of water supplies.

Building new islands for waterfowl would likely result in short-term increases in turbidity in reservoirs and in short-term adverse effects that would be difficult to avoid.

For special-status species management, water resources could benefit greatly in the areas where management action is focused—for instance, where instream flows and channel condition are improved for use by certain fish species.

4.21.5 Summary of Effects of the Preferred Alternative

The Preferred Alternative provides many measures to improve land health and would result in minor adverse effects and moderate to major beneficial impacts to water resources. Additional focus on a variety of management practices to achieve PFC would result in increased progress toward meeting land health standards.

Exclosures around springs, riparian areas, and contributing uplands would result in additional beneficial effects. Assertion of instream flow and riparian rights would result in benefits to water resources overall. A larger variety of management practices would be used to manage fisheries, including removal of cattle from areas where they are affecting water quality and stream channel condition. This approach is expected to result in substantial short-term and long-term beneficial effects on water resources in these areas.

Major improvements to livestock grazing strategies and land health would be made, resulting in the restoration of riparian areas and springs. Recreation identifies most of the field office area as ‘Primitive’ or backcountry to emphasize recreation opportunities in natural settings. OHV use would be restricted, and the potential for water resources impacts related to cross-country OHV use would be very low. Significant restrictions on OHV use and closure of routes would reduce potential impacts on water resources from cross-country travel, and route proliferation.

Beneficial effects would also result from implementing sediment intrusion buffer zones that are greater than 50 feet and restricting new construction to locations with the least impact on water resources.

4.21.6 Cumulative Effects

Cumulative effects are mainly expected where water bodies do not meet land health standards (on BLM-administered lands) or are designated as impaired under the Clean Water Act, Section 303(d) (on both BLM- and non-BLM-administered lands). Water bodies meeting this definition are listed in Chapter 3. In such areas, any management action that can impede the meeting of land health standards would adversely affect water quality. Such impacts are not considered substantial.

Land uses on areas surrounding BLM holdings could generate adverse effects on water resources. These effects could be exacerbated by BLM actions with similar potential adverse effects. Known activities and conditions on non-BLM-administered lands in the ELFO area include the following:

- conversion of sagebrush and other habitats to agricultural or residential use,
- invasions of noxious weeds,
- juniper treatments,
- logging and road building,
- livestock grazing,
- water use, and
- wildfire.

In approving specific activities and implementing suitable measures and management practices for lands it administers, BLM would consider these adjacent uses and the potential for BLM's activities to exacerbate potential cumulative adverse impacts. Therefore, although some cumulatively considerable effects might result from BLM activities in combination with other land uses, such effects are expected to be minor.

4.21.7 Mitigation Measures

All resource uses that could degrade water resources would employ BMPs to minimize potential adverse effects. Where adverse effects cannot be avoided and disturbed resources would not naturally recover, they would be mitigated for by providing improvement equal in value to the area disturbed elsewhere in the field office area.

4.21.8 Unavoidable Adverse Impacts

Resource uses of most concern would be livestock grazing, wild horse and burro use, new road construction, and OHV use, because of their potential for localized and widespread surface disturbance. Actions with similar but smaller adverse effects are related to forestry, issuing rights-of-way, and mineral extraction because these actions would disturb smaller areas.

Fire and fuels management has a great potential to degrade water resources, but natural recovery of watersheds and benefits to water resources following fire and fuel uses would outweigh these effects.

4.21.9 Short-Term Uses Versus Long-Term Productivity

Short-term uses resulting in adverse impacts to water resources – such as vegetation and juniper treatments and fire use – would generate enhanced long-term productivity.

4.21.10 Irreversible and Irretrievable Impacts

None.

4.22 Potential Effects on Wild Horses and Burros

This section describes the direct, indirect, and cumulative effects on wild horses and burros from implementation of the Preferred Alternative. Impacts from decisions concerning air quality, cultural resources, wildland fire management, noxious weeds and special status plants, visual resources, forestry, wild and scenic rivers and boating would have negligible or minor impacts on wild horses and burros. Therefore, these subjects are not being discussed further in this analysis. Impacts from decisions concerning fuels management, soils, wildlife, vegetation, water resources, wild horses and burros, recreation, and livestock grazing could affect wild horses and burros, and are discussed below.

4.22.1 Methodology and Assumptions

This impact assessment is based on the assumption that the existing wild horse and burro AML would remain at their current levels unless changes are required because of the need to comply with land health standards. BLM would successfully manage herds within the AML range.

Although herd sizes would be maintained at AML, management actions that increase the availability of forage could provide forage for wild horses and burros. Such actions are considered to benefit wild horses and burros by increasing the health of individuals and reducing the potential that carrying capacity could drop below AMLs during drought periods. Increased forage is considered a benefit, despite the general recognition that water availability rather than forage is most limiting to wild horse and burro populations.

4.22.2 Incomplete or Unavailable Information

The analysis of effects assumes that the AMLs for the three herd management areas are appropriate and would be maintained over time. If monitoring determines the AMLs are not appropriate, then they may be adjusted up or down. Adequate information is available to address the impacts of other resource program actions on wild horses and burros at the planning level of the PRMP.

4.22.3 Analysis

This analysis defined the levels of effects on wild horses and burros as follows.

Negligible: Wild horses and burros would not be affected, or the effects would be at or below the level of detection. Impacts would be so slight that they would not be of any measurable or perceptible consequence to the population, health, distribution, or wild free-roaming character of the animals.

Minor: The effects on wild horses and burros would be detectable but localized, small, and of little consequence to the population, health, distribution, or wild free-roaming character of the animals. Mitigating measures, if needed to offset adverse effects, would be simple and successful.

Moderate: The effects on wild horses and burros would be readily detectable and localized, with consequences to the population, health, distribution, or wild free-roaming character of the animals. Mitigating measures, if needed to offset adverse effects, would be extensive and probably successful.

Major: The effects on wild horses and burros would be obvious and would result in substantial consequences to the population, health, distribution, or wild free-roaming character of the animals. Extensive mitigating measures would be needed to offset adverse effects, and their success would not be guaranteed.

4.22.4 Analysis of the Preferred Alternative

Management emphases for protecting or restoring soil conditions would have minor adverse impacts to wild horses and burros. Restrictions for heavy equipment, tools used for recovering areas in degraded condition, and road placement would overall benefit wild horses and burros by limiting activities to the most suitable soils. BLM would manage horses and burros at appropriate management levels (AML) and would adjust these levels should impacts to soils be attributed to wild horses or burros.

Wildlife management actions that emphasize habitat improvement in uplands and riparian areas, as well as reductions of invasive juniper, cheatgrass, and other annual grasses, would benefit wild horses and burros by also improving forage conditions and potential water availability. Maintenance of existing exclosures (> 40 acres each) that encompass a total of 2,200 acres would not affect wild horses or burros because horses have become accustomed to their presence. New exclosures would need to be analyzed at the project level and designed specifically to minimize impacts from new fence construction, which could include possible changes in herd movement and changes in access to water.

Proposed land acquisitions would benefit wild horses and burros by minimizing management problems with use of private lands within herd management areas. Land disposals, rights-of-way, and utility corridor management actions, as described, would negligibly affect wild horses and burros.

Gathering horses and burros in response to stabilization and rehabilitation plans for wildfire and vegetation treatments would temporarily and slightly (minor impact) lower herd numbers. Exclosure fences built to protect treated areas might impede movement within HMAs, depending on the exclosure size.

HMAs would continue to be managed with regular gathers to maintain herd numbers within appropriate management levels and, when necessary, for rehabilitation after wildfire. BLM would maintain three HMAs at appropriate management levels, emphasizing the historical traits of each herd. Emphasis would be given to promoting public education and interpretation of the wild horse and burro program. Facilities would be developed for the adoption program and for public viewing of wild horses and burros in their natural habitat.

Increased emphasis on restoring ecosystems and habitats that are not fully functioning or are unhealthy would both adversely affect and benefit wild horses and burros. The potential for large acreages (up to 4,500 acres) to be treated with prescribed fire and mechanical, biological, or chemical treatments in any one year could moderately affect wild horses and burros for the short term immediately following treatment. If similar treatments occur in the same area during later years, the impacts would become greater and extended over a longer timeframe.

Removing animals from an area to allow vegetation treatments to be effective would require more gathers of wild horses and burros more often than the proposed 3-year interval. Fencing to protect vegetation treatments could have varying degrees of disturbance, depending on the HMA. The Twin Peaks HMA, being the largest HMA in the field office area, provides more flexibility for horses to adjust to temporary fences and allows them to better redistribute themselves within the HMA and adjust movement patterns. The Fort Sage HMA is much smaller than the Twin Peaks HMA. New fences in the Fort Sage area could greatly impede (major impact) animal movement between forage areas and water sources.

In the long-term, vegetation treatments to restore unhealthy ecosystems, protect unique vegetation associations, and improve habitat conditions would benefit wild horses and burros by doing the following:

- increasing desirable vegetation,

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- protecting soils,
- reducing the potential for invasive species, and
- increasing the overall productivity of the range for wild horses and burros.

Managing water resources and supply would slightly affect (minor impacts) wild horse and burro management. As long as there is progress toward attaining water quality and riparian objectives, restrictions would have minor adverse impacts to wild horses and burros. The emphasis on providing more water developments to improve livestock distribution would benefit wild horses and burros by increasing the potential water sources for horses when livestock are not present, potentially improving distribution of horses within an HMA.

Management activities such as building new fences, establishing exclosures, and gathering horses could moderately affect wild horses and burros by

- blocking their access to water,
- restricting their movement, and
- reducing animal numbers.

The Preferred Alternative could benefit wild horses and burros with its emphasis on developing water sources and extending seasonal availability for wildlife, by also providing those water sources for horse and burro use.

Adverse impacts from energy and minerals management would involve the Fort Sage and South Dry Valley SRMAs and the North Dry Valley ACEC. Impacts would be minor due to greater restrictions on or closure of these areas to leasable, locatable, and saleable minerals on 85,000 acres within the Fort Sage and Twin Peaks HMAs. In addition, greater restrictions on activities, including exploration for and development and removal of minerals within these areas would lessen and control impacts to wild horses and burros.

Livestock grazing would continue with intensive management on portions of some allotments, including building of new fences and water developments. Livestock-horse competition for forage and water would continue. Rest and deferment from livestock grazing would improve overall forage conditions, benefiting wild horses and burros. Over time, the general health of the herds is expected to improve. Livestock grazing allotments within HMAs are already managed with intensive grazing systems, so few adjustments in the existing grazing strategies may be needed to meet the requirements. More fences required for livestock control could moderately affect wild horses and burros by limiting their movement within the HMA. Developing more water sources would benefit horses and burros.

The recreation emphasis on SRMAs at Fort Sage and designating a new SRMA in the Dry Valley Rim area could have minor adverse impacts on the wild horses and burros in those areas. Increased use by OHV riders, hikers, equestrians, and sightseers could increase human-horse encounters and disturbance in areas previously less used by the public. Restricting motorized use to designated routes could keep impacts negligible by providing areas of limited use where horses and burros could remain mostly undisturbed.

The building of 45 miles of new non-motorized routes within WSAs could also inflict minor adverse impacts to horses and burros in portions of WSAs that previously were mostly inaccessible to the public. Human-horse encounters would increase.

4.22.5 Cumulative Effects

The area of analysis for cumulative impacts on wild horses and burros is the area within the boundary of each herd management area. Management of horses and burros is regulated to remain within designated herd areas that were used by herds as their habitat in 1971. BLM does not manage horses outside these areas, and resource management activities outside the herd areas are not expected to affect the animals within them.

Cumulative effects to wild horses and burros revolve around forage and water availability, as well as human disturbance, including recreation, development, and livestock grazing. Over the long term the following would benefit wild horses and burros by improving their overall habitat:

- fuels and vegetation treatments,
- intensive grazing strategies, and
- developing water sources for livestock and wildlife.

Treatments requiring rest from grazing and involving the building of fences would cumulatively impede movement within herd areas if intensive grazing strategies also require building new fences. Multiple treatments of adjacent acres over consecutive years would cumulatively decrease forage availability for wild horses and burros for at least two years beyond the treatment periods. Typical requirements for rest after vegetation treatments within the ELFO area are at least two years, followed with approval (based on monitoring information from the natural resources interdisciplinary team) allowing grazing to resume. The same requirements would apply to wild horses and burros in most instances.

Increased recreation in existing and newly designated areas, along with more vegetation treatments like prescribed fire, could cumulatively affect wild horses and burros by changing their movement and distribution within herd areas in an attempt to avoid re-occurring activities.

Limiting many activities to designated routes would mitigate some impacts. New non-motorized routes within WSAs and SRMAs would promote increased visitor use within areas previously used only intermittently. These routes might result in more human-horse encounters, but horses are expected to adapt to the activity or learn to avoid areas receiving more recreation use.

4.22.6 Mitigation Measures

- Use a staggered schedule for fuels and vegetation treatments within HMAs to reduce the short-term adverse impacts to wild horses and burros from treated areas that require rest from livestock or wild horse and burro grazing until vegetation has recovered.
- Locate new fences to support both livestock grazing strategies and protect vegetation treatments without building multiple fences for single purposes in the same areas.

4.22.7 Unavoidable Adverse Impacts

There are no unavoidable adverse impacts to wild horses and burros if mitigation measures are implemented.

4.22.8 Short-Term Uses Versus Long-Term Productivity

Short-term fuels and vegetation management activities, such as prescribed burning or mechanical treatments, would benefit the long-term productivity of the herds by increasing available forage and

improving habitat. Dispersed recreation in an area, while individually short term, would potentially have cumulative long-term impacts on wild horse and burro herd distribution by disturbing an area's use for forage or as a water source.

4.22.9 Irreversible and Irretrievable Impacts

Irretrievable impacts to wild horses and burros would include the loss of forage in areas of vegetation treatments. Prescribed fire and mechanical, biological, or chemical treatment of uplands would temporarily remove areas from vegetation production. These areas would otherwise be available for wild horse or burro forage. Fences for special habitats, riparian improvement, or spring developments designed for wildlife would result in an irretrievable loss of water resources for wild horses and burros and would adversely affect them.

4.23 Potential Effects on Wildlife and Fisheries

This section describes the direct, indirect, and cumulative effects on terrestrial and aquatic wildlife from land use decisions under the Preferred Alternative.

4.23.1 Methodology and Assumptions

Land use decisions may result in effects to individuals of a species, wildlife populations, and habitat or life history requirements. The information used in this analysis was obtained from the following sources:

- agency and scientific literature;
- the professional judgment of BLM and other wildlife biologists;
- interdisciplinary team members and contractors;
- existing plans
- wildlife databases; and
- field site visits.

This information, in addition to existing knowledge of species-habitat relationships and general knowledge of the field office area, was used to assess impacts.

The planning approach regarding terrestrial and aquatic wildlife is to determine which activities or actions are likely to affect wildlife, whether effects are adverse or beneficial, and what type of mitigation, if any, can be used to minimize adverse effects.

The analysis considered an effect on terrestrial and aquatic wildlife **adverse** if it would do the following:

- cause a loss of individuals of a species or population;
- interfere significantly with the movement of a resident or migratory species;
- reduce habitat quality or acreage, especially if it prevents the reestablishing of native biological communities that inhabited the area before the action; or
- harm, harass, or destroy a species, habitat, or natural community that is recognized for scientific, ecological, recreational, or commercial importance.

In addition, for special status species and their habitat, an effect was considered adverse and requiring mitigation if it would harm, harass, or destroy any special status species, its habitat, migration corridors, or breeding areas.

The analysis considered an effect on terrestrial and aquatic wildlife **beneficial** if it would do the following:

- maintain or increase individuals of a species or population;
- protect or facilitate the movement of a resident or migratory species; or
- maintain or increase habitat quality or acreage, especially if it promotes native biological communities.

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This analysis includes a number of assumptions concerning BLM resource programs that have significant effects on terrestrial and aquatic wildlife:

- The wildlife management program would adhere to regulations and policies in BLM Manual 6840, the Endangered Species Act, FLPMA, and the Wilderness Act of 1964.
- AMPs would be developed and monitored, and activities would be conducted in compliance with BLM's 'standards and guidelines for land health' (S&Gs). The S&Gs include special consideration for sensitive species and vulnerable biological resources.
- Management actions would be compatible with guidelines in the "Conservation Strategy for Sage-Grouse (*Centrocercus urophasianus*) and Sagebrush Ecosystems within the Buffalo-Skedaddle Population Management Unit", other sage-grouse conservation strategies, and U.S. Fish and Wildlife Service biological opinions concerning implementation of PRMP programs.
- Project-level implementation plans would incorporate guidance from management plans identified in this PRMP (see Chapter 2) or to which BLM is signatory. Projects would incorporate expert opinion, literature review, and local field work, in order to develop sound strategies for implementation actions that would minimize adverse effects on wildlife and wildlife habitat.
- Project-level effects would be suitably mitigated under NEPA standards for AMPs and other BLM plans.
- Management actions affecting special-status species would have similar effects on other native wildlife utilizing the same habitats.
- Native wildlife in general would usually benefit from measures protecting and enhancing habitats for special-status species.
- Management of riparian areas would adhere to riparian health standards and guidelines.

Resource programs were evaluated under the Preferred Alternative to determine their potential for effects on the following major terrestrial and aquatic wildlife groupings:

- Federally listed species
- State-listed and BLM 'sensitive' species
- Ungulates (primarily deer and pronghorn)
- Sagebrush ecosystems and sagebrush-obligate species
- Other native wildlife species
- Native and non-native fish and other aquatic species
- Non-native wildlife species

Habitat types and associated suites of wildlife species for the ELFO are included in Table 4.23-1:

Table 4.23-1 Habitat Types and Associated Suites of Wildlife Species

Habitat Type	Wildlife Species (Including, but not limited to)
Shrub-steppe (includes big sagebrush, low sagebrush and mixed desert shrub habitats)	Mule deer, pronghorn, sage-grouse, antelope ground squirrel, Merriam kangaroo rat, northern sagebrush lizard, northern desert horned lizard, northern shrike, loggerhead shrike, chipping sparrow, Brewer's sparrow, black-chinned sparrow, sage sparrow, Say's phoebe, sage thrasher, gray flycatcher, western tanager, northern flicker
Perennial grasslands	Carson wandering skipper, mule deer, pronghorn, sage-grouse, horned lark, western meadowlark, rock wren, California quail, Great Basin pocket mouse, northern grasshopper mouse, western harvest mouse
Herbaceous grasslands—annual and forb	Mule deer, pronghorn, California ground squirrel, deer mouse, Great Basin rattlesnake, American kestrel, northern harrier, red-tailed hawk, golden eagle, rough-legged hawk, sage-grouse, horned lark, western meadowlark, mourning dove, scrub jay, American goldfinch
Juniper woodlands (>20% canopy)	Mule deer, pronghorn, golden eagle, western scrub jay, juniper titmouse, Oregon junco, gray flycatcher, long-eared owl, Swainson's hawk, red-tailed hawk, ferruginous hawk
Aspen, oak, mountain mahogany woodlands	Mule deer, northern goshawk, Cooper's hawk, warbling vireo, orange-crowned warbler, Bullock's oriole, tree swallow, house wren, western tanager, bluebirds, sapsuckers, woodpeckers, bats
Coniferous forest	Bald eagle, Lewis's woodpecker, white-headed woodpecker, brown creeper, western wood peewee, mountain chickadee, western screech owl, Cooper's hawk, mule deer, golden-mantled ground squirrel, Rocky Mountain rubber boa
Riparian/Wetlands	Mule deer, pronghorn, sage-grouse, bald eagle, golden eagle, beaver, porcupine, Great Basin pocket mouse, long-tailed pocket mouse, long-tailed weasel, montane vole, Pacific tree frog, Rocky Mountain rubber boa, Sierra garter snake, valley garter snake, mallard, Bewick's wren, black-throated grosbeak, Bullock's oriole, bushtit, canyon wren, killdeer, song sparrow, Wilson's warbler, yellow warbler, American dipper

4.23.2 Incomplete or Unavailable Information

Adequate information exists on the occurrence, general potential for occurrence, seasons-of-use, relative suitability of habitat, and consequences of management actions for regional species of wildlife. Recently, more complete information regarding species presence or absence within the ELFO area has been collected for some species, including sage-grouse, pygmy rabbit, and Carson wandering skipper. However, information on the locations, population status, trends, and distributions of some wildlife species within the field office area is limited.

4.23.3 Analysis

Most impacts on wildlife are difficult to quantify with precision. This analysis defines beneficial and adverse effects according to the following terms describing the general extent and magnitude of anticipated effects:

Negligible: The effects on wildlife would be at or below the level of detection. Effects would be so slight as to not be of any measurable or perceptible consequence to the population of any wildlife species and would generally be temporary or short term (last less than a single year or season).

Minor: The effects on wildlife would be detectable but localized and of little consequence to the population of any wildlife species. Effects would generally be temporary or short term but in some cases might be long term. Mitigation measures, if needed to offset adverse effects, would be simple and successful.

Moderate: The effects on wildlife would be readily detectable and localized with consequences at the population level. Effects might be short term or long term. Mitigation measures, if needed to offset adverse effects, would be extensive and would probably be successful.

Major: The effects on wildlife would be obvious and would result in substantial consequences to wildlife populations in the field office area or region. Effects might be short term but would likely be long term. Extensive mitigation measures would be needed to offset adverse effects, and their success would not be guaranteed.

Short Term: An effect generally lasting less than a single year or season.

Long Term: An effect lasting longer than a single year or season.

4.23.4 Impacts Common to All Wildlife Species and Habitats

Management actions for the following resource programs would result in specific minor to moderate adverse effects, and moderate to substantial beneficial effects to wildlife species or habitats: forestry (including juniper control); fire and fuels management; soil and water resources; vegetation and noxious weeds; livestock grazing; wild horse and burro use; energy and minerals; utilities development; lands and realty; recreation/travel; and wildlife habitat management.

4.23.4.1 Forestry, Fuels Treatments, and Juniper Control

Forest and fuels management actions would affect wildlife species and habitat in various manners, depending on the specific action and species ultimately affected. Beneficial effects for some species or their habitats may or may not result in adverse effects to others. Heavy equipment used in these operations would cause some soil compaction and displacement with corresponding effects on habitat, including ground cover disturbance, alteration, and removal. Additionally, equipment and personnel would result in disturbance and possible displacement of wildlife.

Bald Eagle

Bald eagles would primarily benefit from forest and fuels management, as these actions would improve overall forest health. Thinning projects would 'Open' up the forest canopy, allowing light to promote the growth of understory species such as shrubs and grasses, and provide easier access to forest prey species. Suitable and potential nesting and roosting trees and snags would be retained, as would some dead woody material, including snags, down logs, and litter. Forest thinning and fuels management actions would benefit wildlife in the long-term by promoting a natural fire regime and reducing potential habitat loss due to catastrophic wildfire.

Mule Deer

Mule deer would benefit from forest and fuels treatment over the long-term, primarily due to the opening of the forest canopy, which would promote understory growth of shrubs, forbs, and grasses they utilize for cover and forage. Short-term adverse effects would likely occur due to disturbance from humans and equipment during management operations, and disturbance, alteration, and removal of some vegetation. Removal of overstory structure and down woody material could have adverse effects such as reduction in cover. Effects from juniper removal actions would essentially be the same.

Other Species

Small mammals, various birds, and some reptiles would also be affected by forest, fuels, and juniper management actions. Most raptors would benefit from opening the overstory canopy, as this would facilitate maneuverability and access to prey; conversely, the species utilized as prey would adversely affected. Some forest avian species, small mammals, and reptiles would be adversely affected, as trees or down material removed could mean reduced shelter, cover and forage opportunities. Juniper reduction projects would be conducted based on soil series information; sites containing soils consistent with juniper woodlands would be managed less intensely than those sites that indicate juniper is an invasive species. Songbird species occupying sites containing soils not consistent with juniper woodlands would be adversely affected as these sites would undergo heavy reduction treatments, and juniper habitat would be significantly altered by tree removal. Other species depending on these habitats, regardless of soil series, would be adversely affected as the habitats were disturbed, modified, and removed. Juniper management actions would result in short-term disturbance to vegetation, and thus habitats, but produce net beneficial effects of restoring these habitats over the long term.

4.23.4.2 Fire Management and Suppression

The long-term goal of the fire management program is to maintain a variety of seral stages across all vegetation communities. Doing so should maintain or improve wildlife species and habitat biodiversity. Wildfires typically result in more adverse effects than prescribed burns, as they generally occur over larger areas, affect more vegetation, and burn hotter. These hotter fires can damage plant root systems, soil organisms, and biological crusts, resulting in long-term adverse effects to habitats and thus wildlife species and populations.

Aggressive suppression of wildland fires will favor later successional, non-fire-dependent habitats. This could benefit some species, such as bald eagle, California spotted owl, forest raptors, and sage-grouse, by protecting nesting, roosting or foraging sites. However, full suppression can also result in adverse effects to species by allowing for the buildup of heavy fuels that can ultimately increase future fire intensity and increase potential loss of habitat due to catastrophic fire. This holds true in sagebrush ecosystems also; in some cheatgrass-invaded sagebrush communities, wildfire can result in type conversion (Glenn 2004), and significantly alter habitats for sagebrush associated wildlife. Full suppression can increase the size and density of big sagebrush, leading to more fuel accumulation, and further the loss of understory grasses and forbs which are critical to young sage-grouse, and important to ungulates and other wildlife species. Rehabilitation efforts following wildfires will be implemented to minimize invasions of cheatgrass and other invasives.

The actions of fire management and suppression efforts can affect wildlife. Disturbance from aircraft, equipment, and personnel can adversely affect wildlife. Construction of handline removes vegetation and can displace wildlife or alter migration or movement patterns. Removal of trees and brush can destroy shelter and forage, and decrease thermal and escape cover. Movement of equipment and personnel can increase the potential of introducing invasive plant species and noxious weeds, affecting habitats and ultimately wildlife.

4.23.4.3 Soil and Water

Healthy, productive soil is necessary to provide quality habitat for wildlife species. The goals of the soil resources program are to promote long-term soil health and productivity, and to provide earth materials for activities (i.e., roads, trails, and livestock water facilities). Management for soil resources focuses on practices to determine which soils are not meeting land health standards and promote the stabilization of soils so that they do meet these standards. These practices should serve to increase the ecological potential of these sites, and ultimately provide benefits to wildlife. Additionally, BLM will determine which soils have the most suitable characteristics for particular uses, and use these soils for the management actions of other resource programs such as OHV use, road and trail building, and other developments. In the long term, soil actions will ultimately benefit most wildlife species by increasing vegetation diversity, vigor, and native composition. Soil actions which include measures to reduce streambank erosion would benefit fish and other aquatic species.

Some soil management measures would likely result in minor, direct, short-term adverse effects to wildlife due to effects on vegetation through surface disturbance and vegetation removal. However, the long term increase in soil productivity and vegetation resources would eventually benefit terrestrial and aquatic wildlife habitat and species.

Water is an essential resource for wildlife. Proposed water resources management actions will greatly benefit wildlife resources. These actions include management and protection of streams, springs, and associated riparian and wetland communities by implementing such measures as fencing springs, adjusting grazing management strategies, and closing roads. Such actions would benefit wildlife by increasing vegetative diversity and structure in these systems, and protect them from degradation and destruction. This in turn, should maintain or increase diversity in wildlife species in these areas, and aid in ensuring an adequate water supply for the proper distribution of wildlife.

Restoration of hydrologic function would focus on stream, riparian and wetland areas that are currently not in PFC. Best management practices would be developed for these areas in order to improve water quality and make progress toward meeting standards.

4.23.4.4 Vegetation and Noxious Weeds

Vegetation management actions would benefit wildlife resources, especially in the long term. Vegetation would be managed in accord with Northeastern California and Northwestern Nevada Standards for Land (Rangeland) Health and Guidelines for Livestock Grazing Management (Appendix B). These standards and guidelines would maintain vegetation currently rated as 'Healthy' and manage other vegetation to achieve and then maintain 'Healthy' status. Areas would be 'Closed' to grazing by livestock and wild horses and burros following stabilization and rehabilitation of prescribed disturbances and wildfires until the area recovers or it is determined that grazing would no longer cause adverse effects. Additionally, special status plants would be managed to maintain, restore and enhance populations, and treatments to reduce or eliminate invasive and noxious weeds would improve land health and enhance habitat. These actions would be of moderate to major long-term benefit to wildlife habitat by maintaining or increasing vegetative biodiversity within the field office area, and providing desirable forage and cover for a variety of species.

Planting, seeding, and other vegetation manipulations along streambanks are important measures to preserve or enhance water quality and decrease water temperatures. Such actions would greatly improve aquatic habitats, especially for native cold-water fish. Aquatic and riparian species, in addition to all other wildlife species, would benefit greatly from these measures.

Site rehabilitation is often needed after ground-disturbing activities such as logging, fuel treatment/juniper reduction, road and trail construction, powerline construction, rights-of-way, and trespass/illegal activities, have occurred. Rehabilitation methods include utilizing mechanical, manual, chemical, and biological techniques. Natural events such as wildfires and soil erosion would also be considered for rehabilitation efforts. Site rehabilitation efforts can adversely affect wildlife in the short term due to disturbance from equipment and personnel, but in the long term provides benefits by restoring ecosystem and watershed health.

The IWM program strives to reduce, control, or eliminate undesirable (invasive and noxious) weeds and annual grasses. Controlling these plants and restoring native vegetation will preserve or enhance biodiversity, forage, and cover and has significant long-term benefits to wildlife habitats. These actions are particularly important in sagebrush communities; reducing or containing annual grasses such as cheatgrass and medusahead would greatly benefit the wildlife species, such as sage-grouse, that depend on these habitats.

4.23.4.5 Livestock Grazing and Wild Horse Use

BLM policy is to manage livestock grazing in order to meet land health standards. Individual grazing allotments will be evaluated for Standards and Guidelines based on ecosystem and watershed health criteria. If the criteria are not being met, and grazing is determined to be the causal factor, livestock management will be adjusted. Adjustments may include altering season of use, grazing intensity or AUMs. Grazing by wild horses and burros are managed in HMAs, and also managed to reach or be below AMLs. Wild horses and burros graze within the field office area on a year-long basis and, like livestock, can compete with wildlife for forage, and increase soil compaction, erosion, sedimentation, and degradation of accessible stream channels. Grazing by livestock and wild horses and burros primarily affects sagebrush-steppe associations, grassland associations, and riparian/wetland associations, and thus affects wildlife species that utilize these habitats. In general, wild horse and burros grazing mostly conflicts with deer and pronghorn use when occupying the same range.

Bald Eagle

Grazing by livestock and wild horses and burros does not seem to directly affect bald eagles, but human disturbance associated with activities concerning grazing has the potential to create adverse effects. Humans on foot, on horseback, in vehicles, or in aircraft, involved in ranching or gathering operations may disturb reproductive, nesting, foraging, and roosting activities of eagles. Such disturbances may result in minor to major short term or long term adverse effects to bald eagles.

Carson Wandering Skipper

Currently there is limited information on this species. The Draft Recovery Plan for the Carson Wandering Skipper (USFWS, 2005) contains a “Recovery Narrative Outline for Actions Addressing Threats”, and lists under action 2.5, “Determine the relationship between livestock grazing and the Carson wandering skipper and its habitat”. This action states in part: Excessive livestock grazing is a potential threat to the species through reduction in the availability of nectar sources and *Distichlis spicata* (salt grass, the host plant), trampling, ground compaction, and increases in weeds.

Currently there is no information on what level of grazing and type of grazing management enhances or degrades habitats for the Carson wandering skipper. Differences in animal stocking rates (number and type of livestock per acre), and management (grazing early season, late season, year-long, high intensity/short duration, etc.) may improve, degrade, or have no significant effect on the quality of habitats for the Carson wandering skipper in grazed areas (USFWS, 2005).

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Carson wandering skippers have been found on private lands within the ELFO. These lands are also utilized for grazing, so the two are not exclusive.

It is believed that some grazing is beneficial to this species, as individuals prefer habitat of shorter heights, presumably to allow better viewing of potential predators (Yssel 2004).

Sage-Grouse

Measures to conserve sage-grouse are contained in the Conservation Strategy for Sage-Grouse (*Centrocercus urophasianus*) and Sagebrush Ecosystems within the Buffalo-Skedaddle Population Management Unit (Northeast California Sage-Grouse Working Group 2006). The Conservation Strategy states that, “The entire discussion of grazing impacts applies equally to livestock, and wild horses and burros.” Connelly et al. (2000) concluded *there is little experimental evidence linking grazing practices to sage-grouse population levels. However, grass height and cover affect sage-grouse nest site selection and success. Thus indirect evidence suggests grazing by livestock or wild herbivores that significantly reduce the herbaceous understory in breeding habitat may have negative impacts on sage-grouse populations.* Miller and Eddleman (2001) report that poor livestock grazing practices can have a huge negative impact on sage-grouse habitat. Probably the most significant long-term adverse impact of excessive livestock grazing on sage-grouse is the degradation of sagebrush, meadow, and riparian communities. Excessive grazing also increases the potential of direct competition between livestock and sage-grouse.

Grazing management practices, which maintain the integrity of sagebrush communities, can have positive, neutral, or negative impacts on sage-grouse habitat. Season, duration, distribution, and intensity of use, as well as class of livestock will determine the effects of grazing on sage-grouse food and cover (Northeast California Sage-Grouse Working Group 2006). Diet overlap between cattle, wild horses and burros, and sage-grouse under moderate grazing is minimal since cattle graze primarily on grass rather than forbs. The potential, however, for diet overlap with sheep is considerably greater. The spatial distribution of use by livestock and sage-grouse will influence the relationship between these animals (Northeast California Sage-Grouse Working Group 2006).

Livestock grazing, if managed in compliance with land health standards and livestock grazing standards and guidelines, in addition to the Conservation Strategy for Sage-Grouse (*Centrocercus urophasianus*) and Sagebrush Ecosystems within the Buffalo-Skedaddle Population Management Unit (Northeast California Sage-Grouse Working Group 2006), is likely to have minor to moderate effects on sage-grouse.

Mule Deer and Pronghorn

The Western Association of Fish and Wildlife Agencies Mule Deer Working Group’s publication, “*Mule Deer: Changing Landscapes, Changing Perspectives*” (2003) states that well managed livestock grazing can improve the types and quantities of desirable plants, and maintain and create much-needed openings in dense habitat. On the other hand, poor livestock grazing practices can help spread invasive plants, interfere with plant succession, reduce nitrogen in the soil, and change the plant community. Spring grazing is encouraged, as in the spring the cattle concentrate on the grass species, and encourages the growth of browse species such as sage and bitterbrush (WAFWA 2003).

By changing structural conditions and botanical composition of plant communities, livestock grazing has altered pronghorn rangelands more than has any other human-controlled activity (Leftwich and Simpson 1978, Autenrieth 1978, Kindschy et al. 1982). According to Autenrieth (1982) and Pyrah (1987), livestock grazing can impact pronghorn in the short term by seasonal or annual removal of forage and in the long term by modification of entire plant communities.

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The impacts of livestock grazing on pronghorn habitat often are complex, including modification of plant biomass, species composition, and structural components, such as vegetation height and protective cover. A direct vegetative impact is competition for preferred forage.

Indirect adverse impacts are “(1) gradual reductions in the vigor of some plants and in the amount and quality of forage produced, (2) elimination or reduction of the ability of forage plants to reproduce, (3) elimination of locally important cover types and replacement by less favorable types or communities, either by direct actions over time or by changing the rate of natural succession process, and (4) general alterations and reduction in the kinds, qualities and amounts of preferred or otherwise important plants through selective grazing or browsing or other activities” (Kie et al. 1994:665-666). Possibly the greatest impact of livestock grazing on pronghorn populations has been changes in plant succession and intensive foraging on fawning areas (O’Gara and Yoakum 2004).

Fencing problems are more of an issue for pronghorn, and are most prevalent where fencing interferes with pronghorn seasonal movements of more than 50 miles. They are especially severe where pronghorn are confined in pastures with livestock during droughts (Hailey et al. 1966, Hailey 1979). In northern regions, fences can prevent animals from leaving areas of deep snow to obtain forage where less snow has accumulated (Martinka 1967, Sundstrom 1970, Oakley 1973). Fences on the ELFO will conform to BLM wildlife-friendly fence standards which include a smooth bottom wire, allowing pronghorn to move under.

Livestock grazing, if managed in compliance with land health standards and livestock grazing standards and guidelines, in addition to rangeland improvement projects should have minor to moderate adverse and beneficial effects to mule deer and pronghorn.

Other Species

Species such as small mammals, rodents, reptiles, and invertebrates may experience adverse effects from livestock and wild horse and burro grazing, due to reduced cover. This can increase chances of predation. Conversely, species such as raptors, coyotes, bobcats, and other predators would experience beneficial effects from reduced cover, as prey would be more easily located.

Fish, other aquatic species, and riparian-dependent species would be adversely affected if livestock or wild horses and burros concentrated at riparian or aquatic habitats and caused damage to these habitats. Measures to protect these sensitive habitats would result in beneficial effects to these species.

4.23.4.6 Energy and Minerals / Utility Development

Energy and minerals management actions could have minor short-term or long-term adverse effects on wildlife habitat and species, particularly deer, pronghorn, sage-grouse, and sagebrush obligate species. Effects would occur from removal of vegetation, alteration of site conditions, including hydrology, which could result in habitat-type conversions of dominant vegetation; and indirect disturbances such as the introduction of invasive weeds. Additionally, disturbance from equipment and personnel could adversely affect wildlife. Energy towers and lines can cause injury or mortality of wildlife due to collision or entanglement.

Mineral extraction activities could cause adverse effects to wildlife species; however these effects would be minimized by the application of restrictive stipulations in project-specific NEPA documents. WSAs would be ‘Closed’ to leasable and saleable mineral activities, but ‘Open’ to development and exploration for locatable minerals as long as activities do not require reclamation (unless prior to Oct. 21, 1976).

Because the demand for energy and mineral resources on lands within the field office is low, and specific program activities require individual permitting and NEPA analysis, the program is not expected to have a substantial adverse effect on wildlife species and their habitats. Impacts from wind energy development would be analyzed and mitigated for at the site-specific level.

4.23.4.7 Lands and Realty

The ELFO would seek to acquire lands with high ecological or historical values in proximity or adjacent to large, contiguous public land bases. These acquisitions would result in long-term minor to major beneficial effects to wildlife and wildlife habitat, depending on the acreage of the acquisition and affected wildlife species. Deer and pronghorn could benefit by improved management of important foraging, migration, fawning, or other priority habitat; sagebrush obligates could benefit from the same in nesting, brood-rearing, and similar habitat. Land disposals would occur as identified on Maps Lands-1 only if determined that local community benefits outweigh BLM retention of the parcel. Parcels important to wildlife habitat would not be recommended for exchange or disposal, hence adverse effects to wildlife would be negligible or minor. Land exchanges could benefit wildlife by providing additional contiguous habitat or by acquiring important habitat areas.

4.23.4.8 Recreation / Travel

Wildlife and their habitats are likely to experience adverse effects from recreation and travel, depending on the nature, extent, and duration of the activity. Effects may vary for certain species in particular seasons or life-cycle stage such as breeding, nesting, or young-rearing stages. Minor effects can result from short-term vehicle or human disturbance of individuals or habitat (vegetation and soil disturbance), while more severe effects might result from permanent habitat modification (such as construction of recreation facilities or road-building), or disturbance that interferes with reproduction (such as disturbance of a sage-grouse lek or raptor nest). Adverse effects can also result from habitat modification caused by soil erosion and weed introduction and proliferation. Adverse effects to wildlife from recreation actions would be reduced through protective measures in this PRMP and project-level NEPA documents. Limitations regarding recreation activities (such as OHV use) and travel as part of special recreation management areas or within other special designations would benefit wildlife and habitat by limiting ground disturbance and incidental disturbance of individuals. In addition, potential conflicts or issues would be identified through the interdisciplinary process and actions developed to address and mitigate for them. Table 4.23-2 summarizes effects on wildlife from human use associated with roads and trails.

Bald Eagle

Eagle tolerance of human activity varies between individuals (USFWS 1986). Bald eagles are particularly intolerant of human disturbance during the breeding season. Human activities have caused abandonment of nests and have resulted in reproductive failures (Detrich 1980, Bogener 1980, Lehman 1983). In general, adult eagles are more sensitive to disturbance during courtship, egg-laying and incubation, and their sensitivity decreases as young develop (Mathisen 1968, Fraser 1981). Recreation and travel activities have the potential to adversely affect bald eagles due to short-term and long-term disturbance by OHVs, passenger vehicles, boats, snowmobiles, aircraft, foot traffic, and other means which may result in eagle disturbance.

Carson Wandering Skipper

The “Draft Recovery Plan for the Carson Wandering Skipper” (USFWS 2005) lists recreation as one of the threats to this species, although it was not discussed at length in the document. The plan states, “As development increases near known sites, there may be a potential for increases in recreational activities,

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such as off-highway vehicle use. This use is likely to occur both on public and private lands as these areas become more developed.

Recreational use at the Carson City population may have contributed to the possible extirpation of that population through habitat destruction and fragmentation” (USFWS 2005) currently, no Carson wandering skippers have been found on ELFO lands. However, they have been found on private lands at Honey Lake in the vicinity of BLM lands. Development of these BLM parcels for recreational access to Honey Lake could result in significant adverse effects to the species.

Sage-Grouse

Recreation and travel can adversely affect sage-grouse, primarily through OHV use. Disturbance from OHVs would be significantly detrimental if it occurs while sage-grouse are on leks (breeding display sites) or if nesting is affected through destruction of nests or hens flushed from nests. Disturbance during brood-rearing could cause young to be isolated or result in increased predation. Destruction or degradation of habitat is another concern of recreation and travel uses. Limitations regarding OHV use and designation of routes will reduce effects to this species. The Conservation Strategy for Sage-Grouse (*Centrocercus urophasianus*) and Sagebrush Ecosystems within the Buffalo-Skedaddle Population Management Unit (Northeast California Sage-Grouse Working Group 2006) contains sage-grouse conservation actions regarding OHV management, which are consistent with BLM Northeast California Resource Advisory Council Recommended Off-Highway-Vehicle Management Guidelines; these would be implemented under the Preferred Alternative.

Mule Deer and Pronghorn

Mule deer and pronghorn are primarily affected by recreation and travel actions through habitat modification. Recreation, especially OHV use, has the potential to degrade, fragment, and destroy habitat important to the life requirements of these species. Individuals are likely to experience only minor effects from incidental recreation and travel, except possibly during fawning seasons. Hunting as a recreational pursuit affects these species, and may result in effects ranging from minor disturbance to direct mortality for those individuals that are harvested. Seasonal and permanent road closures would also limit excessive disturbance to these species (particularly in wintering and fawning habitats and during critical reproductive periods). Limitations regarding OHV use and designation of routes implemented in the Preferred Alternative would reduce effects to these species.

Other Species

Recreation and travel will affect virtually all wildlife species and habitats to some extent. These effects will vary with species, locations, habitats, and types of recreation or travel involved. Limitations regarding OHV use and designation of routes implemented in the Preferred Alternative will reduce effects to these species.

Table 4.23-2 Effects on Wildlife from Human Use Associated with Roads and Trails^{1/}

Road and Trail-Associated Actions	Disturbance Type ^{2/}	Recreation Activity ^{3/}	Expected Effects
Hunting and trapping	3	Harvest	Mortality from hunting or trapping as facilitated by road and trail access
Poaching	3	Harvest	Increased illegal take of animals as facilitated by roads and trails
Collisions	3	Harvest	Death or injury resulting from a motorized vehicle running over or hitting an animal
Negative human interactions	3	Harvest	Increased mortality of animals (euthanasia or shooting) owing to increased contact with humans, as facilitated by road and trail access
Movement barrier or filter	2	Habitat modification and disturbance	Interference with dispersal or other movements as posed by a road or trail itself or by human activities on or near a road or trail or road or trail network
Displacement or avoidance	1	Disturbance	Spatial shifts in populations or individual animals away from a road or trail or road or trail network in relation to human activities on or near a road or trail or road or trail network
Habitat loss and fragmentation	2	Habitat modification	Loss and resulting fragmentation of habitat owing to the establishment of roads or trails, road or trail networks, and associated human activities
Edge effects	2	Habitat modification	Changes to habitat microclimates associated with the edge induced by roads and trails
Snag or downed log reduction	2	Habitat modification	Reduction in density of large snags and downed logs due to their removal near roads as facilitated by road access
Collection	2	Harvest	Collection of live animals for human use as pets (i.e., reptiles and amphibians) as facilitated by the physical characteristics of roads or trails or by road or trail access
Route for competitors and predators	2	Habitat modification	A physical, human-induced change in the environment that provides access for competitors or predators that would not have existed otherwise
Disturbance at a specific site	1	Disturbance	Displacement of individual animals from a specific location that is being used for reproduction or young-rearing
Snow compaction	3	Habitat modification	Direct mortality associated with animals being crushed or suffocated as a result of snow compaction from snowmobile routes or groomed ski trails
Physiological response	1	Disturbance	Increase in heart rate or stress hormones when near a road or trail or network of roads or trails

^{1/}Based in part on Wisdom et al., 1999.

^{2/} Disturbance Type 1 occurs when an animal sees, hears, smells, or otherwise perceives the presence of a human but no contact is made and it may or may not alter its behavior.

Disturbance Type 2 is when habitat is changed in some way.

Disturbance Type 3 involves human actions in which there is direct and damaging contact with the animal (Liddle, 1997).

^{3/} Knight and Cole, 1995.

4.23.4.9 Wildlife and Fisheries

Management actions identified in Chapter 2.25 Wildlife and Fisheries would result in minor to moderate short-term beneficial effects for wildlife resources, with goals of providing long-term benefits. Actions focus on managing wildlife resources, with overall results producing viable, healthy, productive, and diverse populations of native and desired plant and animal species. Management actions provide for terrestrial and aquatic species needs by addressing habitat management such as protecting, enhancing and restoring the diversity and distribution of desirable vegetation communities; providing for maintenance of habitat structure and function; and restoring degraded landscapes and decadent habitats.

Management actions for all resource programs would follow terms and conditions outlined in biological opinions and recovery plans for the following federally listed species:

- Bald eagle – Pacific Bald Eagle Management Plan (USFWS 1986)
- Carson wandering skipper – Draft Recovery Plan for the Carson Wandering Skipper *Pseudocopa eodes eunus obscurus* (USFWS 2005)
- Lahontan cutthroat trout – Lahontan Cutthroat Trout *Oncorhynchus clarki henshawi* Recovery Plan (USFWS 1994)

Additionally, BLM would cooperate in continuing development of draft recovery plans, habitat management plans, and contribute to surveys or other efforts to the benefit of these species.

Sage-grouse leks (breeding display sites) and other sage-grouse habitat would be protected and managed through measures incorporated from the Conservation Strategy for Sage-Grouse (*Centrocercus urophasianus*) and Sagebrush Ecosystems within the Buffalo-Skedaddle Population Management Unit (Northern California Sage-Grouse Working Group 2006).

AMPs, vegetation, wildfire rehabilitation, and fuels-reduction treatments, in addition to other BLM projects, would be subject to Endangered Species Act and NEPA compliance, with mitigation to avoid or offset adverse effects to wildlife resources. Actions would also comply with BLM Manuals, including Manual 6840—Special Status Species Management and Manual 1745—Introduction, Transplant, Augmentation, and Reestablishment of Fish, Wildlife, and Plants.

Cooperation and coordination with other agencies, including U.S. Fish and Wildlife Service, CDFG, Nevada Department of Wildlife (NDOW), and USDA Forest Service, among others, would continue regarding various wildlife species and habitat projects and issues, providing benefits to federally listed, state-listed, BLM sensitive, and other wildlife species and their habitats.

Seasonal protection measures and buffer zones would be implemented, as suitable, for permitted activities when undertaken (see Table 2.25-1). These measures would assist in reducing adverse effects such as disturbance and possible reproductive failure for species during critical times in life-history stages.

4.23.5 Analysis of the Preferred Alternative

The Preferred Alternative is expected to result in minor to moderate adverse effects to wildlife resources, and minor to major beneficial effects when considered both short-term and long-term. Wildlife resources management actions strive to manage for biological diversity of wildlife species and habitats. Wildlife resources would experience beneficial effects from combined forestry, fire and fuels treatments, vegetation restoration, weed treatments, soil and water actions, and wildlife management actions.

The description of effects on wildlife resources in this section will focus on five major vegetation (habitat) alliances and associated wildlife species (see Table 4.22-1 Habitat Types and Associated Suites of Wildlife Species):

- Coniferous forest
- Juniper woodlands
- Aspen/oak/mountain mahogany woodlands
- Sagebrush-steppe (grasslands are included here)
- Riparian/wetlands

4.23.5.1 Coniferous forest

Forestlands (22,000 acres) would be managed to improve forest health through a variety of silvicultural practices. These practices would result primarily in short-term adverse effects to some species, including those utilizing the trees that are removed by thinning operations (such as woodpeckers and forest songbirds), or those utilizing down material for shelter and cover (such as small mammals, reptiles and amphibians). However, thinning would allow more light to penetrate to the forest floor, and provide for more understory growth of forage and cover, in addition to easier access to forest prey species. Artificial regeneration of forested acres would also benefit wildlife resources. Long-term benefits to wildlife resources include restoring ecosystems to a natural fire regime and potentially reducing habitat loss to catastrophic wildfire.

Bald Eagle

Bald eagles would primarily benefit from the Preferred Alternative, as overall improvements in forest health would result. Thinning projects would open up the forest canopy, allowing for an open crown canopy which is required to produce trees with suitable substrates for nest structures, and for increased visual aspect and maneuverability. Suitable and potential nesting and roosting trees and snags would be retained, as would some dead woody material, including snags, down logs, and litter. Full fire suppression efforts in bald eagle nesting territories, coupled with forest treatments should provide significant beneficial effects to bald eagles. Implementing measures from the Pacific Bald Eagle Management Plan and the Cleghorn Habitat Management Plan will also benefit this species and its habitat on the ELFO.

California Spotted Owl

Under the Preferred Alternative, forest stand characteristics such as vertical canopy layering, tree height and diameter diversity, canopy closure, large snags and down woody material would be maintained within suitable habitat for this species, resulting in minor to moderate beneficial impacts.

Mule Deer

Mule deer would benefit from the Preferred Alternative, as forestlands would be managed to improve forest health. Thinning operations would allow more light to penetrate to the forest floor, and provide for more understory growth of forage and cover, resulting in beneficial effects.

Some minor adverse effects would result, due to initial vegetation disturbance, and creation of skid roads and trails, however over the long-term vegetation would recover, and skid roads and trails would recover or be rehabilitated.

4.23.5.2 Juniper Woodlands

Juniper woodlands, which comprise approximately 20,000 acres in the ELFO area, would be managed for the successional stages of woodland development. Treatments in true juniper woodlands would primarily consist of cutting trees generally less than 150 years old, increasing interspace for understory vegetation to grow, and reducing the probability of crown fires. Treatment actions, which would primarily occur by prescribed fire and mechanical means, would result in minor to moderate adverse effects on some bird, small mammal, and reptile species from tree removal and soil and vegetation disturbance, but overall benefits would include reduced fire danger, increased vegetative understory, increased water table, and restoration of sites to their ecological potential.

Mule Deer and Pronghorn

Mule deer and pronghorn would benefit from juniper woodland treatments, as juniper reduction would allow for increased growth of understory shrubs and grasses used for quality forage. Additionally, increased spacing of trees would likely facilitate movement. Minor adverse effects include somewhat decreased thermal and hiding cover, however, old-growth trees would still remain to provide these needs.

Raptors

Raptors, including golden eagles, long-eared owls, Swainson's hawks, red-tailed hawks, and ferruginous hawks would benefit from juniper treatments, as reduced canopy closure would allow for easier spotting and access of prey. Increased growth of understory species could result in increased numbers of prey species. Adverse effects could include fewer perch points from which to perch or roost (bats may also roost in juniper), but old-growth trees that remain would continue to provide for these activities.

4.23.5.3 Aspen/Oak/Mountain Mahogany Woodlands

Beneficial effects for wildlife resources would result from management actions taken to maintain, enhance, and restore these unique vegetation communities. There are approximately 1,400 acres of aspen, 1,300 acres of oak woodlands, and 1,500 acres of mountain mahogany association within the field office area. These sites contain unique vegetation communities, and thus are important to a variety of wildlife species. At least 55 species of mammals and 135 bird species are known to use aspen (DeByle 1985). Cutting and lower-intensity burning would be primary treatment methods in aspen and oak habitats, while low-intensity burning, bulldozing, selective shearing and pruning would be utilized in mountain mahogany stands. These treatments would benefit wildlife by improving habitats through recruitment, reduced competition from conifers and other vegetation, reduced potential of loss from intense fires, and reduced impacts from livestock grazing. Minor adverse effects could result from treatment activities including disturbance or removal of vegetation, and the presence of equipment and humans during treatments, but overall long-term benefits would outweigh adverse effects. Adverse effects to these habitats from livestock and wildlife overgrazing would be reduced by protecting areas of concern through fencing or utilizing down material to protect shoots and seedlings.

Mule Deer

Mule deer would benefit significantly from actions that enhance and restore aspen, oak, and mountain mahogany woodlands, as these habitats provide fawning, fawn-rearing, foraging, and escape and thermal cover. Oak mast provides high protein forage and is of the greatest value in late summer and autumn when deer are at the lowest levels of the annual nutritional cycle (Wallmo, 1981).

Birds

These unique habitats support high densities of breeding birds, including some species that prefer them or are most often found in them. The “California Wildlife Habitat Relationships System” predicted numbers of species potentially occurring in aspen habitats in Lassen County. The system listed eighteen bird species modeled at high suitability for at least one life function (Furnas 2005). Enhancement and restoration actions under the Preferred Alternative would provide benefits to bird species by providing shelter forage and cover needs.

Small Mammals

A variety of small mammals, including bats, would benefit from enhancement and restoration actions in these habitats. The “California Wildlife Habitat Relationships System” listed nineteen small mammal species modeled at high suitability for at least one life function (Furnas 2005). Enhancement and restoration actions would provide benefits to these species in the form of providing shelter forage and cover habitat.

4.23.5.4 Sagebrush-Steppe (Including Grasslands)

These habitats are the most widely distributed habitats within the field office area. These include big sagebrush, low sagebrush; Great Basin mixed shrub, mixed desert shrub, and grasslands (perennial grass, annual grass, and forbs). A wide variety of species utilize these habitats in all seasons to fulfill life history requirements.

Carson Wandering Skipper

This species utilizes salt grass habitats that contain or are near plants used as nectar sources. Livestock or wild horse grazing and recreation are most likely to result in adverse effects to this species. Managing livestock to meet land health standards and standards and guidelines, and managing wild horses and burros to AMLs, would benefit Carson wandering skippers by decreasing potential threats to the species. These include reduction in availability of nectar sources and salt grass, trampling, ground compaction, and increases in weeds (USFWS 2005). Recreation can adversely impact the species or its habitat through foot or vehicle traffic, including OHVs. Salt grass or nectar sources could be trampled, disturbed, or removed, which can affect or destroy Carson wandering skipper eggs, larvae, or adults, and alter their food sources.

Soil and water actions are likely to benefit the species and its habitat, as they would improve habitat conditions and overall ecosystem health. Wildlife actions will also benefit Carson wandering skipper by following the Draft Recovery Plan (USFWS 2005), conducting surveys in potential and suitable habitat, and cooperating with other groups and agencies in furthering knowledge and conservation efforts.

Sage-Grouse

The Preferred Alternative would provide minor to moderate beneficial effects to sage-grouse, with potential in the very long-term to provide major benefits. Sage-grouse are considered a sagebrush obligate species, using sagebrush habitats year-round; managing livestock to meet land health standards and standards and guidelines, and managing wild horses and burros to AMLs, would benefit sage-grouse by retaining sagebrush understory vegetation. Implementing the Conservation Strategy for Sage-Grouse (*Centrocercus urophasianus*) and Sagebrush Ecosystems within the Buffalo-Skedaddle Population Management Unit (Northern California Sage-Grouse Working Group 2006) would provide benefits to sage-grouse under virtually all resource programs, as actions pertaining to these programs are addressed in the document.

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Benefits include protection measures for sage-grouse habitat and individuals, including restricting rights-of-way; limiting OHV use and travel routes; restricting seasonal herbicide and pesticide use; restricting timing of recreational events and predator control measures; and limiting distances and types of fences.

Vegetation actions would benefit sage-grouse by reseeding wildland fires, and enhancement actions will strive to allow sagebrush-steppe communities to move toward or reach their ecological potential. Benefits from juniper reduction actions include reducing fire danger, increasing vegetative understory and restoring sites to their ecological potential.

Mule Deer and Pronghorn

Sagebrush communities are very important to these species. Mule deer utilize sagebrush extensively for escape and thermal cover, in addition to bedding sites, but do not consume high quantities of it due to the turpentine-like oils in the leaves. Pronghorn consume it in the winter as forage (low sagebrush is more nutritious and palatable). Juniper reduction actions could have minor adverse effects, as some cover for these species may be eliminated, but overall benefits should result, as shrubs, forbs, and grasses should increase, and sites could be restored to their ecological potential. Vegetation actions such as reseeding and replanting could result in beneficial effects of increased forage and cover.

Managing livestock to meet land health standards and standards and guidelines, and managing wild horses and burros to AMLs, would benefit these species by retaining the overall structure and function of the sagebrush-steppe ecosystem (overstory and understory vegetation).

Managing travel and OHVs so that use is 'Limited to Designated Routes' would benefit these species by reducing disturbance and degradation of habitat the construction of new roads and trails would result in adverse effects due to increased disturbance and fragmentation or degradation of habitat.

Soil and water actions would benefit these species by improving the basis for vegetation growth, providing erosion control measures, and increasing surface water availability.

Other Species

The Preferred Alternative would provide overall minor to moderate benefits for most wildlife species, and primarily minor adverse effects. Birds utilizing the invasive juniper sites would experience adverse effects when juniper reduction efforts removed shelter and cover; however, opening the canopy would benefit raptors, as viewing and access of prey would be facilitated. Reduction of juniper would reduce the number of perches for raptors. Species including some small mammals, amphibians, and reptiles could also benefit from juniper reduction actions due to reduced fire danger, increased vegetative understory, increased water table, and the restoration of sites to their ecological potential.

Managing livestock to meet land health standards and standards and guidelines, and managing wild horses and burros to AMLs, would benefit various sagebrush obligate and sagebrush associated wildlife species by maintaining or restoring the overall structure and function of the sagebrush-steppe ecosystem (overstory and understory vegetation). This would provide needed shelter, cover, and forage for these species.

Managing travel and OHVs so that use is 'Limited to Designated Routes' would benefit wildlife species by reducing disturbance and degradation of habitat. New roads and trails would result in adverse effects due to increased disturbance and fragmentation or degradation of habitat. Species affected include reptiles, small mammals such as squirrels and rabbits, nesting raptors and songbirds, and upland game birds.

Soil and water actions would benefit these species by improving the basis for vegetation growth, providing erosion control measures, and increasing surface water availability. Wildlife actions such as maintaining and installing guzzlers will contribute to providing for the water needs of wildlife.

Designating seven new ACECs would benefit wildlife resources by managing lands to protect their environmental aspects and values on 89,397 acres. Additional use restrictions that would apply to specific ACECs (see Table 2.12-1), including utility and right-of-way avoidance areas, ratings as VRM Class II, and restrictions to energy and mineral development would result in minor to moderate beneficial impacts to wildlife habitat.

4.23.5.5 Riparian/Wetlands

These habitats are very unique and are scattered in small acreages throughout the field office area. They are extremely valuable for wildlife, and contain a high diversity and abundance of various wildlife species. BLM Riparian Inventory (BLM 1995 to 2002) assessments show that 84% of Lotic (flowing water) sites and 85% of Lentic (standing water) sites are rated as 'Properly Functioning Condition' (PFC). Riparian/wetland wildlife habitats rated PFC are overall in good condition, with habitat elements intact for most wildlife species that use them. The Preferred Alternative implements actions to maintain areas currently rated as PFC in good condition, and to improve areas that are currently rated as 'Functioning at Risk, Upward or Static Trend' to PFC.

Grazing by livestock and wild horses can have adverse impacts to riparian/wetland areas and associated wildlife habitat. Some localized overuse of forage will most likely occur in riparian and wetland areas and near watering areas due to the higher quality and longer growth period of forage, compared to adjoining upland areas. When forage plants are overused, desirable native species can be replaced by less desirable species that produce little or no forage value. A decline in soil condition, plant cover, and plant species composition also can encourage the invasion and growth of noxious weeds or other invasive plants. Early spring grazing also would adversely affect vegetation resources by the trampling of wet soils, uprooting of seedlings, and damage to mature plants.

The Preferred Alternative would result in minor to major beneficial effects to wildlife resources utilizing these habitats. Proposed management actions to improve and protect streams (and associated riparian and wetland communities), include adjusting current livestock grazing management strategies (e.g., grazing periods, season of use), managing wild horses within established appropriate management levels, and preventing ground disturbance within streams and riparian areas. Grazing exclosures would be utilized as needed to protect riparian sites, as well as fencing springs and providing off-site watering sources. Livestock salting sites will be located ¼ mile from riparian areas to discourage overuse and damage to plant communities by livestock. Implementation of improved grazing practices to meet land health standards and construction of up to 90 miles of new cross fencing is expected to result in long-term benefits to vegetation communities that have been identified as 'At Risk' of becoming unhealthy. Such actions would benefit wildlife by increasing vegetative diversity and structure in these systems, and protect them from degradation and destruction. This in turn, should maintain or increase diversity in wildlife species in these areas, and aid in ensuring an adequate water supply for the proper distribution of wildlife.

Western juniper and other undesirable woody vegetation will be removed from riparian areas, where they have encroached into the riparian plant community. Roads having a negative impact on riparian areas will be re-routed, eliminated, and/or rehabilitated. These treatments would improve riparian community structure and composition, and streambank stability, and decrease water temperature. This would be especially beneficial for native, cold-water fish species.

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Such actions would benefit wildlife by increasing vegetative diversity and structure in these systems, and protect them from degradation and destruction. This in turn, should maintain or increase diversity in wildlife species in these areas, and aid in ensuring an adequate water supply for the proper distribution of wildlife.

Mammals

Large and small mammals would benefit from restoration and improvement to riparian and wetland habitats. Mule deer fawning, fawn-rearing, browsing, and thermal cover would be maintained or enhanced, as would cover, forage, and shelter for many other mammal species. Minor adverse effects could result from disturbance of vegetation management or fencing projects, but fences would be built to BLM wildlife standards to minimize adverse effects.

Birds

Riparian habitat is very important for birds. Bird surveys conducted by Point Reyes Bird Observatory personnel recorded a greater number of bird species in these habitat areas than in the larger upland habitats. Vegetation treatments in riparian and wetland habitats would have beneficial effects to bird species by providing increased nesting, foraging, perching, and cover habitat, in addition to providing more animal and plant food matter. Waterfowl and other aquatic-related birds would benefit from habitat improvements by increases in quality of habitat, and increased nesting, foraging, and cover requirements. Improvements could result in increased food sources, such as plant, invertebrate, and fish species. Additionally, raptors could benefit, as food sources including fish, waterfowl, and other prey species increased due to improved habitats.

Reptiles and Amphibians

Much of the suitable habitat for these species is found in riparian and wetland areas, especially if they contain a woody component. Restoration and enhancement projects would significantly benefit these species by providing additional shelter, foraging, and cover habitat. Soil and water actions would also promote healthy riparian and wetland habitats and would contribute to increased beneficial effects for these species. Minor adverse effects to these species could occur from project activities (disturbance of vegetation and presence of equipment and personnel), but long-term overall benefits would outweigh adverse effects.

Fish

Fish species would benefit from riparian and wetland restoration and enhancement projects. Proposed management actions for the rehabilitation, maintenance, and enhancement of riparian and aquatic habitats, and their associated native and desirable non-native fish, will be designed and conducted following BMPs, which may include maintaining or improving minimum pool depths, increasing clean spawning gravels, and implementing bank stabilization measures where needed. Vegetation treatments will improve streambank stability, which would benefit all aquatic species. Such measures would also decrease water temperature, which would be especially beneficial for native, cold-water fish species. Soil and water actions would also promote healthy riparian and wetland habitats and would contribute to increased beneficial effects for fish. Actions consistent with the Criteria to Meet Standards for Rangeland Health Standard 2: Streams (applicable to wildlife) and the Criteria to Meet Standards for Rangeland Health Standard 4: Riparian and Wetland Sites will result in beneficial effects to fish and other aquatic species. Minor adverse effects could result from project implementation activities (disturbance of vegetation and presence of equipment and personnel), but long-term overall benefits would outweigh adverse effects.

4.23.6 Cumulative Effects

The area of analysis for cumulative impacts on wildlife resources is defined as the ELFO boundary. Major uses over the next 20 years are likely to continue and in some cases increase for the following reasons:

- Fish and wildlife development and use would continue at its current rate, or at an increased rate depending on the condition of habitat, which is influenced by terrestrial vegetation health.
- Domestic livestock grazing would continue to affect 97% or less of the areas, with actual grazing use differing depending on the grazing system.
- Outdoor recreation would increase as more people from metropolitan areas utilize recreation opportunities within the ELFO area.
- Wildland fires would continue to change the vegetation landscape, requiring, in some cases, emergency stabilization and rehabilitation.
- Timber production would continue at its current or lower level, perhaps becoming a fuels management activity more than a commercial enterprise.
- Wild horses and burros would be maintained at appropriate management levels.
- Mineral exploration and production are not expected to increase because of the lack of mineral resources except for sand and gravel.
- Wind energy and other renewable energy sources are expected to increase.

Cumulative effects to wildlife resources may result from various environmental processes and management actions occurring on lands adjacent to the ELFO. Adjacent landowners include other BLM offices in California and Nevada, USDA Forest Service, U.S. Fish and Wildlife Service, Department of Defense, CDFG, NDOW, California Lands Commission, California Department of Corrections, various county entities, and private landowners. Primarily, cumulative effects to wildlife resources occur due to effects on habitat. Habitat conversion, degradation, fragmentation, and loss can all adversely affect wildlife, either temporarily or permanently.

Such actions or activities include conversion of lands to residential or agricultural use; invasion of lands by noxious weeds, annual grasses or other invasive species; juniper treatments; logging or forestry actions; grazing practices; road and trail construction; and fire (wildland and prescribed burns).

BLM projects proposed on lands administered by the ELFO would be subject to NEPA documentation and permitting decisions, which would address cumulative effects on a project-level basis.

Management actions that are considered relevant to the evaluation of cumulative impacts on wildlife resources within the ELFO area include the following:

- Implementing federal recovery plans and biological opinions for listed species on other federal lands;
- Completing and implementing ongoing multi-agency planning efforts such as those for sage-grouse and juniper management;
- Implementing similar management actions on adjacent lands managed by other BLM field offices and the USDA Forest Service to manage ecosystems to achieve objectives similar to those for BLM-administered lands (i.e., land health standards, Healthy Forests Initiative, ecosystem management);
- Implementation and project-level implementation of other existing or future management plans;

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- Acquiring and managing land by the CDFG, including:
 - Revising deer and pronghorn herd plans;
 - Converting native habitats to agricultural uses;
- Subdividing private lands, including conversion from agricultural and grazing uses to residential uses, according to Susanville (Naphtali H. Knox and Associates and others 1990) and Lassen County (Simcox and Funke 1999) General Plans;
- Water development issues for interbasin transfer to the City of Reno or other regional areas; and,
- Future geothermal or other energy development.

The continued management and protection of large tracts of land as open space is considered a beneficial cumulative effect to wildlife because it offsets the conversion of lands from agricultural or residential use and maintains large contiguous patches native plant communities as wildlife habitat.

The continued coordination across administrative boundaries with private and public agencies throughout the region as part of BLM's IWM program is considered a beneficial cumulative effect for wildlife. Private lands in the region provide important habitat for wildlife (Northern California Sage-Grouse Working Group 2006), and lands adjacent to BLM-administered lands are being invaded by noxious weeds at a similar rate, or higher rate, to those occurring on BLM-administered lands.

In addition to juniper encroachment on BLM-administered lands, encroachment is also occurring on adjacent public and private lands. Harvesting of juniper, for both fuel wood and biomass, is occurring on adjacent public and private lands at some level. While such harvest results in temporary ground disturbance, in addition to the potential for introduction of noxious weeds, BLM's focus on reduction of juniper in the region is considered a major beneficial cumulative effect on wildlife habitat.

Hazardous fuels reduction treatments and even-aged forest management would result in substantial and long-term changes to the ecosystem. In these areas, successive treatments would allow early seral grass and shrub communities to dominate or co-dominate. Thinned forest stands would begin to display late-successional stage characteristics earlier than unmanaged stands. Cumulative effects to wildlife via habitat could be either beneficial or detrimental depending on the specific species considered. Generally, wildlife diversity and abundance would be expected to increase over time. In addition, watershed quality and overall ecosystem function would be expected to improve.

Wildland fire management on USDA Forest Service and private lands could result in cumulative effects on wildlife habitat. Although fire is generally considered beneficial to vegetation resources over the long-term, wildlife can be adversely affected in the short term (displacement, lack of food or cover), or even long-term if the understory that returns post-fire is invasive annual grasses or noxious weeds. Actions such as full fire suppression by BLM or other federal and state agencies can contribute to adverse cumulative effects to wildlife resources by increasing the buildup of fuels and decadence in habitats and increasing the risk of habitat loss due to catastrophic wildfires. The same may also occur if there is a lack of involvement by CDF in conducting prescribed burns on private lands.

Cumulative effects of livestock and wild horse grazing on wildlife resources occurs primarily through effects on vegetation, either via competition for forage or habitat modification. Livestock grazing occurs on adjacent public and private lands, as does grazing by wild horses and burros.

BLM currently has existing policy which directs the agency to manage livestock grazing in order to meet land health standards. Additionally, the proposed action includes managing wild horse and burro numbers

at or below AMLs. These actions should serve to reduce adverse cumulative effects to wildlife resources. Livestock grazing will continue on adjacent public and private lands, and will continue to affect wildlife resources; however reductions or disruptions of livestock grazing on private lands could also result in adverse effects to wildlife resources. Private ranch lands in the region currently provide important habitat for various wildlife species including sage-grouse (Northern California Sage-Grouse Working Group 2006), pronghorn, deer, and waterfowl. If private landowners were to substantially change operations (convert native lands for grazing or intensify management to offset forage losses on BLM lands) or abandon ranching and sell their land, possibly for other uses), adverse effects to wildlife resources could increase.

The Preferred Alternative would be effective in reducing or reversing cumulative effects due to the emphasis on restoration of vegetation communities toward historic conditions and thus wildlife habitat. In particular, sagebrush-steppe condition and structure, and habitat for associated wildlife species, would be improved by these treatments. Health, longevity, and extent of old-growth juniper and coniferous forests would also be enhanced, which would in turn benefit species utilizing these habitats. Overall, effects would be primarily beneficial, as BLM strives to promote management to maintain and make significant progress toward meeting land health standards.

4.23.7 Mitigation Measures

Most proposed actions for wildlife management relate to mitigation measures applied to certain land uses. Mitigation generally takes the form of changes in type of action, the size or magnitude of an action, or changes in timing of an action. Mitigation measures could entail a seasonal or permanent closure to a particular activity or structure, a change in type of action such as using fire versus mechanical fuels reduction, or adjusting the size of an action such as limiting acreage cut or otherwise treated.

Some mitigation measures to reduce impacts to terrestrial and aquatic wildlife and habitat are addressed in Chapter 2.25 Wildlife and Fisheries (i.e., protection for known raptor nests and sage-grouse leks). Mitigation that may be required for a particular action will be addressed as needed at the project level. Mitigation measures would likely reduce significant impacts to habitat and to the viability of terrestrial and aquatic species populations, but may not avoid all adverse impacts.

4.23.8 Unavoidable Adverse Impacts

Certain unavoidable adverse impacts to terrestrial and aquatic wildlife species and habitat would occur from implementing the Preferred Alternative. These impacts would result in some measure of short-term habitat loss, degradation, fragmentation, and habitat type-conversion from vegetation or fuels reduction treatments, facilities, or road development or off-highway trespass which could include loss of biodiversity, a reduction in ecological site function or potential, population reduction and/or isolation, and loss of forage or prey base. Mitigation measures described above and in Chapter 2 would be employed to reduce these impacts; however some impacts would result to varying degrees.

4.23.9 Short-Term Uses Versus Long-Term Productivity

Construction of roads for forestry, fire-fighting, fuels treatment, and energy and mineral operations would constitute short-term uses that could cause long-term wildlife habitat fragmentation unless these roads are closed eventually and/or rehabilitated after use. Other resource management actions that could cause long-term adverse effects to wildlife habitat include recreational trail development (especially if motorized use is permitted), utilities and rights-of-way, and grazing by livestock and wild horses and burros.

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These activities result in habitat loss and fragmentation, and degradation through vehicular and human disturbance, soil erosion, destruction of native vegetation, and introduction and spread of noxious weeds (which compete with native vegetation for water and space and can alter site vegetative biodiversity). Such results can significantly or permanently decrease ecological site potential and long-term productivity.

4.23.10 Irreversible and Irretrievable Impacts

The Preferred Alternative has been designed to avoid any irreversible or irretrievable impacts to wildlife. However, irreversible and irretrievable impacts could occur if habitat loss, degradation, or fragmentation results in isolation of wildlife populations into smaller populations that are more susceptible to extinction from random events. Fragmentation could also alter or eliminate migration corridors used by wildlife to move between winter and summer habitats or habitat used for reproduction and upbringing of young. Fragmentation could thus create an irretrievable loss in a species' productivity and adversely affect populations.