

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, take place at a later time or are farther removed in distance, but are still reasonably foreseeable; and cumulative effects are the combination of direct and indirect effects of the decisions made here, combined with other continued trends or anticipated effects that are outside the scope of the PRMP decisions, that may affect the resources discussed here.

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.

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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 most resources 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 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 are the combination of direct and indirect effects of the decisions made here, combined with other continued trends or anticipated effects that are outside the scope of the PRMP decisions

Mitigation

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 and equipment emissions, and fugitive dust from construction and the use of unsurfaced roads.

Smoke from wildland fires and prescribed burning is expected to result in the greatest impacts on air quality. Wildland fire use (WFU) applies 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 Surprise Field Office 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 degrading air quality. Reduced fire intensity, less air quality degradation, and fewer acres burned by wildfire in the long term are expected to result from alternatives that do the following:

- perform more fuels treatment,
- use full suppression on less land, and
- apply the appropriate management response (AMR) suppression prescription to more land.

Prescribed fire would be used to protect, maintain, and enhance resources. All prescribed burning would comply with the California Smoke Management Guidelines for Agricultural and Prescribed Burning. The use of prescribed fire would be based on approved burn plans and would follow project-specific prescriptions within 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 wildland fire use (WFU) would reduce emissions over the long term by reducing fuel loads but would more consistently generate 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.

Fugitive dust from vehicle travel usually settles quickly and remains relatively close to the point of origin, resulting in only localized effects. These effects are expected under all alternatives. Other sources of emissions (emissions from vehicles, minerals exploration, and construction) generally would be localized and short lasting. But because of the non-attainment status for carbon monoxide and ozone in Washoe County, Nevada, any emissions from BLM lands in Washoe County would contribute to cumulative air quality impairments.

4.1.2 Incomplete or Unavailable Information

We cannot accurately predict the acreage of lands subject to wildfire in any given year. Consequently, we describe the potential effects of wildfire in relative terms by the extent of fuels treatments and the assigned suppression prescription. Because the ranges of acreages proposed for prescribed burning are generally broad, we cannot precisely determine annual emissions from prescribed burning. Therefore, we also describe the potential effects of prescribed burns in relative terms. We do not have information on, nor do we measure, the amount of airborne fugitive dust resulting from the following:

- operating vehicles on paved and unpaved roads,
- construction and other earth-moving activities, and
- soil disturbance.

4.1.3 Analysis

We used the following impact thresholds for analyzing the intensity of effects on human health and air quality related values.

Negligible: Air quality would not change, or changes in air quality would be below or at the level of detection and, if detected, the effects would be considered slight.

Minor: Air quality would measurably change, but the changes would be small and local. No air quality mitigating measures would be needed.

Moderate: Air quality would measurably change and would have appreciable consequences, but the effect would be relatively local. Air quality mitigating measures would be needed and would probably be successful.

Major: Air quality would measurably change, would have substantial consequences, and would be noticed regionally. Air quality mitigating measures would be needed, and their success would be uncertain.

4.1.4 Analysis of the Preferred Alternative

Most of the field office area (73%) would be managed under an AMR of full fire suppression, and 27% would be managed under a more flexible AMR response. Effects on air quality, including visibility and human health, would conform to current programs and policies. Wildland fire would generate smoke that might cause a temporary localized conflict with residents, recreational users, and other visitors.

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Prescribed burning of 500 to 5,000 acres per year would result in a somewhat higher level of emissions on an annual basis. These factors would attenuate wildland fire intensity over the long term as fuel loads are reduced in those areas. Adverse short term impacts to air quality would be negligible to slight; long term impacts would be moderately beneficial.

Motorized vehicles (including recreational vehicles) and any equipment with an internal combustion engine would emit pollutants, including ozone precursors (ROG and NO_x), carbon monoxide (CO), and PM10.

The use of unsurfaced roads, recreational OHVs, and construction would generate localized fugitive dust. Vehicular and equipment emissions and fugitive dust from the use of unsurfaced roads—as well as timber harvest, construction, and other activities from new projects that would be undertaken—would require site-specific National Environmental Policy Act (NEPA) analysis. Suitable management practices would be applied in compliance with NEPA.

Adverse short term impacts to air quality would be negligible to slight; long term impacts would be moderately beneficial.

4.1.5 Cumulative Effects

Smoke from prescribed or wildland fires burning simultaneously in the following adjacent areas would significantly lower the air quality of northeast California and northwest Nevada:

- Modoc National Forest,
- BLM Alturas Field Office,
- BLM Lakeview Field Office,
- BLM Winnemucca field Office,
- Sheldon National Wildlife Refuge,
- Hart Mountain National Antelope Refuge, and
- private and state lands.

Prevailing winds in the area blow from the south and southwest. As a result, multiple fires could degrade air quality in Southern Oregon and northwest Nevada. Several prescribed fires are not likely to burn at the same time because the Surprise Field Office coordinates its burn plans with other BLM field offices and offices of the U.S. Forest Service and California Department of Forestry (CDF). But large wildland fires or escaped prescribed fires could burn in several areas at one time, significantly degrading air quality.

4.1.6 Mitigation Measures

No major adverse air quality impacts are projected under the Preferred Alternative. But the following mitigating measures may be implemented to further minimize air quality emissions from 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 human-caused activities in the area and the winter inversion potential. Computer modeling to assess smoke dispersion, and related smoke management techniques can help reduce the potential that prescribed burning would degrade air quality.

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 burn in several areas at one time, significantly degrading air quality. Sources outside the field office area releasing pollutants during the same time could produce more intense but still moderately adverse effects throughout the area.

4.1.8 Short-Term Uses Versus Long-Term Productivity

Prescribed fire may degrade (minor effects) air quality over the short term by increasing windborne particulates (PM10 and PM2.5) due to smoke and vegetation loss. This short-term increase in local and sub-regional smoke from prescribed burns must be compared to the large regional smoke plumes of wildfires that can be expected without prescribed burning over the long term. Prescribed fires are planned and implemented to accelerate ecosystem and plant community recovery to a healthier and more vigorous state. In the long term they benefit air quality.

4.1.9 Irreversible and Irretrievable Impacts

With proper management and remediation, no projected irreversible or irretrievable air quality impacts would result from the proposed prescribed burning alternatives.

4.2 Potential Effects on Cultural and Paleontological Resources

This section discusses the potential effects on cultural and paleontological resources from direct, indirect, and cumulative effects from implementation of the Preferred Alternative. The occurrence of archaeological sites in the field office area is high. The planning area has an estimated 13 archaeological sites per square mile (Corson 1980:2-43). Paleontological resources, both vertebrate and botanical, are also present within the management area but are found in lesser densities than archaeological sites. Management objectives for archaeological and paleontological resources might conflict with those for other resources and uses.

4.2.1 Methodology and Assumptions

Certain assumptions were made on the management of cultural resources in the future and are discussed as follows:

- BLM will comply with all federal and state cultural resources laws and regulations, including the following:
 - Sections 106 and 110 of the National Historic Preservation Act (NHPA),
 - American Indian Religious Freedom Act,
 - 36 CFR 800 (Protection of Historic and Cultural Properties),
 - Executive Order 13007 (Sacred Sites), and
 - BLM's National Programmatic Agreement with the Advisory Council on Historic Preservation and the National Conference of State Historic Preservation Offices (SHPOs).
- BLM will conduct Native American consultation and will consult with the appropriate SHPOs.
- BLM will work in accord with the Protocol Agreements established between BLM and the Nevada and California SHPOs. These agreements specify the approach for cultural resources protection, including such issues as site identification, interpretation, and protection and stabilization efforts.

These authorities mandate and direct the treatment of paleontological resources in the Surprise Field Office area. Locality-specific assessment and mitigation strategies would be implemented where significant paleontological resources would be damaged or destroyed by surface-disturbing actions.

4.2.2 Incomplete or Unavailable Information

The overall cultural resources sensitivity of the Surprise Field Office area is considered to be high. But only 7% of the field office area has been surveyed for cultural resources. This work was completed during the 1970s and resulted in finding 946 cultural resources. Although a number of cultural resources have been found in the interim period, a Class I overview was recently developed for the planning effort. This overview synthesized all available data; determined data gaps; and developed a predictive model for determining numbers, locations, and frequencies of cultural resources.

4.2.3 Analysis

The National Historic Preservation Act (NHPA) requires agencies to consider the effects of their actions on properties listed or eligible for listing on the National Register of Historic Places (NRHP). The process begins by identifying and evaluating cultural resources for NRHP eligibility, followed by assessing effects on eligible resources. The process concludes after consultation.

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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.

For the purposes of this analysis, the levels of effects on cultural and paleontological resources are defined as follows:

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

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

A beneficial minor effect would involve the maintenance and preservation of sites. For purposes of Section 106, the determination of effect would be *no adverse effect*.

Moderate: The effect would be measurable and perceptible. The action would change one or more character-defining features of a cultural resource, but it would not diminish the integrity of the resource to the extent that its NRHP eligibility would be jeopardized. For purposes of Section 106, the site's NRHP 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*.

Major: The effect on cultural or paleontological sites would be substantial, noticeable, and permanent. For NRHP eligible or listed archaeological sites, the action would change one or more character-defining features of an archaeological resource, diminishing the integrity of the resource to the extent that it no longer would 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*.

4.2.4 Analysis of the Preferred Alternative

The Preferred Alternative would result in negligible to moderate adverse impacts, and provides moderate beneficial effects to cultural resources.

The issuance of rights-of-way, leases, and permits that result in ground-disturbing activities could directly affect cultural resources. Impacts could range from negligible to major; however, impacts would be mitigated under standard avoidance or recovery procedures. Indirect or inadvertent impacts to cultural resources could result from the issuance of rights-of-way, leases, and permits, but the overall risk to cultural resources from such impacts is expected to be minor.

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Surface-disturbing activities of leasable mineral sales and energy exploration and development could result in mitigated impacts to cultural resources. In addition, the potential for indirect and inadvertent impacts would increase proportionally to the amount of land 'Open' to mineral leasing and development. While direct impacts from range improvement projects would be mitigated, projects such as enclosure fencing would directly benefit cultural resources by excluding livestock grazing in specific rehabilitation areas. Developing off-site water sources would also reduce the impacts and damage to cultural resources in riparian areas and around springs.

Other impacts might result from livestock grazing. Livestock wallowing, congregating, and trailing at or across cultural resource sites can damage artifacts and the contexts in which they occur (Halford 1999; Borghi: personal observation). Cattle shading and rubbing can damage standing historic structures and prehistoric petroglyph panels. Overgrazing, cattle trailing, and excessive trampling at springs and along stream banks can all lead to a denuding of protective vegetation cover and create indirect impacts to cultural resources by accelerating erosion and exposing artifacts to illegal surface collection and vandalism, breakage, and horizontal and vertical displacement (Halford 1999; Borghi personal observation). These types of impacts would generally be localized at particular sites. Effects could range from minor to major. Grazing management that meets standards for rangeland health and implementation of guidelines for livestock grazing should reduce the amount and extent of impacts or damage to cultural resources resulting from grazing on public lands.

Wild horses can damage cultural resources by breaking surface artifacts, trampling surface and subsurface archaeological deposits, and destroying site integrity. Impacts from wild horses are expected to be greatest where active herd management overlaps areas designated as having high cultural resource values, particularly in riparian or spring areas where wild horses congregate and cultural resource sensitivity is high. As with cattle, these types of impacts would generally be localized at particular sites. Effects to the resource could range from minor to major.

Fire severity (duration of heating) can disturb prehistoric sites because extreme heat can damage stone tools and lithic debris on or near the site's surface (Loyd, Origer, et al. 2002). Rock art can be sensitive to both fire intensity and severity on rock types subject to spalling. Smoke and soot can also damage rock art (Tratebas and Dorn 2004). Fires of any type might expose hidden sites to increased visibility and illegal collection. Impacts from prescribed fires could range from negligible to major; however, impacts would be mitigated under standard avoidance or recovery procedures. Flagging cultural resources for avoidance often can attract attention to those sites, increasing the risk of unauthorized collection.

Appropriate management response (AMR) would be applied to 42,239 acres of Massacre Bench. Use of AMR would reduce the potential for catastrophic fires, which cause increased erosion and potential damage to buried cultural resources. Implementing inventory and evaluation in compliance with Section 106 of the National Historic Preservation Act and avoiding identified cultural resources would reduce the impacts of fire and fuels management. Under standard protocols, impacts to known cultural resources would be considered and mitigated during fire suppression. In some extreme instances, cultural or historic sites could be damaged or destroyed when fire suppression is critical to protecting human life or property.

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

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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.

Impacts from dispersed recreation (camping, hiking, horseback riding, mountain biking, off-highway vehicle [OHV] use) are difficult to assess, particularly because such activities might affect cultural resources that have yet to be found and recorded. Emergency OHV closures to protect cultural resources and closure of unauthorized OHV routes in WSAs would benefit cultural resources.

Indirect and inadvertent impacts to cultural resources might result from attracting more attention or visitation to certain areas. Increased visitation and recreational use can lead to vandalism and illegal collection of artifacts. Providing recreational or public interpretation of cultural and historic resources might enhance appreciation and understanding of the fragile and finite nature of cultural resources. Similarly, promoting the adaptive reuse of historic buildings and structures for recreational purposes would help preserve and protect significant historic properties, helping fulfill the requirements of Section 110 of the National Historic Preservation Act (NHPA).

Designating special management areas such as ACECs, WSRs, and CRMAs would generally benefit cultural resources in these areas, where management actions restrict detrimental uses. These activities would be restricted by reducing or eliminating surface disturbances that are often caused by OHV use, livestock grazing, building range improvements, placement of rights-of-way, and mineral entry. Restricting these activities would result in increased ground cover, leading to reduced soil erosion, which would help maintain the integrity of the cultural sites. The management goals and prescriptions for some special management areas could directly or indirectly affect cultural resources and would require completion of Section 106 procedures.

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. OHV use also may cause the creation of trails that cut into and erode sites, scattering and breaking artifacts. Opportunities for increased looting or vandalism as a result of increased access would also occur. The setting of Native American TCP's or sacred sites would be adversely affected through auditory or visual means by the use of OHVs within such areas.

Several areas under present management would receive more protection from establishing increasing off-highway vehicle (OHV) restrictions. OHV use would be 'Limited to Designated Routes' on 1,208,650 acres, and 11,994 acres would be 'Closed' to OHV use. This would significantly reduce damage to cultural sites from soil compaction, displacement, rutting, and other disturbances.

The added emphasis on accommodating development demands for rights-of-way (ROWs) and communications sites would cause a potentially greater impact on cultural resources from ground-disturbing activities. Compliance with Section 106 would reduce potential effects of utilities, transportation, and telecommunications activities on cultural resources by locating significant cultural resources early in the planning process and taking measures to mitigate the potential effects.

Two cultural resources special management areas would be designated for the significant cultural resources of these two districts [Hays Range (92,449 acres) and Duck Flat (88,315 acres)]. Cultural resource management plans (CRMPs) would be developed for all ACECs, special management areas, and interpretive sites—with resulting benefits to cultural resources.

Woodcutting would target locations with invasive western juniper to aid in fuel reduction and would therefore be subject to Section 106 restrictions. Woodcutting would avoid cultural resource sites or mitigate impacts as required. In addition, appropriate management response (AMR) would be applied to 42,239 acres of Massacre Bench. Use of AMR would reduce the potential for catastrophic fires, which cause increased erosion and potential damage to buried cultural resources.

Implementing inventory and evaluation in compliance with Section 106 of the National Historic Preservation Act and avoiding identified cultural resources would reduce the impacts of fire and fuels management.

Approximately 980,442 acres of the field office area would be ‘Open’ to energy and mineral leasing except for existing WSAs, which are ‘Closed’, and the Bitner and Rahilly-Gravelly ACECs, which would be managed as no surface occupancy. These measures would prevent ground-disturbing mineral exploration and extraction in areas with high cultural resource values, preserving the integrity of the sites and the overall setting around the cultural resources.

Decorative rock collecting for personal use (i.e., non-commercial) would be permitted throughout the SFO management area (except WSAs). Commercial activity would be limited to previously identified areas, which are designated for this purpose. Designated sites would be confined to areas where existing roads provide ready access and adverse impacts on sensitive resources (e.g., wildlife habitats, plant communities, soils, and cultural resources) and other resource uses could be avoided or minimized. Although ground disturbance for energy and minerals extraction could inadvertently destroy or disturb significant cultural resources, the potential for such disturbance is negligible.

Vegetation restoration and maintenance and fuel reduction projects would use prescribed fire, drill seeding, chemical treatment, mechanical treatment, hand treatment, and biological treatment. Restoration projects would be subject to Section 106 inventory as they arose to ensure that cultural resources would not be affected. Restoration and fuel reduction activities cause short-term minor adverse effects to cultural resources resulting from flagging. However, the long-term stabilization of the soils and the reduced potential for catastrophic wildfire would have long-term moderate benefits. Overall, vegetation projects would have moderate beneficial effects and minor to moderate adverse effects.

Increased levels of livestock use would be permitted, if more forage is available. Livestock impacts would be site-specific, with minor to major adverse effects on cultural resources. New grazing exclosures and water development projects would be mitigated to avoid direct and indirect impacts to cultural resources.

Designating and managing three areas (Massacre Bench, Bitner Ranch, and Rahilly-Gravelly) as ACECs would protect cultural resources from right-of-way (ROW) development, and unauthorized OHV access. Designating two cultural resources management areas at the Hays Range (92,449 acres) and Duck Flat (88,315 acres) would offer a proactive approach to managing cultural resources.

4.2.5 Cumulative Effects

Cumulative effects under current management from actions or activities by agencies or entities other than BLM could affect archaeological districts, historic districts, cultural landscapes, and linear historic and prehistoric districts (trails). Not all of Surprise Field Office has been surveyed, and few districts or landscapes have been identified. It is difficult therefore to determine whether more significant districts and landscapes exist and whether contributing elements exist on lands next to BLM-administered land. Ground-disturbing activities and activities and actions that alter settings on adjacent 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 National Register of Historic Places.

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Conversion of sagebrush habitats to agricultural use on adjacent private lands might disturb cultural resources by affecting the integrity of resources. In addition, conversion of habitat to residential use by private landowners, the U.S. Forest Service, U.S. Fish and Wildlife Service, and the California Department of Forestry and Fire Protection (CDF) might result in similar cumulative effects.

Juniper treatment and logging on private lands might involve ground-disturbing activities that affect individual significant cultural resources and districts. All ground-disturbing activities and actions by agencies or entities other than BLM with the potential to affect the integrity of resources could result in cumulative effects on significant cultural resources.

Compliance with Section 106 and 110 of the National Historic Preservation Act and 43 CFR 3809 of the Paleontological Resources Protection Act would reduce potential effects. Cumulative effects to cultural resources are not expected to be significant.

4.2.6 Unavoidable Adverse Impacts

The greatest threat of damage or destruction to cultural resources would result from casual, unauthorized activities (such as dispersed recreational activity, OHV use, and vandalism) and natural processes (natural decay, deterioration, or erosion). Un-quantified indirect impacts would result.

4.2.7 Short-Term Uses versus Long-Term Productivity

None.

4.2.8 Irreversible and Irretrievable Impacts

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

In addition, although management procedures would comply with federal laws and agency guidelines by providing a systematic means to proactively address direct impacts to cultural resources from authorized projects and activities, mitigation in the form of data recovery might be needed on certain occasions. Once data has been recovered at a given site, the recovery limits or diminishes potential opportunities for future research and interpretation.

4.3 Potential Effects on Energy and Minerals

This section analyzes the direct, indirect, and cumulative effects on energy and minerals activities from implementation of the Preferred Alternative.

4.3.1 Methodology and Assumptions

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 Lake City/Surprise Known Geothermal Resource Area 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.

4.3.2 Incomplete or Unavailable Information

Limited information exists on the location and extent of mineral resources in the Surprise Field Office 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

We considered effects on energy and minerals development *adverse* if they would restrict or raise the cost of mineral and energy exploration, development, and extraction. We considered the effects *beneficial* if they would increase access to the resources. We considered effects on energy and minerals more beneficial if more land would be open to development with fewer restrictions. And we considered alternatives less beneficial if more land would be ‘Closed’ to development or more restrictive conditions would be placed on development.

For this analysis, we defined the levels of effects on energy and mineral management 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 development of energy and minerals would be moderately lower (26 to 50%) than at present for an adverse impact or moderately higher (26 to 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.

4.3.4 Analysis of the Preferred Alternative

Essentially, the goals and objectives for mineral and energy development common to all alternatives 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 RMP would recognize and conform to the National Energy Policy (National Energy Policy Development Group 2005) by:

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

4.3.5 Leasable Mineral Resources

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. These requirements are detailed in Appendix D.

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Of BLM-administered lands 980,442 acres (80%) would be ‘Open’ to mineral leasing under standard lease terms. A total of 50,344 acres (4%) would be required to abide by seasonal use restrictions to protect critical wildlife habitat, as follows:

- 28,034 acres within 0.6 miles of greater sage-grouse leks,
- 3,670 acres within 0.25 miles of known raptor nests, and
- 18,640 acres within 0.25 miles of pronghorn kidding grounds.

A total of 6,277 acres (0.6%) of BLM-administered lands would fall under permanent no surface occupancy rules, including the following areas:

- The Rahilly-Gravelly ACEC, 957 acres of which is managed by the Surprise Field Office, as directed by the Lakeview RMP and EIS (BLM 2003a).
- Bitner ACEC (1,921 acres)
- Within a 100-acre buffer of occupied pygmy rabbit habitat.

A total of 183,581 acres within existing WSAs (15% of BLM-administered land) would be ‘Closed’ to mineral leasing. The proposed Massacre Rim ACEC (44,870 acres) overlaps a wilderness study area (WSA). All management actions for those portions of the ACEC within a WSA would be governed by the Wilderness Interim Management Policy (BLM 1995) until Congress makes a determination on wilderness designation for the area. If these acres are later released from wilderness study, BLM would manage them according to the management direction for that ACEC. 44,870 more acres (4%) would be ‘Open’ to mineral leasing with restrictive stipulations if the area is released from wilderness study.

The fencing of areas of 40 or fewer acres to protect unique plant communities from animals would negligibly affect leasable mineral development because the total area fenced would be less than 200 acres (0.16% of BLM land in the field office area).

Exploration, development, and extraction of energy and minerals in areas that could adversely affect cultural resources would be mitigated, restricted, or not allowed. But because affected areas are expected to be relatively small, the adverse effect would be negligible to slight.

The building of new permanent roads to support other resource objectives would not be allowed. Temporary roads that are reclaimed after use would be permitted after NEPA review. Restrictions on road building and use would be placed near mule deer, antelope, elk, and bighorn sheep reproductive areas.

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 also be determined on a case-by-case basis.

Leasable energy and mineral exploration, development, and extraction would have negligible to minor adverse effects because of the few 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 incorporate needed mitigation measures into terms, conditions, and stipulations of permits and leases. A minor benefit could result from realty actions and the release of WSAs from wilderness study.

4.3.5.1 Cumulative Effects

The area of analysis for cumulative impacts on leasable minerals consists of the Surprise Field Office 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. 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. However, 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 temperature gradient holes would be filed under all alternatives during the life of this plan. These notices of intent would most likely be filed in the known geothermal resource area (KGRA). Total surface disturbance from geophysical surveys over the life of the plan is expected to be about 0.5 acres. Disturbance from temperature gradient holes is expected to be 5.5 acres. Eight exploratory wells would be drilled under all alternatives and during the life of RMP, 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 Rahilly-Gravelly ACEC, no surface occupancy stipulations 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 any of the alternatives, and no cumulative impacts are expected.

4.3.5.2 Mitigation Measures

The Preferred Alternative would not substantially decrease acres 'Open' to energy and mineral leasing. No impacts would result that would require mitigating oil, gas, and mineral resources. Therefore, mitigation measures would not be needed.

4.3.5.3 Unavoidable Adverse Impacts

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

4.3.5.4 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.

4.3.5.5 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.

4.3.6 Locatable Mineral Resources

Public lands are either 'Open' or 'Closed' to locatable mineral use. 'Closed' areas are said to be "withdrawn" from mineral entry. 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.

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.

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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:

- areas in the National Wild and Scenic Rivers System and areas designated for potential addition to the system;
- designated areas of critical environmental concern (ACECs); and
- areas designated as 'Closed' to off-highway vehicle (OHV) use (as defined in 43 CFR 8340-5); 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.

All of the BLM-administered lands (1,220,644 acres) in the field office area would be 'Open'.

Fencing areas of 40 or fewer acres to protect unique plant communities from animals would have negligibly adverse effects because the total area fenced would be less than 200 acres (.16%) of BLM-administered land. But if the unique plant community 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.

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The building new permanent roads to support other resource objectives will not be allowed. Temporary roads that are reclaimed after use would be permitted after NEPA review. Restrictions on road building and use would be placed near mule deer, antelope, elk, and bighorn sheep reproductive areas when alternative routing is practical.

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 also be determined on a case-by-case basis when relocation of site-specific activities is permissible.

There would be 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 could result from realty actions and if WSAs are released from wilderness study.

4.3.6.1 Cumulative Effects

The area of analysis for cumulative impacts on locatable minerals consists of the Surprise Field Office 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 total surface disturbance from exploratory drilling over the life of this RMP is expected to be 300 acres. Any locatable mineral deposits found in the planning area would probably (under present economics and commodity prices) be too small or low grade to be economically developed. If any deposits are developed, the total surface disturbance from exploration and development would be about 1,000 acres.

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 additional 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' 183,581 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.

4.3.6.2 Mitigation Measures

The Preferred Alternative would not substantially decrease the acres 'Open' to locatable mineral development. No impacts that would require mitigating locatable mineral resources; therefore, mitigation measures would not be needed.

4.3.6.3 Unavoidable Adverse Impacts

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

4.3.6.4 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.

4.3.6.5 Irreversible and Irretrievable 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.

4.3.7 Saleable Mineral Resources

All existing saleable mineral material sites would be evaluated to determine continued need and ensure that they are meeting user needs. The applications for contract sale and free use permits would be allowed. 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.

Lands available for saleable minerals would fall into one of two categories: 'Open' or 'Closed'. The wilderness study areas (WSAs) (183,581 acres) would remain 'Closed' to saleable minerals. Saleable minerals include decorative stone, sand and gravel, and aggregate.

Emphasis will be placed on resource management through commodity production combined with mitigation measures for resource protection. 1,037,063 acres (85%) of BLM-administered lands would be 'Open' to saleable minerals activities.

Fencing areas of 40 or fewer acres to protect unique plant communities from animal impacts would have negligibly adverse effects because the total area fenced would be less than 200 acres (0.16% of BLM-administered lands). If the unique plant community is within an area proposed for saleable mineral development, then mitigation measures will be implemented on a case-by-case basis.

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.

The building of new permanent roads to support other resource objectives would not be allowed. Temporary roads that are reclaimed after use would be permitted after suitable NEPA review. Road building and use would be restricted near mule deer, antelope, elk, and bighorn sheep reproductive areas when alternative routing is practical.

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 also be determined on a case-by-case basis when site-specific activities can be relocated.

There would be negligible to minor adverse effects on saleable mineral exploration, development, and extraction because no lands would be 'Closed' to saleable mineral activities outside of WSAs, and restrictive mitigation measures would be limited. Conflicts with other resources would be resolved through mitigation measures. A minor benefit could result from realty actions and if Congress releases WSAs from wilderness study.

4.3.7.1 Cumulative Effects

The area of analysis for cumulative impacts on saleable minerals consists of the Surprise Field Office 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 Surprise 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, and no cumulative impacts are expected.

4.3.7.2 Mitigation Measures

The Preferred Alternative would not substantially decrease acres 'Open' to saleable minerals development. No impacts would require mitigation of impacts to saleable mineral resources. Therefore, mitigation measures would not be needed.

4.3.7.3 Unavoidable Adverse Impacts

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

4.3.7.4 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.

4.3.7.5 Irreversible and Irretrievable Impacts

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

4.3.8 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 I.

4.3.8.1 Analysis of the Preferred Alternative

Most of management area (81%) would be available for renewable energy development, with the exception of WSAs (183,581 acres) and the proposed Bitner ACEC (1,921 acres). Two areas of critical environmental concern (Massacre Rim and Rahilly Gravelly), a total of 45,827 acres, are designated as rights-of-way avoidance areas. This means that after undergoing a site specific NEPA review any applications for new rights-of-way 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.

Specific renewable energy project proposals will be considered through the rights-of-way authorization process, in accordance with FLMPPA, regulations, and BLM policy. 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 and a project/site specific NEPA review. Implementation of any proposed management actions would ensure that potential adverse impacts to most of the natural resources present at wind energy development sites would be minimal to negligible.

Approximately 36% of the field office area would be managed as VRM Class II, and approximately 18% would be designated as VRM Class III (see Map VRM-1). Class I designations apply only to wilderness study areas (WSAs) (15%), and change of the WSA status would require an action by Congress. As described in Section 2.18 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.

Approximately 31% 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 minor to moderate site-specific adverse effects on renewable energy development, primarily because 19% of the field office would be excluded or avoided for new development. In addition, 69% 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 Visual Resource Management Class (VRM) Class II (see Chapter 2.18).

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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.

4.3.8.2 Cumulative Effects

The area of analysis for cumulative impacts on renewable energy development is the Surprise Field Office 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. The development of wind energy farms is 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.

4.3.8.3 Mitigation Measures

None.

4.3.8.4 Unavoidable Adverse Impacts

None.

4.3.8.5 Short-Term Uses Versus Long-Term Productivity

None.

4.3.8.6 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 RMP planning process incorporated environmental justice considerations to meet federal law requirements by addressing any adverse human health or environmental impacts that might affect minority or low-income populations to a greater extent than the general population in the areas. The only environmental justice population in the Surprise Field Office area is the Native American community.

Most management actions would not affect this population. Proposed management actions with the greatest potential to affect environmental justice issues in the field office area relate to 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 disproportionately affect environmental justice populations. Where potential adverse effects have been recognized, 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 RMP level.

4.4.3 Analysis of the Preferred Alternative

No effects related to environmental justice are expected from management actions for the following:

- air resources;
- soil resources;
- terrestrial and aquatic wildlife;
- vegetation;
- water resources;
- wild horses;
- forestry; grazing;
- lands and realty;
- recreation;
- special management areas; or
- utilities, transportation, and telecommunications.

Any action that would bring the public closer to traditional cultural properties (TCPs) (e.g., building interpretive sites) could adversely affect Native Americans. Such actions should be implemented in close consultation with Native American communities. Fencing cultural resources that would restrict access to Native Americans is considered an adverse effect.

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Fencing cultural resources to the general population, while allowing Native Americans occasional access, is considered a beneficial effect, because sacred sites, TCPs, and other resources would be protected.

Increases in particulates in the air from prescribed burning and appropriate management response (AMR) would lower 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 might adversely affect Native Americans. Consultation with tribal groups on proposed projects close to sacred sites with high-value visual resources would avoid potential use conflicts.

4.4.4 Summary of Impacts

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

4.4.5 Cumulative Effects

There are no anticipated cumulative effects resulting from implementation 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 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. Later rehabilitation costs would be lower in healthy plant communities.
- Appropriate management response (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 longer timeframe.
- Adverse effects would do the following:
 - 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.
- 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 target number of acres were noted in the alternatives description, the acreage was assumed to be a target to be achieved during the life of the RMP 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.

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- Areas treated for juniper removal with less than 60% cover would include perennials in the understory and therefore would respond more favorably to 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

Without vegetation maps of pre-European settlement, information on an area's soils, climate, and topography could be used to predict the potential natural vegetation (PNV). PNV groups represent the stable vegetation types that would become established on an ecological site if all successional stages were completed without human 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.

4.5.3 Analysis

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.

4.5.4 Impacts Common to all Fire and Fuels Actions

Fire and fuels management actions include fuels reduction programs and the decisions of how, when, and where to suppress wildfires. Full suppression of 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 (Miller, et. al. 1999).

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Appropriate management response (AMR), consists of any specific and suitable action taken to meet public and firefighter safety needs plus resource objectives. AMR 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 range 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 wildland fire use (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 wildland-urban interface (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 (Bates, J.D., et al, 2005).

Most fuels reduction would target juniper. Dense stands of juniper are somewhat fire resistant (Miller R.F., et al, 2000); hence, restoration of these stands might actually convert the landscape to plant communities with more frequent fire intervals. 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 fuels 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.

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 and 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 fuel loading across the landscape, particularly through the juniper reduction program. Benefits are also expected through efforts to restore riparian, aspen, and mountain mahogany communities (Wall, et al 2001).

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.

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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 fuels load is not sufficient to carry a fire, fire-intolerant juniper could become established and out-compete fire-tolerant grasses and forbs.

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

Recreation actions could both benefit and adversely affect 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.

Roads could also act as fuel breaks and contain certain fuels 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, fuels alteration, and safety areas.

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

- areas of critical environmental concern (ACECs),
- National Register-eligible sites,
- wilderness study areas (WSAs), and
- other special management areas.

Retardant use would be allowed in these areas for initial attack. Retardant use during extended attack would be considered as a part of the wildland fire situation analysis, with consideration of the resources at risk and public and firefighter safety.

Limiting the use of retardants could hinder suppression, enlarging fires in these restricted areas. Nevertheless, the cost of controlling the fire might not be affected because suppression techniques would need to rely on indirect methods and natural barriers.

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Effects of 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.

4.5.5 Analysis of the Preferred Alternative

BLM would use the appropriate management response (AMR) to treat 42,239 acres considered for the Wildland Fire Use strategy of AMR. The effects of AMR using the full suppression management action as a fire management strategy would extend across 891,695 acres, or more than 73% of the field office area. This AMR response would do the following:

- reduce the cost of suppression,
- improve and maintain fire-adapted ecosystems, and
- reduce the size and intensity of future fires because of reduced fuel loads, and
- likely increase the burned acreage and smoke.

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. And 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 would be treated at the rate of 500 to 5,000 acres per year, with an emphasis on wildland restoration and populated WUI areas. The acres chosen are unlikely to be the most effective at altering fire behavior at the landscape level. Suppression costs could decrease over time because of decreased risk to residences and infrastructure. This treatment 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.

Juniper is highly intolerant of fire. If the frequency of fires were increased, juniper seedlings would be killed, and their density would decrease. The natural fire cycle is likely to be restored more quickly and would result in smaller fires, healthier plant communities, and reduced rehabilitation costs.

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. Collecting dead wood from the 1,700 acres of mountain mahogany would result in small-scale fuels reductions in these areas.

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Major improvements to livestock grazing strategies and land health would be made, resulting in the restoration of native plant communities, causing minor beneficial effects by restoring natural fire regimes. Forty nine allotments and 1,445,443 acres would remain available for livestock grazing.

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

AMR using the full suppression strategy would be used on a total of 73% of the field office area. Wildland-urban interface (WUI) areas would be protected. But fuels would continue to build up throughout the field office area and would further increase the probability of large, intense wildfires. The remaining 27% would be designated for appropriate management response (AMR). AMR would enhance ecological recovery by reducing fuels and restoring natural fire regimes where the actual prescription based on prevailing weather conditions is not full suppression.

Fuels would be treated at a rate of 500 to 5,000 acres per year. The benefits of the fuels reduction treatments would contribute to restoring up to 100,000 acres of native plant communities over the life of the plan.

No areas would be designated as 'Open' to off-highway vehicle (OHV) use. This would reduce the risk of human-induced ignitions from OHVs.

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 wildland-urban interface (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.

Restricting the fire management response allowed in areas of critical environmental concern (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.

Where suppression options would be restricted in cultural resource management areas (CRMAs) effects on the fire and fuels program would be likely to influence fire management during an incident by creating priority protection areas, which could increase the suppression cost of an incident. 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.

The Preferred Alternative would result in negligible adverse effects and moderate beneficial impacts, as the use of ‘adaptive management’ and the appropriate management response for wildland fire suppression is emphasized, livestock grazing is reduced, and OHV use is restricted. Over the long term, the combined effects of the proposed 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.

4.5.6 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 natural potential vegetation groups across the landscape. Since prescribed fires and fuels reduction would also be applied on the adjoining Modoc National Forests, Hart Mountain and Sheldon National Wildlife Refuges, 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 Preferred Alternative would not result in significant adverse cumulative effects to fire and fuels management.

4.5.7 Mitigation Measures

Education will emphasize community protection procedures and public safety measures. Surprise Field Office (SFO) 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,
- 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.

Surprise Field Office 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.

4.5.8 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.

4.5.9 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. Designated recreation routes and areas, and minerals development would unavoidably limit the restoration of natural fire regimes in some areas. In vegetation communities prone to annual invasive species, wildland fire might allow the area to be further overtaken by these species.

4.5.10 Irreversible and Irretrievable Impacts

None.

4.6 Potential Effects on Forestry

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

4.6.1 Methodology and Assumptions

Forest inventories and vegetation surveys are the main sources of information on BLM forest resources in the Surprise Field Office area. The distribution of commercial forests was obtained from Sustainable Yield Unit (SYU) 15 plot data and the timber production capability classification (TPCC).

Indicators used to describe forest resources and their conditions include the following:

- species composition,
- site productivity,
- stand age,
- successional stage,
- standing volume,
- basal area, and
- stand health.

Current data for these indicators by stand are not available. (See Incomplete or Unavailable Information.) Stand or forest health pertains to vigor, fuel hazard, and presence of and susceptibility to insect pests and pathogens.

Effects of other resource programs on the forestry program were evaluated for how they would affect the use of forest resources and forest health.

4.6.2 Incomplete or Unavailable Information

Stands in the field office area have not been surveyed or rated for hazardous fuel loads. But some stands are known to contain hazardous fuels and therefore would respond favorably to thinning treatments.

No recent forest inventories have determined growing stock, growth and yield, or other conditions of timber stands. In 1974 plots were inventoried to calculate allowable cut, and in 1977 forests were inventoried to determine lands capable of commercial timber production. Examinations of stands to determine specific treatment recommendations were completed in 1985. Future forestry prescriptions will need current information to determine proper treatments and to prioritize the amount of biomass and saw log material to be removed.

4.6.3 Analysis

For this analysis the levels of effects on forestry management were defined as follows:

Negligible: The impact is at the lower level of detection; the condition and health of forests and woodlands in the field office area would not measurably change.

Minor: The impact is slight but detectable; the condition and health of forests and woodlands in the field office area would undergo a small change.

Moderate: The impact is readily apparent; the condition and health of forests and woodlands in the field office area would undergo a small but permanent measurable change.

Major: The impact is severe; the condition, health, and amount of forests and woodlands within the field office area would undergo a long-term or permanent measurable change.

4.6.4 Analysis of the Preferred Alternative

Under the Preferred Alternative, maintenance and restoration of degraded forests of all types, including conifer types, aspen, and mountain mahogany, would improve forest health (Wall, et. al. 2001). Fuelwood cutting and reducing juniper woodlands (coordinated with the fire and fuels program) would not adversely affect the forestry program because the 17,500 acres of old-growth juniper woodlands would be maintained where they have historically grown. Reducing competition from juniper in low-site forests would improve the health and vigor of these communities.

The Preferred Alternative for the fire and fuels program and the forestry program itself would most affect the forestry program. Proposed vegetation management actions would improve forest and woodland health. Effects of juniper reduction component of vegetation management are described for the fire and fuels program. The terrestrial and aquatic wildlife program and the designation of special management areas would restrict forestry activities. The restrictions in WSAs would most affect the forestry program by applying year round to a large area.

Forestry management treatment of 35 to 150 acres of commercial and low-site forest would result in up to 3,000 acres of conifer forest being treated over the life of the plan. This treatment would improve forest health in treated stands and would make these stands less susceptible to destruction by catastrophic wildfire. Prescribed fires would also be used as needed to reduce hazardous fuels and control juniper in low-site forests, as a means of restoring ecosystem health and reintroducing the effects of fire to fire-dependent forest types. Prescribed fires would also be used on up to 3,000 acres over the life of the plan. This treatment would improve forest health in treated stands and would make these stands less susceptible to destruction by catastrophic wildfire.

Reforestation across commercial and low-site forest would promote more effective regeneration than natural seeding alone. Woodcutting potentially would be used to target invasive juniper. Free use areas are expected to increase woodcutting.

Juniper reduction is likely also to change fire frequency and intensity patterns on the landscape level. Closed-canopy juniper stands are relatively fire resistant. Therefore, restoring fire-adapted native plant communities and their associated fire regimes might increase fire frequency and the potential for spread of fires to forested areas. The indirect effects of this change in fire cycles on the forestry program are beyond the scope of this analysis. The effects of avoiding special-status plant populations to forestry operations would be minor. The effects of adopting visual resource management (VRM) restrictions into forestry management would also be minor.

Forest acreage in the Surprise Field Office area is small, and forests would not be managed for forest products other than fuelwood from invasive juniper stands and salvage sales after uncontrolled wildfire. Mechanical and hand treatments would be used to thin stands, reducing fuel loads and, by association, decreasing the risk of the spread of catastrophic wildfire. Opening up stands would allow using fire as an ecological tool to restore natural fire regimes to fire-dependent forest types.

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Thinning would also increase the vigor and productivity of the remaining trees. Mechanical treatments that reduce canopy fuels in addition to ladder fuels provide merchantable timber and would result in greater benefits to forest health in the commercial stands. Because the density of overstory trees in low-site forests is low, reducing canopy fuels is not essential to reducing the risk of wildfire in these areas. Some forestry activities would result in soil compaction from heavy equipment. Any adverse impacts on regeneration would be compensated for by focused regeneration efforts.

Realty actions resulting in the disposal of isolated parcels of BLM-administered land could result in the loss of forestland acres. Creating more opportunities for recreation would increase human density and therefore increase the potential for human-caused ignitions and later spread of fire to forestlands.

Restrictions on harvesting in areas of critical environmental concern (ACECs) would reduce the forest and woodland area that could be treated. The proposed ACECs would minimally affect the forestry program. Most of the area of the proposed ACECs would be within the Massacre Rim WSA, and the restrictions described below for WSAs already apply to these areas. Limitations on forestry activities in WSAs would reduce the forest area that could be treated. Forest fiber products could not be removed from lands that become ACECs. Such products include salvage harvests, wildlings, and Christmas tree cuttings, bough cuttings, and domestic firewood gathering or cutting for offsite use (USDI 1995b). Woodcutting is the main activity that is restricted on the 183,581 acres of WSAs, which amounts to 15% of the field office area. Also, much of this area is not accessible. And the remainder of the field office area outside WSAs would be 'Open' to the cutting of fuelwood. Therefore, closing this area is not considered an adverse impact.

Fuels would be treated at the rate of 500 to 5,000 acres per year, focusing on the wildland-urban interface (WUI).

Fuels reduction programs alone can do the following:

- reduce the probability of future forest loss to fire,
- reduce competition to seedlings and saplings, and
- when prescribed fire is used, favor fire-adapted species.

The use of full suppression as a wildfire management tool could result in continued accrual of hazardous fuels, leading to greater potential for damaging fires in the future and later loss of commercial and low-site forests to wildfire. Uncontrolled wildfires would result in some areas being replaced by naturally regenerated even-aged stands or plantations. In low-elevation fire-dependent forest types where fire is suppressed over the long term, the species composition could shift if fire-dependent species are replaced by other species, mainly firs. But an aggressive fire suppression strategy to protect the scarce forest resources on BLM-administered lands in the field office area would reduce the effects of wildfires in forest stands.

Soil disturbance may provide favorable mineral seedbeds for some species. Fuels treatments not directed at forestlands would reduce the fuel load on the landscape, indirectly benefiting forests by reducing the potential for the spread of wildfire.

Fuels treatments to reduce the extent and spread of juniper woodlands would convert those areas to a sage/grassland steppe ecosystem. This loss of woodland would result in overall benefits on the landscape level, as potential natural vegetation (PNV) would be restored to the landscape.

Imposing limited operating periods (LOPs) and distance buffers to minimize the disturbance to sensitive wildlife species would restrict some forestry activities. These short-term restrictions would minimally affect the overall program. Managing bald eagle habitat would be coordinated with the forestry program and would not cause adverse effects.

4.6.5 Summary of Impacts

The Preferred Alternative would result in negligible adverse impacts and moderate to major beneficial impacts. No commercial production or harvest would be allowed. Management focus would be on forest health improvements and fuels reduction treatments. Fuels treatments at a rate of 500 to 5,000 acres annually would amount to 100,000 acres treated over the life of the plan. Forestry activities would reduce hazardous fuels in some commercial and low-site forests. Areas would be treated on an as-needed basis. Prescribed fire would be used as a tool to restore low-site forests but on a very limited basis—only 400 acres over the life of the plan. Reforestation would also benefit forest resources. Juniper would also be reduced at a rate of 500 to 5,000 acres per year. Fuels would continue to build up throughout the field office area and further increase the probability of large, intense wildfires that could damage forest resources. Forestry activities would reduce hazardous fuels in most commercial forests over the life of the plan. Prescribed fire would be used as a tool to restore low-site forests on an area greater than defined under any of the action alternatives. Reforestation would facilitate regeneration.

4.6.6 Cumulative Effects

The effects of fire and fuels management on adjacent land ownerships would be similar to those from the fire and fuels program on BLM-administered lands. Like BLM, the U.S. Forest Service is implementing projects to reduce hazardous fuels. These projects would benefit BLM and other landowners. Overall, the field office area is expected to become more fire safe over the life of the plan, as a greater percentage of the land area undergoes fuel reduction treatments and more private landowners become aware of the benefits of creating fire-resistant defensible space around homes. Reductions in hazardous fuel loads throughout the field office area would result in healthier forest ecosystems on the landscape.

Recent trends in managing forestlands for forest health are expected to continue. Thinning forests and woodlands for biomass in the future would likely be a function of the market for wood chips (hog fuel) to fuel biomass-burning plants. If the market price of chips increases to a level where thinning woodlands becomes profitable, interest in harvesting woodlands is likely to increase.

The Preferred Alternative would not result in significant adverse cumulative effects to forestry management.

4.6.7 Mitigation Measures

After forest and woodland treatments, disturbed areas would be reseeded or replanted where needed if natural regeneration or reestablishment of targeted species is difficult or time sensitive.

Noticeable disturbances after firewood sales and/or salvage would be mitigated to prevent soil erosion and other surface disturbances from recreational OHV use, through road or trail closing.

Avoiding unauthorized surface-disturbing activities within delineated riparian areas would mitigate impacts to woody riparian species from recreational activity within riparian corridors. Monitoring soil erosion and applying standard erosion control techniques to the area would mitigate impacts to soils after treatments.

4.6.8 Unavoidable Adverse Impacts

If the mitigation measures described were implemented, minerals exploration and development and woodland and vegetation treatments for fire and fuels management would cause short-term unavoidable adverse affects to woodland resources but no long-term unavoidable adverse affects.

4.6.9 Short-Term Uses Versus Long-Term Productivity

These activities would tend to be adverse in the short term and beneficial in the long term. Short-term adverse impacts would result from surface disturbance caused by the following:

- harvesting,
- chemical and mechanical treatments,
- reseeding,
- fire suppression, and/or
- burned areas temporarily denuded of vegetation that would tend to increase soil erosion and increase the potential for noxious weed infestation in treated areas.

Vehicles and equipment used in vegetation and woodland treatments would have short-term adverse ground-disturbing impacts on woodland resources. But long-term benefits would result from reduced excessive fuel loads within the treated areas, which would do the following:

- decrease the potential for catastrophic, stand-destroying wildland fire;
- allow public use of woodland products;
- improve woodland habitat; and
- increase woodland productivity by restoring woodland and forest health.

Prescriptive fire or other treatments that reduce the number of diseased or insect-infested trees in the field office area would also benefit woodland health in the long term.

4.6.10 Irreversible and Irrecoverable Impacts

No management actions would irreversibly remove woodland resources and prevent their possible restoration. But noxious weed infestations indirectly resulting from fire treatments or wildfire could become irretrievable impacts. Other irretrievable impacts would include:

- prescribed fire,
- other fire treatments and vegetation treatments that remove the resource until re-growth;
- harvesting, thinning, or construction-related impacts that temporarily remove the resource during the life of a project;
- uncontrolled wildfire-caused loss of woodland resources; and
- Off-highway vehicle (OHV)-caused disturbances that inhibit re-growth

4.7 Potential Effects on Lands and Realty

4.7.1 Land Use Authorizations

The land tenure program establishes an overall plan for land tenure adjustments (LTAs) to consolidate land ownership and to promote more efficient and effective management of lands by BLM and other public and private entities. Land tenure adjustments are generally pursued in response to requests for sale or exchange of lands by the public, or to achieve BLM resource management goals and objectives. Land tenure adjustments are the mechanism by which BLM may seek to achieve specific resource management objectives.

Land tenure adjustments do not result in any direct impacts on the environment because they involve only a change in land ownership. A change in ownership may result in indirect or cumulative effects through subsequent changes in the use of the lands that are bought, sold, or exchanged—as described further below. A change in ownership also may indirectly affect the social and economic conditions in the region, by changing county tax revenues. Any change in land tenure would be subject to separate evaluation to ensure that the action is consistent with FLPMA criteria and that it is in the interest of the Nation. Regardless of the disposal or retention classification of lands in the RMP, no tenure adjustments would be approved that are determined to be inconsistent with FLPMA.

All land tenure changes are also subject to specific review under NEPA to determine whether any significant impacts on the environment would occur as a result of the change in ownership and subsequent management or use of the land. Regardless of the disposal or retention classification of lands in the RMP, no land disposals would be approved if, during NEPA review, the lands were found to contain superior resource values. Such lands would be reclassified as retention or “custodial” lands and would be subject to long-term management by BLM for their resource values.

4.7.1.1 Methodology and Assumptions

The primary policies of the United States and BLM with respect to land tenure are set forth in FLPMA. In accordance with FLPMA, land tenure adjustments—including disposal or acquisition of public lands—must meet specific criteria and must serve the national interest. FLPMA also requires that public lands be managed on the basis of multiple uses, recognizing the Nations’ need for domestic sources of minerals, food, and fiber from public lands, and in a manner that will protect environmental resources. Although it is not possible, at a planning level, for the Surprise Field Office to identify specific parcels that ultimately would be subject to a change in ownership, it is assumed for this analysis that all changes in land tenure would be consistent with FLPMA.

The Surprise Field Office anticipates a continuing demand for disposal of public land parcels throughout the area, either by exchange or sale. Current land exchange and sale procedural requirements result in a time frame of 3 to 5 years to complete each sale or exchange, depending on the complexity and controversy associated with the specific disposal. Past experience with these processes indicates that such disposals probably cannot be accomplished rapidly enough to meet the demand.

The administration of public lands indirectly influences national, regional, and local conditions in a variety of ways. Use of public lands and resources provides revenues to the federal government. Public lands also contribute financially to local governments through the purchase of local services; provisions to share commodity collections with local governments; and payments in-lieu of taxes, which compensates counties for loss of local property tax due to exemption of public lands from property taxes.

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Public lands provide or contribute to numerous environmental amenities, such as clean water, scenic quality, and recreational opportunities. Recreational use of public lands provides a substantial amenity to users at the local, regional, and national level and generates local economic activity.

Within this resource management plan the Surprise Field Office area had been divided into geographic zones that emphasize Acquisition, Retention/Exchange and Disposal. Each zone defines the priority land tenure activity within the geographic areas.

4.7.1.2 Incomplete or Unavailable Information

Although BLM has classified areas as potentially suitable for retention, acquisition, or disposal, classification of lands does not commit BLM to the sale or purchase of any specific parcel. All Land tenure adjustments are considered on a case-by-case basis and are subject to evaluation under FLPMA and NEPA to determine their suitability for disposal or acquisition. It is therefore not possible to identify specific parcels or the full extent of land tenure adjustments that may occur within the management area of the field office or the life of the plan.

4.7.1.3 Analysis

The use of the terms “negligible, minor, moderate and major impacts” are not applicable to Lands and Realty.

4.7.1.4 Analysis of the Preferred Alternative

The Preferred Alternative would result in negligible adverse impacts and minor beneficial effects to lands and realty.

Land tenure adjustments can result in several beneficial effects, which are the reason they are implemented. Consolidation of land ownership results in more effective and efficient land management. Contiguous blocks of land, under one ownership, are more easily and efficiently managed. Consolidation also can resolve access issues to isolated parcels and resolve incompatible land use issues. Land tenure adjustments also can resolve inadvertent trespass issues.

No specific land disposals or exchanges have been identified; thus, there are no direct impacts associated with these lands and realty issues. Future land tenure adjustments for major water developments, to protect water sources, consolidate management opportunities or to accommodate the needs for the economy and community growth would be processed on a case-by-case basis with public notices as required by regulation.

BLM recognizes local government concerns over net gains of public lands within the respective counties and would continue to consider these concerns during land tenure adjustment processes. Priority would be given for acquisition of lands identified as inholdings in Wilderness Study Areas and Special Management Areas, lands containing significant cultural resources, special status species habitat, riparian/wetland habitat, crucial wildlife habitat, and high value recreation areas. Lands would be acquired through donation, purchase, or land exchange from willing partners. Recreation resources would affect Lands and Realty where increased public access is desired to provide recreational opportunities.

If locatable minerals are found on lands to be sold, the Surprise Field Office might remove the lands from sale, dispose of the surface estate, or reserve all or part of the mineral estate to the U.S. Consequently, the Surprise Field Office would dispose of the mineral estate pursuant to Section 209(b) of the FLPMA or a surface owner could acquire the mineral estate under 43 CFR 2720.

Acquisition of access rights could be pursued, providing easements for removal of mineral resources, and ROW designation, permits, and leases would be provided for oil and gas gathering systems or roads.

Cultural and historical sites, special area designations, special status species, fish and wildlife habitat, wetland/riparian habitats, water and fisheries issues and other resource values generally limit lands available for exchange or disposal in any area; reducing the demand for the number and type of realty use authorizations and withdrawals; and restricting the ability to construct or relocate roads for legal access. The acquisition of WSA and other special management area inholdings, and for parcels with high resource values that would benefit the public, emphasizes retention or exchange within the large contiguous block for management efficiency and public access. Disposal is considered in the Disposal Zone 3 for local community economic growth.

4.7.2 Rights-of-Way, Utilities, and Communications

This section discusses the direct, indirect, and cumulative effects on other realty actions, such as rights-of-way grants, utilities, and communication sites, from implementation of the Preferred Alternative. The Surprise Field Office will continue to receive requests and applications for linear rights-of-way (ROWs), communication sites, and renewable energy ROWs.

The location and nature of future ROW applications are not known. Applications or proposals would be subjected to project-specific NEPA analysis, which would determine needed restrictions in the form of mitigation measures. The results of these analyses would be considered in the decision at the ROW-project level. BLM might approve a ROW application as submitted, deny it, or substantially alter it to avoid or mitigate impacts on other resources and the environment. The mitigation measures generated through the NEPA process would be implemented as terms and conditions of the ROW grant. The range of potential effects on ROWs or other forms of access includes the following:

- ROWs, except that access to private inholdings could not be provided in certain areas.
- ROWs would be issued to fully meet the applicant's needs.
- ROWs would be issued but with restrictions that could make it less useful, more costly, or both.

4.7.2.1 Methodology and Assumptions

Section 503 of the Federal Land Policy and Management Act (FLPMA) provides for designating ROW corridors and encourages the use of ROWs in common to reduce environmental impacts and the proliferation of separate ROWs. BLM policy encourages applicants to locate their proposals within existing corridors. When ROW corridor proposals conflict with special designations, such as WSAs and ACECs, these areas should be excluded or avoided or special stipulations applied. Private inholdings in WSAs cannot be denied access, but highly restrictive mitigation can be applied.

Public lands will continue to be 'Open' for ROWs, including potential sites for wind energy, solar energy, transmission lines, pipelines, roads, and communication facilities where consistent with national, state, and local plans.

As the population in the western United States increases, the need will increase for transmission lines, gas pipelines, and designation of utility corridors across public land. With more technological improvements, certain areas might be considered for alternative energy development, such as wind, solar, and biomass generation. While the current contribution of renewable energy is relatively small, wind energy and other renewable energy-generating sectors of the economy are growing in the United States.

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Continued growth of alternative energy is considered important in delivering larger supplies of clean, domestic power. Any development of an alternative energy site would also require approval of new roads and new powerline construction to tie into the existing power grid.

For the most part, existing utility corridors are situated in areas that will continue to be ‘Open’ to ROW development.

4.7.2.2 Incomplete or Unavailable Information

Other realty actions are initiated by an applicant’s addressing a need for access or use of BLM-administered lands. Consequently, the purpose, location, and timing of future ROW grants are unknown until an application is submitted.

4.7.2.3 Analysis

For this analysis, the levels of effects on other realty actions were defined as follows.

Negligible: The effect would be barely detectable and would not cause added restrictions beyond site-specific mitigation. The amount of land ‘Open’ for realty actions without being ‘Closed’ or restricted would be maximized.

Minor: The effect would be slight but detectable and would impose only minor restrictions or add slightly higher costs to realty actions.

Moderate: The effect would be readily apparent, and moderate restrictions or moderately higher costs would be imposed on realty actions.

Major: The effect would be severely adverse, and substantially more restrictions and/or substantially higher costs would be imposed on realty actions.

4.7.2.4 Analysis of the Preferred Alternative

The Preferred Alternative represents a different configuration of land areas that are ‘Open’ for other realty actions, which

- include development,
- exclude development, or
- allow development with restrictions.

Lands would be ‘Closed’ to realty action development or would be ‘Open’ subject to certain restrictions determined through project-level NEPA analysis. The categories of lands that could be ‘Closed’ include the following:

- Wilderness study areas (WSAs) – All proposals must meet non-impairment criteria, which prohibit permanent facilities unless they are grandfathered, they have valid existing rights, or they provide access to private inholdings.
- Areas of critical environmental concern (ACECs) – Restrictive stipulations would apply depending on the purpose of the ACEC.

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- Wild and scenic rivers (WSRs) and candidate rivers – Restrictions would be similar to those for WSAs.
- Research natural areas (RNAs) – Restrictive stipulations would apply depending on the purpose of the RNA.

Resource areas that might result in applying more stipulations include the following:

- sensitive biological habitats,
- areas with highly erodible soils on steep slopes,
- cultural and historic resources,
- areas with highly unstable slopes or areas with unique geologic resources,
- sensitive watersheds, riparian areas, or areas where water quality or quantity or aquifer conditions are likely to be affected,
- recreational opportunity areas.
- scenic resources.

For areas not ‘Closed’ to realty actions, the NEPA process at the application stage provides site-specific analysis and information valuable in determining whether to grant specific realty applications and, if so, what mitigation measures to implement with each grant to protect other resources. For example, the effects of more project stipulations might require restrictions such as no access or use during periods of high recreational use or periods critical to species reproduction.

Impacts on potential realty actions are mainly socioeconomic. Placing lands in ‘Closed’ categories or requiring measures to mitigate effects on other resources can result in a proposed action or access being more costly, uneconomical, or even infeasible. The purpose of access routes and linear feature ROW grants, such as pipelines, roads, and transmission lines, is to connect two locations with a form of infrastructure. Connecting two areas might not be feasible given the nearby ‘Closed’ land areas. Avoidance of sensitive resources and restricted areas such as wilderness areas, WSAs, and ACECs, could require a much longer route, with economic implications. Restricting use of a ROW or access route to only certain times of the year to protect wildlife during periods critical to their reproduction or to avoid conflicts during recreational seasons might not meet the ROWs purpose and need or could result in an economic impact on the ROW grant holder.

Most utility corridors are designed to extend along existing transportation routes or to parallel existing ROW projects. By consolidating compatible transportation and utility projects in existing corridors, an agency can reduce habitat loss, degradation of resources, and fragmentation of public land ownership patterns. But locating within an existing corridor can increase costs and disutility to a ROW grantee if this approach results in a longer or more expensive project. Consolidating ROW grantees at existing communication sites can cause user conflicts and electronic interference. The existing corridors or communications sites might not be the best location, given the purpose and need for the ROW.

BLM maintains certain public roads on federal lands. Maintaining these roads can have both beneficial and adverse effects. Improved access can result in more users, creating increased direct and indirect impacts on other natural resources. These effects are discussed in the respective resource sections in Chapter 4. Improved access also increases social and economic benefits to road users, including those with private inholdings, grazing interests, recreational users, and BLM administrators.

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Not maintaining existing roads can result in positive or adverse effects, depending on the amount of use. If an un-maintained road becomes impassable, the social and economic benefits of access are forgone, and other resources would not receive the indirect impacts of the access. Roads that are not maintained or are 'Closed' but are still passable can result in use that accelerates erosion and increases vehicle maintenance costs. Un-maintained roads indirectly impair riparian areas and water quality through sedimentation from increased road erosion.

Weed management would affect ground-disturbing realty actions by adding costs for weed mitigation.

BLM's acquisition of WSA inholdings from willing sellers would allow public access in areas that might now be 'Closed'. Such acquisition would also eliminate the need to grant ROWs within existing WSAs.

Typically lands BLM acquires have high-value resources, and BLM would deny or impose strict stipulations to any realty actions on these lands. Acquisition could also be beneficial. In spite of strict stipulations, BLM might grant ROWs across public lands where access across private lands did not previously exist.

Disposal of lands for community and economic growth could decrease public access for recreation. ROW applications would increase for access to newly disposed parcels if access does not already exist. Disposal of lands could limit potential development of communication sites, public transportation routes, and renewable energy ROWs and restrict or eliminate potential ROW access to other private parcels.

VRM would impose moderate impacts on realty actions by attaching stipulations to reduce visual impacts within 5 miles of major travel routes. This restriction could limit or eliminate powerline and wind energy projects because there are few options for placing these projects, or for cost reasons these developments need to be near existing transportation routes.

The Preferred Alternative would result in negligible to minor adverse impacts to rights-of-way. Managing for VRM class objectives could restrict development of communication sites and renewable energy. Land tenure actions would either (1) restrict access when BLM acquires high-value resources for protection or (2) allow access over former private lands that were previously 'Closed'. Closure of ACECs to realty actions would cause minor hardships because these areas are either small or remote.

4.7.3 Cumulative Effects

Cumulative effects on land tenure would primarily result from the combined past, present and future land tenure actions of the Surprise Field Office and the surrounding National Forests. Few other land tenure actions in the region are of sufficient magnitude to contribute to a cumulative effect on land ownership. Numerous small land sales are expected to occur in the assessment area. While such a large number of land sales may contribute to a cumulative effect on land tenure, these transfers of ownership are mostly between private landowners and are not likely to result in a substantial change in the use or management of the land.

Lands also may be acquired by the Surprise Field Office in the cumulative assessment area; however, the acreage of land that may be acquired cannot be quantified with any certainty. Broad areas within each field office are classified as retention/acquisition, where BLM may seek to acquire lands to improve management efficiency. In addition, BLM may seek to acquire lands to meet specific objectives, such as improved access or resource management. The ultimate extent of land acquisition depends on a number of variables, including resource management objectives, public requests for access or other realty actions, the presence of willing sellers, and funding to support acquisition.

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Added 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.

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

Cumulative impacts on potential ROW and access projects typically would result in either less land 'Open' or higher operating costs because of the following factors:

- increasing acreage of public land that is not 'Open' for ROW development,
- increasing number of stipulations and conditions for ROW grants, and
- increasing cost of reclamation and bonding.

The effects of the action on ROW grants and other access would vary to the extent that lands would be 'Open' or 'Closed' to such activities and, if 'Open', restrictions would be placed on the ROW grant. The magnitude of the effects would be relative to the amount of lands not 'Open' to ROWs and the stipulations applied to the ROW grant when it is issued.

The Preferred Alternative would not result in significant adverse cumulative effects to lands and realty management.

4.7.4 Mitigation Measures

There are no mitigation measures necessary for Lands and Realty.

4.7.5 Unavoidable Adverse Impacts

There are no unavoidable impacts for Lands and Realty.

4.7.6 Short-Term Uses Versus Long-Term Productivity

There is known loss in land productivity as a result of the decisions of the Preferred Alternative.

4.7.7 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.

4.8 Potential Effects on Livestock Grazing

This section discusses the direct, indirect, and cumulative effects on opportunities for livestock grazing from implementation of the Preferred Alternative. 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 land use planning level through consultation with the interested public and the livestock grazing decision/protest/appeal process. Mitigation measures would be incorporated into grazing permits.

4.8.1 Methodology and Assumptions

The following are assumptions used in the impact analysis.

- 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 off-highway vehicle (OHV) use would not restrict vehicle use required for permitted livestock use management.

4.8.2 Incomplete or Unavailable Information

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

4.8.3 Analysis

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 (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.

This analysis defined the levels of effects on livestock grazing as follows:

Negligible: Grazing operations would not be appreciably affected.

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Minor: The effect on grazing operations would be perceptible, and the action would slightly change grazing operations, but the change would be localized.

Moderate: The effects on grazing operations would be apparent, and the action would result in a limited change in grazing operations.

Major: The effects on grazing operations would be readily apparent or widespread, and the action would substantially change grazing operations.

4.8.4 Analysis of the Preferred Alternative

The Surprise Field Office would continue to annually authorize at least 92,465 AUMs of forage on 1,445,443 acres, including virtually all of the acres within the planning area. On the basis of forage availability and improved livestock distribution due to more water development, overall livestock AUM authorizations would increase by 1 to 5% (from 92,465 to 97,088 AUMs) during the life of the plan (subject to meeting Land Health Standards, the needs of special status species, and the requirements to protect National Register-quality archaeological sites). Changes at the activity plan level would be made in response to site-specific monitoring. These changes would have a minor benefit to livestock grazing. BLM is not expected to require any allotments to be entirely unallotted, or retired, from livestock grazing as a result of resource use conflicts.

The highest grazing utilization allowance for native rangelands is now 40-60%. The approved Northeastern California and Northwestern Nevada Standards and Guidelines for Livestock Grazing (BLM 1988a, 1999b) were implemented in 2000. They require that Guideline 16 (controls on utilization): “Utilization levels to be applied to those allotments not meeting or making significant progress toward meeting the standards as a result of current livestock grazing practices” be implemented.

Maximum utilization would be reduced on a site-specific basis. Areas needing reduced utilization would be fairly widespread, including 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.

Utilization would be reduced from moderate (40% - 60%) to light (20% - 40%), and the livestock management to meet this target would consist of the following:

- significant changes in grazing systems,
- more pastures and exclosures, and
- possibly seasonal restrictions or reductions in livestock numbers or duration of use.

About 15% of the planning area not meeting rangeland health standard would need to have utilization levels reduced. This reduction would moderately affect livestock grazing.

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

- future acres suitable for livestock grazing and

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

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 5,500 acres are within fenced exclosures in which livestock grazing is infrequently authorized, and only when needed or compatible with meeting the site-specific resource objectives. New livestock and wild horse exclosures would be needed to mitigate the impacts of livestock grazing on other resources. New exclosures would generally be small (less than 10 acres) and would have minor adverse impacts on livestock grazing due to a reduced amount of area authorized for such grazing. Exclosures would also have a negligible adverse impact on livestock grazing due to occasional death loss of cattle trapped within exclosures.

About 2,000 acres of new exclosures would be needed to mitigate livestock impacts on the following:

- special status species habitat,
- National Register of Historic Places archaeological sites,
- Land Health Standards, and
- other high-priority resources.

Exclosures would reduce the total acres grazed by livestock by less than 1% over the life of the plan (20 years), which would inflict negligible to minor adverse affects on the planning area's livestock industry.

Wild horses can affect livestock grazing both directly and indirectly. Grazing by horses directly reduces the amount of forage and water available for livestock. Indirectly, wild horses are present within herd management areas year-round. The intensity of wild horse use is controlled by managing the number (AML) of wild horses that are in wild horse herd management areas. But the season, duration, and frequency of wild horse use cannot be controlled. Therefore, impacts of wild horse use, particularly in special habitats and natural concentration areas, occur annually. Wild horses would be maintained within AMLs in eight herd management areas within seven grazing allotments and 493,821 acres (40% of the area). Wild horse grazing, even at AML, would continue to result in moderate direct and indirect adverse impacts to livestock grazing in the planning area.

Often, the only options for mitigating wild horse use and meeting the objectives for these areas are to build exclosures or control the intensity, season, duration, or frequency of livestock use. In addition, wild horses limit options for large-scale restoration of degraded or decadent vegetation. Unless wild horses are removed or reduced to well below appropriate management levels (AMLs), large areas cannot be completely rested after treatment, wild fire, or prescribed fire within herd management areas (HMAs). As a result, wild horse use, even at AMLs, inflicts minor to moderate adverse affects on livestock within HMAs.

Seedings designed for livestock forage benefit livestock grazing. They can do the following:

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

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Actions to restore soils and native rangelands can have both short- and long-term impacts on livestock grazing. Areas that are seeded or allowed to regenerate naturally after wildfire, prescribed fire, or other disturbance need to be rested from livestock grazing for 1 to several years. In the short term, the loss of acreage available to livestock grazing is an adverse impact. In the long term, livestock benefits from the following:

- retaining soil,
- eliminating noxious and invasive weeds, and
- restoring native rangelands to healthy, productive communities dominated by perennial species.

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. Restoring decadent sagebrush communities, cheatgrass converted communities, and grasslands would benefit livestock in the long term. Sagebrush and grassland communities are large and widespread and provide the bulk of the forage base for livestock in the planning area.

At least 49,894 acres (4% of the planning area) of upland soils that are not meeting Land Health Standards would be restored. Improving these soils and the plant communities on them would negligibly benefit livestock grazing over the long term.

The Surprise Field Office would manage archaeological resources under Section 106 of the National Historic Preservation Act. Compliance with Section 106 would inflict minor to major adverse affects on 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 adversely affect livestock grazing. These activities increase the number of people and vehicles that access remote areas. Theft of livestock and vandalism of livestock handling and watering facilities may amplify with the increase in the number of people accessing remote areas. People leave gates open, allowing cattle and wild horses to get into areas where they shouldn't be. Current levels of dispersed recreation, and of energy and mineral exploration and extraction, are inflicting negligible to minor adverse affects. Dispersed recreation is expected to increase under all of the alternatives, and adverse impacts from these activities would increase to minor to moderate levels.

From 1,050 to 9,100 acres would be treated annually to maintain or restore sites to satisfactory ecological condition. These treatments could include

- prescribed fire,
- mechanical treatment (chip/shear, chainsaw, brush crushing, etc.), and
- biological methods (tightly prescribed grazing and native seeding).

The types of communities that would be restored first include the following:

- areas that would quickly recover to site potential,
- special habitats,

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- accessible juniper sites that have ready access for woodcutters and biomass harvesting equipment, and
- areas with the potential to increase livestock forage production.

At this rate of treatment, 21,000 to 182,000 acres, or between 2% and 15% of the planning area would be restored during the life of this plan (20 years). This restoration would have negligible to minor benefits on livestock grazing. Up to 18,200 acres could be treated annually. These areas would need to be rested from livestock grazing for at least two growing seasons. Therefore, up to 36,400 acres, which provide 2,275 AUMs of forage (about 3% of the planning area), would need to be annually rested from livestock grazing.

The 36,740 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. These allotments encompass 547,919 acres and contribute 37,485 AUMs to the planning area's livestock industry. Maintaining the seedings would moderately benefit livestock grazing. The 8,400 acres of existing poor condition seedings on one allotment (including 143,307 acres and 9,591 AUMs) would be restored to native species-dominated communities and would no longer be managed as seedings. These seedings are not providing much forage or flexibility for the livestock grazing system in the allotment. Therefore, managing them as native rangelands would not affect livestock grazing.

Grazing of domestic sheep would continue on the Tuledad, Selic-Alaska, and Red Rock Lake allotments, unless in the future the current operator elects to convert the livestock kind from sheep to cattle or if the allotments are vacated for reasons unforeseeable at this time. Due to the interest of state game agencies to reintroduce bighorn back into the Warner Mountains, any subsequent request to convert permits from cattle back to sheep would be coordinated with livestock operators and the state game agencies and the status of bighorn re-introduction potential in the South Warner Mountains re-evaluated through the NEPA process. This action would result in minor adverse effects to individual domestic sheep operators.

4.8.5 Summary of Impacts

All impacts, adverse or beneficial, would be negligible to minor under the Preferred Alternative to livestock grazing operations. Forage available annually for livestock grazing would increase slightly and existing good condition seedings would be maintained with crested wheatgrass. Additional livestock forage would be made available through native vegetation restoration efforts in the most productive rangeland communities. Site-specific utilization reductions on approximately 15% of the area and approximately 2000 acres of new exclosures would be required to mitigate livestock impacts on special habitats and archaeological sites as a result of increased livestock distribution. Approximately 85% of the planning area would be unavailable for domestic sheep grazing. The amount of area grazed by wild horses would be increased from about 36% to about 40% 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.

4.8.6 Cumulative Effects

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

Since European settlement began in the mid 1800's, 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 grasses. There were no 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. Heavy grazing use and construction of roads/trails along the riparian corridors resulted in downcutting and dewatering of meadows. These factors, coupled with fire suppression and the extreme drought of the 1930's resulted in a reduction of the forage available for livestock grazing. The increasing competition for open grazing lands made livestock management much more difficult and un dependable.

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 1970's and 80's, 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 1960's 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 Surprise Field Office for healthy ecosystems, wilderness, 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. The Preferred Alternative would not result in significant adverse cumulative effects to livestock grazing management.

4.8.7 Mitigation Measures

None identified.

4.8.8 Unavoidable Adverse Impacts

Actions needed to restore land health, particularly prescribed fire and special habitat management, would have short and long term unavoidable impacts on 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.

4.8.9 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.

4.8.10 Irreversible and Irretrievable Impacts

Livestock forage that is not harvested during periods of restoration, or that is reserved for other uses would constitute an irretrievable commitment of resources. Conversion of areas to non-native annual grass species (resulting from wildfire) may be an irreversible impact, as the native perennial forage based would be lost.

4.9 Potential Effects on Recreation and Visitor Services

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

4.9.1 Methodology and Assumptions

The analysis of this section compares the impacts on outdoor recreation through changes in the recreation 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. We used the following assumptions in assessing the impacts of resource program management on recreation.

- One of the key issues affecting recreation is the growth of recreation use in the field office area. A market study prepared in 2002 for the northeast California area named nonmotorized activities such as day hiking as some of the most popular activities and stated that vehicle-based activities such as driving and sightseeing were also highly popular (Tierney and Rosegard 2002)..
- This PRMP will designate a route network for access and recreation based on a global positioning system (GPS) inventory completed in 2003. The Surprise Field Office area has 1,900 miles of routes, excluding highways.
- All types of recreation use are likely to increase over the 20-year planning period, and demand would continue from local community residents and groups. 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.
- The Surprise Field Office would manage recreation taking a phased approach, with some areas receiving further planning and stronger implementation efforts to meet immediate demands and reduce resource damage.
- A designated route system would provide higher quality recreation opportunities and reduce conflicts. But potential enhancement in experiences depends on engineering and maintenance levels. Inadequate design or maintenance could lead to more 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 nonmotorized 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 nonmotorized trails would continue to increase, particularly for trail opportunities relatively close to urban or residential areas.

4.9.2 Incomplete or Unavailable Information

Adequate information is available to analyze the effects on recreation resources at the RMP 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.

The area of analysis for cumulative impacts was defined as the specially designated area and all surrounding lands affecting the special designation.

4.9.4 Analysis of the Preferred Alternative

The current federal laws and agency guidelines to protect cultural resources in the long term would both benefit and adversely affect recreation in the Surprise Field Office area. Long-term benefits would result from preserving cultural resources. In addition to preserving sites of historic importance, identifying, stabilizing, and protecting cultural resources would expand recreational and educational opportunities (e.g., sightseeing and interpretive study) by preserving cultural sites of recreational interest to visitors. Limiting recreational opportunities to reduce cultural resource disturbances could lessen recreational opportunities in the long term. Also, plans to protect cultural resources, such as site monitoring, identification, stabilization, or restoration plans, in the short term would restrict recreation in specific areas. Effects to recreation would range from beneficial to moderately adverse.

Fire management could inflict short-term adverse affects and bring long-term benefits to recreation. Wildland fire management would cause the closing of dispersed recreation areas in the short term, producing short-term losses of recreational opportunities. Visual quality, especially along Scenic Byways, is a key component of recreational activities that would be degraded in the short term as well. In the long term, the following actions would improve visual quality:

- reducing fuel loads,
- moving the present fire regime toward historic, ecologically sustainable fire conditions,
- reducing the potential for wildland fire, and
- creating a visual mosaic of vegetation and wildlife habitat.

Recreational opportunities for viewing wildlife and for big-game hunting would later improve with these measures and with implementing emergency stabilization and rehabilitation (ESR) treatments.

Management actions for improving soil, vegetation, and forestry resources could cause short-term adverse affects and long-term benefits to recreation. Direct short-term impacts of soil and vegetation management would result from broad-scale vegetation treatment plans such as for prescribed burns and fuel reduction and juniper treatments. Treatments such as these would affect visual quality of site-specific areas for the short term.

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Long-term benefits would result from the following:

- improving vegetation communities,
- reducing or eliminating livestock grazing from areas that are being degraded,
- reducing off-highway vehicle (OHV) use in affected areas, and
- reducing or eliminating other conflicting uses.

These measures would improve vegetation and promote soil stabilization, which would provide long-term benefits by enhancing recreational opportunities and improving scenic quality. As a result, short-term moderate adverse affects would lead to long-term benefits.

Management to improve wildlife habitat and populations would not substantially affect recreation from restrictions that would limit activities. Relocating or closing roads to protect water quality and riparian habitat could disrupt route network connectivity and reduce access for activities. But such actions would generally be limited to areas where impacts would not be significant. Management actions under this resource program could indirectly benefit recreation by increasing the health and populations of wildlife, which would increase opportunities for hunting and wildlife viewing. Short-term adverse affects from wildlife management would result in long-term benefits.

Wilderness study areas (WSAs) would be managed as visual resource management (VRM) Class I. Recreation would benefit by preserving the natural setting for primitive recreation experiences. Designating VRM classes for the whole field office area and requiring planning to meet VRM class objectives would enhance recreation experiences by helping to protect the landscape's visual integrity.

Livestock use and grazing of wild horses affects the visual quality of areas. Improper grazing practices can degrade water resources, soils, riparian areas, wildlife habitat, and cultural resource sites by trampling, trailing, and wallowing. The result is adverse affects to recreation experiences, especially visual quality. Livestock grazing under the Preferred Alternative will be managed to meet land health standards and objectives, resulting in restoration of native plant communities and the natural setting. Livestock use and grazing would result in minor to moderate adverse affects to recreation.

Land acquisition eases access to public lands and resources and contributes to a more efficient and manageable land ownership pattern. Such acquisition would benefit recreational uses in the long term by improving access to recreation areas and expanding trail-related recreational opportunities (e.g., motorized and nonmotorized vehicle use, horseback riding). Acquiring easements would have the long-term benefit of improving the availability and accessibility of recreation areas throughout the field office area.

Developing mineral resources within the field office area would adversely affect recreation in the short and long term. Surface disturbances from mineral exploration and development would disturb vegetation, wildlife, and scenic quality and degrade recreational opportunities. However, new roads constructed for mineral development would provide access to portions of the Surprise Field Office area that are now inaccessible to certain types of recreation uses, such as hunting and OHV use and would benefit these recreational activities in the long term.

Long-term indirect effects would include the potential for uncontrolled OHV use to degrade recreation resources and experiences. Cross-country OHV use would also inflict long-term, indirect adverse affects, with varying degrees of resource degradation.

OHV overuse would degrade trails, soils, water resources, riparian areas, wildlife habitat, cultural resources, and the recreational experiences provided by these resources. All of these effects degrade the overall visual resources, especially along key scenic areas, such as the Backcountry Byways.

Under the Preferred Alternative, 11,994 acres would be ‘Closed’ to OHV use, and 1,208,670 acres would be ‘Limited to Designated Routes’. OHV route closures and designations would result in substantially less resource degradation. In addition, OHV use within the Bitner ACEC would be ‘Closed’, and OHV use would be ‘Limited to Designated Routes’ within the Massacre Rim and Rahilly-Gravelly ACEC. These restrictions would protect the natural resources and recreation settings in these unique areas. These OHV restrictions should not affect motorized recreational opportunities but would enhance recreation experiences by protecting natural settings and reducing user conflicts.

OHV use would also increase the risk of wildland fire, which would reduce recreational opportunities in areas affected by fire, or cause closure of areas disturbed by wildland fire. OHV trail designation would have the long-term direct benefits to recreation by doing the following:

- increasing opportunities for OHV travel,
- limiting resource degradation,
- reducing resource use conflicts, and
- adequately responding to the recreational demand for this activity.

Designating the Massacre Rim, Bitner, and Rahilly-Gravelly areas of critical environmental concern (ACECs) could restrict some dispersed recreation activities on 47,000 acres to protect resources, but the impacts would not be significant. Benefits could be realized from reducing user conflicts. Designating these areas as ACECs would help to protect important historic, cultural, scenic, and wildlife values, and would have long-term benefits to most recreational activities.

Three seasonal viewing areas would be developed for wild horse viewing, increasing recreational opportunities. Recommending to Congress Twelvemile Creek as a wild and scenic river would benefit these river segments by preserving their outstanding remarkable values and recreational opportunities.

In summary, the Preferred Alternative would result in negligible adverse effects to recreation, and moderate beneficial effects.

4.9.5 Cumulative Effects

Recreation experiences can be diminished if the natural or social setting (contact with other visitors) of the activity are altered and fail to meet visitor expectations. An example of diminished experience would consist of the loss of habitat through conversion to other uses or loss of opportunities such as lack of wildlife in degraded habitat.

When considered with land use and programs on surrounding lands, activities on BLM-administered lands could affect recreation. People seeking recreation experiences historically have used BLM-administered land and adjacent U.S. Forest Service and California Department of Fish and Game lands for a wide variety of activities. Growth and development of local communities and larger nearby population centers such as Reno, Nevada, would continue to increase demand for recreation on public lands, leading to potential overcrowding and user conflicts. The effects of current management combined with activities in surrounding areas could affect recreation by changing the natural setting that is considered desirable for much recreation.

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Most activities in BLM resource programs would be temporary and would be limited to the local area where the activities occur. The cumulative effects on recreation for the Preferred Alternative would not be significant when considered in combination with other land uses and reasonably foreseeable activities in the field office area, including continued habitat loss and fragmentation by development. BLM resource management could lead to long-term benefits to recreation by retaining and enhancing natural open space for recreation, especially as demand increases.

4.9.6 Mitigation Measures

None identified.

4.9.7 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.

4.9.8 Short-Term Uses Versus Long-Term Productivity

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

4.9.9 Irreversible and Irretrievable Impacts

No irreversible impacts to recreation resources or activities are expected. There would be long-term irretrievable impacts to recreation resources from minerals development in areas formerly used for solitary, remote, and unconfined recreation. Short-term irretrievable impacts to recreation resources would be caused by prescribed burning or other fire treatments.

4.10 Potential Effects on Social and Economic Conditions

This section describes the potential impacts on social and economic conditions from implementation of 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).

We assumed that management actions that could directly or indirectly affect recreational opportunities, tourism, property, aesthetics, and safety could affect communities in the Surprise Field Office area.

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

- Quantitative impacts were limited to four management actions: fires and fuels, vegetation management, forestry, and grazing.
- All other management actions either were assumed to be equal or 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 Surprise Field Office area was limited to Lassen, Washoe, and Modoc Counties.

The following procedure was used to estimate the economic effects of each management action. First, we estimated the change in regional spending for each action. 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 U.S. Forest Service, and it is widely used throughout the United States 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 Surprise Field Office area to include Lassen, Washoe, and Modoc 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 RMP 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 Analysis of the Preferred Alternative – Social Conditions

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
- other impacts of fire.

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Management actions involving prescribed burning might result in the harmful effects fire, 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 the 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,
- increased 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.

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 off-highway vehicle (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, wilderness study areas (WSAs), and wild and scenic rivers 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.

4.10.5 Analysis of the Preferred Alternative – Economic Conditions

Up to 2,500 acres/yr. may be treated with mechanical methods. Table 4.10-1 summarizes the direct plus indirect and induced jobs that would result from annual mechanical treatment in the three-county economic study area. Mechanical treatment would generate approximately 18 new jobs in the study area. These new jobs would increase total personal income in the two-county economic study area by \$507,000.

Prescribed fire, chemical treatments, and biological treatments are also expected to benefit the local economy as a result of expenditures made for goods and services. However, expenditures made on mechanical treatments are expected to result in greater economic activity because of the total acres treated with this method and use of some of the material removed as fuel for biomass plants.

Additional vegetation management may include mechanical harvesting, prescribed burning, and manual harvesting, on up to 4,000 acres/yr. Mechanical and hand treatments would generate approximately 8 new jobs in the three-county study area (Table 4.10-1). The new jobs would increase total personal income in the two-county economic study area by \$217,200.

Conducting vegetation management activities using prescribed fire also would benefit the local economy as a result of expenditures on equipment and supplies. Although beneficial, the total acreage treated is not expected to result in a substantial change in local economic activity.

Approximately 980,000 acres would be ‘Open’ to exploration and possible extraction of leasable minerals, 1.2 million acres would be ‘Open’ for locatable minerals, and 1 million acres would be ‘Open’ for saleable minerals. Although revenues associated with energy and minerals are not a substantial element of the local economy, allowing entry to extract minerals and encouraging development of renewable energy sources could benefit local economic activity.

Forest management would include fuels reduction treatments from up to 150 acres/yr. The Preferred Alternative also includes reforestation activities and the construction of some temporary roads to facilitate management activities. Mechanical harvesting is estimated to generate less than one new job and increase personal income by approximately \$15,200. Forest management activities are not expected to result in substantial benefit to local economic activity.

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.

Up to 62,716 acres of land would be sold or transferred and up to 27,542 acres would be acquired resulting in a net decrease of 35,174 acres. Lands under federal ownership in Washoe, Lassen, and Modoc Counties totaled 2.9 million, 1.6 million, and 1.7 million acres, respectively. During fiscal year 2000-2001, in-lieu payments to Washoe, Lassen and Modoc Counties were estimated to total \$1.5 million, \$996,000, and \$259,000, respectively (U.S. Bureau of Land Management 2004b, 2004). The very slight reduction in land held in federal ownership is not expected to substantially reduce the federal in-lieu payments received by the counties.

4.10.6 Summary of Impacts

Social

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.

Economic

Table 4.10-1 summarizes the combined effect on employment and income resulting from the management actions proposed. When combined, these actions are expected to generate approximately 26 jobs and \$739,500 in annual personal income. Total employment in the three-county study area would increase by approximately 0.01% and total personal income would increase by 0.005%. Although not quantified, the other management actions discussed above also would slightly increase regional economic activity. The increase in economic activity in the three-county study area attributable to management actions would be very small.

The potential reduction of in-lieu payments to the counties as a result of the sale or transfer of federal lands in the Surprise Field Office area would not be substantial and losses in county revenues may be offset by a potential increase in property tax revenues.

4.10.7 Cumulative Effects

Social

The Preferred Alternative would not result in any adverse cumulative impacts on local or regional social conditions. But 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 over 82% of the land area in the Surprise Field Office, with BLM-administered lands comprising 50%. 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, view sheds, 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.

Economic

Table 4.10-2 summarizes the cumulative effects on employment and income when combined with the proposed management programs for the Alturas Field Office and Eagle Lake Field Office. When combined, management actions would result in an increase of 83 jobs and increase in personal income of approximately \$2.3 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 approximately 0.03% and personal income of approximately 0.02%. The combined increase would not result in a substantial reduction in economic activity. Jobs and income generated by fuels, vegetation, and forest management occurring in each Field Office would be responsible for most of the change in economic activity.

Table 4.10-1 Estimated Changes in Employment and Income from Management Actions in the Surprise Field Office Area

| Management Action | Direct Jobs | Direct Income (\$) | Indirect/ Induced Jobs | Indirect/ Induced Income (\$) | Total Jobs | Total Personal Income (\$) |
|-------------------|-------------|--------------------|------------------------|-------------------------------|------------|----------------------------|
| Fire and fuels | 11.1 | \$299,860 | 6.6 | \$207,171 | 17.7 | \$507,031 |
| Vegetation | 4.8 | \$128,476 | 2.8 | \$88,763 | 7.6 | \$217,239 |
| Forestry | 0.3 | \$8,993 | 0.2 | \$6,214 | 0.5 | \$15,207 |
| Grazing | 0 | NA | 0 | NA | 0 | NA |
| Totals | 16.2 | \$437,329 | 9.6 | \$302,148 | 25.8 | \$739,477 |

Note: NA = Not applicable (because there is no change in jobs, there is no corresponding change in income). Source: IMPLAN 2004

Table 4.10-2 Cumulative Effects on Income and Employment in the Surprise Field Office Region

| Field Office Area | Management Action | Total Jobs | Total Personal Income (\$) |
|-------------------|-------------------|------------|----------------------------|
| Surprise | Fuels | 17.7 | \$507,031 |
| | Vegetation | 7.6 | \$217,239 |
| | Forestry | 0.5 | \$15,207 |
| | Grazing | 0 | NA |
| | Total | 25.8 | \$739,477 |
| Eagle Lake | Fuels | 0 | NA |
| | Vegetation | 0 | NA |
| | Forestry | 6.2 | \$199,932 |
| | Grazing | 0 | NA |
| | Total | 6.2 | \$199,932 |
| Alturas | Fuels | 34.4 | \$1,840,016 |
| | Vegetation | 2.4 | \$63,133 |
| | Forestry | 14.3 | \$364,347 |
| | Grazing | 0 | NA |
| | Total | 51.1 | \$2,267,496 |

Notes: NA = Not applicable (because there is no change in jobs, there is no corresponding change in income). Source: IMPLAN 2004

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4.10.8 Mitigation Measures

None.

4.10.9 Unavoidable Adverse Impacts

None.

4.10.10 Short-Term Uses versus Long-Term Productivity

None.

4.10.11 Irreversible and Irretrievable Impacts

None.

4.11 Potential Effects on Soil Resources

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

4.11.1 Methodology and Assumptions

Key Soil Resources Concepts

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

The primary indicators for evaluating the overall condition of soil resources 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 resources (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); to resist a reduction in this capacity; and to recover this capacity following degradation.

The LHA data is maintained in the Surprise Field Office. 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 properly functioning condition (PFC), rating 3 is considered functioning at risk, and ratings 4 and 5 are considered non-functional.

The 12 LHA indicators are listed below:

- Rills;
- Water flow patterns;
- Pedestals and terracettes;
- Bare ground;
- Gullies;
- Wind scour, blowout/depositional;
- Litter movement;
- Resistance to erosion;
- Soil loss or degradation;
- Plant community composition/distribution relative to infiltration and runoff;
- Compaction; and
- Litter amount.

Soil health is influenced by the following processes:

Soil compaction results from vehicles, construction equipment, people, animals, wild horses, and livestock traveling over trails or land. This can lessen the amount of precipitation that can infiltrate into the 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 ground cover. Ground cover is defined as all plants (including shrub/tree canopies), litter, gravel/rock and microbiotic crust that protects the soil from raindrop impacts. When ground cover is removed, precipitation falls directly on the soil. This can increase surface erosion and sedimentation, and decrease 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. It reduces the peak runoff during precipitation events by extending the period of runoff after a precipitation event. It also has a beneficial effect by filtering precipitation and reducing 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 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 waterbodies 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.

Mechanisms for Effects

The management actions that could lead to the effects described earlier includes the following on-the-ground activities:

Ground disturbance could result from many activities, including archaeological activities; and mechanical and hand treatments of vegetation; livestock and wild horse trampling; energy and minerals development; harvesting of timber; road construction and maintenance; recreation activities; facilities development; water development; and construction of structures such as buildings, fences, and exclosures. If not properly managed, ground disturbance could 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 stream bank disturbance that can result in mobilization of sediment and weakening of 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 fence lines, soil disturbance from trampling would be greater in those areas, with associated effects related to soil disturbance and compaction. Soil organic matter, root structure, and soil biota can all be compromised. In particular, vertisol soils (which exhibit high shrink-swell characteristics) are at a high risk for soil degradation. Concentration of livestock and wild horses in riparian areas can lead to destruction of stream banks, which is possible where alternate water supplies are not available, or where exclosures are not used.

Altered drainage patterns could result from ground-disturbing activities such as road construction, timber harvesting, and instream structures. Altered drainage patterns could increase erosion and sedimentation and, in turn, decrease soil productivity.

Increased erosion and sedimentation from roads can occur when improperly maintained drainages associated with roads concentrate runoff from roads and cause erosion and sedimentation. Erosion and sedimentation can also affect 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 cause soil compaction. If they are driven irresponsibly off-road, 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 soils beneath and immediately adjacent to interpretive centers and associated trails. Areas of greater disturbance may experience reduced soil productivity.

Restricted or improved ability of BLM to manage for the benefit of soil resources could occur, depending on which alternative is selected. Different alternatives offer BLM varying levels of control to manage watersheds for the maximum environmental benefit of soil resources.

Improper locating of projects could occur if there is not a proper balance between visual considerations and soil considerations. If projects are not sited properly, erosion and sedimentation could be increased.

4.11.2 Data Sources

Data for analysis have been obtained through BLM staff knowledge, NRCS Order III soil surveys, and the LHA described above. Assessments and data used to compare soil condition with the LHA indicators are maintained in several databases and linked to GIS themes.

4.11.3 Analysis Methodology and Key Assumptions

The analysis boundary for considering the effects on soil resources includes all lands under the Surprise Field Office area's jurisdiction. Effects related to soil resources were analyzed qualitatively, based on a review of soil data for the Surprise Field Office area and professional judgment. Analysis focused on the potential of project alternatives to degrade soil resources. In analyzing effects, the following assumptions were made:

- Short-term effects are those effects anticipated to occur within 1 to 5 years of implementation of the activity. Long-term effects are those that would occur after the first 5 years of implementation but within the life of the RMP (projected to be 20 years).
- Recreation use of the field office area would continue to increase.

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- BLM polices, including the Standards and Guidelines would be achieved and applied as appropriate across all alternatives (see below).
- Adverse effects on soil resources throughout the entire Surprise Field Office area would be minimized through management practices and adherence to Standard 1 of the Standards and Guidelines (Standard 1) (see below).
- No net loss of soil productivity or fertility would occur as a result of any alternative. If soil productivity were decreased in one area, it would be offset by restoration or mitigation offsite.
- BLM will conform to the latest California Department of Transportation (Caltrans) and Uniform Building Code (UBC) building code standards, County General Plan seismic safety standards, County grading ordinances, and National Pollutant Discharge Elimination System (NPDES) requirements.
- Effects are quantified based on their relationship to Standard 1 (see below). Under the various management actions for the project alternatives, 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 implementation of management actions under alternative would increase soil/site stability and hydrologic function. The one exception to this relates to special management areas management actions, for which effects are not quantified based on their relationship to Standard 1. For this resource, effects are based on the alternative’s potential to protect soil resources.

Rangeland Health Standards and Guidelines for Northeastern California and Northwestern Nevada

The most applicable criteria for determining the extent of effects related to soil resources are listed below. These criteria are set forth in Standard 1, 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.”

Meaning 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:

- Groundcover (vegetation, litter, and other types of groundcover such as rock fragments) is sufficient to protect sites from accelerated erosion;
- Evidence of wind and water erosion, such as rills and gullies, pedestaling, scour or sheet erosion, and deposition of dunes, is either absent or, if present, does not exceed what is natural for the site; and
- 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 the fact that BLM intends to implement management practices such that this standard is achieved or significant progress toward meeting this standard is maintained. As a result, the primary findings 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 cause these goals not to be met.

4.11.4 Incomplete or Unavailable Information

Adequate information is available to analyze the effects on soil resources at the RMP level.

4.11.5 Analysis

This analysis defined the levels of effects on soil resource 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 was 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 result in a change in the soil character over a relatively wide area. Mitigating measures probably would be necessary to offset adverse effects and would likely be successful.

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 anticipated to occur within 1 to 5 years of implementation of the activity

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

4.11.6 Analysis of the Preferred Alternative

Soil resources management actions would result in increased vegetation cover, increased soil stability, and other beneficial effects—such as limiting sedimentation and erosion, and improving soil/site stability and hydrologic function. These management actions include protecting uplands from adverse effects by constructing and maintaining exclosures; prescribed burning or mechanical vegetation treatment, soil treatment, and/or seeding; installing erosion control structures; closing and rehabilitating selected roads on public lands; minimizing new road construction; establishing sediment intrusion buffer zones around sensitive areas; minimizing management activities and uses in perennial and intermittent drainages where such activities would adversely affect watershed function or process; limiting heavy machinery use near perennial and intermittent drainages or where soils are not meeting Land Health Standards; restricting recreational activities, including OHV use; preventing damage to high shrink-swell soils by limiting compacting activities (e.g., grazing, OHV use, and maintenance activities) to periods when the soil is dry enough to support the weight of the activity; and restricting development to suitable or unproductive soils.

Some management actions (e.g., prescribed burning, mechanical treatment of vegetation, gathering wild horses, and constructing exclosures) could result in short-term minor adverse effects on soil resources, such as decreased infiltration and increased soil compaction, sedimentation, and erosion. Such effects would result in decreases in soil/site stability and hydrologic function, as well as soil productivity. However, measures would be implemented to minimize these effects and, in the long term, soil/site stability and hydrologic function would be improved, and sedimentation and erosion would be limited. Overall, all of these activities are anticipated to greatly benefit soil resources in the long-term.

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Cultural resources management actions would develop three new interpretive areas and designate three new ACECs. CRMPs would be developed for these areas, and management attention would be focused on the ACECs, which would include measures that would benefit soil resources. In addition, OHV use would not be allowed in the Bitner ACEC, and OHV use in the Massacre Rim and Rahilly-Gravelly ACEC would be 'Limited to Designated Routes'. NRHP-eligible sites also would be fenced to eliminate impacts from grazing and wild horses. These actions would greatly benefit soil resources in these areas by reducing the potential for disturbance.

The cultural resources management actions include measures to reduce ground-disturbing activities, such as restrictions on access, grazing, OHV use, woodcutting, and mineral development—with beneficial effects on soil resources. Some of these activities (e.g., fence construction) could cause short-term minor adverse effects on soils; however, cultural resource management activities with potential to adversely affect soil resources would be required to implement management measures such that the impacts on soils resources are not significant. No net loss of soil productivity or fertility would occur, because decreases in soil productivity in one area are required to be offset by restoration and/or mitigation offsite.

Wildland fire management would make use of the full range of fire suppression options. Fuels management would develop and implement fuels treatment plans. This could consist of prescribed burns and both mechanical and biological treatments. These actions could result in unavoidable short-term minor to moderate effects on soils resources, such as increased erosion, sedimentation, and runoff from ground-disturbing activities and vegetation removal. However, prescribed fires generally would mimic natural fire cycles; consequently, effects are not considered substantially adverse. The use of fire tends to keep soils resources on a trajectory closer to a more natural cycle; the exception would be catastrophic fires, where recovery is slow.

Approximately 1.2 million acres would be subject to full fire suppression, which represents the vast majority of acres in the field office area. Therefore, the potential for catastrophic fires is low throughout the Surprise Field Office area, and all alternatives are likely to result in minor to moderate impacts on soil resources depending on the size of the fire and the amount of ground disturbing suppression actions taken. While fuels treatments, wildland fire use (WFU), and appropriate management response (AMR) are prescribed for varying acreages among the alternatives, these areas are very small in comparison to the area subject to full suppression.

The terrestrial and aquatic wildlife management actions with the potential to affect soil resources include seasonal road closures, fuels treatments, management of habitat for proper stream and riparian function, management of grazing, use of exclosures, maintaining and enhancing water sources, seasonal use restrictions in particular areas, habitat restoration, juniper removal, weed control, natural fire, limiting OHV use in some areas, and building nesting structures and islands. Some of these actions could result in short-term minor adverse effects on soil resources, such as increased erosion, sedimentation, and runoff; decreased infiltration; and soil compaction—thereby resulting in decreases in soil/site stability and hydrologic function, as well as soil productivity. However, effects would be reduced by implementation of erosion control measures where necessary and are not considered significant. In addition, many measures would result in long-term benefits to soil resources, for instance, where they result in increased vegetative cover or reduced trampling near water sources.

The vegetation management with potential to affect soil resources includes measures such as vegetation restoration, vegetation removal, weed treatment, road relocation, fence construction, mechanical and hand vegetation treatments, and wildland fire. Measures to protect and restore vegetation can create beneficial impacts on soil resources through resting lands from livestock grazing in burned and degraded areas, protection of threatened and endangered plant populations, restoration of improved plant communities, and fencing of degraded habitats.

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These same measures may cause damage from direct disturbance in the form of reseeding; prescribed fire; and hand, chemical, and mechanical treatments. These ground-disturbing activities associated with vegetation management could occur under all alternatives and could result in short-term minor to moderate adverse effects on soil resources from soil erosion caused by surface disturbance and reduced overall vegetative cover. Effects related to erosion are anticipated to be short term, would be reduced by implementation of erosion control measures where necessary, and would be outweighed by long-term benefits to soil stability yielded by native vegetation. Effects of vegetation management actions on soil resources do not differ substantially between alternatives and are not discussed further.

While the various alternatives identify VRM classes, no specific management actions for visual resources are proposed. Rather, future proposals would be required to conform to VRM standards and would be subject to further NEPA analysis if they posed potential to adversely affect soil resources. For this reason and because effects, if any, on soil resources as a result of VRM classifications are speculative at this time, this program area is not discussed further.

The water resources management actions with potential to affect soil resources include closure or relocation of roads; exclosures to protect springs, wetlands, streams, and uplands; construction of erosion control and instream structures; restriction of recreation activities; allowing public use along water quality-limited streams only where it would not affect restoration; and allowing uses in other areas only if progress would be made toward attainment of water quality standards and PFC. In the short term, construction of roads, exclosures, and erosion control and instream structures could result in moderate effects on soil resources such as soil compaction, erosion, sedimentation, and increased runoff. However, management actions in support of water quality and hydrologic function aimed at reducing sedimentation and erosion would result in offsetting long-term benefits to soil resources. Many of the water resources management actions that are common to all alternatives aim to achieve this goal and would result in increased vegetation cover, increased soil stability, and other beneficial effects—such as limiting sedimentation and erosion and improving soil/site stability and hydrologic function.

Elimination of uses that would impair progress toward state water quality standards, PFC, and riparian management objectives—and promotion of restoration of water quality where it is impaired—would result in the most rapid progress of any alternative toward attaining Standard 1 and would result in the greatest beneficial effects overall.

With respect to water supply, development and maintenance of water sources would involve implementation of measures to protect water sources, and would result in the benefit of reducing soil erosion and degradation in areas such as around springs where exclosures are built. Development of additional water sources in areas where water supply is short and forage is abundant, will improve the distribution of livestock, wild horses and wildlife lessening the impacts on vegetation and existing water sources.

The wild horse management actions common to all alternatives with the potential to affect soil resources include the occupation of BLM-administered land by wild horses, and the elimination or minimization of new fence construction that would serve as barriers to movement of wild horses within the herd management areas. Continued use of BLM-administered land by wild horses would result in both short-term and long-term moderate adverse effects on soil resources, such as ongoing soil compaction, erosion, sedimentation, and degradation of stream channel condition where exclosures are not implemented or practical to construct. However, AMLs would be managed at lower levels than under current conditions, and so impacts are anticipated to be reduced resulting in beneficial effects on soil resources overall.

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Development of viewing areas would occur, the construction and use of which could result in soil compaction and erosion. However, appropriate management measures would need to be implemented to avoid or offset any adverse effects, and the residual effects of these actions would not differ substantially from the actions that do not include such development.

Mineral extraction could degrade soil resources if mining activities were not properly conducted. Mining activities would be required to implement standard management practices to reduce soil disturbance, such as removal and stockpiling of topsoil, seeding of disturbed areas, and other measures as necessary to ensure that the activity does not induce substantial erosion or sedimentation. In addition, as part of their approval, individual mining activities would be required to conduct further environmental analysis that would require implementation of management measures as necessary to avoid adverse affects on soils resources.

The forestry management actions that could be implemented with potential to affect soil resources include activities such as prescribed burning, reforestation, fuels treatments, construction of roads, and woodcutting for private use. The effects of management activities are anticipated to be localized and, because the forested acreage of the Surprise Field Office area is very small, the differences in effects between the alternatives are not anticipated to be substantial. Some activities, such as road construction, introduce the potential for moderate soil degradation; however, implementation of appropriate management measures would be required to ensure that these activities do not degrade soil resources or lead to a net reduction of overall soil productivity. Other activities, such as fuels treatments and reforestation, could result in short-term minor adverse effects on soil resources—such as increased erosion, sedimentation, and runoff; soil compaction; and decreased infiltration. These activities would result in long-term benefits as a result of increased vegetative cover, soil stability, and the return of more natural fire cycles.

Unrestricted grazing uses in areas with sensitive soils can result in both short-term and long-term moderate adverse effects on soil resources, such as ongoing soil compaction, erosion, sedimentation, and degradation of stream channel condition where exclosures are not implemented. Conversely, closing areas to grazing would result in long-term beneficial effects on soil resources because erosion, sedimentation, and increased runoff from direct trampling would be avoided.

Other grazing management actions with potential to affect soil resources include compliance with Land Health Standards; grazing rest for burned areas; measures to protect springs, meadows, streams, and other special areas; and new water developments. Some of these activities could result in adverse moderate effects related to erosion and sedimentation; however, in general, these effects would be short term and would be outweighed by long-term beneficial effects where measures are used to protect riparian and upland areas or otherwise benefit soils (such as rest for burned areas). Development of water sources is anticipated to generally protect soil resources by reducing direct livestock, wild horses and wildlife use of springs and the soils located near the springs; beneficial effects would result from the decreased use.

The extent to which each land acquisition or disposal may affect soil resources depends on the relative management approach for the parcel in question, both prior to and following the LTA. Further project-specific analysis would be required to evaluate the effects of each specific lands and realty proposal. It is anticipated that BLM policies, such as the use of standard management practices and adherence to Standard 1, would avoid adverse effects on soil resources. Additionally, no net loss of soil productivity or fertility would occur under any alternative. If soil productivity is decreased in one area, it would be offset by restoration and/or mitigation offsite. Overall, effects on soil resources from lands and realty management actions would be substantively similar across all alternatives, and are not discussed further.

Recreation management actions with potential to benefit soil resources include emergency closures to vehicles where it is determined that OHVs are causing or would cause adverse effects on soils, and restoration of roads designated for closure. These actions would reduce soil disturbance in areas of existing or future soil degradation, and would improve soil conditions in areas that have suffered degradation—benefiting soil resources and speeding recovery to PFC in those areas. In addition, restriction of OHV use in the Rahilly-Gravelly ACEC to designated routes would limit soil impacts related to cross-country travel, also benefiting soil resources in that area.

The Rahilly-Gravelly ACEC and RNA would be designated as proposed in the Lakeview RMP, and would include restrictions on OHV use and new ROWs—with resulting benefits to soil resources. Management of WSAs common to all alternatives would retain their wilderness character and is generally expected to minimize erosion, soil compaction, and sedimentation—thereby benefiting soil resources.

The utilities, transportation, and telecommunications management action with potential to affect soil resources is the granting of ROWs. The actual granting of the ROWs would not adversely affect soil resources; however, implementation of these ROWs (e.g., construction of communications facilities) could result in adverse moderate effects because of ground-disturbing activities associated with construction. These effects could include increased soil compaction, erosion, sedimentation, and runoff, and decreased infiltration. Prior to allowing any major construction activity, BLM would perform project-specific environmental analysis that would identify potential adverse effects on soil resources and appropriate mitigation. Additionally, no net loss of soil productivity or fertility would occur under any alternative. If soil productivity is decreased in one area, it would be offset by restoration and/or mitigation offsite.

1,037,063 acres would be ‘Open’ to leasable and saleable mineral extraction with no seasonal or NSO restrictions (all except the WSAs), and 1,220,644 acres would be ‘Open’ to locatable mineral development. However, no new extraction areas would be established without NEPA compliance and protection of soil resources, and there is little potential for leasable or locatable mineral development in the planning area.

New seedings would provide for increased soil stability over the long term and would result in some beneficial effects. Maximizing water developments to increase livestock distribution would result in areas with little or no utilization being grazed and decreasing the impacts of heavy utilization areas and the damaging effects on soil resources.

Extensive public access to the Surprise Field Office area—except in SRMAs, WSAs, and ACECs—for the purposes of recreation has the potential to have a moderate adverse affect soil resource through increased exposure to ground-disturbing activity. Development of campgrounds, trails, viewing and interpretive areas, and back-country byways in response to demand could cause short-term adverse impacts as a result of construction and long-term effects related to increased use. However, because no net loss of soil productivity would be allowed, impacts are not expected to be significant.

4.11.7 Summary of Impacts

Minor adverse impacts would result from ground disturbing activities, such as increased public access, livestock and wild horse grazing, and potential minerals development. The policy of “no net loss of soil productivity” would be followed; hence impacts are not expected to be significant. Most activities under the Preferred Alternative, such as prescribed fire and vegetation treatments would occur over very limited portions of the field office area.

The activities could adversely affect soils in the short term but would lead to ecosystem health and, in the long term, would benefit soils resources by returning a more natural cycle to the ecosystem.

4.11.8 Cumulative Effects

For considering cumulative impacts, all lands in the watersheds of the Surprise Field Office area's holdings were taken into account, as well as any upland conditions to which the project alternatives could contribute. Cumulative effects are primarily anticipated in areas where upland soils on BLM-administered lands do not meet Land Health Standards. In these areas, any management action with potential for interfering with the ability to meet Land Health Standards or slowing progress toward meeting those standards would be considered to result in a cumulatively considerable impact.

In addition, land uses on areas surrounding BLM holdings can generate adverse effects on soil resources, which could be exacerbated by BLM actions that result in similar adverse effects. Known activities outside the field office area that could contribute to cumulative effects include conversion of sagebrush and other habitats to agricultural or residential use, invasions of noxious weeds, juniper treatments, logging and road construction, water use, and fire. Cumulative effects also are anticipated in areas outside the field office area where surface disturbance activities would occur related to recreation resources management; utilities, transportation, and telecommunications management; or any other management activity that includes road construction. In approving specific activities and implementing appropriate protective measures and management practices, BLM is expected to consider these adjacent uses and the potential for BLM activities to exacerbate any adverse effects. Therefore, while some cumulatively considerable effects may be associated with BLM activities in combination with other land uses, such effects are not anticipated to be significant.

4.11.9 Mitigation Measures

All resource uses with the potential to degrade soil productivity and health would employ BMPs to minimize potential adverse effects. Where adverse effects cannot be avoided and where they 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.

4.11.10 Unavoidable Adverse Impacts

Resource uses of most concern would be those associated with livestock grazing, wild horses, 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, issuance of rights-of-way, and mineral extraction, due to the smaller areas that would be subject to disturbance from those actions. Fire and fuels management has a great potential to adversely affect soil resources; however natural recovery of vegetation and soils following fire and fuels uses would outweigh these effects.

4.11.11 Short-Term Uses versus Long-Term Productivity

Short-term uses resulting in adverse impacts to soils such as vegetation and juniper treatments and fire use would generate enhanced long-term productivity.

4.11.12 Irreversible and Irrecoverable Impacts

Effects to soils such as permanent road construction or campground construction would result in permanent soil compaction, soil structure modification, and vegetation removal that would be irreversible and irretrievable so long as such areas continue to be utilized.

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The implementation of management measures and BMPs in accordance with the alternatives is not likely to result in significant impacts that may be characterized as irreversible and irretrievable commitments. However, some small-scale disruption to resources may occur, which in turn may prove to be long-term or permanent. These are most likely associated with ground disturbance from developments at valid existing mineral claims, sand and gravel pits and the development of a (potential) OHV special recreation management area.

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

This section describes the potential impacts on special management areas from implementation of the Preferred Alternative. Managing specially designated areas of critical environmental concern (ACECs) would focus on allowing uses that are compatible with the special resources of concern, while restricting uses that would conflict with those resources.

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.

ACECs require special management to protect relevant and important resources. Implementation plans will be specifically developed for each new ACEC.

4.12.2 Incomplete or Unavailable Information

Adequate information is available to analyze the effects on ACECs at the RMP level.

4.12.3 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.

For the purposes of this analysis, we defined the levels of effects on ACECs as follows:

Negligible: An area’s characteristics that supported its designation could change, but the change would be so small that it would not be of any measurable or perceptible consequence.

Minor: An area’s characteristics that supported its designation would change, but the change would be small and, if measurable, would be highly localized.

Moderate: An area’s characteristics that supported its designation would change, and the changes would be measurable but would remain localized.

Major: An area’s characteristics that supported its designation would change, and the changes would be perceptible, measurable, and widespread.

4.12.4 Impacts Common to all ACECs

Commercial recreational use or use requiring a special permit proposed within ACECs would be evaluated on a case-by-case basis and would be permitted, modified, or prohibited, as needed to protect the ACEC/research natural area (RNA) values.

Wildland fires would be suppressed mainly by hand in the existing ACECs. Heavy equipment would be avoided unless authorized by the field office manager/designee. This prohibition would help protect the ACEC's relevant and important resources. The use of prescribed fire in ACECs would promote their naturalness by reintroducing fire into the ecosystem.

In ACECs where grazing would be allowed livestock use would continue under existing permit stipulations and approved allotment management plans (AMPs). Any proposed changes in grazing, including time and intensity of use, would be evaluated for impacts on the relevant and important values and would be permitted if the values would be maintained or enhanced. Where adverse impacts are detected, existing livestock use would be adjusted by a variety of methods, including the following:

- fencing,
- reducing livestock numbers,
- changing grazing season, and
- prohibiting livestock grazing.

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.

In conformity to BLM national policy, ACECs are designated VRM Class II; however, if created within a wilderness study area, 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 negligible to minor because of the low potential for these kinds of development. Proposed projects would be evaluated for impacts and permitted where relevant and important values would be maintained or enhanced.

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.

Three interpretive areas would be established within the ACECs. 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 Massacre Rim ACEC

An ACEC of 44,870 acres is proposed, entirely within the Massacre Rim WSA. The area would be managed under the Wilderness IMP until such time as Congress makes a decision regarding wilderness designation. Significant archaeological sites are contained within the Massacre Rim area. The prehistoric sites in the area vary in type and include lithic reduction areas, hunting blinds, hunting stations, resource processing stations, resource procurement stations, occupational sites, caves, rock shelters, and petroglyphs.

The Preferred Alternative would result in negligible adverse and moderate beneficial impacts to the Massacre Rim ACEC. The entire ACEC would be placed in land tenure Zone 2 (retention—further acquisitions not be pursued). A subsequent ACEC Management Plan will be developed to insure protection of wildlife habitats and cultural sites. Eligible cultural sites would be nominated to the National Register of Historic Places (NRHP). The ACEC would be managed under VRM Class II (preserve landscape character, man-caused changes minor and unobtrusive) criteria to protect scenic resources. Motorized travel would be ‘Limited to Designated Routes’, which would curtail damage to sensitive resources due to off road travel.

The ACEC would remain ‘Closed’ to commercial and personal plant collecting and bough-cutting with off-site removal. The ACEC would be ‘Open’ to locatable mineral activities (with stipulations to protect important resources), but would remain ‘Closed’ to saleable minerals and leasing. A prohibition on ground disturbing practices would help protect the quality and quantity of cultural and historical resources, and impacts from energy and mineral development would be negligible.

4.12.5.2 Bitner ACEC

The Preferred Alternative would designate 1,921 acres as an ACEC. The proposed ACEC boundary contains Badger Creek and an associated meadow surrounded by rolling sagebrush land, broken by low rimrock. The Bitner Ranch area contains significant cultural sites which have provided important information on the prehistory and history of the area.

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The Preferred Alternative would result in negligible adverse and moderate beneficial impacts to the Bitner ACEC. The ACEC would be placed in land tenure Zone 1 (acquisition); therefore, acquisition of inholdings and adjacent lands (from willing owners) would be pursued, where this would improve management or enhance the resources and values for which the ACEC was created. The ACEC (like the surrounding area) would be managed under VRM Class II criteria to protect scenic resources.

The Bitner ACEC would be a right-of-way exclusion area, resulting in negligible impacts from ground disturbing activities such as new roads or utility corridors. It would also be 'Closed' to motorized travel, resulting in negligible impacts from motorized uses.

As part of the Bitner ACEC Management Plan, a strategy would be developed to insure the protection of wildlife habitats and cultural sites. Eligible cultural sites would be nominated to the National Register of Historic Places (NRHP). Woodcutting and collection of plants or plant materials would not be authorized.

The ACEC would be 'Open' to locatable and saleable mineral activities, but 'Open' to leasable mineral activities with 'no surface occupancy' (NSO) restrictions. Mineral activity is low throughout the area, so impacts are not expected to be significant.

4.12.5.3 Rahilly-Gravelly ACEC and RNA

The Rahilly-Gravelly ACEC would be designated on 957 acres within the SFO management area. The Preferred Alternative would result in negligible adverse and moderate beneficial impacts to the Rahilly-Gravelly ACEC. The Rahilly-Gravelly ACEC and RNA would be designated and managed to protect sensitive cultural resources, plants, and wildlife habitat. As part of the Rahilly-Gravelly ACEC Management Plan, a strategy will be developed to insure protection of wildlife habitats and cultural sites. The ACEC will also be designated a traditional cultural property for Native Americans.

Specific management practices would include avoiding new rights-of-way (ROWs) and limiting off-highway vehicle (OHV) use and management to avoid disturbing sage-grouse. Indirect benefits would accrue where ACEC management also benefits other resources, such as where management reduces soil erosion.

The Rahilly-Gravelly ACEC would be placed in land tenure Zone 1 (acquisition); therefore, acquisition of inholdings and adjacent lands (from willing owners) would be pursued, where this would improve management or enhance the resources and values for which the ACEC was created. The ACEC (like the surrounding area) would be managed under VRM Class II criteria to protect visual resources. Motorized travel would be 'Limited to Designated Routes', which would curtail damage to sensitive resources due to off road travel.

The ACEC would be 'Open' to all mineral activities; however, leasable mineral development is subject to NSO stipulations. Mineral activity is low throughout the area, so impacts are not expected to be significant.

The ACEC has a large number of sage-grouse breeding display sites (leks). Restrictions would be placed within the ACEC to avoid disturbance of these birds during the breeding season and measures would be taken to preserve these and other habitats important to sage-grouse. This would result in negligible adverse impacts and moderate benefits to sage-grouse habitat within the ACEC.

Livestock grazing would continue, based on existing permit stipulations and approved allotment management plans. Proposed changes to grazing (i.e., season-of-use or grazing intensity) would be evaluated for likely impacts. Changes would be allowed only if they are not likely to have adverse effects on the relevant and important resources and values the ACEC was created to protect. A particular concern is destruction (by grazing and trampling) of cultural plants (plants used for traditional purposes by Native Americans) in-and-around springs. Where adverse effects are evident, livestock use will be adjusted. Typical methods would include additional fencing, reduced animal numbers, and/or season-of-use adjustments. Effects from grazing would range from negligible to major on specific cultural sites.

4.12.6 Cumulative Effects

The area of analysis for cumulative impacts is defined as the specially designated area and all surrounding lands affecting the special designation. Management of both BLM-administered and non-BLM administered lands in the Surprise Field Office area could result in adverse cumulative impacts on some resources, as discussed in the Cumulative Effects sections of specific resource categories. But managing special management areas, in particular, would result in beneficial impacts, with some small effects that are not considered significant. For this reason, managing ACECs is not expected to considerably contribute to any cumulatively significant adverse effects, and this topic is not discussed further.

4.12.7 Unavoidable Adverse Impacts

Unavoidable and adverse impacts would result from mineral development, OHV activity, and recreational activities.

4.12.8 Short-Term Uses Versus Long-Term Productivity

Any loss of values would be throughout the life of the plan.

4.12.9 Irreversible and Irretrievable Impacts

Mineral development would result in loss of relevant and important nonrenewable resources, such as minerals and cultural resources. Unauthorized OHV activity, vandalism, and looting may also have irreversible and irretrievable impacts.

4.13 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 Surprise Field Office as eligible for designation under provisions of the Wild and Scenic Rivers Act.

4.13.1 Methodology and Assumptions

The analysis in this section includes impacts to three segments of one river that was determined by BLM to be eligible for possible designation under the WSR Act using eligibility criteria specified in the Act (See Appendix H).

The eligible segment is a 2.2-mile section (457 acres) of Twelvemile Creek that would be recommended to Congress for wild and scenic river designation with a ‘Recreational’ classification.

River evaluation procedures established in the WSR 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 H) 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 the eligible river segments as suitable for designation under the WSR Act. The primary effect of designating a river as Wild, Scenic, or Recreational under the WSR 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.

Management of most river segments would not change significantly under Wild and Scenic River 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.

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All eligible segments of the rivers being considered for WSR designation would continue to be managed under interim protective measures required by the WSR 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 WSR 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.

4.13.2 Incomplete or Unavailable Information

Adequate information is available to analyze the effects on special management areas at the RMP level.

4.13.3 Analysis

This analysis defines the levels of effects on special management areas 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.

4.13.4 Analysis of the Preferred Alternative

The Preferred Alternative would result in negligible adverse impacts, and moderate short and long term beneficial impacts to the 2.2 mile segment of Twelvemile Creek being proposed for WSR designation. The segment would be managed under the guidelines and standards for 'Recreational' rivers while awaiting a determination by Congress. A 'Recreational' designation could allow the following management actions:

- Public use and access could be regulated;
- Recreation facilities could be established within the stream corridor;
- Forest practices would be allowed;
- Mining would be allowed subject to existing regulations;

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- Rights-of-way (for transmission lines, pipelines) would be avoided or restricted to existing rights-of-way; and
- Motorized uses would be permitted on land and water.

Management along Twelvemile Creek would meet VRM Class II objectives, retaining the natural setting and protecting visual resources in the WSR segment. In addition, attempts would be made to add to the eligible and suitable portion of Twelvemile Creek by acquiring private land along the stream corridor. This acquisition would increase BLM's flexibility to manage sensitive resources, which would result in generally beneficial effects.

Recreation and OHV (motorized uses) uses within the Twelvemile Creek area are relatively low and the effects of these activities on the fisheries' outstandingly remarkable values are negligible. Except for 90 acres, the entire Twelvemile corridor is in public ownership. BLM's acquiring this private parcel would benefit the fisheries' outstandingly remarkable values, regardless of potential designation in the National WSR System.

The potential inclusion of Twelvemile Creek as part of the National WSR System under a 'Recreational' classification would provide another, though minimal, level of protection to the outstandingly remarkable values above the protections already provided under the Endangered Species Act. But should the Warner sucker be removed from the endangered species list, the protection afforded through the act would no longer play a key role in protecting the fisheries' outstandingly remarkable values or associated habitat.

Livestock grazing would continue to be excluded from this stream, regardless of any designation by Congress. WSR designation would ensure a long-term level of protection for the outstandingly remarkable values, regardless of any future role of the Endangered Species Act in protecting the fisheries.

Although Twelvemile Creek was given a tentative classification as 'Scenic' under the eligibility assessment, the 'Recreational' classification would give the needed level of protection for its outstandingly remarkable values while allowing a greater level of flexibility in managing the fish and habitat within the stream corridor. Designating Twelvemile Creek as a 'Recreational' river would have a minor beneficial impact on the fisheries' outstandingly remarkable values.

4.13.5 Cumulative Effects

Past water projects (i.e., water diversions structures) on Twelvemile Creek have had an impact to varying degrees. Several diversion structures have been built above and below the corridor on Twelvemile Creek. Present and future projects or actions on or next to the study corridor would at most only negligibly affect the outstandingly remarkable values because of the protection under current laws, regulations, and policies and the Endangered Species Act.

4.13.6 Mitigation Measures

The following measures could be used to mitigate adverse effects Twelvemile Creek's outstandingly remarkable values:

- Mining: All mineral activity must be conducted to minimize surface disturbance, sedimentation, pollution, and visual impairment.
- Rights-of-way: Where no reasonable alternative exists, other or new facilities should be restricted to existing rights-of-way. Where new rights-of-way are proposed, recreation river values must be fully evaluated in selecting the site.

4.13.7 Unavoidable Adverse Impacts

Unavoidable adverse impacts could result from mineral development, but the Twelvemile Creek corridor has no mining claims or saleable minerals potential. As a result, there would be no unavoidable adverse impacts to the fisheries' outstandingly remarkable values.

4.13.8 Short-Term Uses Versus Long-Term Productivity

There are no short term uses that would affect long term productivity.

4.13.9 Irreversible and Irretrievable Impacts

Any loss of outstandingly remarkable values within the Twelvemile Creek corridor from mineral development would be irreversible and irretrievable during the life of the RMP.

4.14 Potential Effects on Special Designations – Wilderness Study Areas

This section describes the direct, indirect, and cumulative effects on WSAs resulting from implementation of the Preferred Alternative.

4.14.1 Methodology and Assumptions

The Surprise Field Office administers the following wilderness study areas (WSAs):

- The Sheldon Contiguous WSA contains 23,700 acres—748 acres are recommended suitable for wilderness designation.
- The South Warner Contiguous WSA contains 4,500 acres—the entire area is recommended suitable for wilderness designation.
- The Massacre Rim WSA contains 101,290 acres—22,465 acres are recommended suitable for wilderness designation.
- The Wall Canyon WSA contains 46,305 acres—none of this is recommended suitable for wilderness designation.
- The Buffalo Hills WSA contains 47,315 acres (but only 7,792 acres are within the SFO management area). None of the SFO portion is recommended suitable for wilderness designation.

Baseline information for determining potential effects on wilderness study areas (WSAs) from management under the proposed alternatives was obtained from the California Statewide Wilderness Study Report (USDI-BLM, 1990) and the Nevada BLM Statewide Wilderness Report (USDI-BLM, 1991.) Resource management decisions were evaluated for their potential effect on wilderness characteristics.

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 Interim Management Policy for Lands under Wilderness Review (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.

WSAs would be managed under BLM’s Interim Management Policy (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.

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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.

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 Interim Management Policy prevents moderate to major adverse effects and provides minor to moderate benefits to the wilderness characteristics in each WSA.

4.14.2 Incomplete or Unavailable Information

Adequate information was available to effectively analyze proposed management actions as they affect wilderness study areas at the RMP level.

4.14.3 Analysis

For the purpose of this analysis, levels of effects on wilderness study areas are defined as follows:

Negligible: Change in the wilderness character of an area may be measurable, but otherwise barely perceptible and of no consequence.

Minor: Change in the wilderness character of an area would be measurable and perceptible but small and highly localized.

Moderate: Change in the wilderness character of an area would be readily measurable and perceptible, but relatively localized.

Major: Change in the wilderness character of an area would be obvious and widespread.

4.14.4 Analysis of the Preferred Alternative

The Preferred Alternative would result in negligible adverse impacts to wilderness study areas, and moderate to major benefits. Protection afforded to WSAs under the Wilderness IMP would prevent adverse effects from potential threats and would provide minor to moderate beneficial effects to the wilderness character of individual WSAs.

Visual resource management (VRM) Class I objectives apply to WSAs until such time as Congress makes a designation or releases them from management under the Wilderness IMP. This action provides the highest level of visual resource protection. These VRM principles, applied at Class I level during the planning phase of project proposals, prevent adverse effects on the scenic qualities of these areas and increase beneficial effects for projects designed to improve wilderness characteristics.

WSAs would be ‘Closed’ to leasable mineral activities. This action would prevent minor to major adverse impacts on wilderness characteristics from new road and facility construction, and other significant ground-disturbing activities.

WSAs would be ‘Open’ to exploration for and development of locatable minerals, but are limited to activities that do not require reclamation (unless the operation had established ‘grandfathered uses’ or valid mineral rights on or before October 21, 1976.) Closing WSAs to non-grandfathered mining activities requiring reclamation would prevent minor to major adverse impacts on wilderness characteristics from activities similar to those described for leasable mineral development.

WSAs are ‘Closed’ to saleable mineral activities. This action would prevent minor to major adverse effects to wilderness characteristics from activities similar to those described for leasable and locatable mineral development.

Acquired lands within WSA boundaries (in-holdings) are not subject to the Wilderness IMP but would still be managed to protect their wilderness characteristics. This action would result in minor to major beneficial impacts on the wilderness character of these lands and to the WSA in which they are contained.

WSAs would be right-of-way exclusion zones which could result in significant benefits to the preservation of their wilderness character.

Specific project-level details must be determined during implementation-level planning; therefore, specific effects on WSAs (if any) cannot be analyzed at this time. Implementation-level planning will involve an interdisciplinary NEPA process that will identify probable effects on wilderness characteristics using the WSA inventories and the Wilderness IMP for baseline information and policy guidance. The interdisciplinary team will determine if adverse effects are significant and, if so, would make a judgment as to whether these short-term effects are worth the long-term benefits of completing the project. The Preferred Alternative could also be modified to achieve compliance with the non-impairment criteria and the minimum tool requirement of the Wilderness IMP. Management actions of this type are:

- Mechanical seeding, planting, and vegetation thinning for wildlife habitat improvements
- Emergency fire stabilization and rehabilitation projects; such as installation of erosion-control devices, repair of fencing, and seeding
- Control of invasive plants and noxious weeds under the integrated weed management program
- Prescribed fire and mechanical treatments of western juniper
- Maintenance of water sources and developments

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- Maintenance of exclosures

One ACEC (44,780 acres) would be designated within the Massacre Rim WSA.

Within WSAs, OHVs would be ‘Limited to Designated Routes’ (other routes would be ‘Closed’.) This would have major long term beneficial impacts to the wilderness character of these areas. Management of lands acquired within (private in-holdings) and adjacent to WSAs would match that of the surrounding special area designation. This would preserve a natural environment and provide positive long-term benefits to the wilderness character of these lands and the surrounding WSA.

4.14.5 Cumulative Effects

It is BLM policy that an interdisciplinary approach be used. The interdisciplinary team will use the “Interim Management Policy for Lands under Wilderness Review” to analyze proposed actions and determine potential effects in order to ensure that wilderness characteristics are adversely effected. Since this is the case, there are no present or future actions, or combination of actions, likely to have significant cumulative effects on the wilderness character of WSAs.

4.14.6 Unavoidable Adverse Impacts

Illegal off-highway vehicle use and vandalism of cultural resource sites would result in adverse impacts to the wilderness character of WSAs. Although these activities would be specially targeted by law enforcement efforts, a certain amount of this activity is unavoidable.

4.14.7 Short-Term Uses versus Long-Term Productivity

Due to the geology and geography of the SFO management area, there is limited potential and limited interest in energy and mineral development in the WSAs, hence impacts would not be significant.

4.14.8 Irreversible and Irretrievable Impacts

Some cultural resources, such as petroglyphs, pictographs, and prehistoric or historically important structures, are viewed as components of the wilderness setting. Illegal and unauthorized activities that damage or destroy these resources would have irreversible impacts on the resource.

4.15 Potential Effects on Travel Management

This section analyzes the direct, indirect, and cumulative effects on travel management, including off-highway vehicle (OHV) use, from implementation of the Preferred Alternative.

4.15.1 Methodology and Assumptions

Management actions primarily involve motor vehicle access, OHV recreation opportunities, and regulation of off-highway vehicle use. The following baseline information and assumptions were used for assessing the impacts on motorized travel:

- A route network for recreational access, based on the 2002 GPS inventory, will be designated in this RMP.
- Approximately 1,900 miles of routes including state highways, county roads, four-wheel drive roads, and trails for non-motorized use, are located in the SFO management area.
- All types of OHV use are likely to increase over the 20-year span of this RMP. Demand will come from local residents and visitors as well as from individuals and groups.
- Requests for events and commercial recreation permits will increase as more community groups, clubs, and commercial OHV organizations come to rely on BLM-administered lands offering easy access on a daily basis.

4.15.2 Incomplete or Unavailable Information

Adequate information was available to analyze the effects on OHV resources at the RMP level.

4.15.3 Analysis

For the purpose of this analysis, the levels of effects on OHV use are defined as follows:

Negligible: Changes would occur to the extent or type of public access, but effects would be very small and have no practical significance.

Minor: Changes to the extent or type of public access would be small and quite localized. There would be little overall effect on motorized access.

Moderate: Changes to the extent or type of motorized public access would be relatively localized and significant at that level.

Major: Widespread and significant changes would occur to the extent or type of motorized public access.

4.15.4 Analysis of the Preferred Alternative

The Preferred Alternative would result in minor adverse impacts and moderate beneficial impacts to travel management. Motorized access would be 'Limited to Designated Routes' within most (73%) of the management area, and 11,994 acres would be 'Closed' to OHV use. This would have minor to moderate adverse effects on OHV use, primarily from loss of cross-country travel opportunities. Roads in the ranch and meadow area of the Bitner ACEC would be 'Closed' to motor vehicles. This too would have a minor adverse impact on OHV opportunity. Motorized access in the Massacre Rim and Rahilly-Gravelly ACECs would be 'Limited to Designated Routes. This would have negligible effects on OHV recreation.

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OHV use in the Wall Canyon, Sheldon Contiguous, and Massacre Rim WSAs would be ‘Limited to Designated Routes’. (The Wilderness IMP, as a minimum requirement, limits OHVs to *existing* roads and ways.) This would eliminate some OHV opportunities. Overall however, it would only have minor additional adverse impacts on motorized recreation. The Buffalo Hills and South Warner Contiguous WSAs would be ‘Closed’ to OHVs. Both of these areas have very limited routes, so additional adverse impacts from OHV closure would be minor.

Obliteration and rehabilitation of 92 miles of unauthorized routes in WSAs is required under the Wilderness IMP. This decision reaffirms Congressional direction and BLM policy restricting mechanized (mountain bikes) and motorized uses to existing roads and trails in WSAs. Elimination of motorized public access in these areas has minor adverse effects. On the other hand, limiting certain areas to non-motorized travel creates minor beneficial effects for this type of use.

Modifications to the existing travel route network—such as new route construction, re-routing, and hill climb development (OHV recreation areas)—would be subject to visual resource management considerations. This would have a negligible to minor effect on the travel network because it may require development in a less desirable location in order to comply with visual resource requirements.

Land ownership adjustment transactions, including acquisitions and disposals, would maintain or improve public access. Acquiring easements from willing landowners to gain access to public lands would have negligible to major beneficial effects, depending on the easement acquired. The issuance of new right-of-way authorizations may, likewise, have negligible to major beneficial effects. However, new road construction generally would likely have minor benefits for motorized public access.

Cultural resource management constraints would not result in substantial impacts on public access or motorized recreational opportunities. Restrictions on OHV use would be limited to specific areas and would have minor adverse effects.

Management programs involving wildland fire use (WFU), prescribed fire, and mechanical treatments could limit OHV activities during the course of treatments, but impacts would be temporary and limited to certain areas. Implications for OHV use are substantially similar under all alternatives, though activities occur over slightly different areas. Overall effects on OHV use would be negligible for alternatives.

Management actions related to soil conservation would present minor adverse impacts to OHV travel due to restrictions and closures aimed at protecting the soil resource. However, these would be limited to specific times and sites and would not significantly affect overall motorized access.

Management related to wildlife habitat improvements or measures to protect wildlife populations from disturbance would not result in impacts that would substantially limit motor vehicle access. However, road closures and relocations to protect riparian habitats and water quality would impose some disruptions to route network connectivity. Effects would generally be limited to specific areas and would result in minor adverse effects on motorized public access.

Management interventions designed to improve or rehabilitate vegetation communities would not result in substantial adverse impacts on OHV access from road closures or other restrictions related to these activities. Effects would generally be limited to specific areas and would result in minor adverse effects on motorized public access.

Management for the protection and restoration of riparian areas includes road closures and relocations, and enclosure fencing. These activities and constraints could adversely affect OHV use by disrupting the route network and reducing opportunities in some areas. However, most limitations would be site-specific, resulting in negligible restrictions on motorized access when considered overall.

4.15.5 Cumulative Effects

Transportation routes and public access to BLM lands are affected by access and travel decisions made by those who own or administer adjacent lands. However, neither historically nor presently has this created significant difficulty for the transportation route network or public access in the SFO management area. Officially recognized routes within the management area presently total 1,944 miles. Proposed management direction for transportation route designation will affect public access and travel on SFO-administered lands by closing motor vehicle access and imposing OHV restrictions in some areas. However, proposed road closures, even under the most restrictive alternative, would be approximately 4% (92 miles) of the total route network, and affected roads are entirely within WSAs. These are imposed to maintain the wilderness character of these special management areas. Road closures would, therefore, result in negligible adverse cumulative effects on motorized public access or OHV recreational opportunity.

The Preferred Alternative would significantly affect OHV recreational driving by eliminating cross-country travel (i.e., no 'Open' travel designations.) However, there is no demand for *unrestricted* OHV travel for the management area at present. If significant demand for such use does develop, a suitable area exists for possible designation as an OHV recreation area. Even under the most restrictive designations motorized public access would not be significantly affected, though cross-country recreational driving would be eliminated.

4.15.6 Mitigation Measures

If sufficient demand develops for cross-country recreational driving an OHV recreation area could be established—in a suitable location—to mitigate this demand. Also, loss of OHV recreation opportunities would be compensated by beneficial effects on non-motorized recreational experiences and opportunities. This would also reduce user conflicts.

4.15.7 Unavoidable Adverse Impacts

There are no unavoidable adverse impacts.

4.15.8 Short-Term Uses versus Long-Term Productivity

There are no authorized short-term uses of the travel network that would affect long-term productivity.

4.15.9 Irreversible and Irretrievable Impacts

There are no travel management actions which are irreversible or irretrievable.

4.16 Potential Effects on Vegetation

This section discusses the direct, indirect, and cumulative effects on vegetation from implementation of the Preferred Alternative. Effects to vegetation are generally caused by the following:

- construction;
- establishment, use, maintenance, closing, or removal of roads and trails;
- livestock trampling and herbivory;
- fire ignition and suppression, including blading of fire lines;
- mechanical and biological treatment of vegetation;
- herbicide and seeding treatments; and
- introduction, spread, and treatment of noxious and invasive weeds.

Indirect impacts can include the following:

- lowered vigor or death of plants immediately next to roads from dust accumulation;
- changes in plant abundance or species composition from modified nutrient cycling due to soil compaction,
- accumulation of livestock urine and feces,
- erosion from livestock; and
- nutrient modification and soil loss or deposition.

4.16.1 Methodology and Assumptions

The following assumptions were made.

- Reduced vegetation structural diversity and reduced ground cover lead to increased soil erosion rates. Soil erosion rates on shrub-steppe communities highly depend on the proportion of the soil surface protected from raindrop impact by vegetation. Erosion rates increase exponentially as plant cover decreases (Meeuwig 1970).
- Prescribed burn treatments would be designed to retain a mosaic pattern of islands and stringers of unburned vegetation to maintain connected and structurally diverse wildlife habitat. Wildfires may accomplish this objective. But because wildfires generally burn when burning conditions are hottest and driest, we have large burned areas instead of a mosaic of burned and unburned areas.
- The Preferred Alternative has the potential to affect the following characteristics of vegetation:
 - relative abundance of species within communities,
 - relative distribution of plant communities, and
 - relative occurrence of seral stages of those communities.

4.16.2 Incomplete or Unavailable Information

General vegetation mapping for the planning area is based on the potential native vegetation descriptions for the ecological sites from the three soil surveys that encompass the field office area—the Surprise Valley/Home Camp Area, California-Nevada; the Washoe County, Nevada, North Part; and the Humboldt County, Nevada, West Part. These are Order III soil surveys. As a result, the plant community descriptions are general. But the information is sufficient to adequately assess the impacts of the alternatives on vegetation in the planning area. Site-specific vegetation information would be used to develop proposed actions and assess impacts at the activity plan level during the developing of implementation decisions.

Special habitat areas, including riparian areas, aspen stands, mountain mahogany woodlands, and populations of special status plant species, are in stages of survey and condition assessment. Information available for these areas is adequate to assess the impacts of the alternatives. The other site-specific information gathered about these areas would be used to develop proposed actions and assess impacts at the activity-plan level when implementation decisions are developed.

4.16.3 Analysis

The analysis considered effects on vegetation *adverse* if they would result in the following:

- a loss of a number of individuals of any native plant species that could affect abundance or diversity of that species beyond normal variability;
- harm or destruction of a species, natural community, or habitat that is recognized for scientific, recreational, ecological, or commercial importance; or
- alteration or destruction of habitat that would prevent the reestablishing of native biological communities that inhabited the area before the disturbance.

The analysis considered effects on vegetation *beneficial* if they would result in maintenance or restoration of the following:

- vegetation communities (upland, riparian, and special habitats) with enough diversity in species composition and age classes to support nutrient cycles and energy flows;
- native plant species that are vigorous and adequately distributed to ensure reproduction and recruitment when favorable events occur and to permit recovery from localized catastrophic events; or
- plant communities that reflect the desired plant community (DPC) or potential natural community (PNC), as suitable for the ecological sites.

This analysis defined the levels of effects on vegetation 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. No special status plants would be affected.

Minor: The action would affect some individual native plants and would 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 special status plants, 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, and the procedures would probably be successful. Special status plants could be affected.

Major: The action would cause a considerable effect on native plant populations, including special status plants, and the effects would cover a relatively large area. The extensive use of standard operating procedures to offset adverse effects would be needed, but their success would not be guaranteed.

Short-term: An effect that generally would last less than a single year.

Long-term: A change in a plant population or its condition that would last longer than a single year but would be reversible.

Extended: A change in a plant population or its condition that would last longer than 10 years and that might not be reversible.

4.16.4 Impacts Common to All Vegetation Alliances and Plant Communities

4.16.4.1 Construction, Roads, and Facilities

Construction of facilities, such as water development (reservoirs, wells, and springs), fences, roads, campgrounds, interpretive sites, bioengineering projects, and mineral extraction sites involves crushing and uprooting vegetation in the immediate area of the construction and along vehicle access routes to the construction sites. Most impacts from construction are direct, short term, and limited to the immediate project areas. In the long term, facility development can have other indirect impacts as a result of more livestock, wild horse, administrative, and recreational use around new water sources and campgrounds, and along new roads and fences. This added use can compact soils, reduce vegetation cover, and cause dust to accumulate on vegetation. These effects, in turn, can lead to reduced plant vigor, increased plant death loss, and production of more seedbeds for noxious weeds (Trombulak & Frissell, 2000).

Water development for livestock, wild horses, and wildlife, including reservoirs, wells, springs, and spring source enclosures inflict short-term disturbance to riparian vegetation around springs as a result of fence, pipeline, and trough construction.

Construction of bioengineering projects along intermittent and perennial drainages can directly degrade vegetation during and immediately following construction activities. In the long term, properly installed and managed structures benefit riparian vegetation along the drainage, as sediment accumulates, water tables rise, and wetted areas increase.

New road building directly disturbs vegetation by crushing it and compacting soils, and indirectly adversely effects vegetation by creating conditions for dust accumulation, noxious weed invasion, and increasing access for off-highway vehicles (OHVs) (Trombulak & Frissell, 2000). No new roads would be developed in wilderness study areas (WSAs) (183,587 acres), and roads that have developed since the areas were designated would be 'Closed'. This would result in a minor beneficial impact on vegetation in the planning area.

Travel along and maintenance of existing roads indirectly affects vegetation from dust accumulation during grading. At least 30 to 75 miles of roads would be maintained annually. Assuming dust settles on vegetation for ¼ mile downwind of the road, 4,800 to 12,000 acres of vegetation (less than 1% of the planning area) would be affected by dust. Dust would be a negligible long-term adverse impact.

4.16.4.2 Energy and Mineral Development

Mineral development directly degrades vegetation through surface disturbance at the extraction site (well pad, gravel pit, or mine entry). In addition, the increase in roads and road traffic needed to transport material away from the extraction site can have both direct impacts, as new road building destroys vegetation in the roadway, and indirect impacts, from the dust of vehicle traffic on dirt roads.

The lands within WSAs (183,587 acres) would be ‘Closed’ to leasable and saleable mineral development and would be restricted to minimally disturbing activities for locatable minerals. The planning area has little potential for leasable (oil and gas) or locatable (precious and base metals) mineral development because these resources occur so rarely in the planning area that they are generally not economically feasible to extract. Due to their remoteness, WSAs have little potential for saleable (sand, gravel, cinder) development. Therefore, closures and limits on these activities within WSAs would negligibly benefit vegetation.

Surface disturbance from saleable mineral extraction would be rehabilitated following extraction. This rehabilitation would consist of returning and recontouring stockpiled topsoil and restoring the native vegetation community whenever possible. This rehabilitation would have minor benefits to vegetation.

4.16.4.3 Fire, Fuels, and Mechanical Treatments

Aggressive fire suppression has minor short-term adverse impacts on vegetation as a result of the following:

- new firelines, safety zones, and heavy equipment access routes;
- heavy use of existing roads; and
- potential for establishing new roads and ways.

These impacts would be reduced in ACECs, WSAs, RNAs, and known National Register of Historic Places (NRHP) eligible sites.

Prescribed fire could be used as a tool to restore and maintain native plant communities. Prescribed fire has direct, short- and long-term impacts on vegetation. In the short term, fire kills or severely damages vegetation. Vegetation is crushed and soils are disturbed from the following:

- building new firelines, safety zones, and heavy equipment access routes,
- heavy use of existing roads, and
- the potential for establishing new roads and ways.

In the long term, potential adverse impacts include noxious weed invasion, soil loss, and site degradation from wind and water erosion and conversion to invasive species. In the long term, prescribed fire has the potential benefits of restoring and maintaining fire-dependent Great Basin native plant communities.

Mechanical reduction of invasive juniper could be used as a tool to restore, maintain, and protect native plant communities. Chipping and shearing, hand reduction of encroaching juniper, and mechanical disturbance of vegetation on shrub-steppe communities inflict minor, direct, short-term adverse effects on vegetation from equipment crushing vegetation and removing biomass (juniper trees). In the long term, mechanical treatment of invasive juniper can both benefit and adversely effect vegetation. Increased access to remote sites and the potential for fuel loading would indirectly effect vegetation.

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On the other hand, restoring the native shrub-steppe community and reducing soil loss on some sites would indirectly benefit vegetation.

Chipping and shearing operations would follow stipulations to reduce and mitigate adverse impacts, including the following:

- reducing and rehabilitating vehicle landings,
- preventing and controlling noxious weeds,
- minimizing fuel loading, and
- minimizing access routes.

Chipping and shearing operations would have minor benefits to vegetation within treatment areas.

Biological treatments can include localized short-term, tightly controlled livestock grazing and intensive seeding practices. The Preferred Alternative would allow biological treatment of vegetation as a tool for protecting native plant communities.

Herbicides have direct, short- and long-term impacts on vegetation. In the short term, herbicides kill or severely damage targeted vegetation. But unlike large-scale mechanical treatment and prescribed fire, herbicides don't disturb the ground surface. Herbicides are generally either applied by hand to individual plants or sprayed from the air, so no heavy equipment, access routes, or control lines are needed. In the long term, properly applied herbicides can return degraded noxious weed sites to satisfactory ecological conditions.

4.16.4.4 Fuelwood and Post Cutting

The impacts of pole cutting of aspen can be either beneficial or adverse, depending upon the stand. Well-established, old age stands that are not subject to concentrated ungulate use could benefit from removal of mature stems and the ground disturbance of pole harvest. These activities can cause suckering that rejuvenates aspen stands. But marginal stands with few mature stems, heavy brush or juniper encroachment, or heavy grazing or browsing could be damaged or eliminated by the disturbances of pole harvesting. There is almost no demand for aspen poles. But if the demand for these poles increases, stipulations could be placed on pole permits to direct the public to suitable stands.

The impacts of fuelwood harvest in mahogany stands are generally limited to stands that have encroached into adjacent shrub-steppe communities. True mahogany woodlands are normally restricted to fire-safe sites (rims, talus slopes) with limited vehicular access. Harvest of dead wood has few impacts on the stands. Harvest of live wood at current levels negligibly affects the stands.

Wood is generally harvested in juniper woodlands that have encroached into adjacent shrub-steppe communities. True juniper woodlands are normally restricted to fire-safe sites (rims, talus slopes) with limited vehicular access. Juniper harvest generally kills individual trees within the stands. But the overall adverse effects to the woodland communities are negligible at current levels of harvest and juniper encroachment. The Preferred Alternative would allow public and commercial harvest of juniper for fuelwood, poles, and other wood products.

The main adverse effects to vegetation from the harvest of wood products results from the ground disturbance of understory vegetation in the stands and the increase in access routes to remote areas. At current levels of demand for wood products, fuelwood harvest will have little effects on vegetation. But demand, particularly for juniper fuelwood, is expected to increase over the next 20 years.

The potential impacts on vegetation of aspen, mahogany, and juniper harvest could potentially inflict minor to moderate adverse effects to vegetation.

4.16.4.5 Grazing and Browsing

Livestock, wild horse, and wildlife grazing can degrade vegetation in several ways. Direct impacts result from large ungulates (cows, sheep, horses, deer, antelope, elk,) consuming and trampling vegetation. Indirect impacts result when nutrient cycling is modified as a result of processes that occur when animals graze in an area. Annual consumption of vegetation reduces the overall amount of live vegetation and litter, and in the long term can change species composition and distribution.

Grazing in recently burned areas can damage soils and uproot reestablishing native species. Repeated traffic of large ungulates through an area, particularly when soils are wet, can compact and churn soils. Compacting and churning do the following:

- reduce the ability of soils to acquire and retain moisture,
- reduce the ability of native plants to establish and thrive, and
- increase the likelihood that disturbance-adapted invasive species will establish.

Accumulation of urine and feces in concentration areas changes soil chemistry and can also increase the likelihood of invasive species becoming established. Soil loss from accelerated wind and water erosion can result from soil disturbance, removal of litter and vegetation cover, and changes in the composition and distribution of plant species. Soil loss is virtually permanent; permanently decreasing a site's potential to support the native plant community.

The impacts of ungulate grazing are not uniform across the landscape, across seasons, across animal species, across plant communities, or across plant species. Rather, these impacts are concentrated in some areas and almost nonexistent in others. About 10% of the acres in the planning area are receiving moderate to heavy use because they are next to water, livestock trailing routes, and other concentration areas.

Drinking water sources are sparse in the Great Basin. As a result, ungulate impacts are generally higher around these sources than anywhere else on the landscape. Ungulates may heavily use and trample riparian vegetation around these sources, even when adjoining upland vegetation has only been slightly used. Ungulate use in riparian areas in the late summer and fall results in heavier use on shrub species (willow, aspen) than herbaceous species. Woodland areas near water and trailing routes are also subject to higher levels of ungulate use. These areas often supply qualities of forage and cover that are not found in surrounding areas.

Timber stands and aspen, mahogany, and juniper woodlands provide thermal cover for livestock and wild horses and escape cover for mule deer and elk. These stands also retain green herbaceous forage and young aspen and mahogany suckers/seedlings later into the year. Bitterbrush and mountain brush stands provide high protein forage that is particularly valuable for nearly all species of ungulates from mid-summer through the winter. Areas that have been burned in wild or prescribed fire are particularly attractive to grazing animals for several years after the burn because vegetation in these areas is more nutritious and herbaceous vegetation is more plentiful than in surrounding shrub communities.

Livestock, wild horse, and game trails often run along riparian corridors and through swales linking riparian corridors with upland habitat. The soils along swales are usually less rocky than the surrounding basalt talus slopes and clay tables.

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These soils are also more susceptible to compaction and accelerated erosion. About 80% of the planning area is receiving light to moderate use. About 10% of the acres in the planning area are receiving little or no livestock use because they are:

- more than a mile from water,
- on steep slopes, or
- separated from water by natural or artificial barriers.

Sheep and mule deer are mainly browsers. They eat herbaceous species, particularly in the spring. But they have a preference for and will graze on browse species (bitterbrush, aspen, mahogany, sagebrush) throughout the year. Cattle and elk are both grazers and browsers. They prefer herbaceous species, but they will also eat browse species, particularly in the late summer, fall, and winter when herbaceous vegetation is cured. Horses are grazers. They prefer herbaceous species whenever possible but will resort to eating browse species when it is the only forage they can get.

BLM controls livestock season, duration, frequency, and intensity of use through allotment management plans and the grazing permit process. BLM controls wild horse intensity of use by controlling wild horse numbers through establishment of appropriate management levels. BLM cannot control wildlife numbers, nor can it control the season, duration, or frequency of wild horse and wildlife use within herd management areas and wildlife habitat areas.

Livestock exclosures inflict short-term adverse effects on vegetation from fence building. But in the long term, properly built and maintained exclosures benefit vegetation by protecting it from heavy grazing and protecting soils from trampling and compaction.

4.16.4.6 Noxious Weeds and Invasive Species

Noxious weeds occupy a small portion of the planning area and grow mainly on disturbed areas along roads and in riparian corridors (springs, streams, reservoirs). They replace native plant species, and over time some species can change the ability of sites to support potential native species communities.

Chemical, biological, and mechanical control of noxious weeds inflicts negligible short-term adverse effects on native vegetation by subjecting native species in the immediate area of control to the same treatment as the noxious weeds. But the scale of noxious weed infestation is small. Therefore, the direct short-term adverse effects to native species are small. Controlling noxious weeds before they occupy large parts of the planning area would result in major, long-term benefits to vegetation.

The Preferred Alternative proposes aggressive control of noxious weeds in all parts of the planning area. Noxious weeds would also be controlled on private lands, subject to the consent and cooperation of private land owners.

4.16.4.7 Recreation and Travel

Camping, hunting, and hiking directly trample vegetation and soils. These impacts are similar to those caused by livestock, wild horses, and wildlife. Human use is more concentrated in areas near roads, campgrounds, and interpretive sites, around water, and in woodlands. Levels of dispersed recreation are low and are negligibly disturbing vegetation. Dispersed recreation levels are expected to rise during the life of the plan, and vegetation disturbance is expected to rise to minor levels. Off-highway vehicle (OHV) use could inflict major adverse effects to vegetation. Most OHV users stay on roads and trails, and their use has little effects on vegetation.

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Current levels of OHV use are low, and the few users that choose to ride off existing roads and trails are inflicting minor, short term, localized adverse effects to vegetation. Levels of OHV use are expected to increase dramatically during the life of the plan (20 years). Roads run through virtually all parts of the planning area and allow widespread OHV access. Off road or cross-country OHV use could disturb a large portion of the vegetation, including special status species. With repeated use, many of the impacts (soil compaction, soil disturbance, changes to the plant communities, erosion, and establishing new roads) would be major and are long or extended term.

4.16.4.8 Visual Resource Management

Acres within Visual Resource Management (VRM) Class I (WSAs at a minimum) and Class II would have restrictions on the building of facilities and roads, and requirements to reduce and reverse impacts on soils and vegetation. Therefore, establishing VRM Class I and Class II areas would benefit vegetation within the two classes. Acres within VRM Class III and IV have few restrictions on the building of new facilities and roads and few requirements to reduce or reverse impacts on soils and vegetation. Therefore, establishing VRM Class III and IV areas would not benefit vegetation.

4.16.5 Analysis of the Preferred Alternative

4.16.5.1 Native Plant Communities

BLM would continue to authorize 92,465 AUMs of forage annually for livestock grazing on 1,445,443 acres. On the basis of forage availability and improved livestock distribution from added water developments, overall livestock AUM authorizations would increase by 1 to 5% during the life of this PRMP, subject to meeting Land Health Standards, needs of special status species, and requirements to protect National Register-quality archaeological sites. The added forage consumption would inflict minor adverse effects on the planning area's vegetation.

Allotment grazing systems would emphasize increasing existing livestock distribution. About 3/4 of the areas that are receiving little livestock use (91,500 acres) would continue to receive little or no livestock use. Impacts to vegetation in these areas as a result of livestock grazing would be negligible. As a result of new water developments, half of the areas that are receiving little livestock use (30,500 acres) would begin receiving light to moderate livestock use. Adverse impacts on vegetation from livestock grazing would be minor. The areas that are receiving light to moderate livestock use (977,000 acres) would continue to receive light to moderate use, and the adverse impacts on vegetation in these areas from livestock grazing would be moderate.

Because of the modification of livestock grazing systems, new livestock and wild horse exclosures, and improved livestock distribution, half of the areas that are receiving moderate to heavy use (61,000 acres) would undergo the following:

- would receive moderate or less use,
- would be excluded from use, or
- would receive more rest (1-2 years) between periods of moderate to heavy use.

Livestock grazing in these areas would moderately disturb vegetation. About half of the areas receiving moderate to heavy use (61,000 acres) would continue to receive heavier than average use. Livestock grazing would inflict major adverse effects to vegetation in these areas. Actions would be taken to mitigate the impacts on vegetation.

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Livestock grazing management systems would be designed to meet the approved Northeastern California and Northwestern Nevada Standards and Guidelines for Livestock Grazing (BLM 1998a, 1999b) for upland soil, stream health, water quality, biodiversity, and riparian/wetlands.

Burned areas would be rested from livestock grazing for at least two growing seasons. Livestock salting would not be allowed within ¼ mile of springs, meadows, streams, or aspen stands, so that livestock are drawn away from these concentration areas. Utilization levels on native rangelands would not exceed moderate (40-60% utilization, as described in Interagency Technical Reference 1734-3, Utilization Studies and Residual Measurements). And hedging on browse species would not exceed moderate (form class of 2.25 as described in Interagency Technical Reference 1734-3, Utilization Studies and Residual Measurements), so that vegetation remains vigorous and reproductive and soils are protected by live vegetation and litter cover. These restrictions to livestock grazing would result in minor to moderate benefits to these areas.

5,500 acres of livestock exclosures would be retained. Where grazing management systems cannot mitigate the impacts of grazing in special habitats, more livestock and wild horse exclosures would be built to protect the vegetation. In addition, a portion of the unprotected meadow, aspen, and National Register of Historic Places (NRHP) archaeological sites, including all that are near new livestock water developments, would be excluded from routine livestock and wild horse use. Livestock control fences (pasture and allotment divisions) have short-term adverse impacts on vegetation as a result of fence building. But in the long term, properly built and maintained livestock control fences can benefit vegetation because they allow more flexibility to mitigate livestock impacts on vegetation (i.e., duration, season, and intensity of livestock grazing).

About 2,000 acres of new exclosures would be needed to mitigate livestock impacts on the following:

- special status species habitat,
- National Register of Historic Places archaeological sites,
- Land Health Standards, and
- other high-priority resources.

Exclosures would reduce the total acres grazed by livestock by less than 1% over the life of the plan (20 years). Most of the new exclosures would be in riparian and aspen communities. These communities occupy small parts of the planning area's vegetation. Retaining these communities is important to maintaining the planning area's biodiversity. Therefore, protecting these communities from overuse would have minor benefits to the planning area's vegetation.

The Preferred Alternative would maintain wild horses within appropriate management levels (AMLs) in eight herd management areas (HMAs) on 493,821 acres. Wild horse grazing moderately disturbs vegetation and would continue to disturb vegetation throughout the eight HMAs. The Fox-Hog Herd Management Area (HMA) boundary would be enlarged by 48,226 acres. This enlargement would negligibly disturb vegetation because horses from the Fox-Hog HMA would use these acres for fall, winter, and spring habitat. Wild horse appropriate management levels (AMLs) would be adjusted in response to vegetation monitoring. Wild horse numbers would be maintained within AMLs, and wild horses would be removed from areas outside of the herd management areas (HMAs).

The adverse effects to vegetation from ungulate grazing would result directly from these animals' consuming and trampling vegetation and indirectly, from modification of nutrient cycling. Actions to mitigate ungulate grazing would be extensive but generally successful in meeting the objectives for plant communities, including special status species.

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Therefore, ungulate grazing would inflict moderate short- and long-term adverse effects to vegetation.

A total of 1,037,057 acres would be 'Open' to surface occupancy for leasable mineral development; 1,037,063 acres would be 'Open' to saleable mineral development (all except WSAs); and 1,220,644 acres would be 'Open' to locatable mineral development. Impacts are described in Section 4.16.4.2 above.

The Preferred Alternative would impose 'no surface occupancy' restrictions, buffers, and limited operating periods to protect wildlife habitat and to limit impacts on wildlife from construction and use of facilities. These restrictions would generally reduce surface-disturbing activities and would therefore benefit vegetation within the subject zones.

Developing three seasonal wild horse viewing sites and three archaeological interpretive areas would have minor direct adverse effects on vegetation in the immediate area around the sites (2 acres) from initial construction and would inflict negligible long-term disturbance from increased vehicle and pedestrian traffic around the interpretive areas.

Off-highway vehicle (OHV) use throughout the planning area would be 'Closed' or 'Limited to Designated Routes' and would negligibly disturb vegetation. The Preferred Alternative would designate a 957-acre Rahilly-Gravelly Area of Critical Environmental Concern/Research Natural Area (ACEC/RNA). Limiting OHV travel within this ACEC to existing roads and trails would negligibly benefit vegetation.

WSAs (183,587 acres, 15% of the planning area) would be classified as VRM Class I, and 2.2 miles and 257 acres of Twelvemile Creek WSR would be designated as VRM Class II. These VRM classes would have negligible to minor benefits to vegetation.

Aggressive fire suppression would be the appropriate management response (AMR) on 891,695 acres or 75% of the planning area. Less aggressive fire suppression would be the AMR on 328,949 acres, or 25% of planning area. In the long term, full suppression would have minor benefits to vegetation at lower elevations (below 6,000 feet) and would inflict minor adverse effects to vegetation at the higher elevations (above 6,000 feet). Maintaining the option to exercise less aggressive fire suppression where wildfire would meet resource objectives to maintain or restore vegetation would have minor benefits to vegetation.

The Preferred Alternative would apply aggressive fire suppression tactics during periods of high fire intensity. Full suppression would have the following effects:

- minor long-term benefits by limiting the size of very hot fires that often result in large blocks of continuously burned acres and increased amounts of annuals;
- minor to moderate extended benefits on the low- to mid-elevations (approx. 600,000 acres) by limiting the size of fires that could result in type conversion to cheatgrass, medusahead, and other non-native annuals;
- minor long-term adverse effects in the mid and upper elevations (approx. 600,000 acres) by reducing acres that would be naturally restored to earlier seral conditions, including up to 100,000 acres of decadent or juniper-encroached shrub-steppe communities.

Between 1,050 and 9,100 acres would be treated annually to maintain or restore sites to satisfactory ecological condition. These treatments could include the following:

- prescribed fire,

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- chemical treatment,
- mechanical treatment (chip/shear, chainsaw, brush crushing), and
- biological methods (tightly prescribed grazing and native seeding).

The types of communities that would be restored first include areas that would quickly recover to site potential, special habitats, accessible juniper sites that have ready access for woodcutters and biomass harvesting equipment, and areas with the potential to increase livestock forage production. The Preferred Alternative would treat parts of these decadent and degraded communities to maintain and restore satisfactory ecological conditions.

Compliance with Section 106 of the National Historic Preservation Act both benefits and adversely effects vegetation. When Section 106 compliance reduces livestock use, facility and road development, and soil surface disturbance, the impacts on vegetation are beneficial. When Section 106 compliance delays or prevents vegetation restoration projects or reduces the effectiveness of livestock grazing systems, the impacts on vegetation would be adverse.

Several of the actions taken to reduce impacts to cultural resources affect vegetation: more livestock exclosures, other reductions in livestock use (intensity, timing, duration), and prevention of vegetation treatment. Most of these actions result in less surface and vegetation disturbance, and they benefit vegetation in the long term. But they can also adversely effect vegetation in the long term when they prevent the following vegetation restoration projects:

- for decadent brush communities,
- for juniper encroached communities,
- for cheatgrass-converted communities, and
- for grasslands that have converted to brush communities.

Hazardous fuels reduction around cultural resource sites would directly inflict negligible to minor adverse effects on the vegetation that is cleared.

Permitted vertebrate fossil collections would directly but negligibly disturb vegetation in the area collected (foot traffic, soil disturbance, increased likelihood of off-highway vehicles [OHVs]).

4.16.5.2 Aspen, Bitterbrush, and Curleaf Mountain Mahogany Communities

Management changes in aspen, mahogany, and bitterbrush stands would maintain and restore 95% of existing stands within 20 years. Such changes would include the following: juniper/brush removal, prescribed fire, 20 acres of exclosures, livestock use restrictions, grazing system changes, and restoring 20 acres of historic stands.

Aspen and mahogany stands that exceed two acres or that burn in wild or prescribed fires would be rested from livestock use until sucker/seedling recovery criteria specific to the stands are met. Post-fire rest criteria for smaller stands would be determined by the objectives for the surrounding vegetation. These actions would result in moderate beneficial effects to these communities.

At current and expected levels of demand, pole cutting and collecting dead mahogany would negligibly disturb aspen and mahogany stands over the next 20 years. Mahogany harvest would be limited to 30 cords per year, which would ensure that adverse impacts remain negligible, regardless of the demand for mahogany.

4.16.5.3 White Fir and Pine Communities

Timber stands would not be commercially harvested but would be managed for healthy forest habitat. Timber stands occupy less than 1% of the planning area, and most of timber grows next to large timber stands on the Warner Mountains. From 25 to 150 acres of timber stands a year would be treated mechanically or with prescribed fire to maintain vegetation diversity and ecological health of the forested lands. Following wildfire, salvageable timber might be harvested, and the stand might be reforested. The Preferred Alternative would result in negligible adverse effects and moderate beneficial effects to forestland communities.

4.16.5.4 Herbaceous and Grassland Associations

The planning area has 10,000 acres of decadent brush communities and 67,000 acres of brush-dominated grasslands. The Preferred Alternative would implement methods that can effectively restore these communities, including prescribed fire, mechanical disturbance, and herbicides.

Also, 110,000 acres of shrub-steppe communities have been or are being converted to annual grasslands (cheatgrass and medusahead). Few methods effectively restore these communities. Tightly controlled livestock grazing, prescribed fire, and native seeding, coupled with full suppression of high-intensity wildfires can slow and in some cases reverse conversion to annual grasslands. Herbicides and other chemical applications that are effective in selectively controlling annual grasses may soon prove to be safe and effective for use on public lands.

BLM would annually restore from 50 and 100 acres of perennial grassland communities and from 500 to 4,000 acres of decadent and/or annual grass-dominated shrub-steppe communities. Restoration methods would include mechanical treatment, chemical treatment, or prescribed fire. At this rate of treatment, from 5 to 40% of these communities would be restored within 20 years. This restoration would have a minor to moderate benefit to vegetation in the planning area.

4.16.5.5 Sagebrush Communities Encroached with Western Juniper

On 90,000 acres of vegetation communities, juniper has encroached and become a dominant or subdominant species. Juniper invades another 650 acres each year. At this rate of expansion, another 13,000 acres of shrub-steppe, grassland, aspen, and riparian communities will become juniper woodlands within 20 years. The Preferred Alternative would implement methods that reduce juniper encroachment, including prescribed fire, mechanical removal, and herbicides.

BLM would remove invasive juniper using prescribed fire, chemical treatment, and mechanical treatment at a rate of 500 to 5,000 acres per year. This removal would slow or reverse the trend of juniper invasion into shrub-steppe communities. Within 20 years, the potential juniper-invaded communities would be reduced by 10 to 95%. Juniper removal would have minor to major long-term benefits to vegetation.

4.16.5.6 Riparian/Wetland Communities

Under the Preferred Alternative 53 miles of perennial and intermittent streams, and 2,500 acres of riparian/wetland areas would be restored to PFC or DFC. Streams and springs that are not functioning properly (hydrologically) cannot support the native plant communities that are natural for the site. In addition, these springs and streams are often susceptible to accelerated erosion and noxious weed encroachment. Restoring these systems to proper functioning condition (PFC) or desired future condition (DFC) would provide moderate benefits to the vegetation in these systems over the long term.

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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 exclosures, and
- constructing protective fencing where needed.

Livestock salting sites will be located ¼ mile from riparian areas to discourage damaged by livestock. Western juniper and other undesirable woody vegetation will be removed from riparian areas, where they have encroached into the riparian plant community. Roads having an adverse 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.

4.16.5.7 Seedings

About 4% of the planning area—45,140 acres—have been seeded to crested wheatgrass for livestock forage. These non-native seedings impair the diversity and connectivity of native vegetation communities. But they also benefit the surrounding native communities because they defer livestock use until later in the spring when livestock grazing has less of an effect on soils and native species. Most of the seedings have some degree of native brush reestablishment. All but 8,400 acres continue to supply significant amounts of livestock forage and continue to be useful in deferring early-season use on native vegetation communities.

Under the Preferred Alternative 36,740 acres of existing crested wheatgrass seedings would be maintained as crested wheatgrass seedings. These seedings would continue to supply livestock forage and to defer use on native rangelands. They would continue to inflict negligible to minor adverse effects on the diversity and connectivity of native vegetation. About 8,400 acres of existing crested wheatgrass seedings that are in poor condition and are supporting mainly invasive annual grasses and forbs would be restored to native vegetation. Restoring native vegetation communities on these sites would have a minor, long-term benefit to vegetation.

Another 4,568 acres have been seeded to native species or a combination of native and non-native species to stabilize areas that were burned and restore them to natural conditions. The Preferred Alternative would implement techniques that are effective in maintaining seedings, including brush crushing, chaining, and herbicides to reduce the amount of brush and drilling seed to reestablish herbaceous vegetation. These techniques would result in short term minor adverse effects to vegetation in the area being treated.

New seedings would be developed for fire rehabilitation, livestock forage, and wildlife habitat. Objectives for seedings to increase livestock forage would generally include some non-native species because few native species would meet the objectives of the seeding. Fire rehabilitation and wildlife habitat seedings would inflict negligible to minor short-term adverse effects to vegetation during development of the seeding and minor long-term benefits to vegetation that is restored to satisfactory ecological conditions. New livestock forage seedings would inflict negligible to minor short- and long-term adverse effects on native vegetation.

4.16.6 Summary of Impacts

The Preferred Alternative is expected to have minor to moderate adverse impacts on vegetation in the planning area resulting from grazing by livestock, wild horses, and ungulates; construction of roads and facilities; recreation and OHV use; energy and minerals development, and degradation of native ecosystems due to noxious weeds and invasive species and encroachment of western juniper.

Grazing systems would emphasize increasing livestock distribution into previously unused or lightly used areas. As a result, up to 4,600 AUMs of additional livestock use would be authorized annually. Livestock impacts would increase on approximately 30,500 acres (3% of the planning area) that currently receive little use, and approximately 61,000 acres (5% of the planning area) would continue to receive heavy use. 36,740 acres of existing crested wheatgrass seedings would be maintained as non-native seedings. Wild horse grazing would continue on 40% of the planning area and livestock grazing would continue throughout the entire planning area.

The Preferred Alternative is expected to result in minor to moderate beneficial impacts to vegetation. Between 1,050 and 9,100 acres of degraded vegetation communities would be restored annually (21,000 to 182,000 acres over the life of the plan) and 8,400 acres of poor condition crested wheatgrass seedings would be restored to native vegetation. As a result of changes in grazing systems and construction of approximately 2,000 acres of new exclosures, about 61,000 acres (5% of the planning area) that are currently receiving moderate to heavy annual use would receive moderate or less use, would be excluded from grazing, or would receive additional rest between periods of moderate to heavy use.

53 miles of perennial and intermittent streams, and 2,500 acres of riparian/wetland areas would be restored to PFC or DFC. BLM would remove invasive juniper using prescribed fire, chemical treatment, and mechanical treatment at a rate of 500 to 5,000 acres per year. This removal would slow or reverse the trend of juniper invasion into shrub-steppe communities. Within 20 years, the potential juniper-invaded communities would be reduced by 10 to 95%. Juniper removal would have minor to major long-term benefits to vegetation.

OHV use would be 'Limited to Designated Routes' throughout most of the planning area, and cross country OHV use would not be allowed. Limiting OHV travel to designated existing roads and trails would result in minor beneficial impacts to vegetation.

4.16.7 Cumulative Effects

The area of analysis for cumulative impacts on vegetation resources is defined as the Surprise Field Office area boundary. Since European settlement of the area in the mid 1800's, many changes have occurred in the native plant communities. The most productive flat lands in the lower elevations became private agricultural lands. The vast majority of the meadows along perennial and intermittent creeks, and many of the meadows around springs and seeps also became private lands; the largest of these wet areas were homesteaded and hayed. Domestic sheep, cattle, and horse grazing on the shrublands around the early settlements were often heavy and year-round. As a result, herbaceous vegetation in the lower elevations around private lands was selectively removed. Grasslands were converted to big sagebrush and greasewood communities. Roads and livestock trailing/grazing along riparian corridors caused accelerated erosion, down-cutting, and loss of meadows. Livestock grazing inadvertently introduced invasive annual grasses which quickly colonized communities with depauperate understories. In more recent years (since the 1940's), aggressive fire suppression has encouraged the expansion of juniper into shrub-steppe communities and special habitats. The combination of livestock grazing and aggressive fire suppression has also led to an increase in decadent shrub communities with little herbaceous understory vegetation on the higher elevations.

Following the Taylor Grazing Act in 1934, the public lands were allotted for livestock grazing. In the 1960's, the allotments were adjudicated and livestock numbers were reduced to levels that could be sustained. Grazing systems were designed for the allotments to mitigate the impacts of livestock grazing on vegetation by controlling the timing, duration, intensity, and/or frequency of livestock use. Crested wheatgrass seedings were developed for livestock grazing and to defer livestock use on native rangelands. As a result, the condition of native vegetation has greatly improved, particularly in the mid to upper elevations of the Surprise Field Office area.

As a result of accelerated erosion, a great deal of soil has been lost from many riparian corridors. Most of these systems have developed a new primary floodplain and are no longer actively down-cutting; however, re-building the soil, raising the water table, and recovering the historic floodplains in these systems are generally long to extended term processes. On-going recreational use of roads, livestock, and wild horse grazing along riparian corridors, and permanent changes in site potential may prevent some systems from being restored completely to historic conditions.

Juniper continues to encroach into shrub-steppe communities and special habitats. In the absence of disturbance (fire or mechanical), these juniper encroached communities, as well as the decadent big sagebrush communities and the big sagebrush/greasewood dominated grasslands will continue to support plant communities with reduced diversity. Within the last 25 years, noxious and invasive weeds have increased, primarily around private lands, along roads, along riparian corridors, and in heavy livestock and recreational concentration areas.

The primary impacts on vegetation would occur as a result of livestock and wild horse grazing, increasing levels of recreational use, and vegetation restoration efforts. These impacts tend to be concentrated around water sources where livestock and horses come to drink and recreational users come to camp and hunt. The adverse cumulative impacts to vegetation would be short-term and would lead to longer term beneficial impacts.

4.16.8 Mitigation Measures

The primary actions that are necessary to mitigate impacts on vegetation include:

- Ensuring that livestock grazing is managed such that livestock grazing impacts would not prevent the public lands from meeting 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 appropriate management levels 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 appropriate management levels.
- Livestock and wild horse use levels would be reduced when necessary to respond to unusual conditions (fire, drought, insect infestations, etc.).
- Livestock and wild horses would be excluded from areas that are unable to withstand any grazing use.
- 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. Unneeded facilities and 'Closed' mining sites would be removed and rehabilitated.

4.16.9 Unavoidable Adverse Impacts

Livestock and wild horse grazing, recreation, wood harvesting, and mineral exploration and extraction would continue to occur, at some level, under all of the alternatives. All of these activities have adverse impacts on vegetation, regardless of the level of use. Therefore, there will be isolated areas and times that vegetation within the planning area receives minor to major adverse impacts as a result of authorized activities.

4.16.10 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.

Activities that 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, also impact the long term productivity of vegetation in the planning area. Excessive or inappropriate livestock and wild horse grazing; especially on the lower elevations (below 6,000 feet elevation) can contribute to the dominance of annual grasses. Compaction of heavy clay soils by grazing animals and vehicles, particularly when soils are wet can increase the spread of medusahead. As annual grasses become more dominant in the understory of shrub communities, the incidence of severe wild fires increases, and the communities can become type converted to annuals.

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Once a community is converted to annual grasses it becomes extremely difficult (if not impossible) to return the sites to native species production. Heavy grazing that reduces fine fuels and ladder fuels, and aggressive wild fire suppression on the higher elevations (above 6,000 feet elevation) can contribute to the spread of juniper into shrub steppe, riparian, and other special habitats. As juniper increases, the understory shrubs, grasses, and forbs are gradually eliminated from the community.

Once areas have been type converted to juniper, recovering the historic plant community and the historic fire regime that maintains that community becomes much more difficult and expensive. The longer the invaded sites are dominated by juniper, the more soil loss and changes in soil chemistry occur. These processes can permanently reduce the ability of the sites to support the historic plant communities.

4.16.11 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.

4.17 Potential Effects on Noxious Weeds and Invasive Species

This section describes the potential impacts on noxious weeds and invasive species management from implementation of the Preferred Alternative.

4.17.1 Methodology and Assumptions

We obtained the information used in our analysis from the following sources:

- agency and scientific literature,
- cooperative weed management areas,
- BLM professional judgment,
- interdisciplinary team information,
- noxious weeds databases,
- field work, and
- general knowledge of the Surprise Field Office planning area.

We also worked with the Modoc County Weed Management Area Working Group and the Nevada Weed Management Association.

The introduction and spread of noxious weeds and undesirable plants on BLM-administered lands have led to a series of adverse consequences:

- loss of rangeland productivity,
- increased soil erosion,
- reduced species and structural diversity,
- loss of wildlife habitat, and,
- in some instances, possible threats to human health and welfare from increased fire danger.

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 minimize and prevent the spread of noxious weeds during implementation of all management actions, the Surprise Field Office implements the goals and actions described in Partners against Weeds (BLM 1996b) and The National Invasive Species Management Plan (National Invasive Species Council 2001). These 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.
- Integrated weed management—determine the best methods for an integrated approach to weed management and implement on-the-ground operations.
- Coordination—ensure noxious weed control is 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,
- to provide a basis for making informed decisions,
- to assess progress toward management objectives, and
- to develop new and more effective management methods.

In addition to agency wide BLM policy on noxious weed management, the Surprise Field Office has developed standard management measures related to noxious weeds. (See the Surprise Field Offices Noxious Weed Prevention Schedule in Appendix F.) This prevention schedule is applied for all actions that could introduce or spread noxious weeds on lands administered by the Surprise Field Office.

4.17.2 Incomplete or Unavailable Information

Information on noxious weeds in the Surprise Field Office area is complete. The entire planning area has been inventoried once, and several emphasis areas have been inventoried two or three times.

4.17.3 Analysis

This analysis defines the levels of effects on the introduction and spread of noxious weeds and invasive species as follows:

Negligible: No changes would occur from the impact. Changes in noxious weeds or invasive species sites or distribution would be below or at the level of detection, and, if detected, the effects would be considered slight.

Minor: Very little change would result from the impact. The effect would be barely perceptible, and the action would slightly increase number of sites or distribution, but the change would be highly localized.

Moderate: The change would be apparent from the impact. The effect would be easily perceptible, and the action would result in a noticeable increase in number of sites or distribution, but the change would occur over a relatively large area.

Major: The change would be readily apparent or widespread from the impact. The effect would substantially change the number of sites or distribution, and the change would cover a very large area.

Short-term: An effect that generally would last from 1 to 5 years.

Long-term: An effect that generally would last from 5 to 20 years.

In this analysis, effects that would reduce the introduction or spread of noxious weeds on the landscape are considered beneficial to noxious weeds management, whereas effects that would result in the introduction or spread of noxious weeds are considered adverse to noxious weeds management.

4.17.4 Analysis of the Preferred Alternative

Any management actions that disturb or compact soils or remove vegetation can increase the potential for noxious weed or other invasive species infestations that result in the following:

- degraded plant community structure, cover, composition, or diversity;
- low or nonproductive soils;
- erosion;
- slow water infiltration; and
- ultimately, habitat conversion.

Once established, noxious weeds could be easily spread by many vectors, including

- livestock and wild horses;
- construction of range, wildlife, or watershed improvements;
- road maintenance;
- energy and mineral development, including sand and gravel pits;
- utility corridors and other rights-of-way maintenance;
- OHV use;
- recreation site uses and development;
- rangeland vegetation management;
- woodland management;
- archeological and cultural resource management;
- fuels treatments;
- fire suppression; and
- wildland fires.

All of these vectors could continue to introduce and spread noxious weeds and other invasive species. BLM would conduct risk assessments at the project/activity design stage to determine the likelihood of increasing noxious weed opportunities. From the risk assessments, best management practices (BMPs) or suitable mitigation measures would be incorporated into the project/activity plan.

Noxious weed management would continue to be a priority for the Surprise Field Office to protect the condition of other resources. BLM would actively maintain or control invasive species, depending on the size of the infestation, through a cooperative integrated weed management program. BMPs would be prescribed and implemented at the project/activity plan level to reduce the risk of noxious weed infestations caused by the degrading of soil and vegetation. Applying BMPs would be an effective means of preventing noxious weeds or other invasive plant infestations at the project/activity plan level. The result would be reduced erosion, protected water quality, and increasingly desirable vegetation cover and diversity. Acquiring lands could have moderately adverse effects to the weeds program if the lands acquired have a substantial amount of noxious weeds.

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Projects or activities to maintain or improve watershed function, rangeland health, and wildlife habitat would involve ongoing efforts to control weeds to protect and restore healthy plant communities. Improvements in ecological function would benefit the weeds program. Weeds would be less likely to invade, although there would be some risk of weeds becoming established. Improved riparian and upland areas would allow native species to compete with introduced weeds, which would result in fewer weeds at those sites. Maintaining and restoring habitat in good condition would reduce the risk of weed invasion. Ultimately, improved rangeland health would decrease the likelihood of weed establishment and increase the resiliency to weed invasion.

Inventory, control, and restoration efforts would be run in cooperation and coordination with adjacent Cooperative Weed Management Areas (CWMAs).

Establishing six cultural resource onsite interpretive areas for archaeological tourism and public interpretation would create some disturbance. The interpretive areas could have the minor adverse effect of opening up areas to weed invasion, depending on the amount of increased visitor use and soil and vegetation disturbance. Visitor use from areas outside the planning area could also have a minor adverse effect on introducing weeds to the area. But the spread of existing weeds should be negligible during interpretive activities because the interpretive areas are fairly weed-free. The designation of three ACECs for protecting and managing cultural resources and wildlife habitat would benefit the weed program. Adding two cultural resource management areas (CRMAs) should benefit the weeds program because cultural resource management plans incorporating best management practices (BMPs) would be developed for the two CRMAs.

Prescribed fire and fuels treatments could have a minor benefit to the weed program. The project treatment plans would be developed to reintroduce fire as a natural component of the ecosystem, enhance renewable resources, and restore healthy ecosystems. The treatment types would be as follows:

- 500 to 5,000 acres per year of mechanical or prescribed fire treatments,
- 50 to 100 acres of chemical treatment, and
- 50 to 1,000 acres of biological treatment.

The use of heavy equipment as one of the mechanical tools would cause more ground disturbance than other treatments such as prescribed fire, chainsaws, domestic animals, or herbicide. Areas conducive to weed invasion would be created. Equipment from outside the planning area could also bring new weeds into the area. BMPs would be developed at the project/activity plan level, minimizing or mitigating the amount of soil disturbance and the chances of new weeds being brought in from outside the planning area. The Preferred Alternative could have a minor adverse impact to the weed program, depending on the amount of soil and vegetation disturbed during project implementation.

People, vehicles, equipment, livestock, wild horses, and wildlife coming from outside the field office area could bring new weeds with them and could also spread existing infestations. Weeds could also be introduced through contaminated seed, hay, straw, or mulch from stabilization or restoration projects. This action would increase the size of the Fox-Hog Herd Management Area (HMA) by 48,226 acres to encompass the area now being used by the wild horses in the HMA.

This action would increase the size of the Fox-Hog Herd Management Area (HMA) by 48,226 acres to encompass the area now being used by the wild horses in the HMA. One wild horse public viewing site would also be developed in this HMA. The increase in acres would negligibly affect the weeds program because the area is already being used by wild horses with few if any impacts.

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Developing the wild horse viewing site could have a minor adverse effect on the weeds program from soil and vegetation disturbance during site development and from increased visitors from outside the area.

The weeds program would benefit from the following off-highway (OHV) limitations:

- limiting OHVs to designated open routes in most of the planning area,
- limiting OHVs to designated open routes in three WSAs,
- limiting OHV to existing roads and ways in one WSA, and
- closing one WSA to cross-country travel.

These actions would reduce the risk of noxious weeds becoming established and spreading from vehicles traveling off roads, trails, and ways in the planning area.

In summary the Preferred Alternative would result in negligible to minor adverse impacts, and moderate to major long-term beneficial impacts to the control of noxious weeds and invasive species. Under the Preferred Alternative, the risk of weed introduction and establishment would decrease because control, monitoring, and public education would be expanded. In addition, a priority of this alternative is emphasizing early detection of and rapid response to any new infestation within the Surprise CWMA.

4.17.5 Cumulative Effects

The area of analysis for cumulative impacts on noxious weed management is the Surprise Coordinated Weed Management Area (CWMA). Under the NEPA, environmental analysis must consider cumulative effects—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 on private, U.S. Forest Service, U.S. Fish and Wildlife Service, and tribal and state lands surrounding the Surprise Field Office area might result in cumulative effects on noxious and invasive weeds. Essentially, all soil and vegetation resources could be affected by other environmental processes and management actions occurring outside BLM’s influence thus affecting noxious and invasive weed management.

The introduction of noxious and invasive weeds is likely to continue for the reasonably foreseeable future. Cumulative effects of weed infestations could result in habitat conversion and loss of native vegetation, vegetation types, and wildlife species. Riparian/wetland habitats would also be at risk with noxious weed establishment, and soil biotic crust and productivity could be lost.

The following are some actions and activities on lands adjoining BLM-administered lands are affecting noxious and invasive weeds:

- conversion of lands to agricultural use (e.g., alfalfa),
- conversion of lands to residential use,
- invasion of lands by juniper,
- fuels treatments,
- logging,
- road building and maintenances,
- water use,

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- recreational use, and
- fire (both prescribed and wildland).

Although these actions and activities are occurring in the region, the Surprise Field Office area is somewhat shielded from human activities and actions of other agencies and people by:

- the field office area's geographic position in the extreme northeast corner of California and northwest corner Nevada,
- the field office area's isolation, and
- the fact that field office lands are relatively contiguous with a few large but mostly small islands of land in other ownerships.

Modoc National Forest is preparing a noxious weed treatment EIS to eradicate and control 15 noxious weeds in the forest. Until the EIS is final and approved, the forest will continue to be a source of weed infestation along the eastern slopes of the Warner Mountains. Weed seeds would continue to travel along forest and county roads onto BLM-administered lands below.

Fremont National Forest, except for the Silver Lake Ranger District, does not have a comprehensive, ongoing weed management program. As a result, the forest would continue to be a source of weed infestation since the headwaters of many of the planning area's streams are in the forest. Weed seeds would continue to travel downstream onto BLM-administered lands. The Silver Lake Ranger District has a weed management program that would help minimize weed infestation from forest sources in the planning area's north.

If the injunction in Oregon against the use of certain herbicides is lifted, herbicides would facilitate the control and eradication of weeds on BLM-administered lands. But regardless of the methods used to control weeds, their introduction and spread are likely to continue for the foreseeable future.

An integrated approach to the problem would enable effective integrated noxious weed management throughout the planning area, depending on the alternative chosen for program management. Such an integrated approach would include the following:

- prevention strategies,
- inventory and early detection,
- multiple tools for control,
- research to determine the most effective, efficient strategies, and
- follow-up monitoring.

Currently, the ongoing cooperative weed management program minimizes weed introductions to the planning area from outside sources and encourages an integrated and coordinated management approach with adjoining agencies and weed management areas. No substantial cumulative effects are expected to occur under the Preferred Alternative.

4.17.6 Mitigation Measures

BLM will use the following measures to mitigate adverse effects to the weed program.

- Use only certified weed-free seed, hay, straw, and mulch on public lands within the planning area.

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- Clean equipment from outside the planning area before any maintenance or construction activity and before leaving a job site that is already infested.
- Clean fire suppression equipment from outside the planning area of any noxious weed parts before suppression activities.
- Clean equipment working in weed-infested areas before its departure.
- Retain livestock in feedlots that have been used for noxious weed control or fuels reduction projects, and are arriving from outside the planning area. This will allow weed seeds to pass through their digestive systems and fall off their coats.

4.17.7 Unavoidable Adverse Impacts

Increased visitation and recreational uses from outside the planning area (e.g., Black Rock-High Rock Canyon Emigrant Trails National Conservation Area) could adversely affect soils and vegetation. Disturbance to soils and vegetation would increase the chances of weed establishment and spread by visitors and by recreational uses and equipment. BLM has developed the management actions under the alternatives to address these impacts and protect the resources while allowing enough management flexibility to meet resource programs needs.

4.17.8 Short-Term Uses Versus Long-Term Productivity

None.

4.17.9 Irreversible and Irretrievable Impacts

None.

4.18 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 3.19-1). 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.

4.18.1 Methodology and Assumptions

No populations of federally listed plants are known to occur in the SFO (Surprise Field Office) management area. Nonetheless, five species and 150 occurrences of other special status plants (SSP) have been identified within the management area. (However, there are seven species within the Surprise Field Office Boundary – which includes the Black Rock Desert and High Rock Canyon Emigrant Trails National Conservation Area and the Sheldon National Wildlife Refuge.) Ten more species probably occur within the management area, but their presence has not been verified.

The major threats to the continued existence of these plants are grazing and trampling by livestock and wild horses, off-highway vehicle (OHV) traffic, continued fire suppression, mining and decorative rock collecting, invasive plants and noxious weeds, plus soil erosion (from a variety of causes).

This analysis uses information from existing literature, data from BLM's Surprise Field Office, 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.

4.18.2 Incomplete or Unavailable Information

Populations of special status plants are in various stages of survey and condition assessment. Information available for these areas is adequate to assess the impacts of the Preferred Alternative. The other site-specific information gathered about these areas would be used to develop proposed actions and assess impacts at the activity-plan level when implementation decisions are developed.

Information is limited for population status, trends, and distribution of some special status plant species in the Surprise Field Office 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.

4.18.3 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.

4.18.4 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 Surprise Field Office 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.

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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. 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 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.

The Surprise Field Office would use mechanical and manual treatments and prescribed fire to reduce hazardous fuels and juniper cover on up to 5,000 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.

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 adverse, 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 tiehmii*: The species could be affected by grazing
- *Astragalus geyeri* var. *geyeri*: The species is threatened by livestock trampling in spring and early summer.

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- *Cryptantha schoolcraftii*: The species could be affected by grazing.
- *Eriogonum crosbyae*: The species is not grazed by livestock; but could be affected by trampling.
- *Eriogonum prociduum*: The species is not grazed by livestock; but could be affected by trampling.
- *Eriogonum umbellatum* var. *glaberrimum*: The species could be affected by grazing.
- *Gallium glabrescens* ssp. *modocense*: The species may be grazed by sheep.
- *Gallium serpticum* ssp. *warnereense*: The species could be affected by grazing.
- *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.
- *Lomatium roseanum*: The species is probably grazed by cattle and sheep.
- *Oryzopsis exigua*: The species is not noticeably grazed but could be affected by livestock.
- *Phacelia inundata*: The species is threatened by livestock trampling.
- *Thelypodium howellii* var. *howellii*: The species could be affected by grazing.

Livestock grazing under the Preferred Alternative will be managed to meet land health standards. In addition, site-specific management practices will be implemented for all species, populations, and habitats of SSPs as presented in or according to: conservation plans, recovery plans, habitat management plans, conservation recommendations, Biological Evaluations (BE), and best management practices (BMPs). Under certain conditions and in certain areas, as much as 20% of occupied habitat and a 20% overall decrease in abundance (both apply only on an individual species basis and are the threshold level for that species) would be tolerated, where this would not materially contribute to the decline of a SSP. However, the threshold level would not be tolerated where contrary to a biological assessment, conservation strategy, species-specific management guidance, or biological evaluation. These actions would result in negligible adverse effects to SSPs.

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 a vector for noxious weed introduction and spread in the Surprise Field Office area. Non-native invasive plant species or noxious weeds are known to out compete 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 potentially adverse. The Surprise Field Office will aim to reduce or eliminate the introduction and spread of noxious weeds using integrated weed management (IWM), and construction projects will require mitigation measures to avoid the spread of noxious weeds. This approach would provide beneficial results to SSPs.

The Surprise Field Office 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 conservation plans, recovery plans, habitat management plans, conservation recommendations, and/or biological evaluations.
- 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.

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Where land-use activities are contributing to the decline of sensitive (special status and special interest) plants on private lands, BLM would attempt to acquire these lands (from willing owners)—particularly in Hays Canyon and Grass Valley. This would result in a minor to moderate benefit to individual special status and special interest species.

Special management considerations and permit stipulations applied to protect populations of special status plants would apply equally for special interest species. This would result in a minor to moderate benefit to special interest species.

Commercial and private woodcutting would not be allowed where populations of sensitive plants (special status and special interest) are found. Despite this, commercial permits for mechanical harvesting of invasive juniper would be sanctioned within habitats containing such populations. However, special stipulations would apply to the harvesting permits. These would include limits on road construction, mandatory use of rubber-tracked vehicles (for cross-country travel), and access-point rehabilitation requirements (to avoid establishing permanent ways). These mitigation measures would result in negligible adverse effects to individual special status and special interest species.

No attempts would be made to establish special status plant species on suitable but unoccupied habitat. Within the planning area few known sites that are not already occupied by special status species can support such species. Therefore, this action would negligibly disturb special status plants in the planning area. BLM would restore degraded habitat of special status plant species and apply stipulations to reduce impacts on special status species during all vegetation restoration efforts. These actions would negligibly benefit special status plants.

Recreation and travel management actions could affect special status plants, particularly off-highway vehicle use. Impacts from OHV use have been recognized as a threat or potential threat (as described below) to the following special status plants:

- *Astragalus tiehmii*: The species could be affected by OHV use.
- *Cryptantha schoolcraftii*: The species could be affected by OHV use.
- *Eriogonum crosbyae*: The species could be affected by OHV use.
- *Eriogonum prociduum*: The species could be affected by OHV use.
- *Potentilla basaltica*: The species is excluded from OHV use.

The Preferred Alternative implements additional restrictions to OHV use. Approximately 11,994 acres would be ‘Closed’ to OHV use, and 1,208,650 acres would be ‘Limited to Designated Routes’. This reduction of cross-country vehicle use throughout the field office area would result in minor to moderate benefits to special status species.

4.18.5 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.

4.18.6 Mitigation Measures

All proposed Surprise Field Office 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.

4.18.7 Unavoidable Adverse Impacts

No unavoidable adverse impacts will effect the known or suspected populations of special status plants on lands managed by BLM's Surprise Field Office.

4.18.8 Short-Term Uses Versus Long-Term Productivity

None.

4.18.9 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 Surprise Field Office. This is a regulated program, and BLM will follow federal and state policy.

4.19 Potential Effects on Visual Resources

This section analyzes the direct, indirect, and cumulative effects on visual resources from implementation of the Preferred Alternative.

4.19.1 Methodology and Assumptions

All surface-disturbing activities, regardless of alternative or management action, would be subject to the visual resource management (VRM) class objectives of the area within which the activity takes place. The visual resource contrast rating system is used to analyze potential site-specific impacts from surface disturbance and to guide facility placement and design. Surface-disturbing activities and facilities are then designed so that visual impacts conform to the area's assigned VRM class objectives. It should be noted that this VRM impact analysis includes all lands within the Surprise Field Office (SFO) area, not just those administered by BLM. This is due to the nature of the visual resource concept; in which foreground, middle-distance, and background views frequently include a mosaic of federal, state, and privately owned lands and are considered as a whole when assessing the impacts of proposed management actions.

As a general rule, the greater the surface disturbance, the greater would be the impact on scenic quality. Wildland fire, renewable energy and mineral development, special-designation areas, recreational development, livestock grazing, vegetation manipulation, wildlife habitat and cultural resource management would introduce new visual elements; thus altering the line, form, color, and texture that characterize the existing landscape. These surface-disturbing impacts (visible and measurable as line, form, color, and texture) contrast with the natural environment and impact scenic quality on a short or long-term basis.

In assessing the impact of surface-disturbance on scenic quality, viewer perception (measured as viewing distance), viewer sensitivity to impacts, and VRM class objectives are all considered. Areas with lower scenic value (VRM Class III and IV) are allowed a wider range of impacts than areas with higher scenic value (VRM Class I and II.)

4.19.2 Incomplete or Unavailable Information

Adequate information is available to analyze effects on visual resources at the RMP level.

4.19.3 Analysis

For the purpose of this analysis, levels of effects on visual resources are defined as follows:

Negligible: Impacts on scenic quality would be barely detectable, affecting the experience of few visitors in the applicable setting.

Minor: Impacts on scenic quality would be noticeable, affecting the experience of many visitors in the applicable setting.

Moderate: Impacts on scenic quality would be readily apparent, affecting the experience of the majority of visitors in the applicable setting.

Major: Impacts on scenic quality would be dramatically apparent (severely adverse or exceptionally beneficial), affecting the experience of nearly all visitors in the applicable setting.

4.19.4 Analysis of the Preferred Alternative

The Preferred Alternative would result in minor adverse and moderate to major beneficial impacts to scenic quality.

Proposed actions to protect cultural resources by restricting, reducing, or eliminating ground-disturbing activities—such as OHV travel, fire suppression, mineral development, and recreational staging areas—would benefit visual resources by maintaining natural settings at cultural resource sites. Minor, short-term adverse effects would result in isolated areas from archaeological excavations.

Management of wildland fire and fuels—including prescribed burns, wildland fire use (WFU), mechanical treatments, and habitat restoration projects—would result in short-term visual impacts resulting from burned vegetation and other land disturbances. WFU is expected to result in long-term benefits for the health of native plant communities, which would help retain a natural landscape and benefit visual resources.

Fire suppression activities—such as fire lines (bulldozer and hand construction), road access, and staging areas, and the use of fire retardant—would lead to adverse short and long-term impacts. Adverse impacts are strong linear, color, texture, and contrasts in form produced in highly disturbed strips of land denuded of vegetation by these activities. If not sufficiently rehabilitated, scars from fire-suppression activities could remain as long-term visual impacts.

Soil management includes standard practices for road construction, prescribed burns, mechanical vegetation treatment, soil treatments, and seeding. For all alternatives, road construction would be minimized. In addition, ground-disturbing activities, such as those described above, would be minimized and implemented on an as-needed basis. This would have long-term benefits for scenic quality by enhancing the ecological health and natural character of the landscape.

Restoring unhealthy vegetation communities and reducing infestations of noxious weeds would benefit visual resources by restoring the natural character and diversity of the native landscape. Short-term adverse effects would result from the use of machinery and disturbance resulting from vegetation manipulation, but these effects would not be significant. Potential road construction for juniper management and mechanical harvesting of juniper would cause adverse visual impacts, but they would be localized and insignificant, as disturbed areas would be restored to the natural plant community. Casual and unregulated juniper harvest would result in short-term moderate impacts resulting from downed juniper trees and brush, but this will gradually disappear as the juniper decays.

Range improvement projects would affect scenic quality on a short and long-term basis. Temporary enclosure fencing would have short-term effects on visual quality whereas permanent enclosures or allotment fencing affects visual quality for the long-term. Livestock grazing affects soils, riparian areas, and vegetation by potentially denuding vegetation and causing soil erosion. Visual effects are site-specific. Adverse effects from grazing are mitigated through modified grazing practices as well as soil, riparian, and vegetation manipulation projects.

Management of wilderness study areas under VRM Class I, and developing buffer zones for historic trails, would protect the visual integrity of the natural landscape in these areas and preserve their visual resource value. Assignment of VRM classes would be with about 50% of the landscape designated as Class I and II.

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Closure and rehabilitation of roads would improve the visual character of these locations by removing road scars and promoting growth of natural vegetation. Such enhancements would generally be conducted in WSAs and would not affect overall scenic quality.

Approximately 2.2 miles (457 acres) of Twelvemile Creek would be managed under WSR guidelines and standards for recreation—which includes management as VRM Class II. Management for a natural setting would benefit visual resources in the area.

Management practices improving water quality and riparian function (including erosion control measures, in-stream structures, vegetation planting, and use of exclosures), are not expected to adversely affect visual resources because these activities would be limited to the area of impact and, for some measures, visual impacts would be temporary or result in long-term benefits as the natural landscape is restored.

Management of wild horses is not expected to directly affect the scenic quality of the planning area because management does not include ground-disturbing activities and would not produce visual intrusions. However, use of sensitive areas by wild horses would result in secondary effects (such as trampling, soil compaction, excessive grazing of vegetation, and channel-incision) that would degrade the visual quality of the landscape, particularly at watering areas where severe soil and vegetation damage can occur. These impacts would be site-specific or limited in area, and are not expected to be significant.

Activities related to mineral materials development, locatable minerals development, and oil and gas exploration and development have the potential to greatly change the natural character of the visual setting because of ground-disturbing activities and facility development. However, potential for large-scale development is low in the SFO planning area and mitigation measures would be applied to meet VRM class objectives and minimize potential impacts.

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. New utility lines or communication sites would avoid WSAs and ACECs in order to preserve the natural character of these areas from visual intrusion by facilities such as power lines and communications towers. All other areas would be mitigated for visual impacts based upon the VRM class of the area.

Maintenance of (land) acquisition and retention zones would serve to protect scenic integrity by ensuring retention of ownership on 96% of BLM-administered lands managed by this field office. Also, multiple-use policy insures that VRM objectives are addressed in all resource management decisions. Because parcels suitable for disposal are generally small and isolated, no impacts on visual resources are anticipated from disposal actions.

Vegetation treatments and hazardous fuel reduction projects would use prescribed burns, as well as chemical and mechanical treatments. This would result in temporary adverse impacts from a blackened landscape, dead vegetation, and temporary road construction. However, adverse visual impacts are expected to be short term and temporary.

Development of an OHV special recreation management area (SRMA), if the need arises, would result in moderate localized impacts to visual resources. However, disturbance would be limited to a small area; therefore, no major adverse impacts on visual resources would be anticipated. OHV impacts would be reduced in the northern portion of the SFO management area because motor vehicles would be 'Limited to Designated Routes'. Significant beneficial effects to the overall visual setting would result.

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Development of three new cultural interpretive sites would adversely affect the visual setting near those facilities; however, structures and activities would be planned to meet VRM objectives, which would minimize impacts and retain the overall integrity of visual setting.

Proposed management for the three ACECs designated under this alternative would not allow new right-of-ways. The Bitner ACEC would be 'Closed' to motor vehicles. Motor vehicles would be 'Limited to Designated Routes' in the Massacre Rim and Rahilly-Gravelly ACECs, and in WSAs. OHVs would also be 'Limited to Designated Routes' in the rest of the management area. These decisions would have major benefits for visual resources, by protecting the natural setting.

Construction of additional livestock watering developments would create moderate to major, adverse impacts from the presence of these facilities. Visual resources would be further affected by soil erosion and denuded vegetation resulting from livestock concentration around these developments. Incorporating VRM class objectives in the planning process would help minimize potential impacts.

Development of three wild horse viewing areas would adversely affect scenic values near the viewing areas. However, viewing areas would be planned to meet VRM class objectives.

WSAs and the Bitner ACEC would be 'Closed' to exploration for and development of leasable minerals. This would benefit visual resources by eliminating this activity; thereby helping to retain the natural scenic character of these areas. However, most of the management area would remain 'Open' for mineral development. Despite this, potential for large-scale mineral development is generally low, and project planning must meet VRM objectives, thus minimizing visual impacts.

Lands would be acquired from willing sellers within (private in-holdings) and adjacent to WSAs, ACECs, and WSR segments, as well as within or adjacent to conservation and scenic easements. VRM class for these areas would correspond to that of the surrounding special area designation, thus preserving the natural visual setting of these areas. Lands of high resource value would also be sought and acquired.

4.19.5 Cumulative Effects

Land-use in areas adjacent to BLM-administered lands has the potential to adversely affect visual resources on BLM lands. Historically, economic and social factors have altered the natural environment, gradually altering the visual landscape. Some of the most significant activities affecting scenic resources in the SFO management area are: conversion of land for agricultural and residential use, road construction, logging, and vegetation treatments (especially juniper.) Local and regional population growth would lead to increased demand for energy, and potentially increase demand for utility corridors, wind farms, and mineral materials. However, given the relatively low population density in the field office area, growth, and demand for materials is not expected to be significant.

During the completion of environmental analysis for specific projects, BLM will consider potential scenic impacts together with uses and visual effects on adjacent lands such that new activities on BLM-administered lands will not exacerbate existing adverse effects. Management and activities on BLM-administered lands would result in incremental beneficial effects on visual resources from reduced OHV use, limitation of utility transmission to corridors, and removal of abandoned transmission towers, telecommunications sites, and other unused facilities.

Most activities associated with BLM resource programs are temporary and limited to a localized area. Cumulative effects on visual resources are not expected to be significant when considered together with projected land uses and reasonably foreseeable future activities.

4.19.6 Mitigation Measures

Principal mitigation measures are topographic screening, tasteful facility design, thoughtful placement, and coloring to camouflage unsightly areas.

4.19.7 Unavoidable Adverse Impacts

Energy and mineral exploration and development, road and trail construction, and vegetation treatments for hazardous fuel reduction have unavoidable short- and long-term adverse impacts on visual quality that cannot be completely mitigated by coloring or camouflage, facility design or placement, or topographic screening.

4.19.8 Short-Term Uses versus Long-Term Productivity

Short-term adverse impacts from prescribed fire and other vegetation treatments would have beneficial, long-term visual effects by improving the form, color, and line (irregularity or “patchiness”) of vegetation, and by reducing the potential for visual quality degradation that would result from catastrophic wildfires.

4.19.9 Irreversible and Irretrievable Impacts

Some cultural resources—such as petroglyphs, pictographs, and prehistoric or historically important structures—have an important visual component. Unauthorized activities that damage or destroy these resources have irreversible impacts.

4.20 Potential Effects on Water Resources

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

4.20.1 Methodology

The potential for proposed management activities to affect water resources was evaluated primarily through the framework of the Standards and Guidelines. The following standards were used in the analysis: Standard 2 (Streams) and Standard 3 (Water Quality).¹ In addition, water quantity (for both surface water and groundwater) and flooding were considered, as directed in Executive Order 11988 (Floodplain Management). Each criterion is briefly discussed; for a more complete discussion of standards, please refer to the source document.

For this analysis, an effect on water resources was considered *adverse* if it would:

- **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 such that existing or future consumptive or instream uses are impaired.
- **Flooding:** result in incompatible floodplain development, be inconsistent with the standards and criteria of the National Flood Insurance Program, or impair natural and beneficial floodplain values.

4.20.2 Key Water Resources Concepts

The following key water resources concepts are fundamental to understanding the discussion of environmental consequences.

Stream Form and Function

Key factors related to stream form and function includes 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:

- Gravel bars and other coarse-textured stream deposits are successfully colonized and stabilized by woody riparian species.
- Stream bank vegetation is vigorous and diverse, mostly perennial, and holds and protects banks during high stream flow events.
- The stream water surface has a high degree of shading, resulting in cooler water in summer and reduced icing in winter.

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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- Portions of the primary floodplain are frequently flooded (inundated every 1 to 5 years).

Water Quality

Water quality in a typical surface waterbody 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 primarily 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 non-point sources. The following key constituents were considered in the analysis: sediment, temperature, nutrients, pathogens, and DO. Other constituents, such as pH and conductivity, were not considered because of their low potential to be affected by the proposed management actions.

SEDIMENT

Sediment is generated when soils are disturbed and discharged directly to a waterbody or carried to the receiving water in overland runoff. High concentrations of suspended sediment in surface waters cause many adverse consequences, including:

- 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.

Additional 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, as 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 (Gavin and Moore 1982).

Note that, in areas that are starved of sediment (e.g., areas downstream of reservoirs or other artificial impoundments); increases in sediment can result in beneficial effects in terms of stream channel geomorphology and development of aquatic habitat.

TEMPERATURE

Elevated water temperatures can substantially affect organisms adapted to a coldwater 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 in excess of 20°C (68°F) are considered to be stressful—and perhaps lethal—too many coldwater organisms in the Surprise Field Office area. Large daily fluctuations in temperature can also result in adverse effects.

NUTRIENTS

Nutrients are necessary for photosynthesis, as well as to support the requirements of organisms at higher trophic levels. In freshwater aquatic systems, the primary nutrients are phosphorus and nitrogen. In particular, phosphorus is a controlling factor on photosynthetic activity in aquatic systems.

High concentrations can stimulate the growth of plants and algae. Excessive growth of plants and algae can 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. Excessive levels of phosphorus and nitrogen that lead to undesirable algal blooms are part of a process known as eutrophication.

PATHOGENS

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 primary 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 waterbodies. The presence of fecal coliform bacteria in water indicates that fecal material has entered the waterbody. It can also indicate that other harmful bacteria or viruses may be present. Some of the results of these bacteria or viruses in the waterbody could be exposure of people using the waterbody to typhoid fever, bacterial gastroenteritis, and hepatitis A. Fecal coliform bacteria present in waterbodies on BLM-administered lands are usually a result of non-point sources of human and animal waste.

DISSOLVED OXYGEN

The amount of oxygen that can be dissolved in water varies with temperature. Cold water can contain more DO than warm water. The amount of DO that is 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 (BOD) test, which measures the amount of oxidizable matter. Factors resulting in increased DO levels include 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 may result in fish kills.

Water Quantity

Water quantity is related to the volume of flow and/or storage in a given waterbody. For groundwater, water quantity is expressed in terms of aquifer volume. Groundwater resources should be sufficient to support beneficial uses, which can include domestic and agricultural supply. Surface water flows may also support domestic and agricultural consumptive uses; in addition, they can support recreational activity, biological resources (such as fish passage), and water quality.

Flooding

The Federal Emergency Management Agency (FEMA) provides information on flood hazard and frequency on its Flood Insurance Rate Maps (FIRMs). FEMA identifies designated zones to indicate 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 provides benefits to the natural ecosystem; however, it can imperil humans, livestock, wild horses, 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.

4.20.3 Data Sources

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 MS Access Water

Quality database in the Surprise Field Office. California Irrigation Management Information System (CIMIS) 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 that is partially complete.

4.20.4 Assumptions

The analysis boundary for considering the effects on water resources is all the lands within the Surprise Field Office's jurisdiction. For considering cumulative impacts, all lands within the watersheds of Surprise Field Office holdings were taken into account, as well as any downstream conditions to which project alternatives could contribute.

In analyzing effects on water resources, the following assumptions have been made:

- Short-term effects are defined as those impacts that are anticipated to occur within 1 to 5 years of implementation of the activity. Long-term effects are defined as those that would occur after the first 5 years of implementation but within the life of the RMP (projected to be 20 years).
- Adverse effects on water resources throughout the entire Surprise Field Office area would be minimized through the use of standard management practices and adherence to Standards 2 (streams) and 3 (Water Quality) of the Approved Northeastern California and Northwestern Nevada Standards for Rangeland Health and Guidelines for Livestock Grazing Management, as well as BLM's source water and groundwater exportation policies.
- Because of the programmatic nature of the project alternatives, impacts are discussed qualitatively. In some cases, more specific analysis would be required to precisely determine the extent of potential impacts; such analysis would be conducted at the time a management action is clearly defined.

4.20.5 Mechanisms for Effects

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 archaeological investigations; mechanical and hand treatments of vegetation; livestock and wild horse grazing, energy and mineral development; harvesting of timber; construction activities related to roads; recreation activities, including off-highway use; and installation of fences, water sources and exclosures. If not properly managed, this ground disturbance could lead to erosion and sedimentation into waterways, with associated degradations in water quality, such as increased turbidity and smothering of habitat.
- **Streambed disturbance** can result in mobilization of sediments and create increases in 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 associated effects on geomorphology and stream health.
- **Reservoirs and instream structures** can affect storage and flows in surface waterbodies. If a new reservoir is constructed, storage in that area would be increased and flows downstream could be reduced.

- **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 lead to destruction of stream banks and removal of riparian vegetation, which is possible where alternate water supplies are not available or where exclosures are not used. Similar effects can result from the activities of wild horses if not managed properly.
- **Altered drainage patterns** could result from ground-disturbing activities, such as road construction, timber harvesting, and 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 waterbodies during precipitation events, including oil and grease, gasoline, heavy metals, and sediment. Improperly maintained ditches and culverts associated with roads can concentrate runoff from roads and cause erosion. Off-road vehicles can cause erosion.
- **Herbicide use**, if improperly conducted, can cause violations of water quality standards. Residual traces of herbicides can be washed into soils and waterbodies during precipitation events.
- **Water transfers** can result in water being removed from a system and can result in a net decrease in water quantity or otherwise degrade beneficial uses.
- **Public visitation** could mean an increase in ground-disturbing activities from foot and vehicle traffic. Water quality standards also could be violated if an increase in vehicle traffic leads to an increase in contaminants washing off roads into the waterbodies. Direct pollution of waterbodies could occur through 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 related to many of the factors identified above.

4.20.6 Incomplete or Unavailable Information

The water quality database contains all water quality data collected since 2002. Although the data were collected and analyzed using protocols approved or accepted by the U.S. Environmental Protection Agency (EPA) and U.S. Geological Survey (USGS), the quality of the work varies considerably with the experience of the field and analytical personnel. Because of funding constraints, there has been no regular monitoring program, and consistency varies from year to year.

Beginning in hydrologic year (HY) 2002, a conscientious effort was made 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 identified above.

This information also would be used to direct BLM's future water quality data collection efforts to those places where data gaps exist. Because of time constraints, the data used in this report have not been validated and probably reflect a worst-case scenario.

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Other areas where data gaps could be filled include the following:

- Additional water quality data is needed to determine the condition of other waters, including springs, intermittent streams, lakes, and ponds.
- Based on existing data, follow-up data collection is needed on waters that may not meet standards or the needs of desired beneficial uses—primarily the desired assemblage of native aquatic species.

4.20.7 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 within 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 within water quality standards or criteria and within desired water quality conditions.

Moderate: Chemical, physical, or biological effects would be detectable but would be within water quality standards or criteria; however, 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.

4.20.8 Analysis 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. Major water-disturbing activities that are expected to occur under all alternatives include the following:

- livestock grazing,
- wild horse use,
- recreation and off-highway vehicle (OHV) use,
- fire use and fuels treatments,
- road construction and maintenance, and
- juniper treatment projects.

As a result of these activities, impacts include:

- hydrologic modifications through soil erosion and soil compaction, and
- decreased infiltration and increased runoff, thereby degrading water quality and quantity through increased sedimentation and streambank alteration.

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Development and maintenance of water sources for improved livestock and wildlife distribution are anticipated to reduce impacts on water resources in areas where use is currently concentrated. This management would benefit both stream channel condition and water quality by reducing the intensity of effects from livestock and wild horses in any specific location. In addition, use of exclosures around springs and associated riparian systems where needed is anticipated to greatly increase progress toward meeting Land Health Standards in these locations.

Water resource management would allow public uses and activities within streams, riparian areas, and contributing uplands as long as they do not impede progress toward attaining water quality standards or the goals and objectives for riparian habitats and PFC. For streams with quality-impaired segments, or lakes not meeting water quality standards, allowed uses must not interfere with restoring water quality to standards set by the States. 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. Although Basin Plan amendments would not directly affect water resources, amendment of standards would help focus management on areas where problems are most acute, and therefore are anticipated to indirectly benefit water resources over the long-term.

The Preferred Alternative is likely to result in relatively quick progress toward meeting Land Health Standards, and benefits would be more pronounced in both the short-term and long-term. Rehabilitation would focus on natural processes and would not involve actions where these processes are not effective.

Soil resources management actions would result in increased vegetation cover, increased soil stability, and other long- and short-term beneficial effects from limiting sedimentation and erosion and improving hydrologic function. Relevant management actions include implementing best management practices on areas not meeting Land Health Standards; limiting or prohibiting activities near intermittent and perennial streams where such activities would adversely affect watershed function or processes, or where soils are not meeting Land Health Standards; managing livestock grazing patterns; invasive species management activities; actions to prevent compaction of shrink-swell soils; implementing buffers around sensitive sites; and limiting ground-disturbing activities in the vicinity of waterbodies where soils are not in PFC. These actions also would marginally reduce harmful flooding and would improve water supplies by encouraging soil water retention and subsequent release over the season.

Sediment intrusion buffer zones would be established around sensitive sites (e.g., bodies of water, certain biological sites, and archaeological sites) and developed property (e.g., campgrounds, and administrative sites) on a case-by-case basis. Roads and trails would be of primary concern, but buffer zones apply to any soil-disturbing activity that would create significant wind or water-borne sediments, and threaten sensitive resources or human health and property. Adequate protection may not be provided in areas where such buffers are needed but the need is not identified.

Vegetation resources management actions include treatment of noxious weeds, juniper removal, and management and restoration for various native and historical vegetation communities. Multiple management strategies are proposed, including grazing management; use of exclosures, fire, mechanical, hand and chemical treatments; and use restrictions. Short-term adverse negligible effects on water quality from these activities, such as herbicide residuals and soil erosion from surface disturbance and reduced overall vegetative cover, would be ameliorated through the proper use of these treatments and implementation of appropriate mitigation measures. For instance, the methods for herbicide application would follow label requirements and standard operating procedures, which would ensure that any effects from herbicide use would be minimal.

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To the extent that removal of noxious weeds and restoration of vegetation communities supports proper hydrologic function in other ways, the management approach is anticipated to benefit water resources—as it would support maintenance and progress toward Land Health Standards. Long-term benefits would be enjoyed as a result of the soil stability yielded by native vegetation. In addition, many of the managed communities support natural hydrologic regimes. In particular, riparian system management is expected to result in the largest beneficial effect on water resources because of its key role in maintaining stream channel condition, water quality, and management of flows and flooding.

The effects of juniper management on water resources vary, depending on site-specific conditions—such as proximity to water sources (which can affect water quantity) and stand density (which can guide the extent of understory that prevents erosion and supports soil stability). In some cases, juniper removal may increase erosion; in other cases, erosion may decrease. Effects related to site-specific characteristics (e.g., soil type, slope, and proximity to a water source) would be greater than effects related to differences in removal method. On the whole, vegetation resources management actions would result in long-term benefits to water resources.

Specific proposals would be evaluated for their consistency with VRM classifications, and potential effects on resources—including water resources—would be considered. Management measures would be required to ensure that Land Health Standards are maintained and that significant progress continues toward meeting standards. Management would focus on improving progress toward meeting Land Health Standards in areas not currently meeting standards. A variety of management actions, such as livestock management and use of exclosures, would be implemented for this purpose. The Preferred Alternative is anticipated to reduce erosion and releases of other contaminants, and generally would improve water quality, riparian values and stream channel condition in areas not currently meeting standards. Similar but smaller benefits related to flooding and water supply also are expected. The similar benefits from integrated weed management activities would be noticeable in the short-term and would be even more substantial over the long-term.

Forestry management actions include prescribed burning, fuels management, and reforestation, construction of roads, and woodcutting for private use. The ground-disturbing aspects of these activities can result in increased erosion, sedimentation, turbidity, runoff, and soil compaction, and decreased infiltration in the short term. However, timber operations would be required to implement measures as necessary to protect water quality. Where forestry actions improve ecosystem condition, long-term beneficial effects would accrue to water quality, stream channel condition, and flooding as a result of improved natural functioning of forested areas, reductions in catastrophic fires through fuels management. In addition, management would include measures to reduce the effects on water quality of road construction. The effects of management activities are anticipated to be localized and because the forested acreage of the Surprise Field Office area is very small, the effects are not anticipated to be substantial.

If not properly managed, fires can result in increased erosion and sedimentation, as well as other declines in water quality such as increases in organic carbon, releases of other contaminants from burned material, and decreased infiltration that result in increases in peak runoff and flooding. Fire can therefore potentially adversely affect stream channel condition, water quality, flooding, and water quantity. These effects are particularly acute during and following catastrophic fires. In general, use of AMR, wildland fire, and fire and fuels management actions would result in long-term beneficial effects by reducing the potential for catastrophic fires. Stabilization and rehabilitation activities also would result in both short- and long-term beneficial effects. Short-term moderate adverse effects could result from certain fuels management activities, including chemical and mechanical treatments; however, as discussed above, management measures would be implemented to reduce or avoid these effects, and the long-term benefits of such activities generally would offset these effects.

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The vast majority of the field office area would be subject to an AMR of full fire suppression. Therefore, the potential for catastrophic fires is low throughout the Surprise Field Office area, likely to result in minor to moderate impacts on water resources depending on the size of the fire and the amount of ground disturbing suppression actions taken. While full suppression would be used, post-fire rehabilitation and fuels management plans would also be implemented. The beneficial effects of stabilization and rehabilitation treatments would partially offset the adverse effects associated with full suppression; however, fuels treatments would address only small portions of the field office area annually and would not substantially reduce fuel loads over the entire field office area during the life of the plan.

The terrestrial and aquatic wildlife resources management actions include measures to improve fish and wildlife habitat and to support special-status species. These actions generally would result in beneficial effects on water quality over the long term, with appropriate measures implemented to support water quality in the short-term. The indirect benefits associated with habitat rehabilitation, increased water availability, managing grazing practices, use of exclosures, and OHV restrictions can improve soil stability, hydrologic function, and overall beneficial use of water supplies. Developing new reservoirs and maintaining and enhancing water sources could result in increased water supply but would result in short-term streambed disturbance and turbidity from construction. 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. Prescribed burning to support wildlife habitat would result in short-term minor adverse impacts, similar to those described above for fire and fuels management, but would result in long-term improvements to water quality as more natural fire regimes and vegetation communities are restored.

Fisheries management actions include creation of instream structures and other instream improvements, construction of reservoirs to maintain flows, fencing, and closure or relocation of roads where water quality or stream channel condition is adversely affected. All of these measures would greatly benefit water resources through improving water quality, particularly in areas where Land Health Standards are not currently met. In some cases, construction activities could result in short-term negligible effects, such as increased turbidity and release of sediment; these effects would be temporary, however, and the long-term benefits would remain positive. Other actions to manage fisheries could include water flow agreements, acquisition of water rights, and projects with private landowners to maintain streams. All of these actions would assist BLM's ability to successfully manage waterbodies such that they remain healthy with respect to flooding, quantity, water quality, and stream channel condition. In general, terrestrial and aquatic wildlife management actions are anticipated to result in substantial beneficial effects on water resources.

Continued use of BLM-administered land by wild horses in these areas introduces potential for ongoing soil compaction, erosion, sedimentation, and degradation of stream channel condition where exclosures are not implemented (Fleischner, 1994). The presence of wild horses also could degrade water quality when animal wastes are washed into waterbodies during precipitation events, increasing nutrient (Belsky, et al 1999) and pathogen levels in waterbodies (Bohn and Buckhouse 1985b, George 1996).

However, the AML would be set and maintained at levels that allow Land Health Standards to be met, and would represent a decrease from the current levels of wild horses populations. As such, while adverse effects associated with wild horses could still occur, future conditions would represent a substantial improvement relative to existing conditions and are expected to result in progress toward attaining Land Health Standards. Overall, wild horse use would result in short- and long-term minor to moderate adverse impacts on hydrology and water quality.

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Use of BLM-administered lands by livestock would result in similar impacts on water resources as described for wild horses above. Grazing management actions include rangeland improvements, such as prescribed fires, seeding, and fence construction. In addition, areas affected by fire or mechanical treatments would be rested for a minimum of two growing seasons. Finally, where allotments are failing to meet Land Health Standards, appropriate guidelines would be implemented as identified in the Standards and Guidelines. All of these activities are anticipated to result in long-term beneficial effects, particularly where the activities are focused in areas not meeting Land Health Standards. While some short-term negligible effects could be experienced as a result of management actions, such as construction-related erosion associated with new fence construction, measures would be implemented to minimize such effects, and these effects are not expected to be significant.

The extent to which each land acquisition, disposal, and exchange may cause water resources effects depends on the relative management approach for the parcel in question, both prior to and following the LTA. In general, these actions would consider the relative resources values and therefore would benefit water resources by allowing additional management for high-value areas and those that BLM can most effectively manage. The effects would vary, however, based on the specific proposal. Further project-specific analysis would be conducted to evaluate the effects of each specific lands and realty proposal. It is anticipated that BLM policies would be sufficiently protective to avoid adverse effects on water resources.

Recreation activity, in general, can lead to surface disturbance; release of human-related contaminants such as nutrients, bacteria, and trash; and other effects related to vehicle use. Water-based recreation represents a direct mechanism for contamination of waterbodies. Where recreation activity is properly managed (e.g., restricted to appropriate locations and activities), moderate adverse effects on water resources, and water quality in particular, can be minimized or avoided.

Actions with potential to benefit water resources include emergency vehicle closures where it is determined that OHVs are causing or would cause adverse effects on soils and water resources, restriction of OHV use in the Rahilly-Gravelly ACEC to existing roads and ways, and restoration of roads designated for closure. Limitations and closures on vehicle use would reduce the potential for erosion, compaction, and other factors that can lead to sedimentation of streams; reduce water infiltration capacity; and otherwise affect flooding, water quality, and stream channel condition.

Actions with potential adverse effects include new trail and facility construction, with short-term effects from construction and longer-term effects from use of these areas. Measures would be implemented to reduce short-term minor effects such that they are not expected to be significant. In addition, as discussed above, proper siting and management would reduce long-term effects.

No areas would be designated as 'Open' to OHV use, most areas would be 'Limited to Designated Routes'. No new OHV routes would be developed, and closures and limitations to designated routes would be implemented in multiple locations. These actions would result in greatly reduced water resources impacts. Some new roads for OHVs may be developed, which could result in moderate adverse effects to water resources. Land Health Standards would be readily achieved with a relatively small amount of effort.

Mineral extraction could degrade water quality if mining actions were not properly conducted. However, mining activities would be required to implement management measures to reduce soil disturbance, such as seeding and other measures as necessary to ensure that the activity does not induce substantial erosion or result in release of other water quality contaminants. In addition, approval of specific mining proposals would require further environmental analysis that would identify measures to be implemented as necessary to minimize adverse effects on water resources.

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Nevertheless, active mining could slow progress toward meeting Land Health Standards if mining activities increase above the current rate.

WSAs would be ‘Closed’ to all leasable and saleable mineral extraction, which would support Land Health Standards and benefit water resources in the WSA areas—in addition to improving water quality downstream.

Management actions for WSAs would continue similar to present management and are not anticipated to affect water resources, either adversely or beneficially. Some ACEC designations would overlap with existing WSA boundaries. The Rahilly-Gravelly ACEC would be designated as per the Lakeview RMP; management of this relatively small ACEC would avoid acquisition of new ROWs, limit OHVs to existing trails and roads, and manage grazing for resource protection. All of these actions are anticipated to result in beneficial effects in this ACEC and would support water resource standards.

In addition, 2.2 miles and 457 acres surrounding segments of Twelvemile Creek would be managed as a Wild and Scenic River with a ‘recreational’ classification. Management actions for Wild and Scenic Rivers would include many measures that would protect water quality, stream channel condition, and improve progress toward Land Health Standards—such as restrictions on grazing and vehicles, stream bank stabilization measures, and other measures to protect the outstandingly remarkable values and improve riparian conditions.

The utilities, transportation, and telecommunications management actions involve granting ROWs. In some cases, existing ROWs could be affecting water resources—where maintenance involves ground-disturbing activity with the potential to affect water quality. In general, however, maintenance of these ROWs is not anticipated to result in effects that deviate substantially from existing conditions. Granting of ROWs itself would not adversely affect water quality; however, implementation of these ROWs (e.g., construction of communications facilities) could cause minor to moderate adverse effects as a result of ground-disturbing activities associated with construction. This could result in increased soil compaction, erosion, sedimentation, runoff, and decreased infiltration, as well as the potential for release of construction-related hazardous materials. However, prior to allowing any major construction activity, BLM would perform project-specific environmental analysis that would identify potential water quality effects and appropriate mitigation measures.

Cultural resources management actions with potential to affect water resources include fence construction, access restriction, road closures, vegetation removal, increased visitation, trail construction, grazing area reductions, and land use restrictions. Because the majority of the actions are likely to reduce access or otherwise decrease surface disturbance at cultural resources sites, effects on water resources are likely to be beneficial through reductions in erosion and sedimentation and releases of other contaminants associated with human and livestock use. Similar beneficial impacts on stream channel condition would be expected, where access by livestock, wild horses, and OHVs is restricted in the vicinity of streams. Cultural resources management activities with potential to adversely affect water resources would be required to implement management measures such that the impacts on water resources are not significant and progress toward Land Health Standards is maintained. Management actions are unlikely to affect flooding or water quantity, either positively or adversely.

The Preferred Alternative would develop three new interpretive areas, and designate three new cultural ACECs. Additional CRMPs would be developed for these areas, and management attention would be focused on the ACECs, which would include measures that would benefit soil and water resources. Other cultural resources management actions involve activities that are anticipated to result in substantial, long-term benefits to water quality and stream channel condition by reducing the potential for trampling, erosion, and release of other contaminants from humans, vehicles, livestock, and wild horses.

Under the Preferred Alternative recreation management would provide extensive public access to the Surprise Field Office area, except in WSAs and ACECs for the purposes of recreation has the potential to adversely affect water resources through increased exposure to ground-disturbing activity and releases of other contaminants. Development of campgrounds, trails, viewing and interpretive areas, and back-country byways in response to demand could result in short-term moderate adverse impacts as a result of construction—and long-term minor effects related to increased use except that ROS designations would place 448,394 acres in the semi-primitive non-motorized category, which would reduce the effects of vehicle use in those areas.

4.20.9 Cumulative Effects

Cumulative effects are primarily anticipated in areas where waterbodies 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). Waterbodies meeting this definition are identified in Chapter 3. In such areas, any management action that has been identified above as having potential for interfering with the ability to meet Land Health Standards or slowing progress toward meeting those standards would result in impacts on water quality. Such impacts are not considered to be of a substantial magnitude.

Land uses on areas surrounding BLM holdings have the potential to generate adverse effects on water resources, which could be exacerbated by BLM actions with similar potential adverse effects. Known activities on non-BLM-administered lands in the Surprise Field Office area include conversion of sagebrush and other habitats to agricultural or residential use, invasions of noxious weeds, juniper treatments, logging and road construction, grazing, water use, and fire. In approving specific activities and implementing appropriate protective measures and management practices for lands it administers, BLM is expected to consider these adjacent uses and the potential for BLM's activities to exacerbate any potential cumulative adverse effects. Therefore, although some cumulatively considerable effects may be associated with BLM activities in combination with other land uses, such effects are not anticipated to be significant.

4.20.10 Mitigation Measures

All resource uses with the potential to degrade water resources would employ BMPs at the activity or project level to minimize potential adverse effects. Reduction of surface-disturbing activities in and near streams, riparian and wetland areas would also mitigate adverse effects. Administrative actions such as halting surface disturbing activities, changes in grazing management, and increased enforcement of travel restrictions can be taken where water resources are being degraded.

4.20.11 Unavoidable Adverse Impacts

Resource uses of most concern would be those associated with livestock grazing, wild horses, new road construction, and OHV use, due to the potential for localized and widespread surface disturbance. Actions with similar but smaller adverse effects are related to forestry, issuance of ROWs, and mineral extraction, due to the smaller areas that would be subject to disturbance from those actions. Fire and fuels management has a great potential to adversely affect water resources; however natural recovery of watersheds and subsequently benefits to water resources following fire and fuels uses would outweigh these effects.

4.20.12 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.

4.20.13 Irreversible and Irretrievable Impacts

Construction of water developments and structures would permanently modify existing water courses and riparian areas so long as they are left in place and continue to be utilized.

4.21 Potential Effects on Wild Horse and Burro Management

This section describes the direct, indirect, and cumulative effects on wild horses from implementation of the Preferred Alternative. Because the Surprise Field Office supports wild horse herds but no wild burros, the discussion of resource impacts is limited to wild horses. Potential impacts to wild horses include decisions from culture resources, fire management, forage allocation, lands and realty management, livestock grazing, mineral resources, recreation, water resources, soil resources, riparian resources, wilderness study areas, special designation, vegetation resources, and wildlife management. Decisions relating to these resources and resource uses would have short- or long-term consequences and various levels of impacts on wild horses in the Surprise Field Office area.

4.21.1 Methodology and Assumptions

Under the Wild Free-Roaming Horse and Burro Act of 1971, regulations, and policies, BLM is required to establish an appropriate management level (AML) for each wild horse herd and to manage populations to this level (BLM 2001). In herd management areas (HMAs) where wild horses would be maintained, BLM would manage the HMA to sustain wild horse populations while achieving herd management plan objectives and Land Health Standards. The AML determination also considers effects on other resources, including forage availability for livestock and wildlife and protecting other resources (BLM 1998). Therefore, managing an established AML would not substantially affect other resources.

As noted in Section 3.22, the herd population sizes on lands administered by the Surprise Field Office exceeded AML in early FY2007 in six of eight HMAs, and the overall horse populations exceeded AML by more than 150%. Nonetheless, the impact assessment is based on the assumption of existing AMLs, including any changes needed to comply with Land Health Standards. Also, this analysis assumed that every herd would be successfully managed according to these AMLs.

Although herd populations would be maintained at AML, management actions that increase the availability of forage have the potential to provide forage for wild horses. Such actions are considered to benefit wild horses by increasing the health of individuals to withstand periods of drought or severe winters. Increased forage is considered a benefit, despite the general recognition that water availability is the limiting resource to wild horse populations.

4.21.2 Incomplete or Unavailable Information

Adequate information is available to address the impacts of resource program actions on wild horses at the planning level for this RMP.

4.21.3 Analysis

For the purposes of this analysis, the levels of effects on each wild horse HMA were defined as follows:

Negligible: The effect would be barely detectable on wild horse appropriate management levels (AMLs) or management and would not impose any more management constraints beyond current regulations and policies. Herd management area (HMA) acreages would not change.

Minor: The effects on wild horses would be slight but detectable and would impose only minor changes to herd area management plans. AMLs and HMA acreages would not change.

Moderate: The effect would be readily apparent, and moderate changes in wild horse herd area management would be imposed. This effect would likely change AML, either upward or downward in the future. HMA acreage would not change, or changes would be relatively small.

Major: The effect on wild horse AMLs or herd area management would be considerable. Either AMLs or individual herd area management would sizably change. The AML for an individual herd would be set at zero or would likely be significantly lower in response to added management restrictions imposed or a change in management classification. An HMA acreage change would be large, either upward or downward.

Short Term: 1-3 years.

Long Term: 4 years or longer.

4.21.4 Analysis of the Preferred Alternative

The Preferred Alternative would result in minor adverse effects and moderate beneficial impacts to wild horses. This alternative conducts high levels of vegetation treatment that would offset juniper encroachment and substantially reverse past encroachment effects on forage quality. Allocation of any additional forage increases would be shared equally between livestock and wild horses.

Present management would continue on four of the existing eight HMAs. Wall Canyon, Nut Mountain, Bitner, and Massacre Lakes HMAs would be managed as a complex. AMLs would be adjusted and some HMA boundaries altered. The most significant change would be a boundary extension of the Fox-Hog HMA, enlarging it by 48,226 acres and resulting in a total HMA area of 493,821 acres. The boundary of the Fox-Hog HMA would be expanded to include areas (pastures) where horses are currently and have historically inhabited. This administrative boundary change would have negligible effects on herd management or AML.

Domestic horses would not be allowed to graze within or next to HMAs if interbreeding with wild horses is likely. In such a case, horse AUMs would be converted to cattle (currently only one horse grazing permit is next to an HMA). During periodic gathers horses released back to the HMAs as breeding stock would be selected for base-herd characteristics, including animal type, color, size, and conformation.

BLM would equitably adjust livestock and wild horse forage allocation using monitoring data and site-specific resource evaluation. If monitoring data finds adverse ecosystem impacts as a result of livestock or wild horse use, the specific class of use (i.e., cattle or wild horse) would be adjusted. In the absence of class-specific monitoring data, adjustments in forage allocation would be proportional to applicable livestock active animal unit months (AUMs) and wild horse AMLs.

BLM would provide and publicize seasonal wild horse viewing areas at three sites in the Surprise Field Office area: These viewing areas would provide minor benefits by exposing the public to wild horses, and educate them about the BLM adoption program. These viewing areas would be in:

- the Buckhorn HMA at Buckhorn Road, near SOB Lake and
- the Fox-Hog HMA, on the Lost Creek Road, near Cottonwood Creek.

Under the Preferred Alternative the following actions would be taken to manage wild horses (Coates-Markle 1999):

- managing for appropriate management levels (AMLs),

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- reevaluating and adjusting AMLs where needed to meet requirements to maintain a natural and thriving ecological balance,
- gathering animals on a regular (3-year) basis to maintain populations at AMLs,
- removing animals found outside HMAs,
- implementing fertility control, and
- conducting censuses and genetic evaluations to support management.

All of these actions would be implemented to maintain healthy horse populations and would benefit wild horses by maintaining healthy herds, even if they result in several AML reductions to meet other resource objectives.

Of all management actions, those under livestock grazing have the greatest potential for conflicts with wild horse management. Livestock and wild horses compete for the same forage and water sources. And in several HMAs they compete for space. BLM would manage livestock and wild horses to achieve moderate (40 to 60%) utilization unless lower levels are needed to meet Land Health Standards. Although Land Health Standards focus on livestock grazing, on-the-ground decisions must consider all uses (BLM 2000). The assessments also include cause-and-affect determinations, meaning that wild horse and cattle grazing would be adjusted on a prorated basis.

Under the Preferred Alternative livestock management would be refined to meet or progress toward meeting Land Health Standards. Range improvements (fencing, offsite water, wells, or pipelines) would be built to reduce grazing effects on riparian habitats. Riparian fence corridors would be incorporated to maintain wild horse movements and migrations. Range improvements intended to restore ecosystem health would increase forage availability and reduce the potential for forage competition between livestock and horses.

Over time, implementing vegetation management actions might increase forage. Therefore, the Preferred Alternative offers the potential to increase AMLs to support more horses with this added forage. In many areas, however, both livestock and horses are limited by water more than by forage availability, so AML adjustments are likely to be minor. The Preferred Alternative would conduct higher levels of vegetation treatment than needed to control juniper encroachment and substantially reverse past encroachment effects. Allocations of any more forage increases would be shared equally between livestock and wild horses.

The Preferred Alternative would intensify deer and sagebrush habitat management with potential for forage improvement for wild horses in some areas. Treatments of aspen, riparian, and wetland habitats would result in fencing, but effects of this fencing on wild horses would be negligible. Aspen management under the Preferred Alternative specifies creation of 4,000 to 5,000 suckers per acre on capable sites. Meeting this objective could require horse exclusion in some areas. But affected acreage and resulting effects on forage availability to horses would be minimal. The effects of maintaining water in wetlands for longer periods would depend on the methods used. Most methods (watershed restoration, excavation to below groundwater, and use of pumps) would also result in benefits by providing drinking water for horses.

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The Preferred Alternative would maintain high-quality crested wheatgrass stands and restore degraded stands, providing a minor improvement in forage for wild horses. Limited forage benefits would result from maintaining crested wheatgrass stands. Juniper treatment would range from 500 to 5,000 acres annually, thereby offsetting encroachment rates and enhancing forage for wild horses. Riparian enhancement areas might be fenced, and livestock and wild horses would be excluded. But offsite water sources would be provided. Noxious weed populations within HMAs would be treated to maintain vegetation conditions for wild horses. These actions would affect small acreages and would negligibly affect wild horse populations. Management measures to control or reduce noxious weeds would benefit wild horses in the long term by maintaining a forage base for wild horses.

Riparian, wetland, meadow, and aquatic habitats would be fenced to ensure adequate drinking water sources for horse use and to ensure that fencing allows for free-roaming behavior (except to achieve the intended exclusion). Common actions to manage native plant communities include maintaining more than 5,500 acres of exclosures in riparian and aspen habitats, considering more exclosures, and protecting culture resources. Most of these exclosures have been built outside HMAs and therefore would have minor effects on wild horse herds.

Management actions for maintaining special status plant species would negligibly affect wild horses, mainly because the restricted area in which the special status plants species occur are in parts of the Surprise Field Office area not normally grazed by wild horses (Darr 1978).

The Preferred Alternative for wildland fire AMR would gradually and cumulatively result in slightly more acres burned and would slightly increase forage for wild horses. Fire could consume forage in herd management areas (HMAs) from time to time. Suppression activities might briefly disrupt horse movements and temporarily reduce forage. But on the basis of the area's fire history, this effect would be minor because fires are likely to be relatively small and would not consume an entire HMA. Therefore horses would simply move to nearby forage sources in the HMA.

Post-fire stabilization and restoration treatments are intended to conserve site capabilities and to restore the burned area to pre-burned conditions. These actions would not change AMLs. In some cases burned areas are fenced to exclude cattle and wild horses. Where fencing is not practical, wild horses might be temporarily removed by gathering. These wild horses would be transported to holding facilities for a 2- to 3-year period or until burned areas are considered recovered. Any such adverse effects on the HMA would be minor.

Fuels treatments (prescribed fire, mechanical, chemical, and biological) would enhance forage availability for wild horses. In the Massacre Lakes, Bitner, Nut Mountain, or Wall Canyon HMAs and in portions of the Fox-Hog HMA treatment methods would negligibly benefit wild horse populations, given the relatively small acreages proposed for treatment.

The soils program involves coordinating with other management programs to meet Land Health Standards. Meeting these standards might require the modifying wild horse management and other activities that damage soil properties. These actions benefit wild horses by protecting forage resources and the long-term productivity of the range.

The only common management action that would directly affect wild horses would result from attributing soil disturbance to wild horses. If taken, this action could lower AMLs. Such a reduction would moderately benefit wild horses. Otherwise, the HMAs capability to support wild horses would decline.

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Soil management practices include applying different-sized sediment buffers around sensitive sites. These actions would protect adjacent uplands from erosion and protect water sources used by wild horses. These protection measures would be limited and would not preclude access to horses for drinking water. The soil resource management action would negligibly benefit wild horse populations and habitats unless soil impacts are attributed to wild horses.

All management actions for federally listed threatened, endangered, and candidate species are mostly involve direct coordination and monitoring. Direct management actions are limited to areas occupied by these species. Many management actions for state-listed, BLM sensitive and state sensitive species also involve coordination and monitoring. But habitat management actions for some species (i.e., sage-grouse) apply to sizeable land areas and vary.

None of the limited management activities for elk and bighorn sheep would conflict with wild horse management. Habitat management programs for deer and pronghorn would negligibly affect wild horse AMLs. No specific restrictions on wild horses are proposed to protect or enhance ungulate habitats.

Although the variety of habitat improvement treatments proposed for sagebrush-obligate species would increase forage availability, only HMAs that are being maintained would benefit.

Management proposed for such special status species as burrowing owls and pygmy rabbits involve conducting surveys and developing management plans for the species. Burrowing owl and wild horse management are unlikely to conflict because these owls prefer grazed areas. Potential localized exclusion of wild horses from areas occupied by the pygmy rabbit would negligibly affect wild horses due to the limited area likely to be involved.

Management actions for other native wildlife species include a variety of monitoring, planning, direct protection, and enhancement actions for migratory birds. None of these actions would affect wild horse populations or management. Fencing waterfowl nesting sites have only localized, minor effects. Maintaining and enhancing water availability for upland game birds could benefit horses, except at sites using devices that restrict large-animal access (i.e., guzzlers). Treatment of important upland habitats (aspen, mahogany, bitterbrush, wetlands, and riparian areas) would provide enhanced habitat conditions for horses, except where exclosures are fenced. Exclosures would be small, and water would be provided to all grazers off site, negligibly affecting wild horses.

Management actions for native and nonnative fish and other aquatic species involve implementing projects and coordinating with other resource management programs to improve streams and springs that are not in proper functioning condition (PFC). If riparian areas are fenced, other water sources would be provided. Localized exclusion of wild horses from areas of protected aquatic habitat would negligibly affect the horses.

The action specifying control or removal of nonnative animals where they threaten native species is not expected to be relevant to wild horses. Other measures to control exotic pest species and encourage the use of native species for revegetation would only negligibly adverse effect wild horses.

Water resource actions common to all alternatives include management to improve desired future condition (DFC) and proper functioning condition (PFC) on 53 miles of streams and 2,500 acres of riparian and wetland areas that do not now meet these conditions. Other actions include measures to meet state water standards and beneficial uses on streams not in compliance and to achieve basin plan standards for bodies of water. Most of these improvements would be met by the following:

- coordinating grazing activities,

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- protecting waters,
- upland erosion control,
- road closure and relocation,
- recreation management, and
- acquisition of key lands.

These actions would negligibly affect wild horses. Access to water would be restricted to ensure continued access to water for livestock, wild horses, and wildlife. Protecting water sources and aquatic resources involves a small area of land (probably <1% of available land in HMAs) and thus a loss of only a small amount of forage for wild horses. Also, such actions would maintain the quality of water available to wild horses and would benefit animal health. Therefore, like the description of related actions for soil resources, these common activities would only negligibly affect wild horses.

Given the low potential for energy and mineral development, limited and localized demand for these minerals, locatable mineral activities would negligibly affect wild horses. Closing all WSAs to leasable and saleable mineral development would negligibly benefit portions of the Massacre Lake, Bitner, and Buckhorn HMAs.

Potential disposal lands include isolated lands that are not easy to manage and that do not have high-value resources. Except for a small parcel in the Carter Reservoir HMA, no HMA lands are within the Zone 3 land tenure designation (potential disposal lands).

Proposed land acquisitions would benefit wild horses by ensuring water availability (most scattered tracts of private lands within HMAs have water sources) and reducing management problems of wild horses using private lands within HMAs.

Most of the lands administered by the Surprise Field Office would be used for low-density recreation. Although the recreation program actions are important in defining recreation benefits and effects, these actions would negligibly affect wild horse populations and habitats. Many recreation activities are of limited seasonal or daily duration and are concentrated on developed recreation sites. Although horses might occupy these sites, they could move to less-visited areas.

Management actions designating backcountry byways and historic national trails would negligibly affect wild horse management. Wilderness study area (WSA) management would be similar to existing management. Three WSAs overlap three HMAs. But proposed management would not alter existing habitat conditions. WSA or wilderness designations would limit future vegetation improvements, temporary gathering facilities, and range improvement structures. These effects on wild horses would be determined on case-by-case basis. No wild and scenic river designations have been proposed in any HMAs.

The Massacre and Bitner ACECs would be designated in the Massacre and Bitner HMAs. The Massacre ACEC is also within the Massacre WSA, and WSA limitations would apply to this area. Otherwise, HMAs would be managed within appropriate AMLs. AMLs or HMAs would be changed if conflicts develop with other values such as culture resources. Under present policies and regulations, ACEC designations would have minor effects on wild horses.

4.21.5 Cumulative Effects

The following resource management programs would negligibly affect wild horse management or they would exclude horses from a very small proportion (<1%) of the herd management areas: visual resources, minerals and energy, forestry; and utilities, transportation, and communications.

Although the wild horses in the Surprise Field Office area are managed mainly on BLM-administered lands within designated HMAs, the acreage of private land inholdings differs considerably from one HMA to the next. But generally these inholdings represent from 10 to 18% on the total acreage. Important water sources for the HMAs often occur on unfenced intermingled private lands. No substantial management changes within these private lands have been proposed, but any private acquisitions would support existing AMLs.

The main mechanisms by which alternatives could affect wild horses consist of implementing actions that do the following:

- increase forage and water availability,
- allocate forage and manage improvements that affect potential for livestock competition for forage,
- designate lands for wild horse management, or
- adjust AMLs to meet other resource objectives.

Management actions for fire and fuels, terrestrial and aquatic wildlife, vegetation, and grazing would increase the availability of forage in the long term. Whether this forage increase would benefit the health and size of horse herd populations depends on the site-specific locations where forage is produced and the extent to which water limits horse populations. Overall, the increase in forage is expected to benefit wild horses. Herd size would continue increasing at an average rate of 18 to 20% annually. Gathers to maintain AMLs would not have any long-term effects on the behavior or reproduction of individual horses or the HMA population as a whole (Hansen K.V., Mosley J.C., 2000).

4.21.6 Mitigation Measures

Exclosures to protect vegetation regrowth, riparian areas, or other resources would be built at the smallest size needed to achieve objectives and used when other actions have been unsuccessful or no other options are available.

New fencing would be built to maintain the HMAs free-roaming characteristics.

4.21.7 Unavoidable Adverse Impacts

Implementing mitigation measures would result in no unavoidable adverse impacts to wild horses.

4.21.8 Short-Term Uses Versus Long-Term Productivity

Short-term fire management activities, such as prescribed burning or other fire treatments, may result in minor, short term forage losses, but would benefit the long-term productivity of wild horse herds by increasing available forage.

4.21.9 Irreversible and Irretrievable Commitment of Resources

There would be no irreversible or irretrievable commitment of resources. The removal of wild horses from the Carter Reservoir herd is not expected to result in an unusual loss of horse resources since the herd is derived from a variety of North American horse stock. But some horses in the herd do appear to have some Old Spanish heritage (Cothra, E.C. 2004). This genetic makeup is expected to occur in other herds in the Surprise Field Office area and would be established by more genetic sampling.

4.22 Potential Effects on Wildlife and Fisheries

This section describes direct, indirect, and cumulative effects on terrestrial and aquatic wildlife that are likely to result from implementation of the Proposed Action.

4.22.1 Methodology and Assumptions

Information used in this analysis was obtained from relevant scientific and agency literature, the professional judgment of BLM (and other) wildlife biologists, interdisciplinary team members, existing plans, wildlife databases, and fieldwork. This information—plus specific knowledge of current species-habitat relationships and general knowledge of the management area—was used to assess impacts.

The planning approach was to determine which activities would likely cause significant impacts on wildlife—regardless of whether effects would be beneficial or not, plus forms of mitigation (if any) which could be used to lessen adverse impacts.

Effects were considered **beneficial** if they would likely increase the quantity or quality of habitat, increase population numbers, or facilitate movement within or between species' habitats. Effects were considered **adverse** if they were likely to decrease habitat quantity or quality, reduce population numbers, or inhibited movement within or between species' habitats.

More rigorous requirements were assessed for special-status species (SSS) and their habitats. For these species an effect was considered adverse—and would require mitigation—if it would result in: harm, harassment, or destruction of an SSS, its habitat, migration corridors, or breeding areas.

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.
- Allotment management plans (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 "Greater Sage-Grouse Conservation Plan for Nevada and Eastern California", other sage-grouse conservation strategies, and USFWS biological opinions concerning implementation of RMP programs.
- Project-level implementation plans would incorporate guidance from management plans identified in this RMP (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 SSS 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 SSS.
- Management of riparian areas would adhere to riparian health standards and guidelines.

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Resource programs were evaluated under the Proposed Action 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

Most programs potentially have some effect on species with several having potentially substantial effects on terrestrial and aquatic wildlife and large areas of land. In order to better understand potential effects to species, all programs have been included. Many programs are grouped due to similar impacts. Where effects could not be refined, only a general discussion of effects is presented. Where more information exists on species occurrence, location, or potential effects from these programs are more than negligible, more in depth coverage of effects is presented across all wildlife and fisheries groups. The following programs are discussed:

- Cultural
- Rights of Way
- Energy and Mineral Resources
- Fire, Fuels and Forestry
- Livestock Grazing and Wild Horse and Burros
- Soils
- Vegetation and Noxious Weed Management
- Special Area Designations
- Lands and Realty
- Recreation and Travel Management and VRM
- Water Quality and Hydrologic Function and Water Supply
- Wildlife and Fisheries

4.22.2 Incomplete or Unavailable Information

While specific information on the location and population status (or trends) of most wildlife in the SFO area is limited, more complete information has been collected for several SSS or locally important species including the Warner sucker, Wall Canyon sucker, greater sage-grouse, golden eagle, pygmy rabbit, pronghorn antelope, mule deer, elk, and bighorn sheep. Information on species presence has been compiled and a species checklist created for the field office (Appendix G).

Adequate information exists concerning the likelihood of the presence of certain species, seasons of use, relative suitability of habitat for specific species, and the consequences of management actions.

4.22.3 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 on terrestrial and aquatic wildlife as follows:

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.

Minor: The effects on wildlife would be detectable but localized and of little consequence to the population of any wildlife species. Mitigation measures, if needed to offset adverse effects, would be simple and successful.

Moderate: The effects on wildlife would be readily detectable and relatively localized, with consequences at the population level. Mitigating measures, if needed to offset adverse effects, would be extensive and probably successful.

Major: Effects on wildlife would be obvious and widespread resulting in substantial consequences to the regional populations of one or more species. Extensive mitigation would be needed to offset adverse effects, and success would not be guaranteed.

Short-term: An effect (generally) lasting less than a single season or year.

Long-term: A change in wildlife populations or habitats lasting longer than a single season or year.

4.22.4 Analysis of the Preferred Alternative

Proposed management actions under the Preferred Alternative would result in specific minor to moderate adverse effects, and moderate to major beneficial effects to wildlife species or habitats. A variety of management actions are designed specifically for the protection, restoration, or enhancement of wildlife habitats or populations. In some cases, certain management activities can result in substantial impacts for wildlife. These impacts are disclosed in this section by resource program.

Under the Preferred Alternative, pre-determined actions set forth in biological opinions, recovery plans, or conservation agreements would be followed for federally listed species. The only currently affected species for this management area are the Warner sucker. Any 'listed' species and its habitat found in the future would be protected and managed to maintain or enhance populations of that species. The bald eagle is a listed species which has some habitat in the planning area but is not known to breed here. BLM projects must comply with the Endangered Species Act and NEPA. Efforts to minimize or avoid adverse effects on wildlife are implemented at the project level.

Sage-grouse leks (breeding display sites) and other sage-grouse habitats are protected using measures derived from local conservation strategies for sage-grouse within the Massacre, Vya, and Buffalo-Skedaddle Population Management Units (PMUs). Additional protective measures for these birds would be taken from state and national strategies. Actions under these and other strategies would provide long-term benefits to breeding habitats for these species and other species inhabiting sagebrush-steppe ecosystems (such as pygmy rabbits and sage-sparrows).

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New water developments would be designed so as not to degrade spring and riparian habitats and make them more useable for wildlife. Management actions will incorporate seasonal and permanent buffers (Table 2.22-1) to protect special status or special interest species as well as wildlife-friendly design criteria for fences and water structures.

The Preferred Alternative also utilizes large-scale planning for habitat and species management thereby reducing inefficiencies inherent in single-species management.

4.22.4.1 Cultural Resources

General discussion

Cultural resource management would pose both beneficial and adverse effects. Both positive and adverse effects of this program are expected to be negligible. Compliance with section 106 of the National Historic Preservation Act and designation of 47,748 acres of ACEC's would provide long-term negligible benefits to wildlife by reducing harassment and providing additional measures to protect habitat from adverse modification. Cultural actions also have the potential for adverse effects in that they may prevent habitat manipulations that would benefit wildlife (an indirect effect), such as juniper-reduction around sage-grouse strutting grounds or directly by the addition of fencing which could impact wildlife movements. At present very few fences have been erected to protect cultural resources and future cultural actions are expected to be on a small scale.

On-site cultural interpretive areas would be small and placed near roads or primitive campsites. These would have negligible adverse impacts on wildlife. Some would not increase disturbance beyond current levels. ACEC and special management area designations will have negligible to minor benefits for wildlife, primarily due to reduced disturbance from OHVs.

4.22.4.2 Energy and Minerals

General discussion

Standard terms and conditions for leasable minerals provide stipulations protecting SSS and other important resources. Protective stipulations can also be applied for saleable minerals. There are no stipulations for locatable mineral development, but restorative stipulations can be applied for the benefit of wildlife. The Preferred Alternative applies seasonal, leasable mineral restrictions in the vicinity of sage-grouse leks, pygmy rabbit burrows, and special status raptors. Exploration and development for leasable minerals could have significant adverse effects on wildlife and wildlife habitats; however, the combined effects of seasonal restrictions and low potential for leasable mineral development should minimize disturbance-related effects on wildlife. In addition, leasable mineral areas have permanent NSO restrictions which will benefit sage-grouse and pygmy rabbits, but other species will benefit as well. The entire planning area, with the exception of 183,581 acres, is open to saleable mineral development. Typically, these are small cinder, sand, gravel, or decorative rock permits and have negligible impacts on most wildlife. The entire planning area is also open to locatable mineral uses. However, the potential for new locatable mineral development is low, so impacts are likely to be minor.

Federally listed species: Bald eagle and Warner sucker

Due to the low probability of actions taking place in habitat for these species, this program is expected to have negligible effects on listed species.

State- and BLM-listed species

California bighorn sheep could have a seasonal 0.25 mile buffer placed around breeding habitats (up to about 49,500 acres) if necessary and Swainson's hawk a 0.5 mile seasonal buffer around an active nest depending on activity.

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Since most activities related to this program are not likely to occur in bighorn habitat and Swainson's hawk nesting is not known to occur on SFO lands, this program is expected to have negligible effects to either species.

Ungulates

While activities related to this program could occur throughout mule deer and pronghorn antelope habitat and to a limited extent in elk habitat, seasonal 0.25 mile buffers around important breeding habitats would be used as necessary. Since most activities related to this program are not likely to occur and habitat for these species is so widespread, negligible adverse effects would be expected.

Sagebrush ecosystems and sage-steppe species

The Preferred Alternative mitigates actions around sage-grouse by requiring 0.6 mile seasonal buffers around active leks as well as permanent 0.25 mile No Surface Occupancy (NSO) buffers. Currently this could amount to about 28,000 acres in seasonal restrictions and almost 6,000 acres of NSO around sage-grouse leks. Pygmy rabbit would require at least a 100 acre NSO buffer around each active burrow or currently up to 4,300 acres if all active burrows had activity around them. Since major activities related to this program (leasable and locatable minerals) are not likely to occur and minor activities (saleable minerals) are minimal, this program is expected to have negligible long-term effects to most sage-steppe species however, could cause short-term adverse effects to pygmy rabbit and sage-grouse.

Native and non-native aquatic species

This program area is not expected to interact with aquatic species therefore effects to these species would be negligible.

Desirable non-native species

This program area is not expected to interact with these species to any great degree. It is possible that there would be some short-term adverse effects to chukar from disturbance around gravel pits but these would be negligible.

4.22.4.3 Rights of Ways

General discussion

As part of the SFO overall "primitive experience" theme, this program area will continue to primarily grant rights of way (ROWs) within existing roads, confine disturbance to existing areas, and maximize existing communication facilities at Fox and 49 Mountains. While designation of new utility corridors and the development of new communication sites would be considered, all greater sage-grouse habitat and habitat of other SSS species would be designated as ROW exclusion zones, except ROWs needed to provide reasonable access to non-federal inholding. Development of communication sites would be confined to existing disturbed areas, and no new sites would be developed—except for BLM management and local improvement and upgrade purposes.

While management of this program has its largest potential adverse effect on sage-grouse and raptors, the Preferred Alternative incorporates restrictions protecting SSS and limits the construction of new utility corridors or communication sites—with the possible exception of wind-power developments. Future BLM granted rights-of-way, including utility corridors and communication sites would be consistent with USFWS guidance to minimize effects to migratory birds. Management is expected to result in minor to moderate benefits for most SSS wildlife by restricting most development inside existing right-of-ways. Management is expected to have negligible benefits to non-SSS and could possibly have minor adverse impacts on specific species depending on the size of project involved.

4.22.4.4 Fire, Fuels and Forestry

General discussion

Wildfire suppression activities are generally beneficial in that they protect wildlife habitats. However, appropriate management response (AMR) tactics for high-intensity fires can destroy patches of habitat that would otherwise contribute to structural diversity of habitats or may inadvertently transfer unwanted aquatic species between watersheds during “bucket drops.” Full suppression of wildland fires would *initially* be required on a total of 891,695 acres with reassessment of the situation as the fire burned. The AMR for low-intensity fires is more likely to be beneficial because unburned areas can be left, thereby providing long-term structural diversity benefits to wildlife habitats. Fuels management in wildland/urban interface (WUI) lands could affect a significant amount of important wildlife habitat. About 8% of the planning area (100,624 acres of combined public and private lands) is WUI. Private lands tend to be better watered and therefore usually contain a greater density and diversity of wildlife. However, this depends on specific land uses and the degree of local wildlife harassment. On the other hand, for the SFO planning area, most WUI lands are associated with livestock grazing or farming and wildlife harassment is generally low, except during fuel reduction projects.

The total area of yearly fuel-reduction treatments is low so effects on wildlife would be short-term and localized. Forestry actions could affect up to 5,000 acres annually, although this is likely to be much lower. Conservation measures outlined for forestry that are expected to benefit wildlife include; leaving nest or roost trees, harvest exclusion areas, and noxious weed control. No new road construction would benefit wildlife by reducing future OHV disturbance and preserving habitat. However, temporary roads would be built, and woodcutting trails would not be rehabilitated. Together, these measures are expected to have minor to moderate adverse effects on wildlife, depending on species.

Federally listed species: Bald eagle and Warner sucker

Bald eagles are expected to benefit from any wildfire suppression activities although due to the very small amount of available habitat only at a negligible level. Forestry and fuels management would have negligible beneficial long-term effects by improving forest “health” and reducing the potential for catastrophic wildfire in potential bald eagle habitats. While there is always a potential for a retardant drop into Warner sucker waters during a wildfire, GIS layers of species locations and habitats are used to reduce this potential. Since there is no occupied habitat and little potential habitat on BLM lands, and buffer strips are built into projects in grazing allotments with potential Warner sucker habitat, effects from forestry and fuels would be negligible to Warner sucker.

State and BLM listed species

These programs have some potential to affect Swainson’s hawk, California bighorn sheep, juniper titmouse and several of the bat species. Wildfire suppression activities would provide minor to moderate long-term benefits to these species by protecting their habitats. Forestry actions are expected to have negligible effects and fuels projects minor beneficial effects when they take place in important habitats for these species. Species such as Swainson’s hawk have limited potential to be affected by actions related to the RMP since most breeding appears to be associated with private lands and juniper titmouse are thought to be relatively uncommon on the SFO. Bat species are widespread and effects would be difficult to detect. California bighorn sheep would see minor beneficial effects from programs if actions take place near escape habitat and water.

Ungulates

Rocky Mountain elk and mule deer would see negligible to minor benefits from the fire, forestry and fuels programs. Elk would particularly see long-term benefits due to work in and around aspen stands from the forestry and fuels programs. Effects to pronghorn antelope would be greatest from the fire program as it relates to fire suppression.

Sagebrush ecosystems and sage-steppe species

Wildfire suppression activities would provide long-term, potentially moderate to major beneficial effects to sage-steppe species by protecting important sagebrush habitats these species rely on. Species such as sage-grouse and pygmy rabbit would potentially experience greater benefits due to their reliance on specific areas for breeding and brood rearing. While smaller fires have generally been the norm on the SFO, recently several larger fires have burned over known sage-grouse leks and nesting sites.

Fuels projects could have beneficial effects by reducing heavy fuels in certain areas however in relation to sage-grouse, fuels reductions projects can be detrimental if projects burn too large an area or are too hot. Sage-grouse conservation plans for the SFO specifically do not recommend fuels reductions projects in the vicinity of active sage-grouse leks.

Native and non-native aquatic species

These programs are expected to have negligible effects to aquatic species. As with Warner sucker there is some risk of accidental retardant drops into occupied waters during wildfire actions.

Desirable non-native species

There is little potential for species like turkey or brown trout to be affected by these programs since there would be little if any habitat to be affected by these programs. Chukar numbers would remain stable or grow steadily due to wildfire suppression activities limiting the amount of new areas for potential cheatgrass invasion.

4.22.4.5 Livestock Grazing and Wild Horses and Burros

General discussion

Livestock grazing, because of its dominance throughout the landscape (e.g., 1,336 miles of livestock control fencing and 567 miles of livestock water development fencing), has the greatest potential to affect wildlife populations and their habitats. Continuing to authorize grazing on 1,445,443 acres will continue to adversely affect wildlife by limiting population numbers via changes in habitat quality and amount, and allowing direct competition between large ungulates for food and water. Application of the approved standards and guidelines for livestock grazing and prioritizing the needs of SSS would have long-term, beneficial effects for wildlife and their habitats. Increasing the number of water developments for livestock could provide minor benefits to wildlife if constructed with wildlife cover requirements. Increasing the number of livestock water developments could however have adverse impacts on wildlife by increasing competition for food and cover where grazing pressure is currently low. Resting land from livestock grazing for two years following fire, limitations on salting locations, design and location requirements for new fencing and water developments, as well as setting moderate utilization levels for key species of vegetation will significantly benefit terrestrial and aquatic wildlife. Although fencing can be detrimental to wildlife, exclosures will have a positive effect since these frequently contain riparian habitats important to wildlife.

Although wild horses have adverse impacts on important riparian summer habitats and wildlife wintering areas, the wild horse and burro program has the potential for some positive effects on wildlife habitats. By maintaining horse numbers within appropriate management levels (AMLs) and allowing seasonal movement within herd management areas (HMAs) densities will be reduced and adverse effects minimized across the landscape. Strict control of wild horse numbers and reduced fencing will have benefits for wildlife by reducing damage to riparian areas, reducing competition at water sources, and reducing barrier to migration. Change would be negligible but positive.

Federally listed species: Bald eagle and Warner sucker

Livestock grazing is generally not considered to have effects on bald eagle. Livestock grazing, specifically cattle grazing, can have long-term adverse effects on Warner sucker. Effects from this RMP are expected to be minor to be moderate in relation to Warner sucker. Due to the location of HMAs, no effects would occur from the wild horse and burro program.

State and BLM listed species

The livestock program has the greatest potential to directly affect many species including affecting several of the bat species. Livestock salting away from riparian areas, providing water at ground level on new and existing water developments, and adherence to the approved Standards and Guidelines for livestock grazing will provide long-term minor to moderate benefits to various bat species and bank swallow which “hawk” insects for food. Maintenance of existing exclosures and construction of additional exclosures will have few adverse effects on bat species since recent studies have shown that bats avoid fencing around water developments relatively well. The wild horse and burro program is expected to have negligible to minor benefits to these species.

Ungulates

Continuing to authorize grazing on 1,445,443 acres will continue to adversely affect wildlife by limiting population numbers via changes in habitat quality and amount, and allowing direct competition between large ungulates for food. Setting of target utilization levels for key species to moderate levels (40-60%), improvements made to water developments, requirements on fencing design, and adherence to the approved Standards and Guidelines for livestock grazing will minimize adverse effects on large ungulates from this program and may provide localized benefits by spreading competition for resources over a broader area. The wild horse and burro program would have minor long-term benefits to bighorn sheep, mule deer, and pronghorn antelope by reducing direct competition for water between these species and horses.

Sagebrush ecosystems, sage-steppe species, and other native species

Continuing to authorize grazing on 1,445,443 acres will continue to adversely affect wildlife by limiting population numbers via changes in habitat quality and amount. The greatest effects to sage-steppe habitats have already occurred. Riparian habitats throughout the field office continue to experience heavy utilization, therefore sagebrush ecosystems near riparian areas are expected to be adversely affected the most. Use of the approved Standards and Guidelines for livestock grazing would provide positive benefits to many habitats by ensuring that effects were minimized and in some cases may reverse some of these impacts. Positive long-term benefits to riparian habitats would occur due to horse AMLs being kept in check.

Native and non-native aquatic species

The livestock program would continue to have long-term moderate adverse effects to native aquatic species due to adverse effects on riparian vegetation and water quality. Brown trout would benefit in areas where livestock grazing adversely impacts riparian areas to a point where water temperatures increase and water quality drops. Use of the approved Standards and Guidelines for livestock grazing and salting away from riparian areas, streams, and meadows will provide long-term positive benefits by ensuring that adverse effects are minimized.

Desirable non-native species

Livestock grazing or wild horses are not expected to affect turkey. Chukar may have negligible benefits if localized intense grazing increases the likelihood of cheatgrass invasion on a particular site. Management actions within the livestock grazing and water quality programs are designed to minimize these possibilities.

4.22.4.6 Soils

General discussion

Improved soil management will have minor to moderate long-term benefits for wildlife by ensuring that soils meet the land health standards or, at a minimum, make significant progress toward that goal. Healthy soils ensure soil fertility and, therefore, the health and abundance of plants upon which wildlife depends. Better soil management will reduce sedimentation of creeks and other waters which will benefit spawning fish and improve habitat for aquatic invertebrates.

Limiting or excluding soil-damaging activities; bioengineering projects for the restoration of soils, vegetation, and wildlife; and employment of sediment intrusion buffer zones will limit adverse effects of management activities on wildlife and provide long-term benefits for terrestrial and aquatic species.

4.22.4.7 Vegetation and Noxious Weeds

General discussion

Vegetation management is expected to improve wildlife habitat by ensuring the availability of a wide spectrum of wildlife habitats. Restoration, maintenance, or enhancement would take place on shrub-steppe associations (about 500 to 4,000 acres/year), about 1,800 acres of quaking aspen woodlands, and about 9,100 acres of curlleaf mountain mahogany. Quaking aspen, bitterbrush, and mountain mahogany communities would be treated at a rate of 10 – 100 acres/year to reduce juniper and brush, and increase shoot density, vigor, and age class diversity. Low-intensity fire (i.e., burning of understory vegetation) and large-scale burns (in conjunction with adjacent shrub-steppe communities), mechanical, and manual treatments will be used to accomplish these objectives. Ensuring that hedging levels do not exceed a form class of 2.25 will help maintain shrub health. Moderate combined utilization levels (40 to 60 %) will help ensure that most forage habitats will be available for wildlife throughout the year. High-priority treatment of invasive juniper in sagebrush-steppe habitats would benefit most sagebrush-obligate species, depending on methods employed, timing, and the size of treatment areas. Resting areas from livestock grazing for two or more years after a fire and seeding with native species as necessary will provide long-term benefits to many wildlife species by helping native plant species establishment.

Control of noxious weeds will also have long-term beneficial effects on wildlife by reducing the amount of land converted to alien species and degenerative plant associations that cannot sustain native wildlife. Adverse short-term effects from the use of chemical treatments would be minimized by strict adherence to approved treatment procedures. Use of biological controls should also prove beneficial—providing the insects or pathogens employed do not interfere with native insects.

Due to the limited habitat found on the SFO, special status plant management is expected to have negligible benefits to wildlife.

Federally listed species: Bald eagle and Warner sucker

The vegetation program is not expected to have any effects on either the bald eagle or Warner sucker. The noxious weed program also is not expected to affect listed species since all applications of chemicals are through approved methods.

State and BLM listed species

Treatment on 500 to 4,000 acres/year to restore shrub-steppe associations would be expected to have beneficial effects to several of these species. Because most manipulation would be expected in sage-steppe habitats, sage-grouse would be expected to have long-term minor to moderate benefits related to this program although all species would experience short-term adverse impacts from disturbance and vegetation changes.

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Depending on the actual population of juniper titmouse on the SFO (currently thought to be low), juniper titmouse would have negligible benefits from maintenance of approximately 17,500 of historic juniper woodland but would be adversely affected in the long-term from shrub-steppe treatments that removed juniper. Bighorn sheep would be positively affected by restoration of shrub-steppe associations as well as approximately 100 acres/year of grasslands.

Ungulates

All ungulates found on the SFO would be positively affected by both the vegetation and the noxious weed programs. Both programs would provide long-term minor to moderate benefits but which would likely not be evident immediately. Restoration, maintenance, or enhancement of important habitats for these species such as aspen, mountain mahogany, and bitterbrush would provide important fall and winter forage for mule deer and elk and important limited calving habitat for elk. Shrub steppe restoration would benefit all species but probably have its greatest effects on pronghorn antelope and mule deer. Use of prescribed fire would have short-term benefits to forage quality for ungulates but could adversely impact species if shrub-steppe diversity is lost.

Maintenance of crested wheatgrass communities in healthy and productive condition (36,740 acres); and restoration of poor condition (8,400 acres) stands to native vegetation will provide negligible benefits by limiting livestock turnout onto spring and summer pronghorn antelope and mule deer ranges. Past conversion of these native ranges to crested wheatgrass has already caused negligible adverse impacts to wildlife on the SFO. Setting utilization levels on key species to moderate (40%-60%) levels, hedging of browse plants at not more than a form class 2.25, and requiring at least three years rest from livestock grazing on sites where fire has burned more than two acres of quaking aspen or mountain mahogany will provide longer-term minor benefits to ungulates like elk.

Sagebrush ecosystems, sage-steppe species, and other native species

The vegetation and noxious weed programs are expected to provide long-term benefits to these species by ensuring the maintenance of sage-steppe habitats. Restoration of up to 4,000 acres/year of shrub-steppe and grassland communities, as well as invasive juniper removal in aspen and riparian habitats, will yield minor to moderate long-term improvements in sage-steppe habitats and restoring 8,400 acres of poor-condition crested wheatgrass to native vegetation will benefit wildlife—especially sage-steppe birds and possibly pygmy rabbit which likely occupied some of the sites prior to conversion. Maintenance of 36,740 acres of productive crested wheatgrass communities in healthy and productive condition will continue to have adverse effects on wildlife. Effects however are expected to be negligible since vegetation changes took place decades before. The integrated weed management (IWM) program will provide minor benefits to wildlife depending on the scale of treatments. Over time, however, preventing infestations and effective control measures could provide moderate to major benefits for wildlife, especially to sage-steppe habitats adjacent to riparian areas.

Native and non-native aquatic species

Negligible to possibly minor long-term benefits to aquatic species are expected from both the vegetation and noxious weed programs. Benefits are expected to the aquatic/riparian interface and its effects to all ochthonous materials important to aquatic species.

Desirable non-native species

These programs are likely to have long-term adverse impacts to desirable non-native species by improving native ecosystems. Minor adverse impacts would be expected to chukar and negligible impacts to turkey.

4.22.4.8 Special Designations

General discussion

Designation and management of areas of critical environmental concern (ACECs), wilderness study areas (WSAs), and wild and scenic rivers (WSRs) would have positive but altogether negligible benefits for wildlife, primarily through reduced disturbance. Localized positive effects would be expected for Warner sucker, sage-grouse, elk, golden eagle, and bighorn sheep, and possibly for habitats of several special status bats and greater sandhill crane. WSA policies are expected to result in some positive effects on wildlife and fish, mainly from reduced OHV disturbance.

4.22.4.9 Lands and Realty

General discussion

Land acquisitions would provide additional habitat for several SSS (such as sage-grouse, golden eagle, bighorn sheep, and Wall Canyon sucker.) Habitat for special interest species (such as pygmy rabbit burrows, Sheldon tui chub waters, pronghorn winter habitat, and elk summer range) would also be acquired. There are about 35,000 acres of zone 3 (disposal) lands containing important burrowing owl, pygmy rabbit, and sage-grouse breeding habitats. Disposal of these sites would have negligible to minor adverse impacts on some species (notably elk and sage-grouse) and moderate adverse impacts to others (burrowing owls, pygmy rabbits, and Sheldon tui chub). All land use authorizations would be evaluated for their impact to sensitive resources, including critical and/or important wildlife habitat

Federally listed species: Bald eagle and Warner sucker

This program is expected to have negligible affects to federally listed species. Although all lands on the SFO for these species are in the potential disposal (zone 3), or potential retention/exchange (zone 2), areas, all land use authorizations will be evaluated for their impact to sensitive resources, including critical and/or important wildlife habitat.

State and BLM listed species

Most lands in the field office are in zone 2, potential retention/exchange. Since most habitat for state and BLM listed species is in this zone, the lands and realty program is expected to provide long-term negligible benefits to these species. Benefits are negligible because no lands are expected to be exchanged if they are important to state or BLM listed species. The largest potential impact to state and BLM listed species is in zone 3 areas where any loss of habitat could have adverse impacts to the small populations of burrowing owl and Sheldon tui chub on the field office as well as to the limited amount of escape habitat for bighorn sheep.

Ungulates

Since most biologists believe that winter range is generally a limiting factor for most large ungulates, potential disposal of zone 3 lands would likely have the greatest adverse impacts to mule deer and pronghorn antelope via loss of winter range. Impacts would be negligible since this zone has such a small number of SFO acres. Retention of lands in zone 2 and especially acquisition of lands in zone 1 would benefit Rocky Mountain elk by providing more summer habitat.

Sagebrush ecosystems, sage-steppe species, and other native species

Retention or acquisition of lands in zones 1 and 2 would benefit all wildlife by providing a variety of habitats along with good water supplies. Because most SFO land in zone 3 is either not watered or not well watered, disposal of this relatively small amount of land should only pose negligible to minor adverse effects to this large group of species.

Native and non-native aquatic species

Acquisition of lands in zone 1 would be expected to provide moderate to major long-term benefits to Wall Canyon sucker and negligible long-term benefits to Sheldon tui chub (*Gila bicolor eurysoma*) and other native warm water fishes. While disposal of lands in zone 3 would probably not significantly affect cold water recreational fishes, it may have long-term adverse effects to access of cold water fisheries along the east slopes of the Warner Mountains. Retention of zone 2 lands would primarily benefit warm water native fishes like speckled dace and redbreasted sunfish and would have negligible benefits to recreational fish use in the Warner Mountains.

Desirable non-native species

Acquisition of lands in zone 1 would have negligible benefits for chukar. If state game agencies introduced turkey into the Warner Mountains or current populations expanded then acquisitions in zone 1 would also have negligible benefits to turkey. Zone 2 actions would provide negligible to minor benefits to chukar on the field office and potentially minor to moderate benefits to turkey. Zone 3 actions would have negligible to minor adverse effects to chukar and potentially minor effects to turkey.

4.22.4.10 Recreation, Travel Management, and Visual Resource Management

General discussion

Institution of OHV closures and restrictions, and special recreation permits will provide minor benefits for wildlife. However, a special recreation management area in the Lower Lake sand dunes could adversely impact species in that area, especially burrowing owls. Management of the SFO planning area as an “extensive recreation management area” would result in impacts similar to current management and would have generally negligible short-term effects on wildlife, except in some riparian areas where minor to moderate long-term adverse effects may occur.

OHVs would be limited to existing roads and trails throughout the planning area and two ACECs would be ‘Closed’ to motor vehicles. Restrictions limiting OHVs to designated routes would apply in WSAs. This management, together with dispersed camping, will reduce disturbance of wildlife. However, moderate adverse impacts could occur for a few species, if a significant increase in vehicular recreation were to occur during the breeding season while animals are raising their young.

Visual Resource Management (VRM) class 1 and 2 designations will keep habitats and overall landscapes intact, when compared to class 3 or 4; therefore, they will have positive benefits for terrestrial and aquatic wildlife. Since, except for WSAs, VRM classes and area sizes have not been established for the Propos Action, benefits to wildlife for these are unclear; however, positive negligible effects are expected in WSAs.

Federally listed species: Bald eagle and Warner sucker

The recreation and travel management programs are expected to have negligible effects to bald eagle and Warner sucker. There is no bald eagle nesting that is known to occur on the SFO and there are no roads known to occur that travel over Warner sucker waters. Negligible short-term impacts may occur intermittently.

State and BLM listed species

The recreation and travel management programs are expected to have negligible adverse effects to these species as well. Many of these species are not known to occur on SFO lands but likely do in limited numbers e.g., greater sandhill crane, ferruginous hawk, while others like golden eagles are fairly common. While some short-term impacts from this program may occur to more common species, impacts should be mitigated as necessary via seasonal ¼ to ½ mile buffers or implementation of NSO measures.

Ungulates

The recreation and travel management programs are also expected to have negligible adverse effects to ungulates on the SFO. While ¼ mile seasonal buffers can be implemented under the new RMP, there are no areas currently known where these would be needed. If necessary, buffers will be implemented to mitigate OHV traffic and any other disturbance during fawning, kidding, calving, and lambing periods. Short-term impacts will continue to occur to these species from normal traffic along main travel routes. With the expected future increase in users and recreational vehicle advances, institution of seasonal closures is expected to become the norm.

Sagebrush ecosystems, sage-steppe species, and other native species

The recreation and travel management programs are also expected to have negligible to minor adverse effects to sage-steppe and other native species on the SFO. Limited Operating Periods (LOP) and NSO buffers would be used as needed for sage-grouse and active pygmy rabbit burrows. Other native species like golden eagles or habitats like bat hibernacula can be protected by other seasonal buffers. Effects on other species are expected to be negligible because many areas are inaccessible during important breeding times. Additionally, the Preferred Alternative limits OHV use to existing roads and trails.

Native and non-native aquatic species

The recreation and travel management programs are expected to have negligible to minor adverse effects to aquatic species. Some damage is expected to be long-term before the solution to the problem is identified. While OHV damage to riparian resources and therefore to aquatic species is currently localized, it is expected to increase in the future due to future increases in users. In more remote areas negligible short-term impacts are expected to continue.

Desirable non-native species

These programs are expected to have negligible impacts to desirable non-native species.

4.22.4.11 Water Quality, Hydrologic Function and Water Supply

General discussion

Fifty-three miles of perennial and (important) intermittent streams and 2,500 acres of riparian and wetland areas are currently known to not meet riparian PFC, assertion of water rights, improved management of water resources, and selective development of water resources would provide moderate benefits for terrestrial and aquatic wildlife. All wildlife groups are expected to see long-term beneficial effects from these programs. In many cases full achievement of these benefits would not be realized during the life of this plan.

Favoring water developments for livestock and wildlife over other commodities and asserting stream-flow and riparian water rights will provide minor to major positive benefits for wildlife, especially shorebirds, waterfowl, and fish.

4.22.4.12 Wildlife and Fisheries

General discussion

Management actions in the wildlife and fisheries program would result in minor to moderate short and long-term beneficial effects for wildlife resources. 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.

Chapter 4: ENVIRONMENTAL CONSEQUENCES

The wildlife program is integral in the development of allotment management plans (AMPs), vegetation and wildfire rehabilitation, and fuels-reduction treatments, and all other BLM projects that take place on the SFO. All projects are 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.

Federally listed species: Bald eagle and Warner sucker

The wildlife and fisheries program is expected to provide negligible to minor benefits to Warner sucker. Limited benefits are due to the fact that there are no known Warner suckers in BLM stream reaches. Benefits are primarily from mitigating actions related to livestock grazing and implementation of monitoring associated with the biological opinion for this species. The bald eagle is expected to have negligible benefits from this program. The limited benefits are due to the extremely small amount of habitat for this species on the SFO. Benefits will come from LOP and co-development of habitat projects in pine habitats.

State and BLM listed species

This program will provide negligible to minor benefits to these species. Species like bats will experience negligible benefits from LOP. Other species like golden eagles will experience negligible to minor benefits from these closures. These measures would assist in reducing adverse effects such as disturbance and possible reproductive failure for species during critical times in life-history stages and are expected to provide both short and long-term benefits. Other benefits from this program related to these species include development of habitat projects with the vegetation and grazing programs.

Ungulates

The wildlife program will provide indirect long-term benefits to ungulates by continuing to work with other federal and state game agencies in development of water resources for ungulates, especially bighorn sheep, and development and implementation of habitat management plans and projects. Species like bighorn sheep will receive moderate benefits due to the reduced possibility of interactions with domestic sheep while other species like pronghorn and mule deer will experience negligible to minor benefits. Elk will benefit from cooperative efforts with state game agencies to develop plans and projects appropriate for this species. This program along with the forestry and fuels programs also develops habitat projects for ungulates, tracks bitterbrush use (an important fall and winter mule deer forage), and ensures that new fences are built to specifications appropriate for ungulates.

Sagebrush ecosystems, sage-steppe species, and other native species

The wildlife program is expected to provide moderate long-term benefits to sage-steppe and other native species. Sage-grouse leks and other sage-grouse habitat would be protected and managed through measures incorporated from local, state, and national sage-grouse conservation strategies. Actions include invasive juniper removal around leks and summer brood rearing habitat, protection and enhancement of riparian areas, continued monitoring of known leks, and survey for new leks. Pygmy rabbit surveys have been completed and this information entered into GIS. This type of information is used to protect these resources during fires, to determine effects of projects on these resources, and to determine where habitat related projects should be placed.

Native and non-native aquatic species

These programs are expected to provide negligible to moderate long-term benefits to aquatic species by the continued monitoring of riparian and water resources, co-development of fisheries conservation strategies and habitat management plans, and development as necessary of in-stream, riparian and upland habitat projects that benefit aquatic species. Where non-native species interfere with SSS, these programs will continue working with state and federal agencies to resolve these issues.

Desirable non-native species

These programs will have negligible benefits to non-native species like chukars by working with state game in the placement of wildlife guzzlers. Negligible adverse effects may occur to chukar in areas where projects to enhance native species reduces cheatgrass. Negligible benefits may occur to turkey if state agencies decide to introduce them on BLM lands and the NEPA process determines this can be done without harming other species.

4.22.5 Cumulative Effects

Major implications for wildlife tend to involve indirect, long-term effects on habitats and ecosystems. Except for large-scale conversion from natural disasters (such as catastrophic wildfires), habitat type-conversion, degradation, fragmentation, and loss have significant adverse effects on wildlife but take years to manifest as population reductions. Cumulative effects on wildlife also include direct and indirect impacts; such as harassment, collision with vehicles and structures, and increased susceptibility to predation caused by human modification of the natural environment. Substantial cumulative effects on the planning area also result from natural resource decisions made for adjacent lands, or even for the region, independent of BLM input or influence. These actions mostly relate to grazing on private property adjacent to BLM-administered lands; large-scale habitat changes to adjacent federal lands, and; to a much lesser degree, from recreational usage.

Adjacent federal landowners include the Modoc National Forest, the Sheldon National Wildlife Refuge, and BLM's Lakeview District and Winnemucca and Eagle Lake Field Offices. State game agencies administer little land within the planning area but directly affect wildlife through the introduction and transplantation of wildlife, creation, and maintenance of wildlife watering facilities, and regulating the hunting of game species.

Historically, the largest adverse effects on wildlife resulted from livestock grazing—both cattle and sheep. Of these effects, the most significant were and are direct competition with livestock for food and water, changes in vegetation composition and abundance, and modification of burn frequency and ignition patterns resulting from livestock grazing practices. Other significant effects directly related to grazing are the creation of roads and pit reservoirs and the destruction of large areas of sagebrush and conversion to livestock forage production. There may also be indirect effects on food sources related to water letdown of irrigation reservoirs and its effects on fish and waterfowl.

Administration of grazing on BLM and USFS lands has led to a grazing-based economy on vast areas of the Surprise Valley, including adjacent private parcels. Large expanses of winter pasture, as well as alfalfa and hay operations, cover the Surprise Valley, the Duck Lake and Cowhead Lake regions, and portions of Long Valley. Deer, pronghorn, and sage-grouse are routine, year-round users of these agricultural areas. Livestock ponds and man-made riparian areas are important for a wide variety of other wildlife as well; especially, waterfowl, shorebirds, and raptors.

However, major changes in grazing management could result in adverse effects on wildlife if livestock operations on private lands were significantly disrupted—especially if disruption happens quickly. Ranchers dependent on federal lands for seasonal grazing may be forced to intensively graze their private lands and/or convert native vegetation to intensive livestock forage production in order to offset forage losses from BLM-administered lands. This could also lead, in some cases, to abandonment of ranching and the sale of land for other purposes—such as development. Private ranch lands in this region provide important habitat for wildlife species such as sage-grouse, pronghorn, deer, and waterfowl. Populations of these animals, especially, could be adversely affected if such changes were to occur.

Chapter 4: ENVIRONMENTAL CONSEQUENCES

Few large fires have occurred in the planning area. Estimates are that 150 acres burn annually as a result of wildfires, although recent years have seen several fires in excess of 2,000 acres. The Barrel fire (2005) burned about 24,500 acres just south of the Oregon border and is the largest recorded event thus far.

The largest known fire within the field office area occurred in the 1940s and burned unchecked in the south half of the area. Numerous single tree fires occur annually and several small prescribed fires have been conducted—mostly in aspen habitats. A continued policy of full suppression by BLM and other federal and state agencies would result in cumulative adverse effects on wildlife and wildlife habitats by increasing fuel build-up and the prevalence of decadent vegetation and would increase the risk of habitat loss from catastrophic wildfires. Positive impacts to wildlife would result from smaller fires; or from larger fires, if allowed to burn unevenly, creating a patchwork pattern.

A single 750-kilovolt transmission line bisected the management area in the mid 1970s. Towers from this project are thought to be the direct cause of reduced attendance on several sage-grouse leks in close proximity to this power line. Improvements to the road system, such as the Barrel Springs Byway, are also suspected to have adversely affected wildlife (e.g., sage-grouse leks.) Mining activity has been relatively low; however, at least one sage-grouse strutting ground became inactive after the Hog Ranch mine began operations. No large-scale wildlife habitat improvement projects have been conducted in the past 20 years. However, some small-scale projects have been implemented for big game and waterfowl.

Traditionally, state wildlife agencies have transplanted game species wherever suitable habitat could be found. Brown trout—a non-native species—have been planted throughout the planning area and are thought to be the primary reason for the decline of the (native) Wall Canyon sucker. It is not known whether other native fishes have been similarly affected. Other species of trout have been planted on the east side of the Warner Mountains but effects of these transplantations are unknown. Chukar partridge have also been transplanted throughout the planning area. No information exists as to their effects on native fauna. At least 8 chukar guzzlers are maintained to provide water for these birds. Starting in the late 1980s, California bighorn sheep have been reintroduced in the High Rock, Little High Rock, and Hays Ranges, and near the Long Valley Rim. Two large-capacity guzzlers were created for them in the Hays Range. These were recently overhauled and fitted with larger capacity tanks.

Important guidance and management actions relevant to the evaluation of cumulative impacts on terrestrial and aquatic wildlife include: federal recovery plans and biological opinions for ‘listed’ species; completion and implementation of multi-agency planning efforts (such as those for riparian habitats, sage-grouse and other sagebrush-obligate species); and development of larger scale, cooperative projects with other BLM offices and other agencies, particularly the USFS and USFWS.

For the past 10 years the SFO has cooperated with the California Department of Fish and Game (CDFG) and the Nevada Department of Wildlife (NDOW) in surveying sage-grouse leks and (with multiple partners) developing conservation plans for this species. The Sheldon National Wildlife Refuge has been conducting large-scale prescribed burns for at least the past decade and—combined with the termination of grazing—much of the refuge has been converted to earlier seral stages. Formerly, the Modoc National Forest had an extensive timber program; however, most timber operations have been curtailed as a result of the Northwest Forest Plan. Currently, major management actions on the Modoc National Forest are concerned with wildland fire and prescribed fire. However, some small timber sales are planned.

Recent isolated housing development has destroyed sagebrush habitats on a number of small parcels. Subdivisions have eliminated two larger tracts within the planning area. Most of this has occurred on private lands within the Surprise Valley, destroying deer fall and winter range and year-long range for pronghorn. Small parcel housing development may result in significant destruction of wildlife habitats in future, especially in conjunction with new right-of-ways for power, water, and road access.

This kind of development impacts wildlife by increasing year-long disturbance, shrinking the size of important habitats (especially winter range for mule deer and pronghorn), reducing the availability of water, and increasing physical hazards (e.g., fencing, road-kill, and the possibility of poisoning from urban and agricultural chemicals.) Development of private parcels would benefit other—generally super-abundant or non-native animals—such as rodents, badgers, skunks, raccoons, and coyotes. Unintentional—but effective—closure of BLM lands has resulted, and is expected to worsen, where fenced private lands straddle non-county roads blocking access to BLM lands beyond.

4.22.6 Mitigation Measures

Many actions conducted for wildlife management purposes are in mitigation of the adverse effects of other resource management actions. Mitigation generally takes the form of changes to the type of action, the magnitude of the action, or the timing of the action. More specifically, mitigation may involve seasonal or permanent closures for certain activities or types of development, more suitable methods to achieve the same results (e.g., mechanical fuel reduction versus prescribed fire), or adjustments in scale (e.g., a yearly maximum cut for timber harvesting or juniper reduction.)

Table 2.22-1 specifies seasonal and permanent restrictions for the protection of selected special interest and SSS. BLM-approved plans and guidelines (see Chapter 2 for a brief list) will also be used to lessen adverse impacts on wildlife or, conversely, to enhance wildlife habitats during project-level design. Wildlife-related mitigation measures for other resource programs are found throughout this RMP. Two prime examples are adherence to rangeland health standards and incorporating site-specific prescriptions in the terms and conditions for leasable mineral developments. Many actions can have adverse actions on wildlife and fish on some level, however, mitigation measures combined with proactive wildlife management (e.g., use of sage-grouse conservation plans), are expected to reduce most adverse impacts on terrestrial and aquatic wildlife.

4.22.7 Unavoidable Adverse Impacts

Under the Preferred Alternative unavoidable adverse impacts would result from actions under many programs, especially grazing, wild horses, OHVs, and fire management. Adverse effects would take the form of competition for necessary resources, degradation of wildlife habitats, and increased levels of harassment. Except for OHVs, most impacts have already taken place. Modest increases in OHV impacts and wildland fires are expected, however, the last is largely unpredictable. Despite adverse impacts on terrestrial, riparian, and aquatic habitats from livestock grazing, these habitats are improving due to institution of rangeland health standards, site-specific mitigation measures, and broad-scale planning (e.g., sage-grouse and habitat conservation plans.)

Wild horses will continue to have adverse effects in riparian areas on about 40% of the planning area, primarily due to year-round grazing. Full suppression of wildfires (as the AMR) would result in unavoidable short-term adverse impacts in years where wildfires burn more than the specified yearly allowance. Although OHV impacts will be lessened by 'limited' designations, road traffic is expected to increase. OHV closures and seasonal restrictions are designed specifically to protect special status and special interest species and therefore will not necessarily protect all species equally. If energy and mineral development were to increase beyond expectations in the next 20 years, significant localized adverse impacts would be expected for some species.

4.22.8 Short-Term Uses Versus Long-Term Productivity

At the present time, 53% of grazing allotments are meeting—or making substantial progress toward meeting—land health standards (category 1.) Another 23% fall within category 2, where one or more standards have not been met and grazing is a major factor in this failure. For 22% (category 3), either the status of one or more of the standards has not been determined or the cause of failure is unknown.

Category 4, which includes areas within category 1, includes areas where one or more of the standards have not been met due to cause(s) other than—or in addition to—livestock grazing. Because of the added pressure of continuous use by wild horses, especially in riparian areas, livestock grazing is expected to have adverse, long-term effects on the productivity of terrestrial and aquatic habitats.

Development of wind power generation facilities and additional utility and communication towers will continue to have adverse effects for sage-grouse on their strutting grounds and further reduce long-term population trends. These facilities also represent long-term collision hazards for other birds and bats. Construction of additional permanent roads and trails, and very large wildfires, are two other factors which would have significant long-term adverse impacts on wildlife—especially where breeding habitat is involved.

4.22.9 Irreversible and Irretrievable Impacts

Only if management actions result in the extinction of a species could the impacts of those actions be truly irreversible. However, management actions that significantly degrade, fragment, or remove habitat for a species in a relatively short period of time may lead to rapid population reduction which could lead to such an event. Practically speaking, however, such a situation would usually apply to a limited number of species already found on various federal and state SSS lists.

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