4.4.9. Special Status Species – Wildlife (including Greater Sage-Grouse)

Greater Sage-Grouse

This section describes the environmental consequences associated with the impacts to Greater Sage-Grouse and other special status wildlife species and their habitats from activities carried out in conformance with this plan, coupled with the mitigation of those activities. In addition, to help implement this Buffalo Proposed Plan, a Western Association of Fish and Wildlife Agencies (WAFWA) MZ I Regional Mitigation Strategy (per Appendix B (p. 1779)) will be developed within one year of the issuance of the ROD. The Regional Mitigation Strategy will elaborate on the components identified in Chapter 2 (avoidance, minimization, compensation, additionality, timeliness, and durability), and will be considered by the BLM for authorized land uses that may impact Greater Sage-Grouse and its habitat. The implementation of a Regional Mitigation Strategy will benefit Greater Sage-Grouse, the public, and land-users by providing a reduction in threats, increased public transparency and confidence, and a predictable permit process for land-use authorization applicants.

Populations of Greater Sage-Grouse fluctuate, sometimes widely, in response to natural factors such as cycles in the abundance of prey or extremes in seasonal weather such as severe winters. It can be difficult to determine whether effects on Greater Sage-Grouse result from any specific management action or from population changes caused by natural factors. Changes in stressors, (e.g., increased human presence and noise) on habitat components such as vegetation, water, soil, or air are the most likely to cause direct and indirect effects on Greater Sage-Grouse and their habitat.

Actions that remove, degrade, or fragment habitat for Greater Sage-Grouse are considered adverse. Beneficial effects result from actions that conserve or improve habitats, such as Greater Sage-Grouse nesting habitat.

Direct effects on Greater Sage-Grouse could result from the loss of habitats or Priority Habitat Management Area (PHMA) features such the lek area, or from the immediate loss of life. Human activities also can directly disturb Greater Sage-Grouse, potentially causing them to abandon a lek or their home range. Disturbance during sensitive periods (e.g., winter and nesting) is known to adversely affect Greater Sage-Grouse. Human activities such as OHV use, recreation, and noise from equipment associated with development and surface-disturbing activities affect Greater Sage-Grouse. These activities are considered to be particularly detrimental to nesting and lekking grouse.

Activities such as vegetative treatments; fire and fuels management; minerals exploration and extraction; construction and maintenance of roads and trails; and development of renewable resources can fragment or cause the loss of Greater Sage-Grouse habitats. Indirect effects on Greater Sage-Grouse can result from changes in habitat characteristics or quality. Various surface-disturbing activities and other actions that remove vegetation and disturb soil can affect habitat quality. Specific actions that change habitat in a way that would make it unsuitable for future habitation can cause indirect effects on Greater Sage-Grouse. Human disturbance from vehicular travel on roads, human activity at drill sites or wellheads, or any other activity not associated with the natural environment (including noise) can indirectly affect Greater Sage-Grouse not accustomed to such disturbances.

Disturbance affects range from short-term displacement and shifts in activities to long-term abandonment of home range. For purposes of this analysis, short-term effects on Greater Sage-Grouse would result from activities to which an individual immediately responds, but do not affect the population viability. For example, many disturbance effects are short-term because a Greater Sage-Grouse might temporarily abandon an area or nest but return immediately following the cessation of the disturbance, such as a passing OHV. Short-term construction can cause Greater Sage-Grouse to abandon a lek or nest, but is often is able to return to the area and successfully reproduce the following season.

Long-term effects on Greater Sage-Grouse are those that would affect the viability of the population. These effects include alteration of adequate habitats in either size or health (direct loss, fragmentation, or degradation) for any or all life requirements (e.g., seasonal habitats), and activities that would affect reproductive success (e.g., activities causing undue energy expenditure for prolonged periods, and removal of breeding grounds and nests). Human disturbance, whether intentional (e.g., harassment) or unintentional, results in increased energy cost to the alerted animals. Disturbed animals incur a physiological cost either through excitement (preparation for exertion) or locomotion. A fleeing or displaced animal incurs additional costs through loss of food intake and potential displacement to poorer (lower) quality habitat. If the disturbance becomes chronic or continuous, these costs can result in reduced animal fitness and reproductive potential. In addition, physical or psychological barriers lead to fragmentation of habitats, further limiting the availability of effective habitat. An area of intensive activity or construction becomes a barrier when animals cannot or will not cross it to access otherwise suitable habitat. These effects are especially problematic when they occur in limiting habitat components such as winter ranges and reproductive habitats (WGFD 2004).

Other Special Status Species Wildlife

Populations of special status wildlife species fluctuate in response to natural factors such as cycles in the abundance of prey or extremes in seasonal weather such as severe winters. It can be difficult to determine whether effects on special status wildlife species result from any specific management action or from population changes caused by natural factors. Changes in stressors, (e.g., increased human presence and noise) on habitat components such as vegetation, water, soil, or air are the most likely to cause direct and indirect effects on special status wildlife species. The Implementation Plan (Appendix B (p. 1779)) which includes the adaptive management and monitoring strategies will allow for management changes when determined necessary to reduce effects on SSS.

Actions that remove, degrade, or fragment habitat for special status wildlife species are considered adverse. Beneficial effects result from actions that conserve or improve habitats, such as raptor nest sites or eagle roosting habitat.

Direct effects on special status wildlife species could result from the loss of habitats or habitat features such as nest or roost sites, or from the immediate loss of life. Human activities also can directly disturb special status wildlife species, potentially causing them to abandon a nest, or their home range. Disturbance during sensitive periods (e.g., winter and nesting) is known to adversely affect special status wildlife species. Human activities such as OHV use, recreation, and noise from equipment associated with development and surface-disturbing activities affect some special status wildlife species. These activities are considered to be particularly detrimental to roosting and nesting raptors.

Activities such as vegetative treatments; fire and fuels management; minerals exploration and extraction; construction and maintenance of roads and trails; and development of renewable resources can fragment or cause the loss of habitats. Indirect effects on special status wildlife species can result from changes in habitat characteristics or quality. Various surface-disturbing activities and other actions that remove vegetation and disturb soil can affect habitat quality. Specific actions that change habitat in a way that would make it unsuitable for future habitation can cause indirect effects on special status wildlife. Human disturbance from vehicular travel on roads, human activity at drill sites or wellheads, or any other activity not associated with the natural environment (including noise) can indirectly affect special status wildlife species not accustomed to such disturbances.

Disturbance affects range from short-term displacement and shifts in activities to long-term abandonment of home range. For purposes of this analysis, short-term effects on special status wildlife species would result from activities to which an individual or species immediately responds, but do not affect the population viability of the species. For example, many disturbance effects are short-term because a species might temporarily abandon an area or nest but return immediately following the cessation of the disturbance, such as a passing OHV. Short-term construction can cause an animal to abandon an area or nest, but the species often is able to return to the area and successfully reproduce the following season.

Long-term effects on special status wildlife species are those that would affect the viability of the population. These effects include alteration of adequate habitats in either size or health (direct loss, fragmentation, or degradation) for any or all life requirements (e.g., seasonal habitats), and activities that would affect reproductive success (e.g., activities causing undue energy expenditure for prolonged periods, and removal of breeding grounds and nests). Human disturbance, whether intentional (e.g., harassment) or unintentional, results in increased energy cost to the alerted animals. Disturbed animals incur a physiological cost either through excitement (preparation for exertion) or locomotion. A fleeing or displaced animal incurs additional costs through loss of food intake and potential displacement to poorer (lower) quality habitat. If the disturbance becomes chronic or continuous, these costs can result in reduced animal fitness and reproductive potential. In addition, physical or psychological barriers lead to fragmentation of habitats, further limiting the availability of effective habitat. An area of intensive activity or construction becomes a barrier when animals cannot or will not cross it to access otherwise suitable habitat. These effects are especially problematic when they occur in limiting habitat components such as winter ranges and reproductive habitats (WGFD 2004).

4.4.9.1. Methods and Assumptions

This section describes the methods and assumptions used to analyze impacts to special status wildlife species. The assumptions and methods include:

- The area evaluated for possible effects on most special status wildlife species includes the entire area within the boundaries of the planning area.
- Effects on special status wildlife species are based primarily on potential effects on habitats managed by the BLM.
- The analysis of special status wildlife species in planning area watersheds focuses on changes in water quantity because that would be the primary indirect effect on watershed species from resource management actions. See the *Special Status Species – Fish* section for more detail on these analyses, and to the *Water* section for more information about effects on water quality and water quantity in the planning area.
- In areas with historic fire regimes, prescribed fire is used to manage vegetative communities and can result in short-term adverse effects and long-term beneficial effects on wildlife and wildlife habitats.
- Short- and long-term surface disturbance are assumed to occur in vegetative types, in proportion to the availability of these vegetative types, in the planning area. Affected acreages for vegetative types are not absolute, but provide a means for relative comparisons among alternatives.
- Precise quantitative estimates of effects generally are not possible because the exact locations of future actions are not known, population data for species status wildlife species are often lacking, or habitat types affected by activities cannot be predicted.
- Because of the migratory nature and relative mobility of some special status wildlife species, these species are affected by actions on non-BLM-administered land more than other species. In the case of migratory species, effects on winter and migration habitats could adversely affect the viability of some species. Winter and migration habitats are assumed to be at least as important to long-term viability of these species as breeding and nesting habitats.
- Actions that would adversely or beneficially affect one species would have similar effects to other species using the same habitats.
- In relation to buffers, "prohibit" means no activity or effects will be allowed during a specific period or in a designated habitat area unless specific biological exception conditions are met. Avoid means to follow guidance for avoidance when possible.
- For purposes of analysis, it is assumed that water use in the planning area could adversely affect surface water quantity in planning area watersheds. Water depletion analyses are based on the assumption that all water used for impoundments or drilling and completion of wells in the planning area would have contributed to the surface flows of the pertinent watershed.
- BLM-authorized activities associated with all resource and all resource use programs within Greater Sage-Grouse habitat would be subject to Greater Sage-Grouse required design features (RDFs) identified in Appendix D (p. 1863). For analysis purposes, it has been assumed that all applicable BMPs, recommended practices, conservation measures, and RDFs would be implemented during site-specific project planning where appropriate.
- Recommendations by the Northeast Wyoming Greater Sage-Grouse Working Group for improving and maintaining Greater Sage-Grouse habitats would be encouraged where appropriate.
- Management of sagebrush habitats would follow the BLM National Sage-Grouse Habitat Conservation Strategy (BLM 2005d). Using these guidelines, Greater Sage-Grouse would serve as an umbrella species for all sagebrush-dependent species. Measures to protect Greater Sage-Grouse will benefit all sagebrush-dependent species.

- All current Greater Sage-Grouse management guidance will be followed such as the BLM's Greater Sage-Grouse National Land Use Planning Strategy (IM-2012-044) and the BLM Wyoming's Greater Sage-Grouse Habitat Management Policy on Wyoming BLM Administered Public Lands Including the Federal Mineral Estate (IM WY-2012-019).
- The more sagebrush acreage protected, the greater the benefit to Greater Sage-Grouse and other sagebrush-dependent species.
- Prohibiting all non-beneficial ground disturbance and disruptive activities in Greater Sage-Grouse habitats would provide a higher level of protection for Greater Sage-Grouse than avoiding these activities.
- The BLM can minimize disturbance impacts to special status wildlife by limiting access to nesting, breeding, and brood-rearing sites. Surface disturbance can be controlled through three types of restrictions: (1) NSO for fluid minerals, which prohibits physical presence; (2) CSU, which limits surface use unless there is a documented plan for mitigation; and (3) TLS, which prohibits surface use during specified periods.
- Removing sagebrush habitat will have a long-term adverse effect on sagebrush-obligate species.
- Over the life of the plan, some species currently considered sensitive, or not formally included on the BLM sensitive species list, could be listed under the ESA. Some currently listed species could be delisted during the life of the plan. Most species delisted or downgraded from federally Proposed or Candidate status will be included on the BLM sensitive species list.
- Public concern for SSS will likely increase during the planning period due to increasing concerns over growth and development on habitats containing these species.
- The USFWS could designate additional wildlife species as T&E as additional data are collected and evaluated. These species would be managed in accordance with the ESA and as directed by decisions under the alternatives.
- All known SSS raptor nests from the GIS database maintained by the BLM BFO were used in the analysis. Buffers associated with raptor nests were analyzed in accordance with USFWS recommended spatial buffers to protect nesting raptors. Nests of unknown raptor species were analyzed as golden eagle nests when located in trees and as ferruginous hawk nests when located on the ground.

Significance Criteria

In addition to the scale of impacts listed in the beginning of this chapter, an adverse impact on special status wildlife species as a result of project actions would be considered potentially significant if there was: (1) substantial loss of the biological integrity and habitat function of ecosystems that would make species eligible for listing under the ESA; (2) decreased viability or increased removal of Threatened, Endangered, Proposed, or Candidate species, or adverse alteration of their critical habitats; and (3) substantial loss of habitat function or disruption of life history requirements of SSS that would preclude improvement of their status.

4.4.9.2. Impacts Common to All Alternatives

Special Status Species - Wildlife (including Greater Sage-Grouse)

Greater Sage-Grouse

Management actions common to all alternatives that could affect Greater Sage-Grouse include: (1) implementing measures in USFWS Biological Opinions for T&E species; (2) maintaining and restoring Greater Sage-Grouse habitats; and (3) establishing a 0.5-mile year-round

disturbance-free buffer zone for known bald eagle nests. These management actions would have beneficial effects on Greater Sage-Grouse as they conserve or improve habitats. The beneficial effects would be major as greater than ten percent of habitats important to Greater Sage-Grouse would be conserved or improved.

Other Special Status Species
Management actions common to all alternatives that could affect special status wildlife species include: (1) implementing measures in USFWS Biological Opinions for T&E species; (2) maintaining and restoring Greater Sage-Grouse habitats; and (3) establishing a 0.5-mile year-round disturbance-free buffer zone for known bald eagle nests. These management actions would have beneficial effects on special status wildlife species resources as they conserve or improve habitats. The beneficial effects would be major as greater than ten percent of habitats important to T&E Species, and bald eagles would be conserved or improved.

Physical Resources

Air Quality (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from management actions associated with Impacts Common to All Alternatives for air quality resources would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (reduced dust emissions, thereby improving habitats). The beneficial effects would be minor as this would improve habitat mostly along roads, likely only covering one to five percent of habitats important to special status wildlife species.

Soil (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from management actions associated with Impacts Common to All Alternatives for soil resources would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (impact avoidance, thereby conserving habitats). These beneficial effects would be moderate as reclamation, though beneficial, is not restoration and the adverse impacts to habitats would likely persist in large areas of disturbance.

Water Resources
Greater Sage-Grouse
The types of effects on Greater Sage-Grouse from management actions associated with Impacts Common to All Alternatives for water resources would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (protecting surface water from soil erosion and/or pollutants, thus conserving habitats). The effects would be major based on protection alone, but when adding the adverse effects of increased water on a naturally arid landscape which provides a vector for WNv. Taylor et al. (2012) proclaim WNv to be the single greatest threat to Greater Sage-Grouse in the planning area. Persistent low-level WNv mortality, combined with severe disease outbreaks, results in local and regional population declines (Naugle et al. 2004; Naugle et al. 2005). Eliminating mosquito breeding habitat from anthropogenic water sources is crucial for reducing impacts (Taylor et al. 2012). The effect on a WNv outbreak year alone can more than cut a population in half, which could lead to functional extinction within the planning area (Taylor et al. 2012). Due to WNv, the beneficial effects are reduced to a moderate level.

Providing an alternative or "off-source" water supply in locations where BLM-authorized uses are fenced out of water sources is of particular concern to Greater Sage-Grouse management.

Without direction for construction of water containment structures (e.g., troughs, tanks, or ponds) to eliminate habitat for mosquitoes, this management action could contribute to population declines. This management action would have a significant impact on Greater Sage-Grouse. The Greater Sage-Grouse populations in the planning area are at great risk as they are small, isolated, peripheral populations at lower elevations (warmer temperatures associated with lower elevations support WNv presence) experiencing large-scale increases in distribution of surface waters. A WNv outbreak year could reduce the area lek count by 60 percent (Taylor et al. 2012). Reducing the threat of WNv by reducing the number of new man-made water sources should remain a focus of future management. Therefore, supporting and encouraging water supply sources without mitigation to reduce or prevent WNv transmission will likely result in a loss of viability within the planning area, but will not jeopardize the continued existence of the species range-wide (Taylor et al. 2012; USFWS 2013a). This management action would have significant impact on Greater Sage-Grouse.

Other Special Status Species
The types of effects on special status wildlife species from management actions associated with Impacts Common to All Alternatives for water resources would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (protecting surface water from soil erosion and/or pollutants, thus conserving habitats).

Cave and Karst Resources (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from management actions associated with impacts common to all alternatives for cave and karst resources would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (cave inventories, thus identification and conservation of bat habitats). The effects would be minor as only a small portion of one to five percent of all bat habitats in the planning area would be identified and conserved.

Mineral Resources

Locatable Minerals (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from locatable minerals resources management actions common to all alternatives would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (removal and/or fragmentation of habitat). The adverse impacts would be negligible for special status wildlife species as locatable minerals are limited within the planning area and less than one percent of SSS habitats are likely to be impacted by locatable mineral development.

Leasable Minerals – Coal

Greater Sage-Grouse
The types of effects on special status wildlife species from leasable coal minerals resources management actions common to all alternatives would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (removal and/or fragmentation of habitat). At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR 3461.5. No new coal leases applications are reasonably foreseeable within PHMA (core population areas and core population connectivity corridors). The adverse impacts would be minor for Greater Sage-Grouse as exploration and

development would be unlikely to occur within PHMA (core population areas and core population connectivity corridors).

Other Special Status Species
The types of effects on special status wildlife species from leasable coal minerals resources management actions common to all alternatives would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (removal and/or fragmentation of habitat). The adverse impacts would be major for special status wildlife species as exploration and development could occur on greater than ten percent of habitats important to more than half of the special status wildlife species in the planning area.

Leasable Minerals – Fluids

Greater Sage-Grouse
The types of effects on Greater Sage-Grouse from leasable fluid minerals resources management actions common to all alternatives would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (removal, degradation, and/or fragmentation of habitat). Forty-six percent (3,386,530 acres) of the planning area is BLM-administered fluid minerals of which 75 percent (2,544,512 acres) has been leased; the majority of which is held by production. Thus, the adverse impacts would be major for Greater Sage-Grouse as leasable fluid mineral potential exists within nearly half of all habitats.

CBNG activity has waned in recent years with the decline in natural gas prices. To date development is approximately half that predicted in the PRB Final EIS (BLM 2003c) and the forecasted CBNG development is much less (Appendix G (p. 1937)). Interest in deep oil and gas resources within the planning area is increasing, with the anticipated spacing being less than with CBNG, one location per square mile (or less) versus eight locations per square mile. Therefore deep development may be more compatible with Greater Sage-Grouse. Appendix D (p. 1863) contains lists of RDFs and discretionary BMPs to promote Greater Sage-Grouse conservation. BLM's High Plains District has also founded the PRB Restoration program, a partnership which promotes reclamation practices and habitat enhancement projects aimed at restoration of sagebrush habitats.

Other Special Status Species - Wildlife
The types of effects on special status wildlife species from leasable fluid minerals resources management actions common to all alternatives would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (removal, degradation, and/or fragmentation of habitat). Forty-six percent (3,386,530 acres) of the planning area is BLM-administered fluid minerals of which 75% (2,544,512 acres) has been leased; the majority of which is held by production. Thus, the adverse impacts would be major for special status wildlife species as leasable fluid mineral potential exists within nearly half of all habitats for nearly every special status wildlife species (black-tailed prairie dogs, raptors, amphibians, reptiles, bats and migratory birds) in the planning area.

CBNG activity has waned in recent years with the decline in natural gas prices. To date development is approximately half that predicted in the PRB Final EIS (BLM 2003c) and the forecasted CBNG development is much less (Appendix G (p. 1909)). Interest in deep oil and as resources within the planning area is increasing, with the anticipated spacing being less than with CBNG, one location per square mile (or less) versus eight locations per square mile. Therefore deep development may be more compatible with SSS. Appendix D (p. 1863) contains lists of

RDFs and discretionary BMPs to promote Greater Sage-Grouse conservation; which would likely benefit other SSS as well. BLM's High Plains District has also founded the PRB Restoration program, a partnership which promotes reclamation practices and habitat enhancement projects aimed at restoration of sagebrush habitats.

Salable Minerals (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from salable minerals resources management actions common to all alternatives would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (removal, degradation and/or fragmentation of habitat). The adverse impacts would be major for special status wildlife species as salable minerals are likely to occur within greater than ten percent of habitats important to nearly all special status wildlife species (nine percent of habitats important to Greater Sage-Grouse) in the planning area.

Fire and Fuels Management

Planned Fire (Prescribed Fire) (All species, including Greater Sage-Grouse)
Prescribed fire would be implemented to meet DPC and resource management objectives and would be planned on a landscape basis with multiple land owners involved. Effects on grassland and shrubland communities would be direct and long term. Fire helps maintain a mixture of vegetative types and age classes that provide habitat for a variety of special status wildlife species. Fire alters habitats and could improve habitat components for some species while degrading habitat for others. Over time, as vegetation recovers from fire disturbance, various species of special status wildlife species would benefit from various successional stages of vegetation. Herbivores are directly affected by the changes in vegetative cover and forage associated with fire, whereas predators respond to both changes in cover and abundance of prey. Due to the size of potential prescribed fire projects in the planning area, more than ten percent of habitats important to most special status wildlife species (Greater Sage-Grouse, bald eagles, herptiles, bats and migratory birds) in the planning area, these impacts would be major. The effects overall from prescribed fire are anticipated to improve habitats and thus be beneficial.

Unplanned Fire (Wildfire) (All species, including Greater Sage-Grouse)
In addition, fire near wetlands can consume dead grass and sedges, opening up dense marsh vegetation to maintain habitat. Burning also stimulates new shoots that have greater value as forage. Under the right conditions, fire can create new ponds or prevent old ponds from filling in with vegetation. Fire can have short-term adverse effects on special status wildlife species when it occurs during nesting or molting periods, or when it eliminates woody vegetative cover.

Shrub communities are maintained by periodic fires. In forested areas, fire creates openings in the forest and snags used for nesting, perching, and foraging. Fire can cause direct effects on birds when it occurs during the nesting season, killing nestlings and destroying nests. Raptors can benefit from fire due to increased populations of small mammals and birds in response to vegetative changes after fire. The timing of the benefit varies depending on the type of prey favored by the raptor. Over the short term, fires reduce cover available for prey species, making them more visible to raptors. Using fire as a habitat management tool in a sagebrush-steppe ecosystem can have adverse effects if it is improperly used, such as converting desirable shrub and perennial grass stands to annual grasses to maintaining annual grass communities. Hazardous fuels reduction and WUI projects are planned for beneficial results, and protective effects are direct and long term for the targeted vegetation. Effects from the fires also can be indirect and adverse over the short-term for non-targeted species in the same vegetative community. Due to the potential long-term degradation of large amounts of Greater Sage-Grouse habitat, but likely

scattered nature of effects to all other special status wildlife species in the planning area, the adverse effects of habitat removal from unplanned fire are likely to be moderate.

Biological Resources

Vegetation – Forests and Woodlands and Vegetation – Grassland and Shrubland Communities (All species, including Greater Sage-Grouse)
In addition to effects described in *Fish and Wildlife Resources – Wildlife* (reducing impacts to habitats), restoring disturbed sites, including split estate lands, in suitable habitat for special status wildlife species would increase suitable habitat and promote new and restore historic habitat. This has a major beneficial effect on special status wildlife species as greater than ten percent of Greater Sage-Grouse, raptor and migratory bird habitats would be affected.

Vegetation – Riparian/Wetland Resources (All species, including Greater Sage-Grouse)
Expanding and enhancing riparian/wetland systems would increase suitable habitat, promote new and restore historic habitat. This would have long-term minor to major beneficial effects on special status wildlife species that inhabit riparian and wetland ecosystems. There are 138,108 acres of suitable riparian habitat for special status wildlife species on split estate lands. Effects would typically be localized, but due to the overwhelming occurrence of riparian/wetland systems and special status wildlife species overlap, projected over the entire planning area (greater than ten percent for all special status wildlife species, except Greater Sage-Grouse), effects would be major beneficial.

Invasive Species and Pest Management (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from invasive species and pest management common to all alternatives would be the same adverse effects (treatment of wildlife food sources) and beneficial (improving vegetative community health) as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter. The overall effects on special status wildlife species, though, would be major adverse as grasshopper populations, one of the food sources of Greater Sage-Grouse young, would be directly targeted and reduced through treatment and WNv, despite management to mitigate it's effects, is the wildcard that could lead to Greater Sage-Grouse functional extinction within the planning area.

Fish and Wildlife Resources – Fish and Special Status Species – Fish (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from fish and SSS fish management common to all alternatives would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (protection and improvement of riparian habitats). This has a major effect on special status wildlife species as greater than ten percent of habitats important to each of black-tailed prairie dogs, bald eagles, herptiles and bats within the planning area would be affected.

Fish and Wildlife Resources – Wildlife (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from wildlife management common to all alternatives would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (maintaining and improving wildlife habitats). The effects would be major as habitats important to wildlife overlap habitats important for special status wildlife species by greater than ten percent.

Special Status Species – Plants (All species, including Greater Sage-Grouse)
Implementation of actions set forth in recovery plans, conservation measures, terms and conditions, and appropriate and reasonable and prudent measures within biological opinions for T&E species at this point in time, includes surface-disturbing restrictions for Ute ladies'-tresses orchids and their habitats, along with guidelines to prevent alteration of stream flow near known populations. Management actions common to all alternatives also include allowing treatments within habitat for special status plant species and within known populations that are proven to benefit the species. These actions, including the prohibitions/restrictions encompass and therefore improve or conserve five to ten percent of habitats important to herptiles and bats (one to five percent of habitats important to Greater Sage-Grouse and less than one percent of habitats important to all other special status wildlife species); therefore, the management actions common to all alternatives would have moderate beneficial effects on special status wildlife resources.

Heritage and Visual Resources

Cultural Resources (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from cultural resources management common to all alternatives would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (protecting habitats by protecting cultural sites). This would have minor effects on special status wildlife species as cultural resources overlap one to five percent of habitats important to herptiles and/or bats and less than one percent of habitats important to all other special status wildlife species.

Paleontological Resources (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from paleontological resources management common to all alternatives would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (protecting habitats by protecting paleontological sites). This would have negligible effects on special status wildlife species as paleontological resources overlap less than one percent of habitats important to special status wildlife species.

Visual Resources (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from visual resources management common to all alternatives would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (prohibiting or limiting disturbance to habitats). Beneficial effects are negligible for special status wildlife species due to the minimal (less than one percent) overlap of the two resources.

Land Resources

Forest Products (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from forest products resource management actions common to all alternatives would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat removal). Forest products resource areas overlap less than one percent of habitats important to special status wildlife species, therefore, impacts would be negligible.

Lands and Realty (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from lands and realty management actions common to all alternatives would be the same beneficial effects as described in the *Fish and*

Wildlife Resources – Wildlife section of this chapter (improved wildlife resource management ability through acquisition/exchange of lands). Lands with potential for acquisition overlap less than five percent of habitat important to any special status wildlife species so these beneficial effects would be minor.

Renewable Energy (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from renewable energy resources management actions common to all alternatives would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat removal and fragmentation). Renewable energy potential exists in greater than ten percent of habitats important to most special status wildlife species (less than ten percent for bald eagles), therefore effects would be major.

Rights-of-Way and Corridors (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from ROW and corridors management actions common to all alternatives would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat loss, degradation, and fragmentation). ROW and corridors are likely to occur throughout greater than ten percent of habitats important to most special status wildlife species (less than ten percent for bald eagles), therefore effects would be major.

Travel and Transportation Management (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from TTM actions common to all alternatives would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat loss, degradation, and fragmentation). The effects from travel and transportation could occur on greater than ten percent of habitats important to black-tailed prairie dogs, Greater Sage-Grouse, bald eagles, and raptors, making these major effects.

Recreation (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from recreation management actions common to all alternatives would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat loss, alteration, and degradation, and additional stressors). Recreational activities are likely to occur on less than ten percent of habitats important to special status wildlife species, so effects should be moderate.

Lands with Wilderness Characteristics (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from wilderness characteristics management actions common to all alternatives would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat conservation). Less than one percent of habitats important to special status wildlife species occur within areas with wilderness characteristics, so the effects would be negligible.

Livestock Grazing Management

Greater Sage-Grouse
In addition to the effects described in the *Fish and Wildlife Resources – Wildlife* section (habitat degradation or habitat improvements), late-season grazing can remove residual vegetation that would provide important nesting cover for Greater Sage-Grouse the following spring.

Livestock range improvements designed to alter grazing distribution and use of pastures, such as fences and water developments, would affect Greater Sage-Grouse. Placing mineral supplements

near Greater Sage-Grouse leks could degrade Greater Sage-Grouse nesting habitat. Livestock fences can create travel barriers, cause stress, and could lead to decreased reproductive success and death from entanglement.

Overall, livestock grazing management actions common to all alternatives would have negligible adverse effects on Greater Sage-Grouse.

Other Special Status Species
In addition to the effects described in the *Fish and Wildlife Resources – Wildlife* section (habitat degradation or habitat improvements), late-season grazing can remove residual vegetation that would provide important nesting cover for special status sagebrush obligates. Livestock grazing also can enhance forage and brood-rearing conditions for special status wildlife species. Special status wildlife could favor regrowth areas previously used by cattle because of the resulting increase in forage palatability.

Livestock range improvements designed to alter grazing distribution and use of pastures, such as fences and water developments, would affect SSS. Placing mineral supplements within sensitive habitats could degrade SSS habitat. Livestock fences can create travel barriers, cause stress, and could lead to decreased reproductive success and death from entanglement.

Overall, livestock grazing management actions common to all alternatives would have major adverse effects on special status wildlife species as allotments occur on greater than ten percent of habitats important to special status wildlife species (except bats).

Special Designations

Areas of Critical Environmental Concern (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from ACECs management actions common to all alternatives would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat conservation). ACECs would encompass one to five percent of habitats important to Greater Sage-Grouse, therefore minor effects would occur.

Scenic or Back Country Byways (All species, including Greater Sage-Grouse)
Scenic or BCBs do not overlap any habitats important to special status wildlife species; therefore, no effects are anticipated.

Wild and Scenic Rivers (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from WSRs management actions common to all alternatives would be the same as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter.

Wilderness Study Areas (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from WSAs management actions common to all alternatives would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat conservation). The WSAs are within less than one percent of habitats important to special status wildlife species so would therefore only have negligible effects.

Socioeconomic Resources

Social and Economic Conditions (All species, including Greater Sage-Grouse)
Management actions common to all alternatives are administrative processes and will have no effect on special status wildlife resources. Impacts to social and economic resources will be quantified on a project-specific basis. Management actions that vary by alternative are also administrative; therefore, social and economic management actions will not be discussed further in this section.

Health and Safety (All species, including Greater Sage-Grouse)
Management actions common to all alternatives are designed to control and mitigate threats to health and human safety and to the environment. Management actions designed to prevent accidental spills of hazardous materials or environmental contamination would have beneficial impacts to special status wildlife by protecting riparian and upland areas across the resource area. Because hazardous materials (e.g., oil, oil and gas by-products, pesticides, and cleaning solvents) are being produced and transported in the planning area, there is a threat of accidents or spills. If there was a spill, mitigation and cleanup would rarely succeed in recovering a riparian or upland area to its original condition over the short term; therefore, there would be localized long-term adverse impacts.

Management actions associated with health and safety are only identified in the *Impacts Common to All Alternatives* section; therefore, health and safety will not be discussed further in this section.

4.4.9.3. Alternative A

Alternative A would continue management in accordance with the 1985 RMP (BLM 1985c) as amended and maintained. This section describes management actions and potential impacts to special status wildlife species from implementing Alternative A.

Special Status Species – Wildlife

Greater Sage-Grouse
Seasonal restrictions on land uses would benefit Greater Sage-Grouse by preventing disturbance during critical breeding and nesting periods. This would have a long-term beneficial effect. Other long-term beneficial effects would result from restricting access roads, pipelines, and powerlines to designated corridors.

Greater Sage-Grouse also would benefit from prohibiting surface occupancy for oil and gas activities, restricting OHV activities in big-game winter ranges or elk calving areas, retaining sufficient escape and foraging habitat adjacent to timber cutting units, and exchanging or selling scattered parcels of public land so areas could be “blocked up” into manageable units. From past experience, it is estimated that restrictions on oil and gas exploration, ROW, and other surface-disturbing activities through special status wildlife species seasonal or NSO provisions are not likely. Under Alternative A, the authorized officer may waive prohibitions and restrictions without defined criteria; this has resulted in inconsistent application of management and has not been effective in protecting wildlife.

Estimated short- and long-term disturbance from BLM actions in the planning area are anticipated to result in loss, degradation, and fragmentation of sagebrush habitat. Alternative A does not provide specific guidance or management actions for the prevention of habitat loss and fragmentation. To minimize effects on sagebrush habitats and Greater Sage-Grouse, Alternative A would avoid surface disturbance or occupancy within 0.25 mile of occupied leks and avoid

surface-disturbing and disruptive activities in suitable nesting and early brood-rearing habitats within 2 miles of occupied leks.

Alternative A does not include surface disturbance restrictions for Greater Sage-Grouse winter habitats, requirements to reduce noise levels of equipment, or restrictions on high-profile structures in sagebrush-obligate habitats (which could fragment habitat because Greater Sage-Grouse avoid some high-profile structures). Alternative A restrictions on surface disturbance or occupancy and disruptive activities around occupied Greater Sage-Grouse leks should provide some benefit to Greater Sage-Grouse during sensitive periods; however, these restrictions might not be sufficient to maintain or improve Greater Sage-Grouse populations over the long term. Energy development within two miles of leks is projected to reduce the average probability of lek persistence from 87 percent to 5 percent (Walker et al. 2007a). Alternative A does not provide any provisions for habitat restoration, a component essential to the repopulation of degraded habitats. Over the long term, projected surface-disturbing and disruptive activities under Alternative A would have a major adverse effect on Greater Sage-Grouse in the planning area, potentially including extirpation within development areas. Current restrictions and lease stipulations, and inconsistent application of impact minimization measures have led to substantial loss of the biological integrity and habitat function of ecosystems; decreased population viability; and substantial disruption of life history requirements of this SSS. This management has had and would continue to have significant impacts on Greater Sage-Grouse in the planning area.

Other Special Status Species

Seasonal restrictions on land uses would benefit special status wildlife species by preventing disturbance during critical winter, breeding, and nesting periods. This would have a long-term beneficial effect. Other long-term beneficial effects would result from restricting access roads, pipelines, and powerlines to designated corridors.

Special status wildlife species also would benefit from prohibiting surface occupancy for oil and gas activities, restricting OHV activities in big-game winter ranges or elk calving areas, retaining sufficient escape and foraging habitat adjacent to timber cutting units, and exchanging or selling scattered parcels of public land so areas could be “blocked up” into manageable units. From past experience, it is estimated that restrictions on oil and gas exploration, ROW, and other surface-disturbing activities through special status wildlife species seasonal or NSO provisions are not likely. Under Alternative A, the authorized officer may waive prohibitions and restrictions without defined criteria; this has resulted in inconsistent application of management and has not been effective in protecting wildlife.

Estimated short- and long-term disturbance from BLM actions in the planning area are anticipated to result in loss, degradation, and fragmentation of sagebrush habitat. Alternative A does not provide specific guidance or management actions for the prevention of habitat loss and fragmentation. To minimize effects on sagebrush habitats, Alternative A would avoid surface disturbance or occupancy within 0.25 mile of occupied Greater Sage-Grouse leks and avoid surface-disturbing and disruptive activities in suitable nesting and early brood-rearing habitats within 2 miles of occupied leks.

Similar to Greater Sage-Grouse, Brewer’s sparrow, sage sparrow, and sage thrasher depend on sagebrush habitats. These species can use other shrubland types, particularly during the non-breeding season. The loggerhead shrike uses a greater diversity of shrubland types, including sagebrush. Therefore, measures to protect Greater Sage-Grouse would benefit all sagebrush and shrubland species. Adverse effects on sagebrush habitats adversely affect these species.

Alternative A does not include surface disturbance restrictions for Greater Sage-Grouse winter habitats, requirements to reduce noise levels of equipment, or restrictions on high-profile structures in sagebrush-obligate habitats. Alternative A restrictions on surface disturbance or occupancy and disruptive activities around occupied Greater Sage-Grouse leks should provide some benefit to special status sagebrush obligates during sensitive periods. Alternative A does not provide any provisions for habitat restoration. Over the long term, projected surface-disturbing and disruptive activities under Alternative A could have a major adverse effect on special status sagebrush obligates in the planning area. Current restrictions and lease stipulations, and inconsistent application of impact minimization measures have led to substantial loss of the biological integrity and habitat function of ecosystems; decreased population viability; and substantial disruption of life history requirements of SSS. This management has had and would continue to have significant impacts on special status sagebrush obligates.

Many neotropical migrants breed and nest on BLM-administered lands and winter in the tropics (BLM 1992b). Although effects on these species in their winter habitat are not subject to BLM management, localized effects on breeding and nesting habitats from surface-disturbing activities are anticipated for neotropical migrants. These effects could include temporary and permanent loss of breeding and nesting habitats. Surface-disturbing activities and associated development would also fragment and degrade habitats for neotropical migrants.

Although there are no specific management actions for special status neotropical migrants that use riparian and wetland systems, these species are affected by other biological resource management actions, particularly those pertaining to water and riparian and wetland habitats. Riparian and wetland areas also provide late brood-rearing habitats for Greater Sage-Grouse; breeding and migratory stopover habitats for sensitive songbirds, waterbirds, shorebirds, and waterfowl; and breeding, foraging, and wintering habitat for bald eagles. Management and potential effects on riparian and wetland species under Alternative A would be similar to those described for migratory game birds (waterfowl) in the *Fish and Wildlife Resources – Wildlife* section of this chapter.

Nongame raptors are anticipated to be affected by surface-disturbing activities under Alternative A. The late winter, spring, and early summer periods, when courtship, nest construction, incubation, and early brooding periods occur, are considered more sensitive to disturbance because adult nongame raptors are more prone to abandon nests at these times (USFWS 2002). Constructing roads, powerlines, and other facilities can contribute to loss and fragmentation of raptor habitats and ultimately affect diversity and abundance of raptor populations (USFWS 2002). Surface disturbance would have localized adverse effects on raptor prey species by temporarily and permanently disturbing habitats for small mammals and birds. Under Alternative A, surface disturbance effects on raptors would be reduced by designated buffer zones around raptor nests. Under Alternative A, no activity or surface disturbance would be allowed within a biologic buffer from any active raptor nest from February 1 through July 31. The distances and dates for no disturbance can vary under Alternative A based on topography, species, season of use, and other pertinent factors. Under Alternative A, the BLM would protect approximately 1,195,815 acres surrounding known raptor nests.

Effects from surface-disturbing activities are anticipated for special status nongame mammals. Surface disturbance is anticipated to have localized adverse effects on special status nongame mammal habitats, including temporary and permanent loss of habitats. Fragmentation and degradation of habitats for special status nongame mammals is also anticipated from surface-disturbing activities and associated development. Under Alternative A, short- and long-term surface disturbance is expected for grassland habitats on BLM-administered land in

the planning area. Reductions in prairie dog populations could affect other grassland species associated with prairie dog towns, including mountain plover, burrowing owl, swift fox, and black-footed ferret. Because most suitable habitats for prairie dogs in the planning area are on private and state lands, there should be no measurable adverse effects on prairie dog populations from BLM actions under Alternative A.

Alternative A does not include specific management actions for bats, nor have bat habitats been delineated in the planning area. In general, forest and woodland special status nongame mammal species occupy similar habitats as forest and woodlands special status nongame neotropical migrants; therefore, effects on these two groups could be similar.

Under Alternative A, there are no specific management actions for special status neotropical migrants that utilize grassland. Short- and long-term surface disturbances to grassland habitats on BLM-administered land in the planning area are expected. Another grassland species, mountain plover, is often found in association with prairie dog towns because they tend to prefer nesting areas with sparse vegetative cover. The long-billed curlew also nests in areas with sparse vegetation. Therefore, these species would also be affected by management actions for black-tailed prairie dogs.

Although there are no specific management actions for reptiles and amphibians under Alternative A, these species would be affected by other biological resource management actions. Amphibians require riparian and wetland habitats. The effects of management actions on these habitat types are described throughout this section.

Physical Resources

Air Quality (All species, including Greater Sage-Grouse)
The types of effects from Alternative A would be the same as described in the *Impacts Common to All Alternatives* section for air quality. In Alternative A, though, these impacts would be analyzed on a project-specific basis. Without monitoring or oversight on a programmatic level, the beneficial effects can only be negligible. Air quality resource management actions under Alternative A would have negligible beneficial impacts on SSS wildlife.

Soil (All species, including Greater Sage-Grouse)
The types of effects from Alternative A would be the same as described in the *Impacts Common to All Alternatives* section for soil (dust emission reduction and vegetation health improvements). In Alternative A, management actions for soil are beneficial where habitats are conserved through prohibitions of surface-disturbing activities and/or surface occupancy, both of which occur on greater than ten percent of habitats important to bald eagles, Greater Sage-Grouse, and herptiles. Within Alternative A, the impacts to soil resources are analyzed on a project-specific basis. Without oversight on a programmatic level, it is likely that beneficial effects would be reduced by half, reducing the major beneficial effects listed above to minor.

Water Resources (All species, including Greater Sage-Grouse)
The types of effects from Alternative A would be the same beneficial effects as described in the *Impacts Common to All Alternatives* section for water (protecting, restoring, developing and improving water sources used by wildlife). Management actions for water in Alternative A are beneficial when habitats are conserved through prohibitions to surface disturbance, which occurs on greater than ten percent of habitats important to bald eagles and habitats important to herptiles, making these beneficial effects major. Within Alternative A, the impacts to water resources are

analyzed on a project-specific basis. Without oversight on a programmatic level, it is likely that the beneficial effects would be reduced by half, making the major beneficial effects only minor.

Cave and Karst Resources (All species, including Greater Sage-Grouse)
The types of effects from Alternative A would be the same beneficial effects as described in the *Impacts Common to All Alternatives* section for cave and karst resources (inventory and protection of habitats). Without monitoring or oversight on a programmatic level, the beneficial effects can only be negligible. Cave and karst resource management actions under Alternative A would have negligible beneficial impacts on SSS wildlife.

Mineral Resources

Locatable Minerals (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species would be the same as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat fragmentation, degradation and loss). Less than one percent of habitats important to special status wildlife species (herptiles and bats) will be affected by locatable mineral development in Alternative A, making the effects negligible.

Leasable Minerals – Coal (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species would be the same as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat loss).

Leasable Minerals – Fluids

Greater Sage-Grouse
Fluid minerals have been leased and developed and would continue to be leased and developed within fifty percent of the Greater Sage-Grouse habitat in the planning area. Energy development within two miles of leks is projected to reduce the average probability of lek persistence from 87 percent to 5 percent (Walker et al. 2007a). Constraints on oil and gas leases, thus far, have not been strong enough to prevent the decline in populations of this species resulting from habitat loss, degradation and fragmentation caused by its development. Continuing to lease and allow development on this scale would cause substantial loss of the biological integrity and habitat function of ecosystems. This management has had and would continue to have significant impacts on Greater Sage-Grouse in the planning area, potentially including extirpation within energy development areas.

Other Special Status Species
The types of effects on special status wildlife species would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat loss and fragmentation). Under Alternative A, fluid resources could be developed on greater than ten percent of all special status wildlife species, making the adverse effects major.

Salable Minerals (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat loss and degradation). Greater than ten percent of habitats important to nearly all special status wildlife species (less for Greater Sage-Grouse) would be affected by salable mineral activities, making these adverse effects major.

Fire and Fuels Management

Unplanned Fire (Wildfire) and Planned Fire (Prescribed Fire)

Greater Sage-Grouse

Alternative A would manage wildland fire for areas where fire is not desirable or can be used as a management tool, and could implement prescribed fire to reduce hazardous fuels and meet fire and fuels management objectives. Nelle et al. (2000) concluded that burning did not benefit Greater Sage-Grouse nesting or brood-rearing habitats and adversely affected nesting habitats due to the extensive time it takes for sagebrush canopy to recover. Because Greater Sage-Grouse hens show fidelity for nesting areas, catastrophic wildland fires that remove large tracts of sagebrush could be detrimental to Greater Sage-Grouse populations. Holloran et al. (2005) recommended limiting prescribed fire that could adversely affect dense sagebrush stands with adequate herbaceous vegetation. Fire and fuels management under Alternative A would promote a natural fire regime and could limit the potential for catastrophic fire, which would benefit Greater Sage-Grouse.

Overall, short-term effects from fire will be adverse based on habitat loss and degradation. Wildfires are estimated to burn 27,596 acres (3.5%) and planned fires are anticipated for 14,000 acres (1.8%) of BLM surface during the life of the plan, a minor effect.

Other Special Status Species

The types of effects on special status wildlife species from Alternative A fire and fuels management would be the same as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter. In addition, Alternative A would manage wildland fire for areas where fire is not desirable or can be used as a management tool, and could implement prescribed fire to reduce hazardous fuels and meet fire and fuels management objectives. Holloran et al. (2005) recommended limiting prescribed fire that could adversely affect dense sagebrush stands with adequate herbaceous vegetation. Fire and fuels management under Alternative A would promote a natural fire regime and could limit the potential for catastrophic fire, which would benefit special status wildlife species.

Overall, short-term effects from fire will be adverse based on habitat loss and degradation. Wildfires are estimated to burn 27,596 acres (3.5%) and planned fires are anticipated for 14,000 acres (1.8%) of BLM surface during the life of the plan, a minor effect.

Biological Resources

Vegetation – Forests and Woodlands (All species, including Greater Sage-Grouse)

The types of effects on special status wildlife species from Alternative A forests and woodlands management would be the same as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat loss and also habitat improvements). Within Alternative A, the impacts from forest and woodland resource projects are analyzed on a project specific basis. Forests and woodlands are less than one percent of habitats important to special status wildlife species, so beneficial effects are negligible to special status wildlife species overall.

Vegetation – Grassland and Shrubland Communities (All species, including Greater Sage-Grouse)

The types of effects on special status wildlife species from Alternative A grassland and shrubland communities management would be the same as described in the *Fish and Wildlife*

Resources – Wildlife section of this chapter (habitat improvement). Due to the lack of specific management actions for grassland and shrubland communities in Alternative A, beneficial effects are likely to be only negligible.

Vegetation – Riparian/Wetland Resources (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative A riparian/wetland resource management would be the same as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat restoration and improvements). Greater than ten percent of habitats important to many special status wildlife species (black-tailed prairie dog colonies, bald eagles, and herptiles) occur in riparian and wetland areas, therefore, the beneficial effects should be major effects.

Invasive Species and Pest Management (All species, including Greater Sage-Grouse)
Infestations of invasive species are spread sporadically throughout the planning area. Weeds contribute to the loss of rangeland productivity, increased soil erosion, reduced water quantity and quality, reduced species diversity, and loss of wildlife habitats. The BLM uses an integrated weed management program that involves grazing, fire management, and chemical, mechanical, and biological controls, and treats various weed species each year. Despite these efforts, the spread of invasive species is anticipated to degrade sagebrush habitats over the long term. Although the extent of sagebrush habitat degradation from the spread of invasive species and other weeds is not known for the planning area, there is a potential for these species to substantially affect Greater Sage-Grouse habitats in the future. Therefore, the anticipated continued expansion and spread of invasive species under Alternative A would adversely affect special status wildlife habitats. Though habitats are not likely to be entirely replaced by invasive species, all habitats would potentially be altered, and the effects are likely to be moderate.

Fish and Wildlife Resources – Fish (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative A fish management would be the same as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat improvements). Greater than ten percent of habitats important to many special status wildlife species (black-tailed prairie dogs, bald eagles, herptiles, and bats) occur within fish habitat corridors. Within Alternative A, the impacts to fish resources are analyzed on a project-specific basis. Without oversight on a programmatic level, it is likely that beneficial effects would be reduced by half, reducing the major beneficial effects listed above to minor.

Fish and Wildlife Resources – Wildlife (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative A wildlife management would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat conservation). General wildlife habitats and those important to SSS wildlife are intertwined. Greater than ten percent of habitats important to special status wildlife species would be impacted by wildlife management actions, therefore the effects would be major.

Special Status Species – Plants (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative A SSS plant management would be the same as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter. Due to the general locations of the special status plants in the planning area, the effects from them are likely to only impact herptiles and bats on a moderate scale and all other special status wildlife species by less than one percent.

Special Status Species – Fish (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative A SSS fish management

would be the same as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat conservation and restoration). The adverse effects would be minor for most SSS wildlife. The lack of protections under Alternative A would likely have a greater adverse effect on bald eagles due to the amount of overlap of suitable habitats for these species, greater than ten percent. Therefore, management actions for special status fish species in Alternative A would have minor adverse effects on special status wildlife species.

Heritage and Visual Resources

Cultural Resources (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative A cultural resources management would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat conservation). At most, cultural resources encompass greater than one percent, but less than five percent of habitats important to herptiles and bats and less for all other special status wildlife species, therefore, the effects from cultural management actions in Alternative A would have minor beneficial effects. Within Alternative A, the impacts to cultural resources are analyzed on a project-specific basis. Without oversight on a programmatic level, it is likely that beneficial effects would be reduced by half, reducing the minor beneficial effects negligible.

Paleontological Resources (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative A paleontological resources management would be the same beneficial effects as described in the paleontological resources paragraph within the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat conservation). Paleontological resources are present in the planning area in less than one percent of habitats important to Greater Sage-Grouse (less than one percent of habitats important to migratory birds); therefore, the management actions for paleontological resources under Alternative A will have negligible beneficial effects of special status wildlife species in the planning area.

Visual Resources (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative A visual resources management would be the same beneficial effects as described in the visual resources paragraph within the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat conservation). At most, VRM of VRM Class I and II areas encompass less than one percent of habitats important to migratory birds only, therefore, the effects from VRM actions in Alternative A would have negligible beneficial effects.

Land Resources

Forest Products (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative A land resources management would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat degradation and loss). Forest products occur on less than one percent of habitats important to special status wildlife species. Therefore, the adverse effects would be negligible.

Lands and Realty (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative A land resources management would be the same as described in the *Fish and Wildlife Resources – Wildlife*

section of this chapter (habitat fragmentation from land disposal or habitat improvement for land acquisition). Land tenure adjustments are identified in Alternative A within one to five percent of habitat important to all special status wildlife species in the planning area. The potential impacts from disposing of SSS habitat outweighs the benefits of potential acquisitions; therefore, the overall effect of land and realty management actions are minor adverse.

Renewable Energy (All species, including Greater Sage-Grouse)
Wind-energy facilities can be a source of mortality for raptors if raptors collide with wind turbine blades. High mortality could result if wind towers are placed along a migration path or in nesting territories. Raptors, other birds, and bats sometimes collide with tall wind-energy and utility infrastructures, including guy wires used for stabilization. Wind-energy facilities also could be a source of habitat loss and fragmentation, and human disturbance from construction and maintenance activities. Alternative A does not include decisions regarding wind-energy development. Large wind-energy fields also involve surface disturbance, which could permanently change the habitat structure of the special status wildlife species inhabitants.

The area of greatest potential for wind energy within the planning area is within five to ten percent of habitat important to bald eagles, making the adverse effects moderate. With a lack of decision, renewable energy would be examined on a project-specific basis. This would increase the probability that these adverse effects might occur.

Rights-of-Way and Corridors

Greater Sage-Grouse
Continued authorization of ROW grants and location of transmission lines and transportation facilities within corridor areas, to the extent feasible have severely impacted Greater Sage-Grouse habitats. There are currently no restrictions on the placement of these facilities. ROWs and corridors have fragmented Greater Sage-Grouse habitats within the planning area to the point of substantial loss of the biological integrity and habitat function of ecosystems. These management actions, under Alterative A, have had and would continue to have a significant impact on Greater Sage-Grouse.

Other Special Status Species
The types of effects on special status wildlife species from Alternative A ROW and corridors management would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat loss and fragmentation). ROWs and corridors are currently proposed within greater than ten percent of habitats important to all special status wildlife species, making these adverse effects major.

Travel and Transportation Management (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative A TTM would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat loss, fragmentation and degradation). Travel and transportation is currently allowed within greater than ten percent of habitats important to almost all special status wildlife species in the planning area, though in less than one percent for herptiles and bats. Major adverse effects would occur on special status wildlife species from management actions for TTM under Alternative A.

Recreation (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative A recreation management

would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat degradation). Designated recreation areas under Alternative A occur within five to ten percent of black-tailed prairie dog colonies, making the effects moderate.

Lands with Wilderness Characteristics (All species, including Greater Sage-Grouse)
Alternative A does not include decisions for the protection of lands with wilderness characteristics, which would allow surface-disturbing activities in these areas. This would have a negligible adverse effect on wildlife.

Livestock Grazing Management

Greater Sage-Grouse
By altering habitat components necessary for Greater Sage-Grouse habitat, livestock grazing can affect the suitability and extent of Greater Sage-Grouse habitats in the planning area. Holloran et al. (2005) documented that annual grazing in Greater Sage-Grouse nesting habitats could adversely affect the next year's nesting success. Under Alternative A, the BLM manages to maintain Category M allotments. Adams et al. (2004) identify grazing intensity and timing and duration of grazing as the most important factors in maintaining herbaceous cover for Greater Sage-Grouse. The current focus of management and monitoring does not emphasize the protective cover of vegetation and litter that Greater Sage-Grouse and other ground nesting birds require. Therefore, livestock grazing management under Alternative A would not improve the quality or quantity of habitat for the Greater Sage-Grouse, and will have minor adverse effects on special status wildlife resources.

Other Special Status Species
By altering habitat components necessary for special status wildlife habitats, livestock grazing can affect the suitability and extent of special status wildlife habitats in the planning area. Under Alternative A, the BLM manages to maintain Category M allotments. Adams et al. (2004) identify grazing intensity and timing and duration of grazing as the most important factors in maintaining herbaceous cover for special status sagebrush obligates. The current focus of management and monitoring does not emphasize the protective cover of vegetation and litter that Greater Sage-Grouse and other ground nesting birds require. Therefore, livestock grazing management under Alternative A will have minor adverse effects on special status wildlife resources.

Special Designations

Areas of Critical Environmental Concern (All species, including Greater Sage-Grouse)
Under Alternative A, the types of impacts to special status wildlife species from management actions for special designations would be the same adverse effects as described under *Impacts Common to All Alternatives*, except that the additional 65,461 acres within the three WSAs would be open to oil and gas development. These three areas contain less than one percent of the habitats important to special status wildlife species in the planning area. Therefore, the adverse effects to special status wildlife species from management actions for ACECs in Alternative A would be negligible.

Scenic or Back Country Byways, Wild and Scenic Rivers, and Wilderness Study Areas (All species, including Greater Sage-Grouse)
No scenic or BCBs, WSRs, or WSAs are proposed in Alternative A. There will be no effect to special status wildlife species habitats from them in this alternative.

4.4.9.4. Alternative B

This section describes management actions under Alternative B, which emphasizes resource conservation, and the likely impacts to special status wildlife species due to their implementation.

Special Status Species – Wildlife

Greater Sage-Grouse

Alternative B management actions for special status wildlife species include modifying existing fences that prevent Greater Sage-Grouse movement; applying prohibitions on surface occupancy, surface-disturbing and disruptive activities in various habitats for Greater Sage-Grouse movement; requiring burial of all new low-voltage powerlines and installation of perch-inhibiting devices on aboveground powerlines. This approach would allow for the greatest protective measures for Greater Sage-Grouse and their associated habitats and would greatly increase the potential for future management decisions to expand the proliferation of this species through active management where habitats important to special status wildlife species occur and BLM has the authority to actively manage them (Table 4.58, "Habitats Important to Special Status Wildlife Species on Each of the BLM-administered Land Types" (p. 1261)).

Under Alternative B, estimated short- and long-term surface disturbance from BLM actions in the planning area would result in less loss, degradation, and fragmentation of sagebrush habitats. In addition, Alternative B includes specific management actions for protection from habitat fragmentation (including sagebrush habitats) on BLM-administered lands. To minimize effects on sagebrush habitats and the Greater Sage-Grouse, Alternative B prohibits rather than avoids surface disturbance or occupancy to protect associated nesting and early brood-rearing habitats. Alternative B would protect Greater Sage-Grouse winter habitat and implement practices to minimize the effects of continuous noise on species that rely on aural cues for breeding. In addition, Alternative B would manage sagebrush communities to enhance or maintain these communities, which would benefit Greater Sage-Grouse by reducing habitat fragmentation. Alternative B would also require that new low-voltage utility lines be buried, and anti-perch devices be installed on new high-voltage utility lines, which would result in relatively little increase in predation on Greater Sage-Grouse from raptors and corvids (e.g., crows and ravens).

Alternative B would prohibit surface-disturbing activities within 4 miles of the perimeter of occupied or undetermined Greater Sage-Grouse leks and winter concentration areas, and prohibit disruptive activities within the 4 mile area and outside the 4-mile buffer in nesting and brood-rearing habitat from March 1 to July 15 and winter habitat and concentration areas from November 15 to March 14. A CSU would be placed on all projects that would allow no more than 3% total surface disturbance per 640 acres. In addition, restoration of Greater Sage-Grouse habitat would become priority for all surface-disturbing activities on BLM surface within modeled nesting, brood-rearing, or winter habitat.

Over the long term, restricting surface disturbance or occupancy around Greater Sage-Grouse leks and within Greater Sage-Grouse habitats, combined with the proactive management action to enhance and restore large, contiguous blocks of sagebrush habitat, would protect sagebrush habitats and have beneficial effects on Greater Sage-Grouse.

Other Special Status Species

Alternative B management actions for special status wildlife species include modifying existing fences that prevent special status wildlife species movement; applying prohibitions

on surface occupancy, surface-disturbing and disruptive activities in various habitats for special status wildlife species (e.g., riparian corridors consistently used by bald eagles, biologic buffers around raptor nests, and amphibian and reptile habitats); requiring burial of all new low-voltage powerlines and installation of perch-inhibiting devices on aboveground powerlines; and prohibiting surface disturbance in prairie dog colonies. This approach would allow for the greatest protective measures for special status wildlife species and their associated habitats and would greatly increase the potential for future management decisions to expand the proliferation of these species through active management where habitats important to special status wildlife species occur and BLM has the authority to actively manage them (Table 4.40, "Habitats Important to Special Status Wildlife Species on Each of the BLM-administered Land Types" (p. 1253)).

Table 4.40. Habitats Important to Special Status Wildlife Species on Each of the BLM-administered Land Types

Surface	Prairie Dog Colonies	Greater Sage-Grouse Winter Habitat	Within 0.5 Mile of Clear Creek, Crazy Woman Creek, Piney Creek, Powder River, and Tongue River	Within 1.5 Miles of Special Status Species Raptor Nests	Amphibian and Reptile Habitat
BLM (acres)	6,156	289,327	12,937	113,784	176,636
Federal Mineral (acres)	47,702	2,165,107	58,902	2,023,118	1,217,959
Source: BLM 2012f BLM Bureau of Land Management					

Special status wildlife species would benefit from conscientious management of physical resources and biological resources. Under Alternative B, the BLM would manage all riparian areas toward mid to late successional stage vegetation that would benefit riparian and wetland species. Under this alternative, there would be greater restrictions on surface disturbance in riparian and wetland areas because this type of disturbance would not be allowed within 0.25 mile of riparian and wetland areas new permanent facilities would not be allowed in these areas. Alternative B actions also would protect and enhance riparian and wetland habitats through more restrictive management of livestock by locating salt and/or mineral blocks a minimum of 0.5 mile from water sources, riparian areas, and aspens stands. These actions would ultimately result in riparian systems with increased plant species and structural diversity throughout the planning area, with benefits for riparian and wetland species. Actions pertaining to water and riparian and wetland habitats also would benefit migratory game birds. The buffer around riparian areas, wetland areas, perennial streams, and 100-year floodplains where surface disturbance cannot occur would be larger under Alternative B. These areas would be closed rather than avoided, which would benefit migratory game birds. In addition, Alternative B management would reduce channel erosion, bank erosion, and channel incision, and restore damaged wetlands.

Under Alternative B, estimated short- and long-term surface disturbance from BLM actions in the planning area would result in less loss, degradation, and fragmentation of sagebrush habitats. In addition, Alternative B includes specific management actions for protection from habitat fragmentation (including sagebrush habitats) on BLM-administered lands. To minimize effects on sagebrush habitats, Alternative B prohibits rather than avoids surface disturbance or occupancy. Alternative B would manage sagebrush communities to enhance or maintain these communities, which would benefit special status sagebrush obligates by reducing habitat fragmentation.

Restrictions around raptor nests would be more extensive under Alternative B (1.5 miles), which would result in fewer direct effects on nesting raptors. Seasonal restrictions vary based on the species of raptor. Alternative B also would manage sagebrush, aspen, and mountain shrub communities in large, contiguous blocks and maintain connections among these communities. In addition, Alternative B would protect riparian areas, restrict placement of salt and/or mineral blocks, and increase control of invasive plant species. These actions would benefit birds and small mammals that comprise raptor prey in the planning area.

Under Alternative B, grassland habitats would be affected by short- and long-term surface disturbances. Surface disturbance and habitat fragmentation under Alternative B would affect special status nongame mammal species.

Alternative B would designate an NSO for black-tailed prairie dog colonies (approximately 47,702 acres). The goal of this NSO is to ensure a long-term, self-sustaining population of prairie dogs in the planning area. The associated potential increases in prairie dog populations under Alternative B would benefit species associated with prairie dog towns, including mountain plover, burrowing owl, swift fox, and black-footed ferret.

Potential effects on the northern leopard frog and spotted frog would be commensurate with effects on riparian and wetland habitats. The adverse effects under Alternative B would be similar to those for special status neotropical migrants that use riparian and wetland habitats.

Effects from conservative management of resources under Alternative B would, in some cases, be similar to those described for Alternative A and *Impacts Common to All Alternatives*. Where effects on special status wildlife species would vary in degree from effects described for Alternative A; further rationale is provided below.

Physical Resources

Air Quality (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative B management of air quality resources would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat conservation). Air quality resources occur throughout all habitats important to special status wildlife species, therefore, the beneficial effects would be major.

Soil (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative B management of soil resources would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat conservation). Management actions for soil resources in Alternative B will occur within greater than ten percent of all habitats important to special status wildlife species. Beneficial effects from soil and habitat conservation would be major.

Water Resources

Greater Sage-Grouse
Under Alternative B, riparian and uplands in historically perennial systems would be managed to restore perennial flows or standing water. Restoration of areas of standing water would encourage creation of mosquito habitats. Increasing mosquito habitats increases the potential threat of WNv outbreaks in Greater Sage-Grouse. The single greatest threat to Greater Sage-Grouse in

the planning area is WNv (Taylor et al. 2012). Persistent low-level WNv mortality, combined with severe disease outbreaks, results in local and regional population declines (Naugle et al. 2004; Naugle et al. 2005). Eliminating mosquito breeding habitat from anthropogenic water sources is crucial for reducing impacts (Taylor et al. 2012). Without direction for construction of water containment structures (e.g., troughs, tanks, or ponds) to eliminate habitat for mosquitoes, this management action could contribute to population declines. The Greater Sage-Grouse populations in the planning area are at great risk as they are small, isolated, peripheral populations at lower elevations (warmer temperatures associated with lower elevations support WNv presence) experiencing large-scale increases in distribution of surface waters. A WNv outbreak year could reduce the area lek count by 60 percent (Taylor et al. 2012). Supporting and encouraging water supply sources without mitigation to reduce or prevent WNv transmission will likely result in a loss of viability within the planning area, but will not jeopardize the continued existence of the species range-wide (Taylor et al. 2012; USFWS 2013a). This management action, under Alternative B would have significant impacts to Greater Sage-Grouse.

Other Special Status Species
The types of effects on special status wildlife species from Alternative B management of water resources would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat conservation). Water resources overlap greater than ten percent of habitats important to special status wildlife species, therefore beneficial effects would be major.

Under Alternative B, riparian and uplands in historically perennial systems would be managed to restore perennial flows or standing water. Restoration of areas of standing water would encourage creation of mosquito habitats. Increasing mosquito habitats increases the potential threat of WNv to susceptible SSS such as raptors.

Cave and Karst Resources (All species, including Greater Sage-Grouse)
In addition to the types of effects described in the *Fish and Wildlife Resources – Wildlife* section of this chapter, bats using caves for roosting, maternity colonies, or hibernation could be affected by surface-disturbing activities near caves, cliffs, or other rock features. More cave habitats are expected to be protected under Alternative B. Human activity in caves would be managed through Cave Management Plans, developed considering direction described in WO IM 2010–181, which would reduce threats to bats from WNS. Five to ten percent of habitats important to bald eagles, herptiles, and bats in the planning area occur within identified cave and karst areas. The beneficial effects of cave and karst management would be minor.

Mineral Resources

Locatable Minerals (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative B management of locatable mineral resources would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat loss degradation and fragmentation). Under Alternative B, locatable minerals will occur within less than one percent of habitats important to special status wildlife species. Adverse impacts will be negligible.

Leasable Minerals – Coal (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative B management of leasable coal mineral resources would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter.

Leasable Minerals – Fluids

Greater Sage-Grouse
Under Alternative B, within 4 miles of Greater Sage-Grouse leks and winter concentration areas are closed to leasing. Forty-six percent (3,386,530 acres) of the planning area is BLM-administered fluid minerals of which 75 percent (2,544,512 acres) has been leased; the majority of which is held by production. Thus, Greater Sage-Grouse may continue to experience population-level impacts, but there will also be areas unavailable for fluid minerals leasing, particularly southeast of Buffalo that could provide secure habitat (Map 14). Disturbed habitat on BLM surface are required to be restored to functional sagebrush ecosystems. Management actions for leasable fluid mineral resources would have a significant impact on Greater Sage-Grouse.

CBNG activity has waned in recent years with the decline in natural gas prices. To date, development is approximately half that predicted in the PRB Final EIS (BLM 2003c) and the forecasted CBNG development is much less (Appendix G (p. 1937)). Interest in deep oil and gas resources within the planning area is increasing, with the anticipated spacing being less than with CBNG, one location per square mile (or less) versus eight locations per square mile. Therefore, deep development may be more compatible with Greater Sage-Grouse. The BFO has incorporated multiple conservation measures to reduce the population's vulnerability, such as habitat restoration to promote the recovery of disturbed habitats and water management measures to reduce WNv transmission. Appendix D (p. 1863) contains lists of RDFs and discretionary BMPs to promote Greater Sage-Grouse conservation. BLM's High Plains District has also founded the PRB Restoration program, a partnership which promotes reclamation practices and habitat enhancement projects aimed at restoration of sagebrush habitats for the Greater Sage-Grouse.

Other Special Status Species
The types of effects on special status wildlife species from Alternative B management of leasable fluid mineral resources would generally be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter.

Forty-six percent (3,386,530 acres) of the planning area is BLM-administered fluid minerals of which 75 percent (2,544,512 acres) has been leased; the majority of which is held by production. Disturbed habitat on BLM surface are required to be restored to functional sagebrush ecosystems which would benefit special status sagebrush obligates.

CBNG activity has waned in recent years with the decline in natural gas prices. To date, development is approximately half that predicted in the PRB Final EIS (BLM 2003c) and the forecasted CBNG development is much less (Appendix G (p. 1937)). Interest in deep oil and gas resources within the planning area is increasing, with the anticipated spacing being less than with CBNG, one location per square mile (or less) versus eight locations per square mile. Therefore, deep development may be more compatible with SSS. The BFO has incorporated multiple conservation measures, such as sagebrush restoration to promote the recovery of disturbed habitats and water management measures to reduce WNv transmission. Appendix D (p. 1863) contains lists of BMPs to promote SSS conservation. BLM's High Plains District has also founded the PRB Restoration program, a partnership which promotes reclamation practices and habitat enhancement projects aimed at restoration of sagebrush habitats.

Salable Minerals (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative B management of salable mineral resources would be the same adverse effects as described in the *Fish and Wildlife*

Resources – Wildlife section of this chapter (habitat loss and degradation). Under Alternative B, salable mineral extraction is permitted within greater than ten percent of habitats important to all special status wildlife species within the planning area, except raptors (one to five percent). Salable mineral management actions in Alternative B will have major adverse effects on special status wildlife species.

Fire and Fuels Management

Planned Fire (Prescribed Fire)

Greater Sage-Grouse
Under Alternative B, wildland fire and other vegetation treatments would be used to restore fire-adapted ecosystems and reduce hazardous fuels. A fire mosaic of burned and unburned areas can be detrimental to Greater Sage-Grouse. Wyoming big sagebrush, the dominate component of Greater Sage-Grouse habitat in the planning area, requires 50–120 years or more recovery time after fire. Evidence suggests that particularly in Wyoming big sagebrush, a program of prescribed burning is unwarranted or inadvisable if maintaining and restoring sagebrush landscapes and sagebrush-dependent species is the goal (Baker 2006). Wildland fire use in Greater Sage-Grouse habitats would cause substantial loss of the biological integrity and habitat function of ecosystems. Under Alternative B, management actions for planned fire would have a significant impact on Greater Sage-Grouse. Planned fires are anticipated within greater than ten percent of habitats important to Greater Sage-Grouse; therefore, the management actions for planned fire will have major adverse effects on Greater Sage-Grouse in the planning area.

Other Special Status Species
The types of effects on special status wildlife species from Alternative B planned fire management would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat loss and degradation). Planned fires are anticipated within greater than ten percent of habitats important to bald eagles, herptiles, and bats (five to ten percent of habitats important to black-tailed prairie dogs, raptors, and migratory birds); therefore, the management actions for planned fire will have major adverse effects on special status wildlife species in the planning area.

Under Alternative B, wildland fire and other vegetation treatments would be used to restore fire-adapted ecosystems and reduce hazardous fuels. A fire mosaic of burned and unburned areas can be detrimental to sagebrush obligates. Wyoming big sagebrush, the dominate component of sagebrush habitat in the planning area, requires 50–120 years or more recovery time after fire. Evidence suggests that particularly in Wyoming big sagebrush, a program of prescribed burning is unwarranted or inadvisable if maintaining and restoring sagebrush landscapes and sagebrush-dependent species is the goal (Baker 2006). Wildland fire use in sagebrush habitats would cause substantial loss of the biological integrity and habitat function of ecosystems. Under Alternative B, management actions for planned fire would have a significant impact on special status sagebrush obligates.

Unplanned Fire (Wildfire) (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative B unplanned fire management would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat loss and degradation). Unplanned fires cannot be pinpointed for occurrence, but it is likely, given the amount, general location of habitats, and

general fire history, that Greater Sage-Grouse and migratory bird habitats will be moderately and adversely affected over the life of this plan by unplanned fire ignitions. Other habitats important to special status wildlife species may also incur the adverse effects of fire, but the likelihood of occurrence makes the effects to these habitats negligible. Overall effects from unplanned fire on SSS wildlife would balance to minor adverse.

Biological Resources

Vegetation – Forests and Woodlands (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative B management of forests and woodlands would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat conservation). Forests and woodlands overlap greater than ten percent of habitats important to migratory birds, including raptors (five to ten percent of habitats important to herptiles and bats, less than one percent of habitats important to Greater Sage-Grouse and bald eagles and no overlap of black-tailed prairie dog colonies), therefore, conservation of forest and woodlands would have overall major beneficial effects on special status wildlife species in the planning area.

Vegetation – Grassland and Shrubland Communities (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative B management of grassland and shrubland communities would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat conservation). Conservation of grassland and shrubland communities provide conservation of greater than ten percent of habitats important to Greater Sage-Grouse, raptors, and migratory birds (five to ten percent of habitats important to herptiles and bats, and less than one percent of habitats important to bald eagles and black-tailed prairie dogs), therefore, management actions for grassland and shrubland communities in Alternative B would have major beneficial effects on special status wildlife species in the planning area.

Vegetation – Riparian/Wetland Resources (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative B management of riparian/wetland resources would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat improvement). Riparian and wetland community improvements would affect greater than ten percent of habitats important to all special status wildlife species within the planning area, except Greater Sage-Grouse (five to ten percent). Management actions for riparian/wetland resources under Alternative B would have major beneficial effects on special status wildlife species overall.

Invasive Species and Pest Management (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative B management of invasive species and pests would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat degradation). Invasive species and pest management is expected to occur within five to ten percent of habitats important to Greater Sage-Grouse and black-tailed prairie dogs (one to five percent of habitats important to herptiles, bats, and migratory birds, and less than one percent of habitats important to raptors and bald eagles), therefore management actions under Alternative B for invasive species and pest management would have minor adverse effects on special status wildlife species.

Fish and Wildlife Resources – Fish (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative B management of fish would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat improvements). Habitats for fish occur within greater than ten percent of habitats important to all special status wildlife species, except Greater Sage-Grouse. Improvements to fish habitats will have major beneficial effects on special status wildlife species in the planning area.

Fish and Wildlife Resources – Wildlife (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative B management of wildlife would be the same as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat conservation and improvement). Habitats important to general wildlife and special status wildlife species are intertwined throughout the planning area. Greater than ten percent of habitats important to special status wildlife species would experience beneficial effects from management actions related to wildlife under Alternative B, making them major.

Special Status Species – Plants (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative B management of SSS plants would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat conservation). SSS plant habitats are present within one to five percent of habitats important to Greater Sage-Grouse, herptiles, and bats (less than one percent of habitats important to black-tailed prairie dogs, bald eagles, raptors, and migratory birds), therefore, protection of habitats for SSS plant habitats in the planning area will have minor effects on special status wildlife species.

Special Status Species – Fish (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative B management of SSS fish would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat conservation). Special status fish species habitat occurs within greater than ten percent of habitats important to bald eagles, (less than five percent for all other special status wildlife species in the planning area) therefore, habitat improvements to special status fish species habitat would have major beneficial effects to special status wildlife species.

Heritage and Visual Resources

Cultural Resources (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative B management of cultural resources would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat conservation). Protective buffer for the cultural resources encompass greater than ten percent of habitats important to black-tailed prairie dogs, Greater Sage-Grouse, raptors, and migratory birds (five to ten percent of habitats important to bald eagles, herptiles, and bats), therefore, management actions for cultural resources under Alternative B would have major beneficial effects on special status wildlife species in the planning area.

Paleontological Resources (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative B management of paleontological resources would be the same beneficial effects as described in the paleontological resources Alternative B paragraph in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat conservation). Protective buffer for the cultural resources encompass less than one percent of habitats important to all special status wildlife species in the planning area. The

beneficial effects from management actions for paleontological resources under Alternative B would be negligible.

Visual Resources (All species, including Greater Sage-Grouse)
Under Alternative B, the beneficial effects of prohibiting or limiting surface-disturbing activities in VRM Class II would occur on less than one percent of habitats important to migratory birds only. Management actions for visual resources under Alternative B would have negligible beneficial effects on special status wildlife species.

Land Resources

Forest Products (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative B management of forest products resources would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat loss). Adverse effects are lessened under Alternative B due to limits of acreage and wildlife-coordinated product removal, but the effects remain adverse. Forest products are harvested within less than one percent of all habitats important to special status wildlife species, making the adverse effects negligible.

Lands and Realty (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative B management of lands and realty would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat conservation). Lands available to retention and acquisition contain less than five percent of habitats important to special status wildlife species, making the beneficial effects minor.

Renewable Energy (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative B management of renewable energy resources would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat conservation). Surface occupancy prohibitions for renewable energy under Alternative B would occur on greater than ten percent of habitats important to special status wildlife species. These prohibitions (all species, including Greater Sage-Grouse)would have major beneficial effects on special status wildlife species in the planning area.

Rights-of-Way and Corridors (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative B management of ROW and corridors would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat conservation). Surface occupancy prohibitions for ROWs and corridor management under Alternative B would occur on greater than ten percent of habitats important to special status wildlife species. These prohibitions would have major beneficial effects on special status wildlife species in the planning area.

Travel and Transportation Management (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative B management of transportation and access would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat conservation), only increased. Under Alternative B, areas within habitat for SSS would be closed to motorized vehicle use. Limiting motorized vehicle use to designated routes and closing areas to motorized vehicle use would decrease adverse effects to special status wildlife species where occurrence may not have been

determined. Allowing any other travel in other areas limited to designated routes only under a special use permit would also decrease adverse effects on special status wildlife species and their associated habitats, because holders of Special Recreation Permits are instructed to follow all rules and regulations and should therefore, avoid locations where the BLM has identified important special status wildlife species habitats. OHV use under Alternative B would be restricted. Restrictions on OHV use under Alternative B result in fewer potential effects (disturbances) to Greater Sage-Grouse. Effects to special status wildlife species from TTM would be major.

Recreation (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative B management of recreation would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat conservation). Permit holders would be instructed to avoid locations where the BLM has identified important wildlife habitats. Recreational areas overlap five to ten percent of habitats important to black-tailed prairie dogs (one to five percent of habitats important to Greater Sage-Grouse and less than one percent of habitat important to all other special status wildlife species in the planning area); therefore, effects to special status wildlife species under Alternative B for recreation would be beneficial and moderate.

Lands with Wilderness Characteristics (All species, including Greater Sage-Grouse)
The types of effects special status wildlife species from Alternative B management of wilderness characteristics would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat conservation). lands with wilderness characteristics are located within less than one percent of habitats important to special status wildlife species. Management actions for wilderness characteristics would have negligible beneficial effects on special status wildlife species in the planning area.

Livestock Grazing Management (All species, including Greater Sage-Grouse)
The types of effects to special status wildlife species from Alternative B management of livestock grazing would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat conservation). Livestock grazing is permitted in greater than ten percent of habitats important to bald eagles, raptors, and herptiles (five to ten percent of habitats important to black-tailed prairie dogs and migratory birds and one to five percent of habitats important to Greater Sage-Grouse), therefore, the management actions for livestock grazing management under Alternative B would have major beneficial effect on special status wildlife species in the planning area.

Special Designations

Areas of Critical Environmental Concern (All species, including Greater Sage-Grouse)
Under Alternative B, designating approximately 511,000 acres as eight ACECs would provide additional protections to sensitive habitats.

Measures identified for the proposed ACECs that would directly benefit special status wildlife species and their associated habitat include (1) closing or limiting the areas to motorized vehicle use; (2) closing the areas to minerals leasing; (3) recommending withdrawal to locatable minerals entry; (4) closing the areas to salable minerals; (5) excluding ROW; and (6) prohibiting all other surface-disturbing activities not compatible with retaining or enhancing the areas' values. These seven areas contain one to five percent of habitats important to Greater Sage-Grouse (less than one percent of habitats important to all other special status wildlife species in the planning area),

therefore, the management actions in Alternative B for ACECs would have minor beneficial effects on special status wildlife species in the planning area.

Scenic or Back Country Byways (All species, including Greater Sage-Grouse)
Scenic or BCBs do not occur within habitats important to special status wildlife species; therefore, there would be no effect.

Wild and Scenic Rivers (All species, including Greater Sage-Grouse)
WSRs do not occur within habitats important to special status wildlife species; therefore, there would be no effect.

Wilderness Study Areas (All species, including Greater Sage-Grouse)
Under Alternative B, altered management of the three areas proposed to Congress as WSAs would provide an additional 28,931 acres of protection for sensitive habitats.

Measures identified for the previously WSAs that would directly benefit special status wildlife species and their associated habitat include (1) closing the areas to minerals leasing; (2) recommending withdrawal to locatable minerals entry; (3) closing the areas to salable minerals; (4) excluding ROW; (5) prohibiting all other surface-disturbing activities not compatible with retaining or enhancing the areas' values; and potentially (6) prohibiting the use of all motorized and mechanized equipment. These areas encompass less than one percent of habitats important to all special status wildlife species. Overall, the management actions in Alternative B for WSAs would have negligible beneficial effects on special status wildlife species in the planning area.

4.4.9.5. Alternative C

This section describes management actions under Alternative C, which emphasizes resource use, and the likely resulting impacts to special status wildlife species due to its implementation.

Special Status Species – Wildlife

Greater Sage-Grouse
Alternative C management actions for special status wildlife species would not modify existing fences; not apply greater restrictions on surface-disturbing and disruptive activities in various special status wildlife species habitats (e.g., Greater Sage-Grouse seasonal habitats); and not require that low-voltage powerlines be buried or perch-inhibiting devices be installed on aboveground powerlines.. Activities allowed in suitable Greater Sage-Grouse habitat could preclude the potential for future management decisions to expand this species through active management.

Management under Alternative C would allow disturbance to sagebrush habitats. Alternative C would manage vegetative resources to comply with the ESA. Alternative C would apply avoidance buffers to Greater Sage-Grouse leks and nesting and early brood-rearing habitat, and winter concentration areas. Alternative C protections and mitigation measures to address surface-disturbing activities would be similar to Alternative A. Overall, because surface disturbance and habitat loss, degradation, and fragmentation would be similar under Alternative C and Alternative A, the associated adverse effects on Greater Sage-Grouse also would be similar. In particular, applying standard lease terms, allowing renewable energy in Greater Sage-Grouse nesting, brood-rearing, and winter habitats, and leasing fluid minerals regardless of Greater Sage-Grouse habitat concerns are management actions that would cause substantial loss of the

biological integrity and habitat function of ecosystems potentially resulting in extirpation within developed areas. Under Alternative C, the management actions for special status wildlife species would have significant impacts to Greater Sage-Grouse.

Other Special Status Species

Alternative C management actions for special status wildlife species would not modify existing fences that prevent special status wildlife species movement; not apply greater restrictions on surface-disturbing and disruptive activities in various special status wildlife species habitats (e.g., riparian corridors consistently used by bald eagles, biologic buffers for raptor nests, and amphibian and reptile habitats); not require that low-voltage powerlines be buried or perch-inhibiting devices be installed on aboveground powerlines; and not prohibit surface disturbance in prairie dog colonies. This approach allows only for the protection of nesting raptors during incubation periods. Alternative C would not protect any special status wildlife species and activities allowed in suitable habitat could preclude the potential for future management decisions to expand or maintain the proliferation of these species through active management.

The effects of Alternative C management would, in most cases, be similar to effects described for Alternative A and under *Impacts Common to All Alternatives*. Where effects on special status wildlife species would vary in degree from those under Alternative A, further rationale is provided below.

Management under Alternative C would allow disturbance to sagebrush habitats. Alternative C would manage vegetative resources to comply with the ESA. Alternative C protections and mitigation measures to address surface-disturbing activities would be similar to Alternative A. Overall, because surface disturbance and habitat loss, degradation, and fragmentation would be similar under Alternative C and Alternative A, the associated adverse effects on SSS also would be similar. In particular, applying standard lease terms, allowing renewable energy in SSS habitats, and leasing fluid minerals regardless of SSS habitat concerns are management actions for special status wildlife species that would cause substantial loss of the biological integrity and habitat function of ecosystems potentially resulting in extirpation within developed areas. Under Alternative C, the management actions for special status wildlife species would have significant impacts.

The adverse effects under Alternative C would be similar to those described for special status neotropical migrants that use riparian and wetland habitats.

Alternative C would likely not protect raptor habitat through smaller buffers and shorter timing restrictions. Lack of protection would cause substantial loss of habitat function or disruption of life history requirements of SSS that would preclude improvement of their status. Under Alternative C, management actions for special status wildlife species would have significant impacts to raptors.

Potential effects on the northern leopard frog and spotted frog would be commensurate with effects on riparian and wetland habitats. Lack of protection would cause substantial loss of habitat function or disruption of life history requirements of SSS that would preclude improvement of their status. Under Alternative C, management actions for special status wildlife species would have significant impacts to BLM sensitive species amphibians and bats.

Physical Resources

Air Quality (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative C management of air quality resources would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat degradation). The adverse effects of no air quality monitoring, though they will occur in every habitat important to special status wildlife species, are, in general, moderate as they cause degradation to habitat quality, but not entire vegetation loss.

Soil (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative C management of soil resources would be the same as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat loss and degradation). Soil resources could be lost from greater than ten percent of habitats important to special status wildlife species under Alternative C. Management actions for soils under Alternative C would have major adverse effects on special status wildlife species in the planning area.

Water Resources

Greater Sage-Grouse

Through the lack of protection of water resources, one to five percent of habitats important to Greater Sage-Grouse would be adversely impacted. The single greatest threat to Greater Sage-Grouse in the planning area is WNv (Taylor et al. 2012). Persistent low-level WNv mortality, combined with severe disease outbreaks, results in local and regional population declines (Naugle et al. 2004; Naugle et al. 2005). Eliminating mosquito breeding habitat from anthropogenic water sources is crucial for reducing impacts (Taylor et al. 2012). Management actions to authorize activities associated with the surface discharge of produced water from development of federal minerals and maintaining existing water supply sources and drilling new water supply wells, developing new seeps and springs, and constructing new reservoirs would increase opportunities for WNv to persist in the planning area. Without direction for construction of water containment structures (e.g., troughs, tanks, or ponds) to eliminate habitat for mosquitoes, this management action could contribute to population declines. The Greater Sage-Grouse populations in the planning area are at great risk as they are small, isolated, peripheral populations at lower elevations (warmer temperatures associated with lower elevations support WNv presence) experiencing large-scale increases in distribution of surface waters. A WNv outbreak year could reduce the area lek count by 60 percent (Taylor et al. 2012). Reducing the threat of WNv by reducing the number of new man-made water sources should remain a focus of future management. Therefore, supporting and encouraging water supply sources without mitigation to reduce or prevent WNv transmission will likely result in a loss of viability within the planning area, but will not jeopardize the continued existence of the species range-wide (Taylor et al. 2012; USFWS 2013a). This management action would have a significant impact on Greater Sage-Grouse.

Other Special Status Species

The types of effects on special status wildlife species from Alternative C management of water resources would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat loss and degradation). Through the lack of protection of water resources, greater than ten percent of habitats important to bald eagles, herptiles, and bats (five to ten percent of habitats important to black-tailed prairie dogs and raptors and one to five percent of habitats important to migratory birds) would be adversely impacted.

Overall, management actions for water in Alternative C would have major adverse effects on special status wildlife species in the planning area.

Cave and Karst Resources (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative C management of cave and karst resources would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat loss and degradation). Human activity in caves would be managed through Cave Management Plans, developed considering direction described in WO IM 2010-181, which would reduce threats to bats from WNS. Cave and karst resources in Alternative C would impact one to five percent of habitats important to herptiles and bats (less than one percent of habitats important to all other special status wildlife species); therefore, management actions for cave and karst resources under Alternative C would have minor adverse effects to special status wildlife species.

Mineral Resources

Locatable Minerals (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative C management of locatable mineral resources would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat loss). Under Alternative C, locatable resources would be permitted in less than one percent of habitats important to special status wildlife species. The adverse effects would be negligible.

Leasable Minerals – Coal (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative C management of leasable coal mineral resources would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter.

Leasable Minerals – Fluids

Greater Sage-Grouse
Fluid minerals could be leased and developed within one hundred percent of the Greater Sage-Grouse habitat in the planning area. Leasing fluid minerals and allowing development on this scale could cause substantial loss of the biological integrity and habitat function of ecosystems, potentially resulting in extirpation within oil and gas fields. Energy development within two miles of leks is projected to reduce the average probability of lek persistence from 87 percent to 5 percent (Walker et al. 2007a). This management has had and would continue to have significant impacts on Greater Sage-Grouse in the planning area.

Other Special Status Species
The types of effects on special status wildlife species from Alternative C management of leasable fluid mineral resources would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter Under Alternative C, fluid resource development would be permitted in greater than ten percent of all habitats important to special status wildlife species in the planning area. The adverse effects would be major.

Salable Minerals (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative C management of salable mineral resources would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat loss and degradation). Under Alternative

C, salable fluid resource development could be permitted in greater than ten percent of habitats important to all special status wildlife species in the planning area, except Greater Sage-Grouse (five to ten percent). The adverse effects would be major.

Fire and Fuels Management

Planned Fire (Prescribed Fire) and Unplanned Fire

Greater Sage-Grouse

Alternative C management would adversely affect greater than ten percent of habitats important to Greater Sage-Grouse; therefore, management actions for planned fire management would be major adverse. Unplanned fires cannot be pinpointed for occurrence, but it is likely, given the amount, general location of habitats, and general fire history, that Greater Sage-Grouse habitats will be moderately and adversely affected over the life of this plan by unplanned fire ignitions.

Under Alternative C, wildland fire and other vegetation treatments would be used to restore fire-adapted ecosystems, enhance forage for commodity production, and reduce hazardous fuels and heavy equipment would be utilized with few constraints. A fire mosaic of burned and unburned areas can be detrimental to sagebrush obligates such as Greater Sage-Grouse. Wyoming big sagebrush, the dominant component of Greater Sage-Grouse habitat in the planning area, requires 50 to 120 years or more recovery time after fire. Evidence suggests that particularly in Wyoming big sagebrush, a program of prescribed burning is unwarranted or inadvisable if maintaining and restoring sagebrush landscapes and sagebrush-dependent species is the goal (Baker 2006). Wildland fire use in Greater Sage-Grouse habitats could cause substantial loss of the biological integrity and habitat function of ecosystems. Under Alternative C, management actions for planned fire would have a significant impact on Greater Sage-Grouse.

Other Special Status Species

Alternative C management would not restore a natural fire regime to fire-adapted ecosystems in the planning area; all wildland fires would be suppressed under Alternative C. Alternative C would preclude the use of prescribed fire and wildland fire to meet fire and fuels management objectives. These actions could increase hazardous fuels, thereby increasing the risk of catastrophic fire. This management would adversely affect greater than ten percent of habitats important to bald eagles, herptiles, bats, and migratory birds (five to ten percent of habitats important to black-tailed prairie dogs and raptors); therefore, management actions for planned fire management would be major adverse. Unplanned fires cannot be pinpointed for occurrence, but it is likely, given the amount, general location of habitats, and general fire history, that migratory bird habitats will be moderately and adversely affected over the life of this plan by unplanned fire ignitions. All other habitats important to special status wildlife species may also incur the adverse effects of fire, but the likelihood of occurrence makes the effects to these habitats negligible.

Under Alternative C, wildland fire and other vegetation treatments would be used to restore fire-adapted ecosystems, enhance forage for commodity production, and reduce hazardous fuels and heavy equipment would be utilized with few constraints. A fire mosaic of burned and unburned areas can be detrimental to sagebrush obligates. Wyoming big sagebrush, requires 50 to 120 years or more recovery time after fire. Evidence suggests that particularly in Wyoming big sagebrush, a program of prescribed burning is unwarranted or inadvisable if maintaining and restoring sagebrush landscapes and sagebrush-dependent species is the goal (Baker 2006). Wildland fire use in sagebrush habitats could cause substantial loss of the biological integrity and

habitat function of ecosystems. Under Alternative C, management actions for planned fire would have a significant impact on special status sagebrush obligates.

Biological Resources

Vegetation – Forests and Woodlands (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative C management of biological resources would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat loss). Less than one percent of habitats important to special status wildlife species would be affected by management of forest and woodland communities in Alternative C.

Vegetation – Grassland and Shrubland Communities (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative C management of biological resources would be the same as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat degradation). Though grasslands and shrublands occur throughout greater than ten percent of habitats important to special status wildlife species, the adverse impacts are likely to only occur to less than one percent of those communities; therefore, the adverse effects are likely to be negligible.

Vegetation – Riparian/Wetland Resources (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative C management of biological resources would be the same as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat degradation). Adverse effects from management actions for riparian/wetland resources could occur in greater than ten percent of habitats important to black-tailed prairie dogs, bald eagles, herptiles, and bats (five to ten percent of habitats important to Greater Sage-Grouse and migratory birds, and less than one percent of habitats important to raptors); therefore, these adverse effects would be major.

Invasive Species and Pest Management (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative C management of biological resources would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat degradation). Invasive species and pest management under Alternative C could occur within five to ten percent of habitats important to black-tailed prairie dogs, Greater Sage-Grouse, herptiles, and bats (one to five percent of habitats important to migratory birds, and less than one percent of habitats important to bald eagles and raptors); therefore, management actions under Alternative C would have moderate adverse effects on special status wildlife species in the planning area.

Fish and Wildlife Resources – Fish (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative C management of biological resources would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat loss and degradation). Greater than ten percent of habitats important to black-tailed prairie dogs, bald eagles, herptiles, and bats (five to ten percent of habitats important to Greater Sage-Grouse and one to five percent of habitats important to raptors and migratory birds) occur in fish habitats that would be left unprotected under Alternative C. Overall, management actions for fish under Alternative C would have major adverse effect on special status wildlife species in the planning area.

Fish and Wildlife Resources – Wildlife (All species, including Greater Sage-Grouse)
Under Alternative C, adverse effects on special status wildlife species would be reduced through prohibiting surface-disturbing activities for the protection of any other resource. This would have a major beneficial effect on habitats for special status wildlife species where these resources overlap. Avoidance areas for other resources would, by nature, be avoidance areas for important habitats for special status wildlife species. An NSO stipulation would not prevent all disturbances. Activities that require surface disturbance to install underground facilities would still be allowed. Though some protections for habitats important to special status wildlife species are present in Alternative C, the overwhelming lack of protections for most special status wildlife species in the planning area make the overall effects adverse and major.

Special Status Species – Plants and Fish (All species, including Greater Sage-Grouse)
Under Alternative C, prohibitions on surface-disturbing activities for the protection of special status plant, fish, and wildlife species would reduce adverse impacts to all wildlife. Avoidance areas for other resources would, by nature, be NSO areas for important wildlife habitats. An NSO stipulation would not prevent all disturbances. Activities that require surface disturbance to install underground facilities would still be allowed. Surface-disturbing prohibitions for special status plant species would also conserve five to ten percent of habitats important to herptiles and bats (one to five percent of habitats important to Greater Sage-Grouse, and less than one percent of prairie dog colonies or habitats important to bald eagles and raptors); therefore, management actions for special status plant species under Alternative C would have moderate beneficial effects on special status wildlife resources. Prohibitions for special status fish species would also conserve greater than ten percent of habitats important to bald eagles (one to five percent of habitats important to Greater Sage-Grouse, herptiles and bats and less than one percent of prairie dog colonies and habitats important to migratory birds); therefore, management actions for special status fish species would have major beneficial effects on wildlife resources.

Heritage and Visual Resources

Cultural Resources (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative C management of cultural resources would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat conservation). Under Alternative C, greater than ten percent of habitats important to black-tailed prairie dogs (one to five percent of habitats important to herptiles and bats and less than one percent of habitats for all other special status wildlife species) would be protected from the much smaller protective buffers around cultural sites in Alternative C, therefore, management actions for cultural resources would have major beneficial effects on special status wildlife species in the planning area.

Paleontological Resources (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative C management of paleontological resources would be the same beneficial effects as described in the paleontological resources Alternative C discussion within the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat conservation). Under Alternative C, less than one percent of all habitats important to SSS in the planning area would be protected by disturbance-free buffers around paleontological resources. This would have only negligible beneficial effects.

Visual Resources (All species, including Greater Sage-Grouse)
VRM under Alternative C would have no effect on special status wildlife species as no proactive management would take place.

Land Resources

Forest Products (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative C management of forest product resources would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat loss). Under Alternative C, forest product harvest is permitted on less than one percent of habitats important to special status wildlife species. The adverse effects would be negligible.

Lands and Realty (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative C management of lands and realty would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat loss and fragmentation). Disposal of lands important to natural resources could mean the disposal of one to five percent of habitats important to the majority of the special status wildlife species in the planning area, except raptors (less than one percent). Management actions for lands and realty under Alternative C would have minor adverse effects on special status wildlife species in the planning area.

Renewable Energy

Greater Sage-Grouse
Authorization of renewable-energy projects, such as wind energy, on 134,875 acres in the planning area under Alternative C could impact one hundred percent of the Greater Sage-Grouse habitats. Renewable energy projects within Greater Sage-Grouse habitats would create substantial loss of the biological integrity and habitat function of ecosystems. These management actions, under Alterative C, would have a significant impact on Greater Sage-Grouse.

Other Special Status Species
The types of effects on special status wildlife species from Alternative C management of renewable-energy resources would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat loss and degradation). Under Alternative C, renewable-energy facilities would be permitted in greater than ten percent of the majority of habitats important to special status wildlife species (five to ten percent for bald eagles and migratory birds). Management actions for renewable energy under Alternative C would have major adverse effects on special status wildlife species in the planning area.

Rights-of-Way and Corridors

Greater Sage-Grouse
Under Alternative C, 725,842 acres would be open for authorization of ROW grants and location of transmission lines and transportation facilities consistent with other resource values that would have severe impacts on Greater Sage-Grouse habitats. There would be no restrictions on the placement of these facilities. ROW and corridors would fragment Greater Sage-Grouse habitats within the planning area to the point of substantial loss of the biological integrity and habitat function of ecosystems. These management actions, under Alterative C, would have a significant impact on Greater Sage-Grouse.

Other Special Status Species
The types of effects on special status wildlife species from Alternative C management of ROW and corridors would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat loss and fragmentation). Under Alternative C, ROW and corridors would be permitted in greater than ten percent of habitats important to nearly all special status wildlife species (five to ten percent for bald eagles). Management actions for ROW and corridors under Alternative C would have major adverse effects on special status wildlife species in the planning area.

Under Alternative C, 725,842 acres would be open for authorization of ROW grants and location of transmission lines and transportation facilities consistent with other resource values that would have severe impacts on many SSS. There would be no restrictions on the placement of these facilities. ROW and corridors could fragment habitats within the planning area to the point of substantial loss of the biological integrity and habitat function of ecosystems. These management actions, under Alterative C, would have a significant impact on many SSS.

Travel and Transportation Management (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative C management of travel and transportation would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat loss and fragmentation). Travel and transportation activities could occur in greater than ten percent of habitats important to Greater Sage-Grouse, bald eagles, raptors, and migratory birds (less than one percent of habitats important to black-tailed prairie dogs, herptiles, and bats); therefore, TTM under Alternative C would have major adverse effects on special status wildlife species.

Recreation (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative C management of recreation would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat degradation). Recreation areas occur in five to ten percent of habitats important to black-tailed prairie dogs (less than one percent of habitats important to all other special status wildlife species in the planning area); therefore, management actions for recreation under Alternative C would have moderate adverse effects on special status wildlife species in the planning area.

Lands with Wilderness Characteristics (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative C management of wilderness characteristics would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat conservation). Lands with wilderness characteristics contain less than one percent of habitats important to special status wildlife species. Beneficial effects from management actions for lands with wilderness characteristics under Alternative C would be negligible.

Livestock Grazing Management (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative C management of livestock grazing would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat degradation). Grazing allotments contain greater than ten percent of all habitats important to special status wildlife species, except bats. Management actions for livestock grazing management would have major adverse effects on special status wildlife species in the planning area.

Special Designations (All species, including Greater Sage-Grouse)

The effects on special status wildlife species from Alternative C management of special designations would be the same as Alternative A.

4.4.9.6. Alternative D

This section describes management actions and potential impacts to special status wildlife species under Alternative D, which generally allows resource use if the activity can be conducted in a manner that conserves physical, biological, and heritage and visual resources, and emphasizes moderate constraints on resource uses to reduce adverse effects on resource values. Alternative D is the Proposed RMP.

Special Status Species – Wildlife

Greater Sage-Grouse

The Governor of Wyoming issued an EO on August 1, 2008, mandating special management for all state lands in Greater Sage-Grouse Core Population Areas. Core Population Areas are important breeding areas for Greater Sage-Grouse in Wyoming, as identified by the Wyoming Governor's Sage-Grouse Implementation Team. In addition to identifying Core Population Area, the team also recommended placing stipulations on development activities to ensure that existing habitat function is maintained within those areas. Accordingly, the EO prescribes special consideration for Greater Sage-Grouse, including authorization of new activities only when the project proponent can identify that the activity will not cause declines in Greater Sage-Grouse populations in the Core Population Area. These protections would apply to approximately 80 percent of the total estimated Greater Sage-Grouse breeding population in the state. In February 2010, the Wyoming State Legislature adopted a joint resolution endorsing Wyoming's Core Area Strategy as outlined in Governor's EO 2008-2 (USFWS 2010). The Governor signed EO 2010-4 on August 18, 2010 to replace 2008-2. On June 2, 2011, Governor Matthew Mead issued Governor's EO 2011-5 to continue consideration of Greater Sage-Grouse conservation needs in the State of Wyoming. BLM Wyoming has adopted Wyoming's approach for projects under its authority.

Alternative D includes this strategy for the planning area. These protections will apply to less than 15 percent of all Greater Sage-Grouse nesting habitats, and accounts for less than 29 percent of the total estimated Greater Sage-Grouse breeding population in the planning area. Due to the size, shapes, and locations of these areas in the planning area, the influence of development has already adversely impacted the 103 remaining active leks inside Core Population Areas (Taylor et al. 2012). Fluid minerals would be leased dependent upon lease location and habitat suitability. Disturbed habitats would be restored on BLM surface within priority habitat and recommended for BLM surface within general habitat.

The use of adaptive management to maintain Greater Sage-Grouse Core Area Populations in accordance with the State of Wyoming's Population Objectives would provide additional protection to sage-grouse populations within core and connectivity habitat if population numbers fell below the target objectives. Monitoring associated with the adaptive management would ensure that if populations were to decline, issues could be identified and corrective management could be implemented to protect and enhance existing population numbers.

Current activities have created substantial loss of the biological integrity and habitat function of ecosystems. Loss of population viability of Greater Sage-Grouse could occur within the planning area, though the continued existence of the species range-wide will not be in jeopardy. Absent a WNv outbreak year, the lower 95 percent confidence limit on the population count is 3,147 males, suggesting that immediate extirpation of the northeast Wyoming population is unlikely if all environmental conditions for Greater Sage-Grouse other than energy development, remain favorable (Taylor et al. 2012). Management actions under Alternative D for special status wildlife species would have significant impacts to Greater Sage-Grouse.

CBNG activity has waned in recent years with the decline in natural gas prices. To date development is approximately half that predicted in the PRB Final EIS (BLM 2003c) and the forecasted CBNG development is much less (Appendix G (p. 1937)). Interest in deep oil and gas resources within the planning area is increasing, with the anticipated spacing being less than with CBNG, one location per square mile (or less) versus eight locations per square mile. Therefore deep development may be more compatible with Greater Sage-Grouse. The BFO has incorporated multiple conservation measures to reduce the population's vulnerability, such as habitat restoration to promote the recovery of disturbed habitats and water management measures to reduce WNv transmission. Appendix D (p. 1863) contains lists of RDFs and discretionary BMPs to promote Greater Sage-Grouse conservation. BLM's High Plains District has also founded the PRB Restoration program, a partnership which promotes reclamation practices and habitat enhancement projects aimed at restoration of sagebrush habitats for the Greater Sage-Grouse.

Other Special Status Species

Alternative D management actions for special status wildlife species would have effects similar to those described for Alternative B; however, Alternative D would allow the following by exception:

- Surface-disturbing and disruptive activities within active black-tailed prairie dog colonies.
- Surface-disturbing and disruptive activities in areas where there are special status amphibian, reptile, and bat species.

Under Alternative D, special status raptors would receive less protection than Alternative B due to the use of USFWS recommended species specific spatial buffers, none of which extend to 1.5 miles.

CBNG activity has waned in recent years with the decline in natural gas prices. To date development is approximately half that predicted in the PRB Final EIS (BLM 2003c) and the forecasted CBNG development is much less (Appendix G (p. 1937)). Interest in deep oil and gas resources within the planning area is increasing, with the anticipated spacing being less than with CBNG, one location per square mile (or less) versus eight locations per square mile. Therefore deep development may be more compatible with some SSS. The BFO has incorporated multiple conservation measures, such as habitat restoration to promote the recovery of disturbed habitats and water management measures to reduce WNv transmission. Appendix D (p. 1863) contains lists of BMPs to promote some SSS conservation. BLM's High Plains District has also founded the PRB Restoration program, a partnership which promotes reclamation practices and habitat enhancement projects aimed at restoration of sagebrush habitats.

Physical Resources

Air Quality (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative D management of air quality would be the same as the effects under Alternative B.

Soil (All species, including Greater Sage-Grouse)
Effects on special status wildlife species from Alternative D management of soils would be similar to those under Alternative B. However, Alternative D could allow activities by exception on 215,496 acres of highly erosive soils, 170,590 acres on slopes equal to or greater than 25 percent, 455,090 acres of soils with poor reclamation suitability, and, although on a limited basis, on 218,928 acres of badlands, rock outcrops, and slopes susceptible to mass movement. In addition, Alternative D would apply a CSU stipulation to oil and gas leases; this could have adverse effects on special status wildlife species on an additional 669,739 acres of highly erosive soils, 412,145 acres on slopes equal to or greater than 25 percent, 1,514,445 acres of soils with poor reclamation suitability, and, although on a limited basis, on 685,950 acres of badlands, rock outcrops, and slopes susceptible to mass movement that could be associated with federal mineral leases. For the impacts to be the same as those under Alternative B, these exceptions would have to be evaluated for site-specific effects on special status wildlife species and would not be granted where there would be conflicts. This is especially important and could have the greatest effect on special status amphibian, reptile, and bat species. The CSU would have beneficial effects on greater than ten percent of habitats important to black-tailed prairie dog colonies, Greater Sage-Grouse, bald eagles, special status raptor species, and where special status amphibian, reptile, and bat species could occur. The management actions under Alternative D for soil would have major beneficial effects on special status wildlife species.

Water Resources

Greater Sage-Grouse
Alternative D could allow activities by exception within 500 feet of springs, non-CBNG reservoirs, water wells, and perennial streams, including applying a CSU stipulation to oil and gas leases and evaluating unneeded reservoirs. The CSU would have beneficial effects on one to five percent of habitats important to Greater Sage-Grouse.

The single greatest threat to Greater Sage-Grouse in the planning area is WNv (Taylor et al. 2012). Under Alternative D, riparian and uplands would be managed to restore perennial flows or standing water. Restoration of areas of standing water would encourage creation of mosquito habitats. Increasing mosquito habitats increases the potential threat of WNv outbreaks in Greater Sage-Grouse. Persistent low-level WNv mortality, combined with severe disease outbreaks, results in local and regional population declines (Naugle et al. 2004; Naugle et al. 2005). Eliminating mosquito breeding habitat from anthropogenic water sources is crucial for reducing impacts (Taylor et al. 2012). Without direction for construction of water containment structures (e.g., troughs, tanks, or ponds) to eliminate habitat for mosquitoes, this management action could contribute to population declines. The Greater Sage-Grouse populations in the planning area are at great risk as they are small, isolated, peripheral populations at lower elevations (warmer temperatures associated with lower elevations support WNv presence) experiencing large-scale increases in distribution of surface waters. A WNv outbreak year could reduce the area lek count by 60 percent (Taylor et al. 2012). Reducing the threat of WNv by reducing the number of new man-made water sources should remain a focus of future management. Therefore, supporting and encouraging water supply sources without mitigation to reduce or prevent WNv transmission will likely result in a loss of viability within the planning area, but will not jeopardize the continued

existence of the species range-wide (Taylor et al. 2012; USFWS 2013a). This management action would have a significant impact on Greater Sage-Grouse.

Other Special Status Species
Alternative D could allow activities by exception within 500 feet of springs, non-CBNG reservoirs, water wells, and perennial streams, including applying a CSU stipulation to oil and gas leases and evaluating unneeded reservoirs. The CSU would have beneficial effects on the following areas currently identified as important to special status wildlife species: greater than ten percent of habitats important to bald eagles, special status raptor species, and areas where special status amphibian, reptile, and bat species could occur (ten percent of habitats important to black-tailed prairie dogs); therefore, management actions under Alternative D for water will have major beneficial effects on special status wildlife species.

Cave and Karst Resources (All species, including Greater Sage-Grouse)
Alternative D effects on special status wildlife species from management of cave and karst resources would, in general, be the same as effects under Alternative A. In addition, implementing a Cave Management Plan for the entire planning area under Alternative D would increase potential beneficial effects on special status wildlife species wildlife where these resources overlap. This is especially important and could have the greatest beneficial effect on special status amphibian, reptile, and bat species. Human activity in caves would be managed through Cave Management Plans, developed considering direction described in WO IM 2010-181, which would reduce threats to bats from WNS. Cave and karst resources in the planning area would have beneficial effects on one to five percent of habitats important to bald eagles and where special status amphibian, reptile, and bat species could occur (less than one percent of habitats important to Greater Sage-Grouse and special status raptor species); therefore, management actions under Alternative D will be minor.

Mineral Resources

Locatable Minerals (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative D management of locatable mineral resources would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat loss and degradation). Under Alternative D, locatable resources would be permitted in less than one percent of habitats important to special status wildlife species. The adverse effects would be negligible.

Leasable Minerals – Coal (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative D management of leasable coal mineral resources would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter.

Leasable Minerals – Fluids

Greater Sage-Grouse
Under Alternative D, leasable fluid resources would be permitted in greater than ten percent of habitats important to Greater Sage-Grouse. Forty-six percent (3,386,530 acres) of the planning area is BLM-administered fluid minerals of which 75 percent (2,544,512 acres) has been leased; the majority of which is held by production. The amount of leasable fluid minerals extraction that could occur under this alternative would result in greater loss and degradation of habitats that support various special status wildlife species, in particular, those that require continuous habitat

on a landscape scale, such as Greater Sage-Grouse. Fluid minerals could be developed within one hundred percent of the Greater Sage-Grouse habitat in the planning area. Leasing fluid minerals and allowing development on this scale would cause substantial loss of the biological integrity and habitat function of ecosystems. Absent a WNv outbreak year, the lower 95 percent confidence limit on the population count is 3,147 males, suggesting that immediate extirpation of the northeast Wyoming population is unlikely if all environmental conditions for Greater Sage-Grouse other than energy development, remain favorable (Taylor et al. 2012). This management has had and would continue to have, significant impacts on Greater Sage-Grouse in the planning area.

CBNG activity has waned in recent years with the decline in natural gas prices. To date, development is approximately half that predicted in the PRB Final EIS (BLM 2003c) and the forecasted CBNG development is much less (Appendix G (p. 1937)). Interest in deep oil and gas resources within the planning area is increasing, with the anticipated spacing being less than with CBNG, one location per square mile (or less) versus eight locations per square mile. Therefore, deep development may be more compatible with Greater Sage-Grouse. The BFO has incorporated multiple conservation measures to reduce the population's vulnerability, such as habitat restoration to promote the recovery of disturbed habitats and water management measures to reduce WNv transmission. Appendix D (p. 1863) contains lists of RDFs and discretionary BMPs to promote Greater Sage-Grouse conservation. BLM's High Plains District has also founded the PRB Restoration program, a partnership which promotes reclamation practices and habitat enhancement projects aimed at restoration of sagebrush habitats for the Greater Sage-Grouse.

Other Special Status Species

The types of effects on special status wildlife species from Alternative D management of leasable fluid mineral resources would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat loss, degradation, and fragmentation). Under Alternative D, leasable fluid resources would be permitted in greater than ten percent of habitats important to black-tailed prairie dogs, raptors, herptiles, bats, and migratory birds; and five to ten percent of habitats important to bald eagles. Overall, the adverse effects would be major.

Forty-six percent (3,386,530 acres) of the planning area is BLM-administered fluid minerals of which 75 percent (2,544,512 acres) has been leased; the majority of which is held by production. The amount of leasable fluid minerals extraction that could occur under this alternative would result in greater loss and degradation of habitats that support various special status wildlife species, in particular, those that require continuous habitat on a landscape scale. Leasing fluid minerals and allowing development on this scale would cause substantial loss of the biological integrity and habitat function of ecosystems. This management would have, significant impacts to some SSS within the planning area.

CBNG activity has waned in recent years with the decline in natural gas prices. To date, development is approximately half that predicted in the PRB Final EIS (BLM 2003c) and the forecasted CBNG development is much less (Appendix G (p. 1937)). Interest in deep oil and gas resources within the planning area is increasing, with the anticipated spacing being less than with CBNG, one location per square mile (or less) versus eight locations per square mile. Therefore, deep development may be more compatible with SSS. The BFO has incorporated multiple conservation measures such as habitat restoration to promote the recovery of disturbed habitats. Appendix D (p. 1863) contains lists of BMPs to promote SSS conservation. BLM's High Plains District has also founded the PRB Restoration program, a partnership which promotes reclamation practices and habitat enhancement projects aimed at restoration of sagebrush habitats.

Salable Minerals (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative D management of salable mineral resources would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat loss and degradation). Under Alternative D, salable mineral resources would be permitted in greater than ten percent of habitats important to all special status wildlife species. The adverse effects would be major. The amount of salable minerals extraction that could occur under this alternative would create a substantial increase in land use intensity, and would result in greater potential for loss or degradation of habitats that support bald eagles and migratory birds.

Fire and Fuels Management

Unplanned Fire (Wildfire) and Planned Fire (Prescribed Fire) (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative D planned fire management would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat loss and degradation). Wildfires are estimated to burn 27,596 acres (3.5%) and planned fires are anticipated for 14,000 acres (1.8%) of BLM surface during the life of the plan, a minor effect.

Biological Resources

Vegetation – Forests and Woodlands (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative D management of forests and woodlands resources would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat improvement). Beneficial effects from management actions for forest and woodland resources could occur in five to ten percent of habitats important to herptiles and bats (less than one percent of habitats important to black-tailed prairie dogs, bald eagles, raptors, Greater Sage-Grouse and migratory birds); therefore, these beneficial effects would be moderate.

Vegetation – Grassland and Shrubland Communities (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative D management of grassland and shrubland communities would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat improvement). Beneficial effects from management actions for grassland and shrubland communities would occur in less than one percent of habitats important to all special status wildlife species. Overall these beneficial effects would be negligible.

Vegetation – Riparian/Wetland Resources

Greater Sage-Grouse
Greater than ten percent of habitats within Greater Sage-Grouse General Habitat Management Area (GHMA) (outside Priority Habitat Areas) is within 500 feet of riparian/wetland systems and aquatic habitats; also within 500 feet of riparian/wetland systems and aquatic habitats is one to five percent of nesting habitat in PHMA (Core Population Areas and Core Population Connectivity Corridors), winter habitat in PHMA, and within 0.6 mile of leks inside PHMA,

therefore, the management actions for riparian/wetland resources would have major beneficial effects on special status wildlife species in the planning area.

Other Special Status Species
The types of effects on special status wildlife species from Alternative D management would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat improvement). Within 500 feet of riparian/wetland systems and aquatic habitats occurs greater than ten percent of habitats important to black-tailed prairie dogs, bald eagles, special status raptor species, and areas where special status amphibian, reptile, and bat species could occur, therefore, the management actions for riparian/wetland resources would have major beneficial effects on special status wildlife species in the planning area.

Invasive Species and Pest Management (All species, including Greater Sage-Grouse)
The effects on special status wildlife species from Alternative D management of invasive species and pests would be the same as Alternative A.

Fish and Wildlife Resources – Fish and Special Status Species – Fish

Greater Sage-Grouse
The 0.25-mile CSU areas for naturally occurring water bodies that contain native and desirable non-native fish species contains greater than ten percent of areas within 0.25 mile of GHMA Greater Sage-Grouse leks (outside Core Population Areas) and PHMA (Core Population Connectivity Corridors), (five to ten percent of habitats important to Greater Sage-Grouse [nesting habitat in PHMA and winter habitat in PHMA], one to five percent of areas within 0.6 mile of Greater Sage-Grouse leks inside PHMA; therefore the management actions under Alternative D would have major beneficial effects on Greater Sage-Grouse.

Other Special Status Species
The effects on special status wildlife species from Alternative D management of special status fish species would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter, although to a varying degree. The 0.25-mile CSU areas for naturally occurring water bodies that contain native and desirable non-native fish species contains greater than ten percent of habitats important to bald eagles, and areas where special status amphibian, reptile, and bat species could occur and habitat important to special status raptor species, and less than one percent of black-tailed prairie dog colonies; therefore the management actions under Alternative D would have major beneficial effects on special status wildlife species.

Fish and Wildlife Resources – Wildlife

Greater Sage-Grouse
Under Alternative D, effects on Greater Sage-Grouse from wildlife management would be similar to those under Alternative B. However, Alternative D could allow development by exception where it meets Greater Sage-Grouse management goals and objectives. For the impacts to be the same as those under Alternative B, these exceptions would have to be evaluated for the presence of Greater Sage-Grouse or suitable habitat, and would not be granted where there would be conflicts.

Other Special Status Species
Under Alternative D, effects on special status wildlife species from wildlife management would be similar to those under Alternative B. However, Alternative D could allow above ground facilities by exception on the 75,175 acres of elk crucial winter range and calving

areas, and could allow disturbance by exception on 1,195,815 acres of biological buffer zones around nests of raptor species of conservation concern. For the impacts to be the same as those under Alternative B, these exceptions would have to be evaluated for the presence of special status wildlife species or suitable habitat, and would not be granted where there would be conflicts. Alternative D also would allow the following by exception:

- Surface disturbance and disruptive activities throughout the entire life of the project during seasons important to wildlife.
- Aboveground distribution powerlines
- Fluid minerals production and not piping by-products out of crucial elk winter range and calving areas
- Aboveground facility development in elk crucial winter range and calving areas
- Surface disturbance and occupancy within USFWS-recommended biologic buffer zones around active nests of raptor species of conservation concern.

In addition, activities in elk seasonal ranges would be limited to removing or altering no more than 15 percent of the existing security habitat. Alternative D includes 9,587 acres of travel corridor avoidance; Alternative D would retain only identified priority travel corridors. Alternative D would increase surface-disturbing prohibitions around plains sharp-tailed grouse leks, 3,601 acres, because the alternative would increase the size of protective buffers to 0.25 mile of the perimeter of these leks. Table 4.41, "Acres within the Planning Area that are Important to Special Status Wildlife Species and Overlap with Areas Important To Wildlife" (p. 1278) lists the amount of overlap between areas important to wildlife and areas currently identified as important to special status wildlife species wildlife.

Table 4.41. Acres within the Planning Area that are Important to Special Status Wildlife Species and Overlap with Areas Important To Wildlife

Important Wildlife Areas	Special Status Species Habitat							
	Black-tailed prairie dog colonies	Nesting habitat within Greater Sage-Grouse Priority Habitat Area	Winter habitat within Greater Sage-Grouse Priority Habitat Area	Within 0.6 mile of leks within Greater Sage-Grouse Priority Habitat Area	Within 0.25 mile of leks within Greater Sage-Grouse general habitat	Within 0.5 mile of riparian corridors consistently used by bald eagles	Within USFWS recommended buffers around nests of special status species raptors	Within areas where special status amphibian, reptile, and bat species may occur
WGFD big game HMAs	0	433 / 0.06%	35 / 0.004%	0	0	740 / 0.3%	0	12,692 / 0.4%
Crucial big game ranges	328 / 0.3%	14,213 / 2%	3,119 / 0.4%	1,514 / 2%	0	3,410 / 1%	1,409 / 0.4%	204,820 / 6%
Priority travel corridors for big game	0	94 / 0.01%	238 / 0.03%	142 / 0.2%	0	2,918 / 1%	22 / 0.006%	68,935 / 2%
Elk security habitat	1,257 / 1%	3,650 / 0.5%	2,908 / 0.4%	18 / 0.02%	260 / 0.9%	5,982 / 3%	3,772 / 1%	446,467 / 13%

Important Wildlife Areas	Special Status Species Habitat							
	Black-tailed prairie dog colonies	Nesting habitat within Greater Sage-Grouse Priority Habitat Area	Winter habitat within Greater Sage-Grouse Priority Habitat Area	Within 0.6 mile of leks within Greater Sage-Grouse Priority Habitat Area	Within 0.25 mile of leks within Greater Sage-Grouse general habitat	Within 0.5 mile of riparian corridors consistently used by bald eagles	Within USFWS recommended buffers around nests of special status species raptors	Within areas where special status amphibian, reptile, and bat species may occur
Proposed Fortification Creek elk WHMA	0	0	0	0	0	200 / 0.08%	0	13,393 / 0.4%
0.25 mile of plains sharp-tailed grouse leks	262 / 0.3%	2,382 / 0.3%	3,077 / 0.4%	1,126 / 1%	24 / 0.04%	90 / 0.04%	911 / 0.2%	4,540 / 0.1%
USFWS recommended biologic buffer zones for raptor nests	54,902 / 53%	132,783 / 19%	163,770 / 20%	16,871 / 21%	10,893 / 37%	127,722 / 54%	852,022 / 100%	984,893 / 28%

Source: BLM 2012f

Note: Percentages in table represent the percent of the special status species habitat (columns) that overlaps important wildlife areas (rows).

% percent
HMA Habitat Management Area
USFWS U.S. Fish and Wildlife Service
WGFD Wyoming Game and Fish Department
WHMA Wilderness Habitat Management Area

Special Status Species – Plants (All species, including Greater Sage-Grouse)
Under Alternative D, effects on special status wildlife species from management of special status plant species would be the same as those under Alternative C, although Alternative D would place a CSU stipulation on mineral leases to require surveys before disturbance activities could be allowed.

Heritage and Visual Resources

Cultural Resources (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative D management of cultural resources would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat conservation). Table 4.42, "Acres within the Planning Area that are Important to Special Status Wildlife Species and Overlap with Cultural and Paleontological Resource Restrictions" (p. 1280) lists cultural and paleontological resources restrictions overlap of areas currently identified as important to special status wildlife species. Overall, the beneficial effects would be major.

Paleontological Resources (All species, including Greater Sage-Grouse)
The types of effects on special status wildlife species from Alternative D management of

paleontological resources would be the same beneficial effects as described in the cultural resources Alternative D discussion within the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat conservation).Table 4.42, "Acres within the Planning Area that are Important to Special Status Wildlife Species and Overlap with Cultural and Paleontological Resource Restrictions" (p. 1280) lists cultural and paleontological resources restrictions overlap of areas currently identified as important to special status wildlife species.

Table 4.42. Acres within the Planning Area that are Important to Special Status Wildlife Species and Overlap with Cultural and Paleontological Resource Restrictions

Cultural and Paleontological Restriction Areas	Special Status Species Habitat							
	Black-tailed prairie dog colonies	Greater Sage-Grouse nesting habitat within Priority Habitat Area	Greater Sage-Grouse winter habitat within Priority Habitat Area	Within 0.6 mile of Priority Habitat Area Greater Sage-Grouse leks	Within 0.25 mile of Greater Sage-Grouse leks within general habitat	Within 0.5 mile of riparian corridors consistently used by bald eagles	Within USFWS recommended buffers around nests of special status species raptors	Within areas where special status amphibian, reptile, and bat species may occur
Cultural NSOs	1,286 / 1%	2,602 / 0.4%	5,729 / 0.7%	18 / 0.02%	82 / 0.3%	1,247 / 0.5%	2,959 / 0.8%	16,081 / 0.5%
Cultural CSUs	15,934 / 15%	103,730 / 15%	118,183 / 14%	7,751 / 10%	3,121 / 11%	11,741 / 5%	66,423 / 17%	347,290 / 10%
Paleontological NSOs	0	357 / 0.05%	622 / 0.08%	0	0	0	0	427 / 0.01%

Source: BLM 2012f

Note: Percentages in table represent the percent of the special status species habitat (columns) that overlaps cultural and paleontological restriction areas (rows).

CSU Controlled Surface Use
NSO No Surface Occupancy
USFWS U.S. Fish and Wildlife Service

Visual Resources (All species, including Greater Sage-Grouse)
Under Alternative D, effects to special status wildlife resources from management actions associated with VRM would be the same as the effects under Alternative B.

Land Resources

Forest Products (All species, including Greater Sage-Grouse)
The effects on special status wildlife species from Alternative D management of forest products would be the same adverse and beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat loss and habitat improvements), although to a varying degree. Under Alternative D, conflicts between the harvest of forest products and management of suitable habitat for special status wildlife species could occur in less than one percent of habitats important to all special status wildlife species in the planning area.

Lands and Realty (All species, including Greater Sage-Grouse)
The effects on special status wildlife species from Alternative D management of lands and realty would be the same as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat improvements). Lands available for tenure adjustments occur in one percent to

five percent of all special status wildlife species, except raptors (less than one percent). The beneficial effects would be minor.

Renewable Energy and Rights-of-Way and Corridors

Greater Sage-Grouse
Renewable-energy development and ROW exclusion or avoidance areas contain greater than ten percent of Greater Sage-Grouse PHMA (Core Population Areas and Core Population Connectivity Corridors), and GHMA (outside Core Population Areas and Core Population Connectivity Corridors) within 0.25 mile of GHMA Greater Sage-Grouse leks; therefore, management actions under Alternative D for renewable energy and for ROW and corridors would have major adverse effects on Greater Sage-Grouse.

Authorization of renewable-energy projects, such as wind energy, on 75,240 acres in the planning area under Alternative C could impact twenty percent of the Greater Sage-Grouse habitats. Renewable-energy projects within Greater Sage-Grouse habitats would create substantial loss of the biological integrity and habitat function of ecosystems. These management actions, under Alterative D, would have a significant impact on Greater Sage-Grouse.

Under Alternative D, 381,176 acres would be open for authorization of ROW grants and location of transmission lines and transportation facilities within corridors when resource objectives can be met, would have impacts on twenty percent of Greater Sage-Grouse habitats in the planning area. ROW and corridors would fragment Greater Sage-Grouse habitats within the planning area to the point of substantial loss of the biological integrity and habitat function of ecosystems. These management actions, under Alterative D, would have a significant impact on Greater Sage-Grouse.

Other Special Status Species
The effects on special status wildlife species from Alternative D management of renewable energy and ROW corridors would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat loss, degradation and fragmentation), although to a varying degree. Renewable-energy development and ROW exclusion or avoidance areas contain greater than ten percent of black-tailed prairie dog colonies, habitats important to special status raptor species, and habitats where special status amphibian, reptile, and bat species could occur (five to ten percent of habitats important to bald eagles); therefore, management actions under Alternative D for renewable energy and for ROW and corridors would have major adverse effects on special status wildlife species.

Travel and Transportation Management (All species, including Greater Sage-Grouse)
The effects on special status wildlife species from Alternative D management of transportation and access would be the same adverse effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat loss, degradation and fragmentation), although to a varying degree. Areas closed to motorized vehicle use under Alternative D include less than one percent of habitats important to all special status wildlife species in the planning area. This means that travel and transportation access would be permitted in greater than ten percent of habitats important to all special status wildlife species in the planning area. The adverse effects would be major.

Recreation (All species, including Greater Sage-Grouse)
The effects on special status wildlife species from Alternative D recreation management would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter, although to a varying degree. Table 4.43, "Acres within the Planning Area that

are Important to Special Status Wildlife Species and Overlap with Special Designations and Controlled Surface Use Areas" (p. 1282) lists the areas of overlap of special designations and CSU with areas currently identified as important to special status wildlife species. Management actions under Alternative D for recreation would have moderate beneficial effects on special status wildlife species in the planning area.

Table 4.43. Acres within the Planning Area that are Important to Special Status Wildlife Species and Overlap with Special Designations and Controlled Surface Use Areas

Special Designations and CSU Areas	Special Status Species Habitat						
	Black-tailed prairie dog colonies	Greater Sage-Grouse Nesting habitat in Priority Habitat Area	Greater Sage-Grouse Winter habitat in Priority Habitat Area	Within 0.6 mile of Greater Sage-Grouse leks in Priority Habitat Area	Within 0.5 mile of riparian corridors consistently used by bald eagles	Within US-FWS recommended buffers around nests of special status species raptors	Within areas where special status amphibian, reptile, and bat species may occur
Burnt Hollow	0	4,008 / 0.6%	4,193 / 0.5%	196 / 0.2%	0	0	2,702 / 0.08%
Dry Creek Petrified Tree	0	2,120 / 0.3%	1,611 / 0.2%	565 / 0.7%	0	0	681 / 0.02%
Middle Fork Canyon	0	93,162 / 0.4%	315 / 0.04%	21 / 0.03%	0	0	2,310 / 0.07%
Mosier Gulch	0	0	0	0	535 / 0.2%	0	768 / 0.02%
Welch Ranch	37 / 0.04%	669 / 0.09%	900 / 0.1%		750 / 0.3%	48 / 0.01%	758 / 0.02%
Weston Hills	0	170 / 0.02%	184 / 0.02%	0	0	0	1,734 / 0.05%
Hole-in-the-Wall	0	7,048 / 1%	4,301 / 0.5%	3,034 / 4%	0	0	1,648 / 0.05%

Source: BLM 2012f

Note: Percentages in table represent the percent of the special status species habitat (columns) that overlaps special designations and CSUs (rows).

% percent
CSU Controlled Surface Use
USFWS U.S. Fish and Wildlife Service

Lands with Wilderness Characteristics (All species, including Greater Sage-Grouse)
The effects on special status wildlife species from Alternative D lands with wilderness characteristics management would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat conservation). Lands with wilderness characteristics contain less than one percent of habitats important to special status wildlife species. Beneficial effects from management actions for lands with wilderness characteristics under Alternative D would be negligible.

Livestock Grazing Management (All species, including Greater Sage-Grouse)
The effects on special status wildlife species from Alternative D livestock grazing management would be the same beneficial effects as described in the *Fish and Wildlife Resources – Wildlife* section of this chapter (habitat conservation), although to a varying degree. Under Alternative D, areas have been identified as incompatible with livestock grazing due to recreation designation,

steep slopes, etc. These areas contain less than one percent of all habitats important to special status wildlife species.

In addition, Alternative D would prohibit the placement of salt or mineral supplements in greater than ten percent of habitats important to bald eagles, special status raptor species, and areas where special status amphibian, reptile, and bat species could occur (five to ten percent of black-tailed prairie dog colonies and one to ten percent of habitats important to Greater Sage-Grouse); thereby avoiding trampling damage to habitat. Overall, the management actions for livestock grazing in Alternative D, in particular maintaining habitat in accordance with BLM Wyoming's Healthy Rangeland standards, will have major beneficial effects on special status wildlife species in the planning area.

Special Designations

Areas of Critical Environmental Concern (All species, including Greater Sage-Grouse)
The effects on special status wildlife species from Alternative D ACEC management would be the same beneficial effects as Alternative B except that only the Pumpkin Buttes (1,731 acres) and Welch Ranch (1,116 acres) would be designated as ACECs.

Scenic or Back Country Byways and Wild and Scenic Rivers (All species, including Greater Sage-Grouse)
Management actions for scenic and BCBs and for WSRs would have no effect on special status wildlife species in the planning area.

Wilderness Study Areas (All species, including Greater Sage-Grouse)
The effects on special status wildlife species from Alternative D management of WSAs would be the same as Alternative B.

4.4.9.7. Cumulative Impacts

Cumulative impacts result from actions on adjoining ownerships that affect habitat availability and levels of disturbance. The greatest factor influencing special status wildlife species in the planning area is scattered land ownership. Because most of the species of concern are wide ranging, activities on adjoining ownerships could compromise or enhance management efforts on public lands.

Although only minor amounts of sagebrush treatment are proposed on public lands, continued modification of sagebrush on other ownerships would cumulatively reduce the availability and quality of that habitat. Cumulative effects on riparian habitats are much more localized and site-specific due to the scattered land ownership on most streams, although improper livestock grazing and upland vegetative treatments on all ownerships could lead to riparian habitat concerns. Management changes implemented on BLM-administered lands to improve riparian conditions also could improve conditions on lands of other ownerships if the same management is applied to those lands. If some uses are restricted or eliminated on BLM-administered lands, it could cause increased use on adjacent ownerships, which would lead to degradation of the riparian conditions on those lands.

Implementing any of the alternatives would contribute to cumulative adverse effects to the Threatened, Endangered, Proposed, Candidate, and sensitive species in the planning area. Cumulative short- and long-term disturbances to these species are many and stem from several

sources. Included in the cumulative effects evaluated are the direct effects of oil and gas (CBNG and non-CBNG) extraction, and development of new oil and gas wells on adjacent lands. Oil and gas development would occur on a mix of federal, state, private, and split estate lands. Additional activities that contribute to cumulative effects in the planning area include coal mining; uranium mining; sand, gravel, and scoria mining; ranching; agriculture; construction of roads and railroads; and development of rural and urban housing.

In particular, the cumulative effects on Greater Sage-Grouse from current, proposed, and future activities such as gas and minerals exploration and development, agriculture, and urban development could include increased mortality, especially from collisions with vehicles and powerlines and increased raptor predation; displacement and harassment; physical degradation or destruction of leks and reproduction areas (nesting and brood-rearing areas); and habitat fragmentation. Surface coal mining and sagebrush treatment have reduced the availability of sagebrush habitats in the planning area. Conversion of native habitats to agriculture has decreased in recent years, but has already permanently reduced availability of Greater Sage-Grouse habitat.

Garton et al. (2011) reported a minimum male count for the PRB population at 3,042 and projected a high probability (86.2%) of falling below 200 males by 2107. The BFO contracted the USGS to analyze the Greater Sage-Grouse population viability within the Buffalo planning area implementing Wyoming EO 2011-5 and Wyoming State Office IM 2012-019, Wyoming's Core Population Area strategy. The USGS concluded that the potential may still exist to maintain a population inside the BFO's Core Population Area, but further development in and around them will compromise their remaining value (Taylor et al. 2012). The remaining population would be vulnerable to extirpation by catastrophic events such as a WNv outbreak. The expanding threat of energy development across the PRB, along with it's associated risk of WNv transmission, have resulted in a downward population trend and make this overall an at risk population (USFWS 2013a).

The BFO has incorporated multiple conservation measures to reduce the population's vulnerability, such as habitat restoration to promote the recovery of disturbed habitats and water management measures to reduce WNv transmission. Appendix D (p. 1863) contains lists of RDFs and discretionary BMPs to promote Greater Sage-Grouse conservation. BLM's High Plains District has also founded the PRB Restoration program, a partnership which promotes reclamation practices and habitat enhancement projects aimed at restoration of sagebrush habitats for the Greater Sage-Grouse.

The Wyoming strategy is a statewide strategy, designed to conserve Greater Sage-Grouse viability at the state scale. Although the Buffalo planning area Greater Sage-Grouse population viability remains vulnerable, the application of the Wyoming strategy to federal (BLM, USFS) and state actions assures long-term population viability within Wyoming. The Wyoming Basin population is considered to be at low risk, as state-designated Core Population Areas adequately capture redundancy and representation for this large population (USFWS 2013a). Similarly, the BLM's management commitments throughout MZ I assure long-term population viability along the eastern edge of Greater Sage-Grouse range. Garton et al. (2011) predicted an 11.1 percent chance that MZ I will fall below 200 males by 2037, and a 24.0 percent chance it would fall below 200 males by 2107. After MZs II and IV, this zone contains some of the highest connected network of Greater Sage-Grouse leks in the range (Knick and Hanser 2011).

4.4.9.8. Comparison of Threats to Greater Sage-Grouse within the Buffalo Planning Area

The major threat to Greater Sage-Grouse habitats in populations occurring across WAFWA MZs 1 is energy development, primarily oil and gas development and supporting infrastructure (USFWS 2013a). Table 4.44, "Comparison of Threats to Greater Sage-Grouse within the Buffalo Planning Area by Alternative" (p. 1285) presents a comparison of alleviated threats to Greater Sage-Grouse.

Table 4.44. Comparison of Threats to Greater Sage-Grouse within the Buffalo Planning Area by Alternative

Resource/Resource Use	Alternative A	Alternative B	Alternative C	Alternative D
Energy Development (Widespread)				
Unleased Fluid Minerals				
Acres closed to fluid mineral leasing	2,346,307 Includes Pennaco v. DOI (2004). 30,520 acres administratively closed to fluid mineral leasing.	2,612,920 No new leases within 4.0 miles of Greater Sage-Grouse leks.	30,520 No new areas would be closed.	72,276 No new areas would be closed to leasing for Greater Sage-Grouse conservation. No surface occupancy within priority habitat (0.6 mile).
Leased Fluid Minerals				
Acres open to mineral leasing with Major constraints (Prohibition on surface disturbance NSO more than 40 acres in size or more than 0.25 mile in width or VRM class I)	85,548 No grouse specific NSOs.	642,232 NSO within 4.0 miles of leks.	303,601 NSO within 0.25 mile of leks.	556,592 NSO within 0.6 miles of priority habitat leks and 0.25 mile of general habitat leks.
Acres open to mineral leasing with Moderate constraints (CSU more than 40 acres in size or more than 0.25 mile in width, NSO less than 40 acres in size or less than 0.25 mile in width, TLS lasting more than 60 days but less than 6 months, avoidance of 200 meters or more, or VRM class II)	782,501 Nesting TLS within 2.0 miles of leks for 3.5 months.	124,467 Nesting TLS within 4.0 miles of leks for 3.5 months.	2,472,472 Nesting TLS within 2.0 miles of leks for 3.5 months.	2,516,826 Nesting TLS within priority habitat for 3.5 months.
Acres open to mineral leasing with Standard lease terms	146,126	1,225	539,499	3,314,254

Resource/Resource Use	Alternative A	Alternative B	Alternative C	Alternative D
Foreseeable Development: Federal CBNG wells	903	101	5,280	2,721
Foreseeable Development: Federal conventional wells	1,828	7	1,990	1,773
Renewable Energy				
Acres where Renewable Energy Excluded	N/A	730,530 Prohibited within 4.0 miles of leks.	28,551	352,068 Exclusion areas for historic properties and southern Big Horn Mountains.
Acres where Renewable Energy Avoided	N/A	45,441 Disturbance subject to 1 location and 3% disturbance per square mile.	618,676	374,518 PHMA classified as avoidance. In addition, core population areas are subject to a limit of on average 1 mineral location per square mile; and disturbance is subject to a 5% disturbance cap within Core Population Areas and Core Population Connectivity Corridors.
Foreseeable Development: Wind-Energy MET Towers	20 sites/20,000 acres	5 sites/5,000 acres	20 sites/40,000 acres	30 sites/75,000 acres
Mining (Widespread)				
Solid Leasables – Coal				
Acres Available to Coal Exploration and Leasing (acres)	715,388	715,388	715,388	715,388
Foreseeable Development: new leases and acres mined	28 leases/106,400 acres	28 leases/106,400 acres	28 leases/106,400 acres	28 leases/106,400 acres
Locatable Minerals				
Additional Acres Recommended for Withdrawal (Closure) from Mineral Entry	0	687,813 Recommend for withdrawal within 4.0 miles of leks.	0	115,614 Withdrawal recommendations for other resources.
Foreseeable Development: Locatable Minerals (numbers of POOs and acres disturbed)	4 POOs/554 acres	4 POOs/277 acres	11 POOs/1,455 acres	9 POOs/1,252 acres
Salable Minerals/Mineral Materials				

Resource/Resource Use	Alternative A	Alternative B	Alternative C	Alternative D
Acres Closed to Salable Minerals/Mineral Materials	28,873 WSAs closed.	3,218,690 Closed within 4.0 miles of leks.	57,213 Closures for WSAs and other resources.	623,061 Closures for WSAs and other resources.
Foreseeable Development of Salable Minerals (numbers of operations and acres disturbed)	61 operations/530 acres	27 operations/114 acres	240 operations/2,090 acres	137 operations/1,193 acres
Infrastructure (Widespread)				
Acres where ROW excluded	N/A	706,556 Exclude ROWs within 4.0 miles of leks.	28,554	79,777
Acres where ROW avoided	N/A	56,857 Disturbance subject to 1 location and 3% disturbance per square mile.	27,706	321,149 Disturbance subject to 5% disturbance cap within priority habitat and 1 location per square mile within core population area.
Foreseeable Development: Powerlines (number/ miles/acreage)	740 rights-of-way 1,000 miles 4,916 acres	500 rights-of-way 425 miles 2,458 acres	1,500 rights-of-way 1,200 miles 7,374 acres	740 rights-of-way 1,000 miles 4,916 acres
Foreseeable Development: Roads (number/miles/ acreage)	1,100 rights-of-way 1,725 miles 18,550 acres	550 rights-of-way 575 miles 9,275 acres	1,650 rights-of-way 2,300 miles 27,825 acres	1,100 rights-of-way 1,725 miles 18,550 acres
Livestock Grazing (Widespread)				
Areas closed to livestock grazing (acres)	10,000 Manage in accordance with Wyoming Standards for Healthy Rangelands.	467,897 Grazing leases not renewed within 4.0 miles of leks.	4,583 Manage in accordance with Wyoming Standards for Healthy Rangelands.	9,992 Manage in accordance with Wyoming Standards for Healthy Rangelands.
Recreation (Widespread)				
Acres Closed to Motorized Vehicle Use	3,650 Closure for other resources.	625,854 Closure for other resources.	28,931 Closure for other resources.	37,389 Closure for other resources.
Acres Seasonally Closed to Motorized Vehicle Use	37,646	18,259	6,839	18,259
Acres Limited to Designated Routes for Motorized Vehicle Use	737,166	137,126	723,497	661,726
Invasive Species (Widespread)				

Resource/Resource Use	Alternative A	Alternative B	Alternative C	Alternative D
Invasive species control	Control in cooperation with counties. Treat annual bromes on project specific basis.	Prevent invasion from non-federal lands. Treat annual bromes throughout planning area.	Prevent spread from public lands to non-federal lands. Prioritize areas for annual brome treatment.	Prevent invasion from non-federal lands. Prioritize areas for annual brome treatment.
Acres of Foreseeable Invasive Species Control (not associated with surface disturbances)	8,000	15,000	10,000	12,000
Conifer Invasion (Localized)				
Conifer management	Remove conifers where they have encroached upon Greater Sage-Grouse habitat.			
Fire (Localized)				
Suppression priority areas	Prevent spread into high value resources.	Protect sensitive resources including within 4.0 miles of leks.	Suppress fire across planning area.	Protect sensitive resources including priority habitat.
Acres of Foreseeable prescribed fire treatments	14,000	3,500	42,000	14,000
Sagebrush Elimination (Localized)				
There is no resource program in an RMP for addressing this threat to Greater Sage-Grouse and its habitat. In general, minimizing vegetation disturbance is recommended for proposed activities. Sagebrush conversion/elimination is not permitted on public lands.				
Urbanization (Localized)				
There is no resource program in an RMP for addressing this threat to Greater Sage-Grouse and its habitat, not within BLM authority.				
BLM Bureau of Land Management CSU Controlled Surface Use DOI Department of the Interior N/A Not Applicable NSO No Surface Occupancy POO Plan of Operation TLS Timing Limitation Stipulation RMP Resource Management Plan ROW right-of-way WSA Wilderness Study Area				

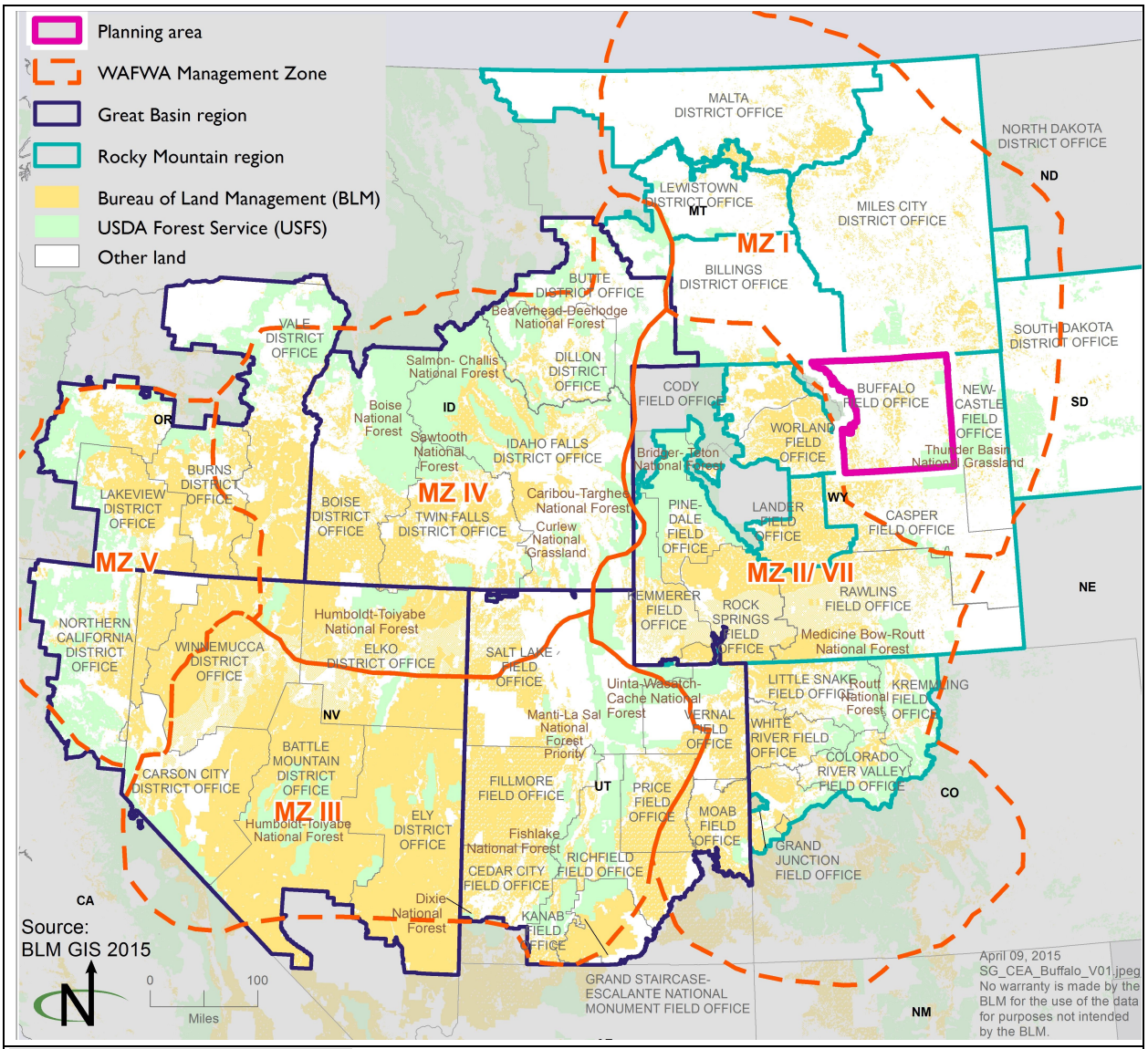
4.4.9.9. Greater Sage-Grouse Cumulative Effects Analysis for the Buffalo Planning Area

This cumulative effects analysis discloses the long-term effects on Greater Sage-Grouse from implementing each RMP/EIS alternative, in conjunction with other past, present, and reasonably foreseeable future actions. In accordance with CEQ guidance, cumulative effects need to be analyzed in terms of the specific resource and ecosystem being affected (Council on Environmental Quality 1997). As discussed in Chapter 1, the purpose for the proposed federal action is to identify and incorporate appropriate conservation measures to conserve, enhance, and restore Greater Sage-Grouse habitat by reducing, eliminating, or minimizing threats to Greater Sage-Grouse habitat. The WAFWA delineated seven sage-grouse MZs based on populations within floristic provinces (Stiver et al. 2006). Therefore, the cumulative effects analysis study area extends beyond the BFO planning area boundary and consists of WAFWA MZ I.

The analysis of BLM and USFS actions in MZ I is focused on Greater Sage-Grouse habitat within the MZ and is primarily based on MZ-wide datasets development by the BLM National Operations Center. Where quantitative data are not available, analysis is qualitative. This analysis includes past, present and reasonably foreseeable future actions are for all land ownerships in the MZ, and evaluates the impacts of the Buffalo RMP, by alternative, when added to those actions. The analysis of nonfederal actions is qualitative and includes a review and analysis of the following:

- State plans
- Coordination with states and agencies during consistency reviews
- Additional data from non-BLM-administered lands

The following diagram shows the boundaries of the WAFWA MZs and the BLM and National Forest System planning areas. The BFO planning area has a relatively small influence in the context of MZ I, because it contains relatively few PHMA or GHMA (1,319,100 acres of PHMA out of 12,506,500 total in MZ I; and 4,668,400 acres of GHMA out of 28,417,600 total in MZ I). As a result, actions in the Buffalo RMP/EIS may have less cumulative impact on Greater Sage-Grouse than those in larger planning areas in MZ I. Section 4.4.9.9.2, “Assumptions” (p. 1292) describes the methods used for this Cumulative Effects Assessment. Section 4.4.9.9.2, “Assumptions” (p. 1292) lists assumptions used in the analysis. Section 4.4.9.9.3, “Existing Conditions in WAFWA MZ I and the Buffalo RMP Planning Area” (p. 1292) describes existing conditions in MZ I and in the Buffalo RMP planning area. Section 4.4.9.9.4, “Regional Efforts to Manage Threats to Greater Sage-Grouse” (p. 1296) discusses present and reasonably foreseeable future federal, state, tribal, and private efforts to conserve Greater Sage-Grouse in MZ I. Section 4.4.9.9.5, “Relevant Cumulative Actions” (p. 1301) lists relevant cumulative actions in MZ I.Section 4.4.9.9.6, “Threats to Greater Sage-Grouse in Management Zone I” (p. 1302) analyzes threats to Greater Sage-Grouse in MZ I and discusses the potential cumulative effects resulting from each threat for each alternative. Section 4.4.9.9.7, “Conclusions” (p. 1331) determines the cumulative effects on Greater Sage-Grouse as a result of implementing each alternative in the Buffalo RMP, in combination with other private, local, regional, state, and federal past, present, and reasonably foreseeable future actions in MZ I.



BLM Bureau of Land Management
MZ Management Zone
USDA U.S. Department of Agriculture
USFS U.S. Forest Service
WAFWA Western Association of Fish and Wildlife Agencies

Figure 4.10. WAFWA Management Zones

4.4.9.9.1. Methods

The cumulative effects analysis uses the following methods:

- Data from the USGS publication Summary of Science, Activities, Programs, and Policies That Influence the Range-Wide Conservation of Greater Sage-Grouse (Manier et al. 2013) establishes the baseline environmental condition against which the alternatives and other past, present, and reasonably foreseeable future actions are compared. Data from this publication are presented in terms of priority and general habitat.

- The USFWS's 12-Month Findings for Petitions to List the Greater Sage-Grouse (*Centrocercus urophasianus*) as Threatened or Endangered (USFWS 2010) and the USFWS publication Conservation Objectives: Final Report (i.e., the COT report; USFWS 2013) were reviewed to identify the primary threats facing Greater Sage-Grouse in each WAFWA MZ. Table 2 of the COT report lists threats to Greater Sage-Grouse that are present and widespread in each population in the MZ.
- For MZ I the list of threats that are directly or indirectly affected by BLM actions are energy development/mining, infrastructure, grazing, conversion to agriculture, fire, spread of weeds, and recreation (USFWS 2013). Two other threats listed in the COT report, sagebrush eradication and isolation/small population size, affect Greater Sage-Grouse populations in MZ I.
- Sagebrush eradication is a component of many threats. Isolation/small population size is not analyzed separately, because no management actions directly address this threat. These two threats are discussed as a component of other threats and in the conclusions. Not all the threats discussed in this section represent major threats to Greater Sage-Grouse in each planning area in the MZ, but each poses a present and widespread threat to at least one population.
- Predation was not included as a threat in the final COT report and was not identified by USFWS as a significant threat to Greater Sage-Grouse populations (USFWS 2010). Predation is a natural occurrence that may be enhanced by human habitat modifications such as construction of infrastructure that may increase opportunities for nesting and perching or increase exposure of Greater Sage-Grouse nests. In such altered habitats, predators may exert an undue influence on Greater Sage-Grouse populations. Predation is discussed in this cumulative effects analysis in the context of these other threats.
- Each threat is analyzed, and a brief conclusion for each threat is provided.
  - The BLM National Operations Center compiled MZ-wide datasets for quantifiable actions in all proposed BLM RMP/EISs in MZ I. These datasets provide a means by which to quantify cumulative impacts from direct impacts of the threats identified in the COT report.
  - PHMA and GHMA were developed to protect the best habitat and highest population density of Greater Sage-Grouse. Although Alternative A does not designate PHMA or GHMA, spatial GIS data were clipped to these boundaries to allow for a consistent comparison across all alternatives.
  - Data and information were gathered from other federal, state, and local agencies and tribal governments, where available, and were used to inform the analysis of cumulative impacts on Greater Sage-Grouse from each of the threats in MZ I.
  - The tables in this cumulative analysis display the number of acres across the entire MZ and the percentage of those acres that are located within the Buffalo planning area. To calculate the total number of acres in the MZ, the number of acres in the other BLM and USFS proposed plans across MZ I are added to the number of acres in the applicable Buffalo RMP alternative. For example, the totally number of acres for Alternative A includes all of the other proposed plans in MZ I plus Buffalo RMP Alternative B.
- A discussion is provided for each alternative in Section 4.4.9.9.7, "Conclusions" (p. 1331). Each alternative considers the cumulative impacts on Greater Sage-Grouse from each of the threats. It also considers whether those threats can be ameliorated by implementing that particular alternative in conjunction with past, present, and reasonably foreseeable non-BLM actions in MZ I.
- The list of relevant cumulative actions in Section 4.4.9.9.5, "Relevant Cumulative Actions" (p. 1301) was derived from each proposed BLM RMP in MZ I to provide an overview of the ongoing and proposed land uses there.

- Baseline data that are consistent across planning areas and that analyze cumulative effects for each alternative, including the No Action Alternative and Proposed Plan, are used in this analysis.
- This analysis uses the most recent information available. For purposes of this analysis, the BLM has determined that the Proposed Plans for the other ongoing Greater Sage-Grouse planning efforts in MZ I are reasonably foreseeable future actions.

4.4.9.9.2. Assumptions

This cumulative analysis uses the same assumptions and indicators as those established for the analysis of direct and indirect effects on Greater Sage-Grouse in Section 4.4.9, *Special Status Species – Wildlife*. In addition, the following assumptions have been made:

- The timeframe for this analysis is 20 years.
- The cumulative effects analysis area extends beyond the planning area and encompasses all of WAFWA MZ I; the quantitative impact analysis focuses on impacts across the MZ. The MZ is the appropriate geographic scope for this analysis because it encompasses areas with similar floristic conditions containing important Greater Sage-Grouse habitat.
- The magnitude of each threat would vary geographically and may have more or less impact on Greater Sage-Grouse in some parts of the MZ, depending on such factors as climate, land use patterns, and topography.
- A management action or alternative would contribute a net conservation gain to Greater Sage-Grouse if there is an actual benefit or gain above baseline conditions. Baseline conditions are defined as the pre-existing condition of a defined area and/or resource that can be quantified by an appropriate metric(s). During environmental reviews, the baseline is considered the affected environment that exists at the time of the review's initiation, and is used to compare predictions of the effects of the proposed action or a reasonable range of alternatives.
- The cumulative effects analysis quantitatively analyzes impacts on Greater Sage-Grouse and their habitat in the MZ. Impacts on habitat are likely to correspond to impacts on populations within the MZ I, since reductions or alterations in habitat could affect reproductive success through reductions in available forage or nest sites. Human activity could cause disturbance to the birds, preventing them from mating or successfully rearing offspring. Human activities also could increase opportunities for predation, disease, or other stressors (Connelly et al. 2004; USFWS 2010; Manier et al. 2013).

4.4.9.9.3. Existing Conditions in WAFWA MZ I and the Buffalo RMP Planning Area

This section summarizes existing conditions and past and present actions for the Buffalo RMP planning area (provided in more detail in Chapter 3) and for MZ I as a whole. Reasonably foreseeable future actions are discussed in Section 4.4.9.9.5, “Relevant Cumulative Actions” (p. 1301).

Greater Sage-Grouse Habitat and Populations

MZ I consists of four Greater Sage-Grouse populations: the Dakotas, Northern Montana, PRB, and Yellowstone Watershed (Garton et al. 2011). The Buffalo RMP planning area includes most of the PRB Greater Sage-Grouse population. MZ I contains some of the highest-connected networks of Greater Sage-Grouse leks in the range (Knick and Hanser 2011); however, it also contains less productive sagebrush, similar to areas where Greater Sage-Grouse have been extirpated (Wisdom

et al. 2011). Sagebrush cover is naturally limited due to the dominant presence of grassland ecosystems. In combination with agricultural pressure and energy production in the PRB and extensive infrastructure, including power lines, fences, and roads (USFWS 2010), this results in substantial habitat limitations for Greater Sage-Grouse populations.

In MZ I, state and private lands account for approximately 35 million acres of Greater Sage-Grouse habitat (approximately 75 percent of habitat), with BLM-administered and other federal land accounting for only 25 percent of surface estate (Manier et al. 2013, p. 118). Private lands and other federal lands with BLM subsurface estate identified as PHMA in the DEIS should be treated as PHMA for management of Greater Sage-Grouse.

Table 4.45, "Management Jurisdiction in MZ I by Acres of Priority and General Habitats" (p. 1293) provides a breakdown of landownership and acres of Greater Sage-Grouse habitat in MZ I. As the table shows, approximately 26 percent of PHMA and 13 percent of GHMA is on BLM-administered lands. In the Buffalo RMP planning area, there are approximately 6 million acres of Greater Sage-Grouse habitat, including approximately 750,000 acres (12 percent) on BLM-administered lands. The remaining 5.2 million acres (88 percent) of Greater Sage-Grouse habitat comprise private, local, state, and other federal and tribal lands.

The percentage of BLM-administered surface estate in the planning area is low. Even so, BLM fluid mineral estate, including surface and split estate lands, covers 46 percent of the planning area (approximately 3,390,000 acres), 75 percent of which has been leased. However, due to the patchwork distribution of land ownership, the conservation results obtained on any ownership are limited unless conservation actions are enacted across ownership boundaries.

Table 4.45. Management Jurisdiction in MZ I by Acres of Priority and General Habitats

	Total Surface Area (Acres)	Priority Habitat (Acres)	General Habitat (Acres)	Non-habitat (Acres)
MZ I	84,110,800 (100%)	11,636,400 (14%)	34,663,000 (41%)	37,811,400 (45%)
BLM	8,325,300 (10%)	2,994,300 (26%)	4,524,900 (13%)	806,100 (10%)
U.S. Forest Service	4,532,500 (5%)	292,400 (3%)	515,300 (1%)	3,724,800 (82%)
Tribal and other federal	5,458,500 (6%)	219,700 (2%)	2,427,700 (7%)	2,811,100 (51%)
Private	54,998,900 (65%)	7,132,500 (61%)	24,682,800 (71%)	23,183,600 (42%)
State	5,421,400 (6%)	995,600 (9%)	2,498,400 (7%)	1,927,400 (36%)
Other	5,374,100 (6%)	1,900 (<1%)	13,900 (<1%)	5,358,300 (99%)

Source: Manier et al. 2013, p. 118

% percent
< less than
BLM Bureau of Land Management
MZ Management Zone

Planning Area Habitat Conditions

Sagebrush is the most dominant shrubland type in the Buffalo RMP planning area, found primarily on the open plains but also in mountain settings. It is dominated by Wyoming big sagebrush, mountain big sagebrush, mountain mahogany, and greasewood. Wyoming big sagebrush tends to grow in the low to mid elevations on the drier sites, while mountain big sagebrush occurs in upper elevations in moister conditions, such as in the southern Big Horn Mountains.

The PRB is near the eastern edge of the Greater Sage-Grouse range. Vegetation communities in the planning area are intermingled, because they represent a transition between the intermountain basin sagebrush communities to the west and the prairie communities to the east. Sagebrush coverage in the PRB is estimated to be 35 percent, with an average patch being less than 300 acres (Leu and Rowland 2005). The PRB patch size has decreased by more than 63 percent in the past forty years, from 820-acre patches and an overall coverage of 41 percent in 1964 (Leu and Rowland 2005).

As a result of past and ongoing human activities in the planning area, substantial areas of Greater Sage-Grouse habitat have been altered from their natural conditions. For example, 46 percent of the planning area (3,387,000 acres) is BLM-administered fluid mineral estate, 75 percent of which (2,545,000 acres) has been leased; most of the leases have been developed and are in production. Much of the nonfederal minerals have also been developed. Human disturbances in the Buffalo planning area include agriculture, mining, roads, urban areas, oil and gas well pads, compressor sites, and other ancillary facilities.

Changes in land use and land development are the primary causes of habitat loss, while habitat degradation is a complicated interaction among many factors, including drought, improper livestock grazing, changes in natural fire regimes, and invasive plant species (Fischer et al. 1996; Pyle and Crawford 1996; Beck and Mitchell 2000; Nelle et al. 2000).

The Greater Sage-Grouse population in northeast Wyoming has decreased by more than 80 percent since 2001 due to intense coal-bed natural gas development; more than 30,000 wells were drilled over a short period, accompanied by thousands of water impoundments, new roads, and power lines. The Greater Sage-Grouse population also has dropped due to WNv outbreaks, leading to state and federal efforts to improve Greater Sage-Grouse conservation. The BFO conducted a viability analysis for Greater Sage-Grouse that was published in 2012 (Taylor et al. 2012). The viability analysis does not anticipate full recovery of Greater Sage-Grouse in the PRB, though conditions may have improved since its publication). The COT report considers this population at risk of extirpation (USFWS 2013).

Buffalo RMP Alternatives

The Buffalo RMP/EIS evaluates the following four alternatives:

- Alternative A, current management (the No Action Alternative)
- Alternative B, which emphasizes conservation of physical, biological, heritage, and visual resources, with constraints on resource uses on BLM-administered lands
- Alternative C, which emphasizes resource uses by limiting conservation measures afforded to physical, biological, heritage, and visual resources on BLM-administered lands
- The Proposed Plan, which generally allows resource use if the activity can be conducted in a manner that conserves physical, biological, heritage, and visual resources

Alternatives A and C manage Greater Sage-Grouse with a localized lek-centered approach, whereas Alternative B manages Greater Sage-Grouse at a landscape scale with much larger buffers. The Proposed Plan manages Greater Sage-Grouse consistent with Wyoming's Core Population Area Strategy codified in EO 2011-5 (Section 4.4.9.9.4, "Regional Efforts to Manage Threats to Greater Sage-Grouse" (p. 1296), below). Not all of these alternatives use a priority and general habitat management (PHMA and GHMA) area approach. However, for comparison purposes in the data tables in Section 4.4.9.9.5, "Relevant Cumulative Actions" (p. 1301), all

alternatives represent the Wyoming-designated PHMA and GHMA for both the planning area and for MZ I as a whole.

PHMA includes the State of Wyoming-designated Core Population Areas (Core Areas) and the Core Population Connectivity Corridors (Connectivity Corridors).

The BLM has incorporated management of Sagebrush Focal Areas into its proposed management approach for Greater Sage-Grouse. Sagebrush Focal Areas are a subset of PHMA and represent recognized "strongholds" for the species that have been noted and referenced by the conservation community identified as having the highest densities of the species and other criteria important for the persistence of the species (Ashe 2014). Those portions of Sagebrush Focal Areas on BLM-administered lands would be petitioned for withdrawal from mineral entry, subject to an NSO stipulation with no exceptions, modifications, or waivers, and are prioritized for management and conservation actions, including, but not limited to, review of livestock grazing permits/leases. There is one Sagebrush Focal Area comprising 1,807,600 acres in MZ I, in Montana.

Population Trends in Management Zone I

Greater Sage-Grouse has been extirpated from almost half of its original range in MZ I; populations continue to decline by 2 to 4 percent annually (Manier et al. 2013). The MZ I Greater Sage-Grouse population was estimated to be 14,814 males in 2007, having declined 17 percent in the number of males per lek since 1965. The number of leks declined by 22 percent over the same period (Manier et al. 2013). Lek counts indicate a 67 percent drop in MZ I from 2007 to 2013 (Garton et al. 2015).

Wyoming data suggest a cyclical pattern, with population lows in 1995, 2002, and 2013, and peaks in 2000 and 2006. Actual trends are difficult to discern due to the smaller survey before 2007, meaning the number and proportion of active to inactive leks is unknown. Since 2007, the number of active leks has remained stable (approximately 1,100 active leks), but the number of males per active lek has declined by more than half, from 42 to 17. In northeast Wyoming, the decreasing number of active leks since 2007 suggests a population decline in that area that is greater than that indicated by the average lek size. Similar population trends are suggested at both state and local scales (Christiansen 2013). The PRB population dropped 76 percent from 2007 to 2013, to 1,651 males (Garton et al. 2015).

Similarly, in Montana, the Greater Sage-Grouse population changes cyclically. The Greater Sage-Grouse population declined sharply from 1991 to 1996, before increasing through 2000 (Montana Sage Grouse Work Group 2005). The population is thought to be down 33 percent from historic levels. Between 2004 and 2013, the average number of displaying males per lek in a given year in Montana ranged from 7 to 19 (Greater Sage-Grouse Habitat Conservation Strategy 2014). Northern Montana population dropped 54 percent to 1,667 males in 2013, while the Yellowstone Watershed population dropped 65 percent to 3,045 males (Garton et al. 2015)

In the Dakotas, Greater Sage-Grouse numbered approximately 300 male birds in 2013, a drop of 72 percent from 2007 (Garton et al. 2015). Although North and South Dakota populations remain connected to populations in Montana, their small size, situation on the edge of Greater Sage-Grouse range, and ongoing threats place them at high risk (Manier et al. 2013, p. 127; USFWS 2013).

4.4.9.9.4. Regional Efforts to Manage Threats to Greater Sage-Grouse

Across the Greater Sage-Grouse range, other BLM and National Forest System sub-regions are undergoing RMP revision or amendment processes similar to this one for the BFO. The Final EIS associated with each of these efforts has identified a Proposed Plan that meets the purpose and need of conserving, enhancing, and/or restoring Greater Sage-Grouse habitat by reducing, eliminating, or minimizing threats. The management actions from the various Proposed Plans will cumulatively decrease the threat of Greater Sage-Grouse habitat loss and will limit fragmentation throughout the range. Key actions present in many of the Proposed Plans include changes in land use allocations, a mitigation framework, an adaptive management strategy, anthropogenic disturbance cap, and protective management actions in priority and general habitat areas.

In addition, there are several regional efforts to manage threats to Greater Sage-Grouse in MZ I. These efforts may have a greater ability to alleviate threats to Greater Sage-Grouse than BLM actions. This is because state and private lands account for approximately 35 million acres (approximately 75 percent) of Greater Sage-Grouse habitat in MZ I (Manier et al. 2013, p. 118).

Wyoming Statewide Efforts

Wyoming has established Core Population Areas to help delineate landscape planning units by distinguishing areas of high biological value. These areas are based on the locations of breeding areas and are intended to help balance Greater Sage-Grouse habitat requirements with demand for energy development (Doherty et al. 2011).

In 2000, the Wyoming Sage-Grouse Working Group (WSGWG) was formed to develop a statewide strategy for Greater Sage-Grouse conservation. This group prepared the Wyoming Greater Sage-Grouse Conservation Plan (WSGWG 2003) to provide coordinated management and direction across the state. In 2004, local Greater Sage-Grouse working groups were formed to develop and implement local conservation plans. Eight local working groups around Wyoming have completed conservation plans, many of which prioritize addressing past, present, and reasonably foreseeable threats at state and local levels, and prescribe management actions for private landowners to improve Greater Sage-Grouse conservation at the local scale, consistent with the overall Wyoming Core Strategy. The Buffalo RMP planning area is part of the Northeast Wyoming local working group, in which the BLM participates. The Northeast Wyoming Sage-Grouse Conservation Plan was completed in 2006 and was updated in 2014 (Northeast Wyoming Sage-grouse Working Group 2014). The local and regional working group plans would assist in Greater Sage-Grouse conservation through monitoring, public awareness, and voluntary protective actions on private land.

Umbrella Candidate Conservation Agreement with Assurances for Wyoming Ranch Management. Candidate Conservation Agreements with Assurances are voluntary conservation agreements between the USFWS and one or more federal or private partners (e.g., the ranchers). In return for managing lands to benefit Greater Sage-Grouse, landowners receive assurances against additional regulatory requirements should Greater Sage-Grouse be listed under the ESA. Within Wyoming, the USFWS and Wyoming Governor's Office in conjunction with the BLM, NRCS, USFS, and other agencies, have developed an umbrella Candidate Conservation Agreement with Assurances for range management activities. Enrolled landowners are expected to comply with grazing specific conservation measures including but not limited to: avoid (or rotationally utilize) known nesting and brood-rearing habitat as a location for activities that concentrate livestock such as stock tank placement branding and roundup; place salt or mineral supplements in sites minimizing

impacts to Greater Sage-Grouse habitat; and within 24 months develop and implement a written grazing management plan to maintain or enhance the existing plant community as suitable Greater Sage-Grouse habitat (USFWS et al. 2013).

Wyoming Executive Order. Wyoming Governor Matt Mead issued an EO on June 2, 2011, that complemented and replaced several EOs issued by his predecessor. The 2011 Wyoming EO articulates Wyoming's Core Population Area Strategy (Core Area Strategy) as an approach to balancing Greater Sage-Grouse conservation and development. It also provides an approach to mitigating human disturbances to Greater Sage-Grouse.

The Wyoming EO applies to state trust lands starting in 2008. These trust lands cover almost 23 percent of Greater Sage-Grouse habitat and benefit approximately 80 percent of the estimated breeding population in the state (USFWS 2010). All proposed activities are evaluated through a density/disturbance calculation tool to determine if the project would exceed recommended density/disturbance thresholds. Additionally, the order has stipulations to be included in permits, with varying restrictions depending on whether the proposed development activity occurs within or outside delineated Core Population Areas (Wyoming EO, June 2, 2011).

In Core Areas, there is a 0.6-mile NSO buffer around occupied leks and restrictions on activities in breeding and winter concentration habitat. Wyoming's Industrial Siting Council, which permits large development projects on all lands in the state, is subject to the terms of the EO. This buffer provides protection for males during lekking season and acts in coordination with the density disturbance cap. The combination of protections could offer Greater Sage-Grouse considerable regulatory protection when large wind energy and other development projects are being considered in Wyoming (USFWS 2010; Manier et al. 2013).

Statewide modeling of trends under the Core Area Strategy suggests that with effective enforcement statewide, the strategy could reduce population losses by 9 to 15 percent across Wyoming. Moreover, the number of Core Areas predicted to maintain 75 percent of their current populations could increase from 20 to 25 under long-term scenarios (Copeland et al. 2013). Combining the Core Area Strategy with $250 million in target conservation easements (provided willing landowners and funding are available) could reduce population declines by another 9 to 11 percent (Copeland et al. 2013).

For the Buffalo RMP planning area, however, the Core Area Strategy may be less protective than in other areas, because much development in Greater Sage-Grouse habitat has already occurred and populations are already in decline. As stated in the Viability Analysis for Conservation of Greater Sage-Grouse Populations for the BFO (Taylor et al. 2012), Core Areas in northeastern Wyoming were delineated only after widespread development had already occurred in Greater Sage-Grouse habitat, leaving few options for conserving populations in this region.

Core Population Areas in northeastern Wyoming exclude approximately 72 percent of peak male Greater Sage-Grouse lek attendance in the Buffalo RMP planning area (BLM 2012k). Core Population Areas in Wyoming also incorporate connectivity corridors (Wyoming Executive Order 2011). These are areas Greater Sage-Grouse use to maintain connectivity between habitat areas (Manier et al. 2013). Connectivity reduces isolation, thereby increasing viability of a population and reducing vulnerability to disease, drought, or other events that may result in extirpation.

Montana Statewide Efforts

The Montana Department of Fish, Wildlife and Parks is tasked with implementing the range-wide WAFWA Sage-Grouse Strategy (Stiver et al. 2006) in Montana. The WAFWA Sage-Grouse Strategy outlines a plan for monitoring, research, outreach, and funding for conservation projects for Greater Sage-Grouse. A basic premise of the WAFWA Sage-Grouse Strategy is that additional conservation capacity must be developed at all local, state, federal, and range-wide levels for both the short term (3 to 5 years) and for the long term (10 years or more) to ensure Greater Sage-Grouse conservation.

In addition, the Montana Department of Fish, Wildlife and Parks's Montana Management Plan and Conservation Strategy for Sage-Grouse was initiated in 2005 to protect, maintain, and restore Greater Sage-Grouse habitat. The plan ranks threats to the species across the state and provides an overall strategy for public and private cooperation in conservation actions, but was not regulatory. In 2013, the governor established the Greater Sage-Grouse Habitat Conservation Advisory Council to provide recommendations on policies and actions to advance the conservation agenda for Greater Sage-Grouse in Montana and provide regulatory authority for conservation actions. The council provided these recommendations in January 2014. The governor subsequently issued an EO on September 9, 2014 (State of Montana 2014), based on the council recommendations that provided the direction for Greater Sage-Grouse conservation in Montana.

Montana Executive Order. The Montana governor issued an EO on September 9, 2014 (State of Montana 2014), based on the council recommendations that provided the direction for Greater Sage-Grouse conservation in Montana. Stipulations for development in the EO and Montana Management Plan and Conservation Strategy for Sage-Grouse include but are not limited to:

- A 0.6-mile NSO buffer around the perimeter of active leks for new activities.
- Locating new overhead power lines and communication towers a minimum of 0.6 mile from the perimeter of active leks.
- A minimum 2.0-mile buffer from active lek perimeters for main roads and 0.6-mile buffer for facility site access roads.
- A 5 percent limit on anthropogenic surface disturbance within the Density and Disturbance Calculation Tool examination area (based upon suitable habitat).
- As authorized by permitting agency or agencies, activities (production, maintenance, and emergency activity exempted), will typically be prohibited from March 15 through July 15 outside of the NSO perimeter of an active lek and within 2 miles of that perimeter in Core Population Areas where breeding, nesting, and early brood-rearing habitat is present.

The approach of the Montana EO/Montana Management Plan and Conservation Strategy for Greater Sage-Grouse is similar to the Wyoming EO. Montana's plan will apply a disturbance cap in core habitat and will limit well density and apply timing limitations. The 0.6-mile buffer would protect males in the vicinity of leks during the breeding season; the density limits and disturbance cap would protect Greater Sage-Grouse during nesting, brood-rearing, and winter concentration activities. The timing restrictions would reduce the potential for displacement or disruption during the breeding season.

North and South Dakota Statewide Efforts

The South Dakota Department of Game, Fish and Parks published its Sage-Grouse Management Plan in 2014 (South Dakota Wildlife Division 2014). While the plan does not address disturbance caps or impose restrictions that are required, it is designed to provide biological information about Greater Sage-Grouse, identify factors that influence sage-grouse in South Dakota, and guide future management direction and actions by establishing objectives to:

- Maintain or increase/improve the existing status and range of sage/steppe habitat in South Dakota.
- Use results from lek counts and inference from past hunting seasons to guide recommendations for the annual hunting season.
- Annually monitor sage-grouse population status and distribution.
- Use results from lek counts and inference from past hunting seasons to guide recommendations for the annual hunting season.
- Develop a public outreach and educational plan that informs the public, landowners, stakeholders, and wildlife/conservation agencies on sage grouse management and the issues of highest concern.
- Support local, interstate and interagency sage-grouse research projects and collaborative conservation planning efforts.
- Document disease outbreaks and develop management responses.

The North Dakota Game and Fish Department has developed its Management Plan and Conservation Strategies for Greater Sage-Grouse in North Dakota (Robinson 2014). The purpose of the plan is in part to meet the objectives outlined in the COT report (USFWS 2013), which include:

- Stop population declines and habitat loss.
- Implement targeted habitat management and restoration.
- Develop and implement Greater Sage-Grouse conservation strategies and associated actions and regulatory mechanisms.
- Develop and implement proactive, voluntary conservation actions.
- Develop and implement monitoring plans to track success of conservation strategies.
- Prioritize, fund, and implement research to address existing uncertainties.

Similar to the South Dakota plan, the North Dakota plan does not address disturbance caps or impose required restrictions but instead is intended to provide biological information on Greater Sage-Grouse in North Dakota and be used as the conservation framework to minimize impacts to Greater Sage-Grouse in North Dakota across all land ownerships.

Powder River Basin Restoration Program

The PRB Restoration Program is a collaborative partnership to restore and enhance Greater Sage-Grouse habitat on a landscape level in the PRB. The basin encompasses 13,493,840 acres in northeast Wyoming and southeast Montana. Surface ownership is composed of approximately 70 percent private lands, 14 percent BLM-administered lands (including 8 percent in Wyoming and 6 percent in Montana), 8 percent National Forest System lands, and 8 percent States of Wyoming and Montana lands. Split-estate mineral ownership is 50 to 60 percent federal (BLM 2015).

The PRB Restoration Program is focusing on areas affected by the federal oil and gas development that has occurred over the past decade in the PRB in northeastern Wyoming. Its objectives are restoring or enhancing disturbed previously suitable habitat to suitable habitat for sagebrush obligate species, primarily Greater Sage-Grouse. This includes multiple sites affected by coal bed natural gas abandonment reclamation efforts, wildfires, and noxious and invasive plants. Priority will be given to those areas recognized as priority habitats (e.g., Core Population Areas and connectivity corridors).

Habitat objectives are meeting the needs for nesting, brood-rearing, and late brood-rearing. The program would contribute to efforts focused on the management and control of mosquitoes

carrying WNv and would include funding, labor, treatment locations, and other needs as determined.

Additionally, efforts would be coordinated to reduce fuels in and near Greater Sage-Grouse habitat to enhance sagebrush stands, support restoration efforts, and reduce the risk of high-severity wildfire. Pine stands and juniper woodlands would be managed for structural diversity and to reduce fuels, especially near PHMA, human developments, and recreation areas.

Natural Resources Conservation Service Sage Grouse Initiative

The NRCS's Sage-Grouse Initiative is working with private landowners in 11 western states to improve habitat for Greater Sage-Grouse (Manier et al. 2013). With approximately 31 percent of all sagebrush habitats across the range in private ownership (Stiver 2011, p. 39), and over 65 percent in MZ I (Manier et al. 2013, p. 118), a unique opportunity exists for the NRCS to benefit Greater Sage-Grouse and to ensure the persistence of large and intact rangelands through long-term contracts and conservation easements (USFWS 2010, p.5). In the Buffalo RMP planning area, local conservation districts, such as the Lake DeSmet Conservation District, have been very active in Greater Sage-Grouse conservation.

Participation in the Sage-Grouse Initiative program is voluntary, but willing participants enter into binding contracts to ensure that conservation practices that enhance Greater Sage-Grouse habitat, such as fence marking, protecting riparian areas, and maintaining vegetation in nesting areas, are implemented. Participating landowners are bound by a contract (usually 3 to 5 years) to implement, in consultation with NRCS staff, conservation practices if they wish to receive the financial incentives offered by the Sage-Grouse Initiative. These financial incentives generally take the form of payments to offset costs of implementing conservation practices and easements or rental payments for long-term conservation.

While potentially effective at conserving Greater Sage-Grouse populations and habitat on private lands, incentive-based conservation programs that fund the Sage-Grouse Initiative generally require reauthorization from Congress under subsequent farm bills, meaning future funding is not guaranteed.

As of 2015, Sage-Grouse Initiative has secured conservation easements on over 455,000 acres across the Greater Sage-Grouse range (NRCS 2015), with the largest percentage of easements occurring in Wyoming (approximately 200,000 acres). In MZ I, Sage-Grouse Initiative has thus far secured conservation easements on 65,881 acres that maintain intact sagebrush-grassland habitat. It has also accomplished the following:

- Established over 1,370,000 acres where grazing management promotes Greater Sage-Grouse habitat and sustainable ranching
- Removed conifers encroaching on 181 acres of Greater Sage-Grouse habitat
- Seeded over 7,500 acres with native plants
- Marked or moved 350 miles of high-risk fences in Greater Sage-Grouse territory

Other Regional Efforts

The USFS is preparing a plan to manage nearly 96,000 acres of Greater Sage-Grouse habitat in the Dakota Prairie National Grassland. The plan is not yet available for review but is likely to propose similar protections for Greater Sage-Grouse on its lands as are included in the BLM RMPs.

In addition, tribes, counties, and local working groups are playing a critical role in promoting Greater Sage-Grouse conservation at the local level. Individual conservation plans have been prepared by most local working groups to develop and implement strategies to improve or maintain Greater Sage-Grouse habitat and reduce or mitigate threats on the local level. The proposed conservation actions and recommendations in these plans are voluntary actions for private landowners. Local working group projects have included monitoring, research, and mapping habitat areas, as well as public outreach efforts such as landowner education and collaboration with federal, state, and other local entities. These efforts provide a net conservation gain to Greater Sage-Grouse through increased monitoring and public awareness.

A programmatic EIS by the Western Area Power Administration (WAPA) and the USFWS for the entire upper Great Plains will focus future wind energy developments in specific corridors outside of Greater Sage-Grouse core habitat (WAPA 2013). In accordance with Section 7 of the ESA, preparation of the programmatic EIS has involved consultation between cooperating entities and the USFWS and preparation of a programmatic Biological Assessment to ensure that the action will not jeopardize the continued existence of any federally-listed species, including the federal candidate Greater Sage-Grouse. At the time of this RMPA specific conservation measures for protecting Greater Sage-Grouse and its habitat under the programmatic EIS are not developed.

Some local working group conservation plans recommend restricting resource uses as well. For example, the Bates Hole/Shirley Basin Conservation Plan (Bates Hole/Shirley Basin Sage-grouse Working Group 2007) recommends that areas within 3.4 miles of an occupied Greater Sage-Grouse lek not be leased for oil and gas development unless mitigation plans have been developed, approved, and funded. Local working group Greater Sage-Grouse conservation plans in MZ I include the following:

- Bates Hole/Shirley Basin (Bates Hole/Shirley Basin Sage-grouse Conservation Plan; 2007)
- Big Horn Basin (Sage-Grouse Conservation Plan for the Big Horn Basin, Wyoming; 2007)
- Northeast Wyoming (PRB) (Northeast Wyoming Sage-grouse Conservation Plan; 2014)
- Glasgow (A Summary of Conservation Activities of the Glasgow, MT Sage-Grouse Local Working Group; 2011)
- Miles City/Forsyth (Miles City Sage-Grouse Local Working Group Action Plan 2011-2014)
- Central Montana Organized Conservation District (no local conservation plan)
- North Dakota (no local conservation plan)
- South Dakota (no local conservation plan)

4.4.9.9.5. Relevant Cumulative Actions

This cumulative effects analysis considers the incremental impact of the Buffalo Proposed Plan and alternatives in combination with other past, present, and reasonably foreseeable future federal and non-federal actions on lands in MZ I. Where these actions occur within Greater Sage-Grouse habitat, they would cumulatively add to the impacts of BLM- and USFS-authorized activities set for in the Buffalo Proposed Plan. In addition to the conservation efforts described above, relevant reasonably foreseeable future cumulative actions occurring on federal, private, or mixed land ownerships in MZ I are described in Appendix G (p. 1937) of the Buffalo Proposed RMP/Final EIS and in the North Dakota, South Dakota, Miles City, Lewistown, HiLine, Billings, and 9-Plan Planning Area RMPs.

The following list includes past, present, and reasonably foreseeable future actions in MZ I that when added to the Proposed Plan and alternatives for the Buffalo RMP could cumulatively affect

Greater Sage-Grouse (see Table 4.57, "Reasonably Foreseeable Future Actions in Management Zone I Likely to Impact Greater Sage-Grouse Habitat" (p. 1337) for more detail):

- PRB oil and gas leases in Campbell, Johnson, and Sheridan Counties, Wyoming
- Surface coal mining and coal leasing in PRB, Wyoming
- Carter Master Leasing Plan for Oil and Gas, Carter County, Montana
- Greater Crossbow Oil and Gas Exploration and Development Project in Campbell and Converse Counties, Wyoming
- Converse County Oil and Gas Development, Converse County, Wyoming
- Increased oil and gas production surrounding the established fields in the southern Williston Basin
- Nichols Ranch/Hank Unit Uranium In-situ Recovery Mining Project, Johnson and Campbell Counties, Wyoming
- Proposed uranium mining in Newcastle, Wyoming and in South Dakota
- Western Area Power Administration Upper Great Plains Wind Energy Programmatic Draft EIS
- Bentonite mining in northeast Wyoming and in Carter County, Montana
- Keystone XL Pipeline, Montana and South Dakota
- Conversion of lands to agricultural and urban development
- Conifer removal projects throughout MZ I

4.4.9.9.6. Threats to Greater Sage-Grouse in Management Zone I

In its COT report the USFWS identifies energy development, infrastructure, grazing, conversion to agriculture, fire, spread of weeds, and recreation as the present and widespread threats facing Greater Sage-Grouse in MZ I (USFWS 2013). These threats impact Greater Sage-Grouse mainly by fragmenting and degrading their habitat. The loss of sagebrush steppe across the West approaches or exceeds 50 percent in some areas. It is a primary factor in long-term declines in Greater Sage-Grouse abundance across its historical range (USFWS 2010).

Habitat fragmentation reduces connectivity of populations and increases the likelihood of extirpation from random events such as drought or outbreak of WNv. Furthermore, climate change is likely to affect habitat availability to some degree by decreasing summer flows and limiting growth of grasses and forbs, thereby limiting water and food supply (BLM 2012j). Sensitive species such as Greater Sage-Grouse, which are already stressed by declining habitat, increased development, and other factors, could experience additional pressures as a result of climate change.

Each COT report threat considered present and widespread in at least one population in MZ I is discussed below. For more detail on the nature and type of effects and the direct and indirect impacts on Greater Sage-Grouse in the planning area, see Section 4.4.9, "Special Status Species – Wildlife (including Greater Sage-Grouse)" (p. 1229) of the Buffalo Proposed RMP/Final EIS. The quantitative impact analysis focuses on impacts in MZ I, with planning area acres provided for context.

Energy Development and Mining

The COT report states that energy development should be designed to ensure that it will not impinge on stable or increasing Greater Sage-Grouse population trends. For mining, the COT objective is to maintain stable to increasing Greater Sage-Grouse populations and no net loss of Greater Sage-Grouse habitats in areas affected by mining (USFWS 2013). In the energy development areas of MZ I, population trends are not stable or increasing; for this reason,

objectives in the planning area are intended to reduce losses, provide a net conservation gain, and sustain a viable Greater Sage-Grouse population, though at a lower level than historical populations (Taylor et al. 2012).

There are approximately 1,004,400 acres of Greater Sage-Grouse habitat in MZ I where energy and mineral development, including oil and gas, coal leasing, mineral materials, and nonenergy leasable minerals, is occurring. There are approximately 33,264,000 acres indirectly influenced by energy development (Manier et al. 2013, pp. 55-71). No geothermal energy development or nonenergy leasable mineral development is presently occurring in MZ I, and no data were available for nonenergy leasable minerals. Impacts from these activities would be similar to other types of mining and energy development. However, since these resources are not present in the MZ, restrictions related to the development of these resources have no impact on Greater Sage-Grouse populations.

Oil and Gas

Nature and Type of Effects. As discussed in Chapter 4, oil and gas development impacts Greater Sage-Grouse and sagebrush habitats through direct disturbance and habitat loss from well pads, access construction, seismic surveys, roads, power lines, and pipeline corridors. Indirect disturbances result from noise, gaseous emissions, changes in water availability and quality, and human presence. These factors could cumulatively or individually lead to habitat fragmentation in the long term (Connelly et al. 2004; Holloran 2005).

Oil and gas development results in direct loss of habitat from well pad and road construction as well as direct mortality from vehicle strikes and disturbance from noise. Oil and gas development also indirectly impacts Greater Sage-Grouse through the species' avoidance of infrastructure due to increased noise and vehicle traffic associated with development. This development can also impact Greater Sage-Grouse survival or reproductive success. Other indirect effects include habitat quality changes, predator communities, and disease dynamics (Naugle et al. 2011).

Several studies from the Great Plains and Wyoming Basin have shown that breeding Greater Sage-Grouse populations are affected at oil and gas well densities commonly permitted in Montana and Wyoming (Naugle et al. 2011). Doherty et al. (2010) found that although impacts were indiscernible at densities of less than one well per square mile, lek losses in parts of MZ I were two to five times greater in areas with development above this threshold. They also found that the abundance (number) of males per lek at the remaining leks declined by approximately 30 to 80 percent. These and other studies demonstrate that both direct and indirect impacts result from the impacts of energy development and geophysical exploration in Greater Sage-Grouse habitat.

Several studies have quantified the distance from leks at which impacts of development become negligible. The studies also assessed the efficacy of BLM NSO stipulations for leasing and development within 0.25 mile of a lek (Holloran 2005; Walker et al. 2007a). Walker et al. (2007a) found that in the PRB buffer sizes of 0.25, 0.5, 0.6, and 1.0 mile resulted in an estimated lek persistence (the ability of leks to remain on the landscape) of approximately 5, 10, 15, and 30 percent, respectively; conversely, lek persistence in areas without oil and gas development averaged approximately 85 percent.

Naugle et al. (2011) reported that impacts of energy development had been documented at distances greater than 3.5 miles from the lek in MZ I. Holloran (2005) found impacts on abundance at a distance between 3 and 4 miles in western Wyoming. However, Naugle et al. (2011) also stated that impacts on leks caused by energy development were most severe near the lek.

Naugle et al. (2011) also found that impacts from energy development often extirpate leks in gas fields. Doherty (2008) documented that lek losses increased and male abundance decreased as well density increased in the PRB. Lek extirpation in areas with 8 wells per section (40 to 100 wells total) within 2 miles of the lek was 5 times more likely to occur than in areas with no wells within 2 miles. Male attendance at the remaining leks in these areas declined approximately 20 to 60 percent (Doherty 2008).

Much oil and gas development previously occurred on private lands with minimal mitigation efforts, but restrictions are now in place to protect Greater Sage-Grouse habitat under the Wyoming and Montana EOs (though the Montana EO still requires funding for implementation). Earlier research had demonstrated that 0.25-mile NSO lease stipulations were insufficient to conserve breeding Greater Sage-Grouse populations in a typical landscape in portions of the planning area (Walker et al. 2007a), when nearly 80 percent of the area within approximately 2 miles of leks remained open to full-scale development.

Lyon and Anderson (2003) reported that oil and gas development influenced the rate of nest initiation of Greater Sage-Grouse in excess of approximately 2 miles of construction activities. Greater Sage-Grouse numbers on leks within approximately 1 mile of natural gas compressor stations in Campbell County, Wyoming, were consistently lower than numbers on leks unaffected by this noise disturbance (Braun et al. 2002). Holloran and Anderson (2005) reported that lek activity decreased downwind of drilling activities, suggesting that noise caused measurable impacts.

In addition to activities directly associated with oil and gas development, road traffic also generates noise. Knick et al. (2003) indicated that there were no active Greater Sage-Grouse leks within approximately 1 mile of Interstate 80 across southern Wyoming; only 9 leks were known to occur between approximately 1 and 2.5 miles of Interstate 80.

For the BFO, of 411 known leks, only 4 are within 1 mile of Interstate 90, and 41 are within 1 and 4 miles of Interstate 90. The remaining 366 leks were more than 4 miles from the highway.

Conditions in the Planning Area and in MZ I. Energy development is a widespread threat to Greater Sage-Grouse in the Buffalo RMP planning area and the neighboring areas of PRB, Bowdoin Field, and Williston Basin. The patchwork landownership pattern in MZ I means that many energy extraction facilities are near property boundaries and may affect Greater Sage-Grouse and its habitat on adjacent lands. Nearly 16 percent of Greater Sage-Grouse habitat in MZ I is within 1.8 miles of oil and gas wells, a distance at which ecological impacts are likely to occur (Knick et al. 2011). Oil and natural gas development-related wells indirectly influence 60 percent of PHMA and GHMA across MZ I, occurring to a distance of 12 miles from the development. Private surface lands account for 65 percent of wells in PHMA and 72 percent in GHMA in MZ I (Manier et al. 2013). Thus, conservation actions on private land are likely to have a greater potential to ameliorate the effects of oil and gas development on Greater Sage-Grouse habitat than any other single land management entity.

Although oil and gas activities have a disproportionately greater effect on private lands, regulatory mechanisms on both federal surface and split-estate lands in MZ I are influential. Federal actions on split-estate lands with federal subsurface minerals will require mitigation (see Appendix D (p. 1863)) for impacts on Greater Sage-Grouse habitat occurring on private surface lands that would not be required on lands with both privately held surface and subsurface.

From 2001 to 2005, Greater Sage-Grouse populations declined by 82 percent within the expansive coal bed natural gas fields in northeast Wyoming (Walker et al. 2007a). This reduced the options for delineating large and intact Core Areas containing an abundance of high-quality Greater Sage-Grouse habitats. As of 2008, federal oil and gas leases covered approximately 2,533,975 acres in the Buffalo RMP planning area (BLM 2008a). This was less widespread than in other parts of MZ I.

Oil and gas development has emerged as a range-wide issue in conservation because areas being developed contain large Greater Sage-Grouse populations (Connelly et al. 2004) and other sagebrush obligate species (Knick et al. 2003).

The exploration and development of coal bed natural gas has been the largest fluid mineral development in the Buffalo RMP planning area. There have been approximately 21,000 coal bed natural gas wells drilled from 1998 to 2010 in the PRB. This has fragmented Greater Sage-Grouse habitat throughout that area. Development has included construction of well sites and other facilities, including metering buildings, compressor stations, and pumping stations; roads to access well sites, pipelines to transport product and waste water, power lines to bring electrical power to the wells, and other infrastructure; and water-holding impoundments to hold the produced water, as the wells must be de-watered to reduce pressure before the natural gas is released.

Hundreds of miles of pipelines have been constructed to transport coal bed natural gas from development site to delivery point. Other pipelines include those for gathering, transportation, and distribution and lines used to transport produced water to discharge points.

With a well life of approximately 12 years, many of the coal bed natural gas wells that were originally drilled are depleted and ready for abandonment. Native vegetation over most buried pipelines has reclaimed its composition. Utility roads and overhead power lines continue to fragment thousands of acres of Greater Sage-Grouse habitat on private, federal, and state lands (BLM 2013b).

Existing leases on BLM-administered land in Greater Sage-Grouse habitat remain valid. There is a potential for future development based on locations of geologic fields distributed extensively across eastern portions of Greater Sage-Grouse range (Manier et al. 2013). This development is subject to future COAs on plans for development in Greater Sage-Grouse habitat. These COAs will provide a net conservation gain to Greater Sage-Grouse compared to the No Action Alternative, under which these COAs would not apply.

The Dakotas population in MZ I is heavily influenced by oil and gas development; oil and gas developments are scattered throughout the Yellowstone Watershed (USFWS 2013, p. 63). The PRB contains substantial energy resources, including oil, natural gas, and coal bed natural gas (USFWS 2013, pp. 64-65); conversely, the northern Montana population has little energy development. Coal bed methane wells typically last 12 to 18 years, while oil and gas wells may last 20 to 100 years in production (Connelly et al. 2004). Most coal bed natural gas drilling in the PRB has concluded, and current and future oil and gas development is anticipated to impact Greater Sage-Grouse less due to horizontal drilling technology.

In the Buffalo RMP planning area, coal bed natural gas fields are largely played out; therefore, the level of activity on existing leases in the planning area is likely to remain relatively stable. While traditional oil and gas drilling is declining, horizontal drilling is increasing south of Interstate 90 and may spread as far north as the Montana border (see Buffalo RMP Appendix G (p. 1937) for more details regarding the specific reasonably foreseeable future actions in Oil and Gas).

Impact Analysis. Table 4.46, "Acres Open* and Closed to Fluid Mineral Leasing in Greater Sage-Grouse Habitat in MZ I" (p. 1306) and Table 4.47, "Acres with NSO and CSU/TL Stipulations in Greater Sage-Grouse Habitat in MZ I" (p. 1306) provide a quantitative summary of present fluid mineral leasing conditions on BLM-administered lands under the Buffalo Proposed RMP/Final EIS alternatives and across MZ I, and an analysis of past, present, and RFAs in MZ I (see Table 4.57, "Reasonably Foreseeable Future Actions in Management Zone I Likely to Impact Greater Sage-Grouse Habitat" (p. 1337)). As stated in the assumptions, the tables are limited to BLM-administered lands and reflect the conditions assuming implementation of the Proposed Plans of the other planning areas in MZ I. Tables displaying fluid mineral acreage include the federal mineral estate and not just BLM-administered surface acres.

Table 4.46. Acres Open* and Closed to Fluid Mineral Leasing in Greater Sage-Grouse Habitat in MZ I

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ I	***Percent Within Planning Area***	**MZ I**	***Percent Within Planning Area***
Open* to Fluid Mineral Leasing				
Alternative A	31,000	100%	2,553,000	5%
Alternative B	0	0%	2,424,000	0%
Alternative C	0	0%	2,943,000	18%
Proposed Plan	0	0%	2,642,000	8%
Closed to Fluid Mineral Leasing				
Alternative A	436,000	64%	2,148,000	95%
Alternative B	2,394,000	93%	548,000	80%
Alternative C	157,000	0%	142,000	21%
Proposed Plan	184,000	15%	157,000	29%

Source: BLM 2015

*Open with standard lease terms and conditions. This table displays the acres of PHMA and GHMA open and closed to fluid mineral leasing in MZ I; it also displays the percentage of those acres that are found within the planning area.

% percent
GHMA General Habitat Management Area
MZ Management Zone
PHMA Priority Habitat Management Area

Table 4.47. Acres with NSO and CSU/TL Stipulations in Greater Sage-Grouse Habitat in MZ I

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ I	***Percent Within Planning Area***	**MZ I**	***Percent Within Planning Area***
NSO Stipulations				
Alternative A	3,577,000	1%	858,000	7%
Alternative B	3,558,000	0%	1,306,000	39%
Alternative C	3,557,000	0%	1,105,000	28%
Proposed Plan	3,626,000	2%	1,281,000	38%
CSU/TL Stipulations				
Alternative A	1,318,000	14%	3,927,000	14%
Alternative B	1,134,000	0%	3,484,000	3%
Alternative C	1,134,000	0%	5,811,000	42%

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ I	***Percent Within Planning Area***	**MZ I**	***Percent Within Planning Area***
Proposed Plan	1,707,000	34%	5,251,000	36%

Source: BLM 2015

*This table displays the acres of PHMA and GHMA with NSO Stipulations and CSU/TL Stipulations in MZ I; it also displays the percentage of those acres that are found within the planning area.

% percent
CSU Controlled Surface Use
GHMA General Habitat Management Area
MZ Management Zone
NSO No Surface Occupancy
PHMA Priority Habitat Management Area
TL Timing Limitation

As shown in Table 4.46, "Acres Open* and Closed to Fluid Mineral Leasing in Greater Sage-Grouse Habitat in MZ I" (p. 1306) and Table 4.47, "Acres with NSO and CSU/TL Stipulations in Greater Sage-Grouse Habitat in MZ I" (p. 1306), fluid mineral closures and stipulations within the Buffalo RMP planning area exert limited influence due to their small acreage compared to the broader MZ. However, closing PHMA and GHMA to leasing, establishing 0.6-mile lek buffers in accordance with the Wyoming EO, applying the disturbance cap, and implementing NSO and CSU/TL stipulations within the planning area would help to reduce the threat of oil and gas development within the greater MZ.

The Proposed Plan would provide the greatest protection to Greater Sage-Grouse in the MZ, by placing the most acres under NSO and CSU/TL stipulation in PHMA and GHMA than any other alternative. This provision would reduce well density and impacts associated with construction and operation. The extensive fluid mineral leasing closures and stipulations under this alternative could affect pending oil and gas development projects. One example is the Greater Crossbow Exploration and Development Project, which proposes to develop 1,500 wells over 10 years. Alternative B would protect the most Greater Sage-Grouse habitat from energy development by closing the most acres to leasing and adding restrictive stipulations, compared to current management (Alternative A). Increasing habitat protections would improve the conditions for Greater Sage-Grouse survival and successful reproduction.

All the action alternatives would manage more acres as open to oil and gas leasing in GHMA, but Alternative B would be the most protective of Greater Sage-Grouse habitat from closure to new fluid mineral leasing. Under Alternative C, substantially more acreage in GHMA would be open to leasing compared to current management, but this alternative would also apply CSU/TL stipulations on more acres than other alternatives.

Under current management (Alternative A) the most acres are closed to leasing because of a court order covering the PRB. All three action alternatives would reopen the PRB to leasing. Alternative C would have similar restrictions on energy development to Alternative A but more acreage open, and would not improve protection for Greater Sage-Grouse habitat or conditions for breeding or winter survival of populations.

Under the Proposed Plan, 0 percent of PHMA and 8 percent of GHMA would be open to fluid mineral leasing in MZ I. This level of protection is much more than provided under Alternative A (No Action Alternative). For GHMA, the Proposed Plan would have more acreage open to drilling, but greatly increased levels of NSO and CSU/TL protection. In the Sagebrush Focal

Area in Montana, habitat would be subject to NSO without waiver or exception. The Buffalo Proposed RMP/Final EIS Mitigation Guidelines in Appendix D (p. 1863) would help protect unfragmented habitats, minimize habitat loss and fragmentation, and maintain conditions to meet Greater Sage-Grouse life history needs in the vicinity of drilling operations. For example, remote telemetry (e.g., monitoring oil and gas operations) would be used to reduce vehicle traffic, disturbance areas would be kept to a minimum, and vegetation would be removed only when necessary.

Implementing any alternative under the Buffalo RMP would not affect pending or future oil and gas development projects outside of the planning area. For example, the Converse County Oil and Gas Project proposes to drill approximately 5,000 oil and natural gas wells in an area encompassing 1.5 million acres (including Greater Sage-Grouse core habitat) in MZ I. However, the NSO buffer and the disturbance caps under the Wyoming and Montana EOs would reduce the threat to Greater Sage-Grouse from oil and gas development on nonfederal lands in MZ I.

The effect of the alternatives and other conservation actions in the MZ (most notably the Montana and Wyoming EOs) could be synergistic meaning the effects of the actions together is greater than the sum of their individual effects. For example, applying buffers in PHMA and on state and private land would effectively conserve larger blocks of land than if these actions occurred individually. This would provide a landscape-scale net conservation benefit, especially in areas where little development has occurred to date.

Development pressure for fluid mineral resources in the Dakotas, PRB, and Yellowstone Watershed is likely to continue; however, future drilling technologies are expected to impact Greater Sage-Grouse less than coal bed natural gas development has in the past decade. The application of major stipulations and closing areas to leasing would greatly reduce impacts to Greater Sage-Grouse on federal mineral estate and the application of lek buffers and disturbance limitations would further reduce impacts on Greater Sage-Grouse populations.

Reasonably foreseeable oil and gas development is widespread in the MZ. When the impacts of the Buffalo RMP are added to these actions, the impact would be a net conservation gain under the Proposed Plan, due in large part to implementation of NSO stipulations, anthropogenic disturbance caps, and adaptive management that would minimize future disturbances to Greater Sage-Grouse populations and habitats.

Coal

Nature and Type of Effects. Past and current coal extraction has been and continues to be a major mining activity in MZ I. Approximately 3 percent of BLM-administered PHMA in MZ I and 8 percent of GHMA is influenced by coal mining (Manier et al. 2013). Surface mining accounts for about 67 percent of production in the United States; large mines can cover many square miles. Coal mining and the use of coal to produce electricity has environmental impacts. These include soil erosion, dust, noise, water pollution, acid-mine drainage, and air emissions, in addition to impacts on wildlife in the area. Burning coal releases toxic fumes and particulate matter into the atmosphere and contributes to climate change (Manier et al. 2013, pp. 69-71).

Conditions in the Planning Area and in MZ I. The PRB in Wyoming and Montana contains some of the largest accumulations of low-sulfur sub-bituminous coal in the world. It is the nation's largest coal-producing region, and coal from the region is shipped nationwide. As described in Chapter 3, most PRB coal production comes from the Buffalo RMP planning area. Extensive

leasing of coal has occurred over the last decade in prime Greater Sage-Grouse habitat in the planning area.

Coal forecasts for the PRB through 2020 indicate that total production is expected to grow at an annual rate of 2 to 3 percent. The preliminary work for the 2030 forecast indicates a slower rate of increase in the PRB of 0.25 to 2 percent. This is based on reduced coal demand, new natural gas discoveries, and possible regulation of GHGs. By 2030 the BLM expects PRB coal production to be between 500 and 700 million tons annually, though more recent projections indicate lower coal demand because of increased supply of natural gas.

Coal surface leases indirectly influence 3 percent of PHMA and 8 percent of GHMA across MZ I. Coal is estimated to impact habitat to a distance of 12 miles from the direct impact area (Manier et al. 2013). Approximately 68 percent of coal leases in PHMA and 82 percent in GHMA occur on private lands in MZ I but may contain federal mineral estate (Manier et al. 2013). Protective stipulations would be of particular benefit on privately owned surface and subsurface lands where the BLM's protective regulatory mechanisms would not apply.

Impact Analysis. Because there are significant coal resources in the planning area, coal leasing decisions under the Buffalo RMP would have a major influence within the greater MZ. Acres of coal leasing allocations would vary by only a small amount between alternatives: Alternative B would designate few acres of Greater Sage-Grouse habitat as suitable within MZ I, while Alternative C would designate the largest acreage as suitable, compared to current management. However, the Proposed Plan would assess coal lease applications for suitability, with PHMA considered essential habitat for Greater Sage-Grouse. The RFD scenario for the BFO suggests that the development of coal resources in the planning area would not vary considerably across alternatives. However, according to coal management for the Proposed Plan, at the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for coal mining, pursuant to 43 CFR 3461.5. PHMA is considered essential habitat for maintaining Greater Sage-Grouse for purposes of the suitability criteria for coal. Furthermore, areas considered suitable for leasing would not necessarily be leased; the actual amount of leasing depends on factors such as price and regulatory safeguards. PHMA contains no leases.

Major coal leasing and development areas extend beyond the Buffalo RMP planning area; however, coal management in the Buffalo RMP will have a relatively greater impact on Greater Sage-Grouse habitat than management from other BLM field offices or other management entities.

Coal development that requires state agency review or approval would be subject to the permitting process and stipulations for development in Greater Sage-Grouse Core Areas under the Wyoming and Montana EOs, as well as BLM review under the Proposed Plan. There are no coal leases in WY Core Areas; however there are some core areas in MT with existing coal leases and mines.

Coal resources would continue to be developed in MZ I outside of the planning area. However, new coal lease applications in Greater Sage-Grouse Core Areas would be subject to the unsuitability criteria set forth in the BLM's regulations at 43 CFR Part 3461.5. In accordance with those regulations, special conditions could be required, as identified during the leasing process, to protect Greater Sage-Grouse habitat. The regulatory requirements for unsuitability in combination with BLM planning efforts and state plans would help reduce the threat from coal extraction and would provide a net conservation gain to Greater Sage-Grouse populations in MZ I.

Mineral Materials

Nature and Type of Effects. Development of surface mines (for sand, gravel, and other common mineral materials found in MZ I) may negatively impact Greater Sage-Grouse numbers and disrupt the habitat and life-cycle of the species, similar to other types of mining activities (Braun 1998; Manier et al. 2013).

Conditions in the Planning Area and in MZ I. Salable mineral materials disposal sites in PHMA and GHMA are widespread throughout MZ I. They are primarily located in northeast Wyoming, and in far southeast Montana. There are 65,000 acres of mining and mineral materials disposal sites (not including minerals mined as energy sources) on BLM-administered surface land in MZ I. There are 122,900 acres across all landownership types. Indirect effects are estimated to 1.5 miles out from the direct effects area (Manier et al. 2013).

The mineral materials currently being developed for commercial purposes in the Buffalo RMP planning area are aggregate (sand, gravel, and riprap), scoria, building stone, and decorative stone. The Buffalo RMP planning area has the greatest number of mineral material sales and free-use permits of any field office in Wyoming.

Across MZ I, PHMA and GHMA are most affected by mining and mineral materials disposal sites on private land surface. Greater Sage-Grouse may be directly impacted, being in the path of development; however, indirect impacts on habitat affect a much wider population of birds. In total, 53 percent of PHMA and 80 percent of GHMA influenced by the indirect impact of mining and mineral materials disposal sites are on private land. This does not include minerals mined as energy sources. Mining and mineral materials disposal sites on BLM-administered surface land, by comparison, indirectly affect 38 percent of PHMA and 11 percent of GHMA (Manier et al. 2013).

Impact Analysis. As shown in Table 4.48, "Acres Open and Closed to Mineral Material Disposal in Greater Sage-Grouse Habitat in MZ I" (p. 1310), acres of PHMA closed to mineral material disposal are similar between current management and the Proposed Plan, while Alternatives B and C both reduce the number of acres open to mineral material disposal. In GHMA, Alternative B would reduce the number of acres open to mineral material disposal the most, while open acreage is similar across the MZ under Alternatives A, C, and D (the Proposed Plan).

Under Alternative B in the Buffalo planning area, all PHMA would be closed to mineral material disposal, which would constitute most of the closed acreage in MZ I. Closures or restrictions on mineral material development in the planning area would reduce the effects on Greater Sage-Grouse from mineral material development on BLM-administered surface and split-estate lands in MZ I. However, these actions may shift development onto nonfederal lands, with potentially greater impact on Greater Sage-Grouse habitats and populations because protective stipulations and permit requirements would not apply.

Table 4.48. Acres Open and Closed to Mineral Material Disposal in Greater Sage-Grouse Habitat in MZ I

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ I	*Percent Within Planning Area*	MZ I	*Percent Within Planning Area*
Open to Mineral Material Disposal				
Alternative A	1,787,000	29%	9,036,000	30%
Alternative B	1,275,000	0%	6,470,000	2%
Alternative C	1,274,000	0%	9,557,000	34%
Proposed Plan	1,845,000	31%	8,421,000	25%

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ I	***Percent Within Planning Area***	**MZ I**	***Percent Within Planning Area***
Closed to Mineral Material Disposal				
Alternative A	3,769,000	0%	242,000	27%
Alternative B	5,997,000	37%	1,093,000	84%
Alternative C	3,769,000	0%	234,000	24%
Proposed Plan	3,865,000	2%	700,000	75%

Source: BLM 2015

This table displays the acres of PHMA and GHMA open and closed to mineral material disposal in MZ I; it also displays the percentage of those acres that are found within the planning area.

% percent
GHMA General Habitat Management Area
MZ Management Zone
PHMA Priority Habitat Management Area

According to the Buffalo RFD, the development of mineral materials in the Buffalo RMP planning area would disturb the fewest acres of Greater Sage-Grouse habitat under Alternative B, while the most acres would be disturbed under Alternative C. The Proposed Plan would disturb more acres than under current management. Mineral material extraction would directly affect Greater Sage-Grouse, including loss of habitat, disturbance, and displacement. The most pronounced impacts on Greater Sage-Grouse populations would be under Alternative C. As described above, these impacts would include disrupting the habitat and life-cycle of the species, similar to other types of mining activities (Braun 1998; Manier et al. 2013).

Alternative B provides the most protection to Greater Sage-Grouse habitat in MZ I from mineral material disposal in PHMA and GHMA. Acres of PHMA and GHMA open to mineral material disposal in MZ I would be similar under Alternative C to current management (Alternative A). In conjunction with past, present, and reasonably foreseeable future actions that restrict mineral material disposal in Greater Sage-Grouse habitat, these two alternatives would only marginally increase protection of Greater Sage-Grouse habitat over baseline conditions.

The Proposed Plan represents a slight increase in the acreage of PHMA open to mineral material disposal. It slightly decreases the acreage of GHMA open to disposal, compared to Alternative A and represents a more than 100 percent increase in acres of GHMA closed to disposal, compared to Alternative A. The Proposed Plan would also apply protective stipulations and limits under the disturbance cap. Under all alternatives, BMPs and RDFs outlined in Appendix B (p. 1779) would help minimize the impacts on Greater Sage-Grouse from mineral development on federal land.

Under the Wyoming and Montana EOs, authorizations of new mineral material disposal sites that require state agency review or approval would be subject to the Greater Sage-Grouse permitting process. They also would be subject to stipulations for development in Greater Sage-Grouse Core Areas. These stipulations would be of particular benefit on privately owned surface and subsurface lands, where BLM protective regulatory mechanisms do not apply.

Overall, the combination of BLM management actions for mineral materials development in the Proposed Plan for the Buffalo RMP, Wyoming and Montana state actions, and planned restoration activities would preserve more habitat from disturbance than current management, reduce disturbance to birds, and provide a net conservation benefit to Greater Sage-Grouse in MZ I.

Locatable Minerals

Nature and Type of Effects. Locatable minerals include gold, silver, uranium, and bentonite. Activities associated with locatable mineral development, such as stockpiling topsoil and extracting and transporting material, would cause mortality and nest disruption. These actions also would reduce the functionality of the surrounding habitat with noise and light disturbance, resulting in lost and degraded Greater Sage-Grouse habitat.

As with fluid mineral development, reclamation practices may help to reduce long-term impacts on Greater Sage-Grouse and their habitat. Although past mining efforts have not emphasized restoration of disturbed areas to near pre-disturbance conditions, recent efforts have been directed toward restoring functional habitat. Future reclamation should be focused on restoring habitats capable of supporting viable Greater Sage-Grouse populations. Even with effective restoration, restored areas may not support Greater Sage-Grouse populations at the same level as prior to disturbance.

Conditions in the Planning Area and in MZ I. The primary locatable minerals in commercially viable quantities in the Buffalo RMP planning area and other parts of MZ I are sodium bentonite, gypsum, and uranium. Other locatable minerals are known to exist in the planning area, but they are currently uneconomical to produce. Most current and forecasted extraction activities are for sodium bentonite (2 active mines, 1 pending authorization, and 47 active mining claims in the planning area), but uranium is also being mined in MZ I. The Nichols Ranch/Hank Unit Uranium in-situ Recovery Mining Project is pending authorization (see Table 4.57, "Reasonably Foreseeable Future Actions in Management Zone I Likely to Impact Greater Sage-Grouse Habitat" (p. 1337)). In the event of a price increase, uranium mining activity would likely increase in Greater Sage-Grouse habitat.

Impact Analysis. As shown in Table 4.49, "Acres Open and Recommended for Withdrawal from Locatable Mineral Entry in Greater Sage-Grouse Habitat in MZ I" (p. 1312) locatable minerals development on BLM-administered land represents a relatively small influence, compared to the broader MZ. However, withdrawals in the planning area would still influence the threat on a MZ-wide scale.

Table 4.49. Acres Open and Recommended for Withdrawal from Locatable Mineral Entry in Greater Sage-Grouse Habitat in MZ I

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ I	*Percent Within Planning Area*	MZ I	*Percent Within Planning Area*
Open to Locatable Mineral Entry				
Alternative A	3,949,000	13%	7,401,000	37%
Alternative B	5,201,000	34%	5,543,000	16%
Alternative C	3,441,000	0%	7,881,000	41%
Proposed Plan	4,080,000	16%	7,190,000	35%
Recommended for Withdrawal from Locatable Mineral Entry				
Alternative A	1,062,000	0%	59,000	0%
Alternative B	1,527,000	30%	210,000	71%
Alternative C	1,062,000	0%	87,000	32%

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ I	***Percent Within Planning Area***	**MZ I**	***Percent Within Planning Area***
Proposed Plan	1,085,000	2%	118,000	50%

Source: BLM 2015

This table displays the acres of PHMA and GHMA open to mineral entry and recommended for withdrawal from locatable mineral entry in MZ I; it also displays the percentage of those acres that are found within the planning area.

% percent
GHMA General Habitat Management Area
MZ Management Zone
PHMA Priority Habitat Management Area

Under Alternative B, more acreage would be open to locatable mineral entry in PHMA, but less acreage would be open in GHMA, compared to current management. Alternative B would have the most acreage of all the alternatives recommended for withdrawal in both PHMA and GHMA and would restrict future locatable mineral operations more than under the other alternatives if the Secretary chose to withdraw these areas; thus it could provide more protections from locatable mineral development should the withdrawal occur; however conservation benefits for Greater Sage-Grouse would be limited because of the limited areas where these resources occur in Greater Sage-Grouse habitat.

Alternative C does not recommend withdrawal of any additional acres of Greater Sage-Grouse habitat from locatable mineral development. Sodium bentonite extraction and other forms of locatable mineral mining would continue to affect Greater Sage-Grouse through disturbance, habitat loss, and habitat degradation. Though PHMA acreage open to locatable mineral entry would be slightly reduced, GHMA acreage would be increased, and overall Alternative C would not provide a net conservation gain to Greater Sage-Grouse.

Under the Proposed Plan, approximately the same amount of acreage in PHMA and GHMA would remain open to locatable mineral entry as Alternative A. However, there would be a slight increase in the PHMA acreage recommended for withdrawal, and nearly double the GHMA acreage recommended for withdrawal across MZ I. All acreage in Sagebrush Focal Areas would be recommended for withdrawal as well, providing a net conservation gain to Greater Sage-Grouse populations by reducing disturbance to birds from human activity and habitat fragmentation from mining.

Under all alternatives, RDFs outlined in Appendix B (p. 1779) would help minimize the impacts on Greater Sage-Grouse from locatable mineral development on federal land. Clustering operations and facilities as closely as possible and placing new infrastructure in already disturbed locations would reduce impacts on sagebrush habitats.

The disturbance cap in the Proposed Plan would not block locatable mineral entry projects, but any locatable mineral entry would be considered as disturbance under the cap. Overall, the measures in the Proposed Plan would help alleviate the threat, and in light of state plans, other BLM planning efforts, and other past, present, and reasonably foreseeable future actions, provide a net conservation gain to Greater Sage-Grouse throughout MZ I.

Nonenergy Leasable Minerals

Nonenergy leasable minerals are materials such as sulfates, silicates, and trona (sodium carbonate). Impacts on Greater Sage-Grouse are similar to those from other types of mining.

Conditions in the Planning Area and in MZ I. Existing leases for nonenergy leasable minerals represent a relatively small threat spatially (Manier et al. 2013). Nonenergy leasable minerals are known to occur in the Buffalo RMP planning area but not in commercially viable quantities. Therefore, implementing any of the alternatives would not reduce the threat in MZ I.

Impact Analysis. Table 4.50, "Acres Open and Closed to Nonenergy Leasable Mineral Leasing in Greater Sage-Grouse Habitat in MZ I" (p. 1314) shows the results by alternative.

Table 4.50. Acres Open and Closed to Nonenergy Leasable Mineral Leasing in Greater Sage-Grouse Habitat in MZ I

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ I	*Percent Within Planning Area*	MZ I	*Percent Within Planning Area*
Open to Nonenergy Leasing				
Alternative A	1,805,000	29%	6,212,000	43%
Alternative B	1,288,000	0%	3,669,000	3%
Alternative C	1,287,000	0%	6,762,000	47%
Proposed Plan	2,049,000	37%	6,491,000	45%
Closed to Nonenergy Leasing				
Alternative A	2,468,000	0%	233,000	38%
Alternative B	4,702,000	48%	1,059,000	86%
Alternative C	2,468,000	0%	201,000	0%
Proposed Plan	2,564,000	4%	670,000	79%

Source: BLM 2015

This table displays the acres of PHMA and GHMA open and closed to nonenergy leasing in MZ I; it also displays the percentage of those acres that are found within the planning area.

% percent
GHMA General Habitat Management Area
MZ Management Zone
PHMA Priority Habitat Management Area

For MZ I, Alternatives B and C would reduce the acreage of PHMA and GHMA open to nonenergy leasing, compared to current management (Alternative A). Alternative B would also increase the acreage closed to nonenergy leasing. Alternative C has approximately the same acreage closed to leasing as Alternative A. The Proposed Plan increases acreage open to nonenergy leasing in PHMA and GHMA. However, it also slightly increases acreage closed to nonenergy leasing in PHMA and more than doubles closed acreage in GHMA, compared to current management. Precluding nonenergy leasable development in more acres of PHMA or GHMA would reduce habitat disturbance and fragmentation if nonenergy mineral extraction were to occur in Greater Sage-Grouse habitat in the future. The Proposed Plan would also apply a disturbance cap, and mitigation for any damage in Greater Sage-Grouse habitat.

In combination with the disturbance cap applied under state plans and BLM actions in other RMP planning areas in MZ I, the Proposed Plan represents an improvement in Greater Sage-Grouse habitat protections in MZ I, and in combination with other past, present, and reasonably foreseeable future actions, would provide a net conservation gain to Greater Sage-Grouse.

Infrastructure

The USFWS (2013) considers energy development and associated infrastructure the largest threats to Greater Sage-Grouse in MZ I. The COT report objective is to avoid development of

infrastructure in Greater Sage-Grouse PHMA. However, in the PRB, considerable infrastructure has already been constructed in Greater Sage-Grouse habitat, making it necessary to focus Greater Sage-Grouse management on minimizing impacts of infrastructure.

Rights-of-Way

Nature and Type of Effects. As discussed in Chapter 4, power lines can directly affect Greater Sage-Grouse by posing a collision and electrocution hazard. They also can indirectly decrease lek attendance and recruitment by providing perches and nesting habitat for potential avian predators such as golden eagles and ravens (Connelly et al. 2004). In addition, power lines and pipelines often extend for many miles. The ground disturbance associated with construction, as well as vehicle and human presence on maintenance roads, may introduce or spread invasive weeds over large areas, degrading habitat. Impacts from roads may include direct habitat loss from road construction and direct mortality from collisions with vehicles. Roads may also facilitate predator movements, spread invasive plants, and increase human disturbance from noise and traffic (Forman and Alexander 1998).

Conditions in the Planning Area and in MZ I. Infrastructure such as ROWs and associated facilities and urbanization is widespread throughout MZ I. In some locations, infrastructure development has affected Greater Sage-Grouse habitat. Development of roads, fences, and utility corridors has also contributed to habitat loss and fragmentation in portions of MZ I. The best available estimates suggest about 16 percent of MZ I is within approximately 4 miles of urban development (Knick et al. 2011). Impacts of infrastructure development in MZ I are primarily related to highways, roads, power lines, and communication towers, with nearly 90 percent of MZ I within 4 miles of a road, 30 percent within 4 miles of a power line, and 4 percent within 4 miles of a communication tower (Knick et al. 2011). In the planning area, most ROWs on BLM-administered lands are associated with oil and gas development, electrical transmission, irrigation ditches, and communications.

Although not representative of all infrastructure ROWs, transmission lines greater than 115 kilovolts (kV) indirectly influence 29 percent of PHMA and 46 percent of GHMA across MZ I. Indirect effects are assumed to occur to a radius of 4 miles (Manier et al. 2013). Approximately 68 percent of transmission lines in PHMA and 73 percent in GHMA are on private lands across Greater Sage-Grouse habitats in MZ I (Manier et al. 2013). Therefore, conservation actions on private lands are likely to have a greater potential to affect transmission line ROWs in Greater Sage-Grouse habitat than any other land management entity. Designating ROW exclusion and avoidance areas in PHMA and GHMA on BLM-administered lands could reduce the threat on these lands; however, the scattered federal landownership encourages routing infrastructure around federal lands, often increasing its length and impact. ROW avoidance and exclusion areas on BLM-administered lands could increase this tendency.

Impact Analysis. Table 4.51, "Acres of Rights-of-Way Designations in Greater Sage-Grouse Habitat in MZ I" (p. 1316) lists the areas of ROW avoidance and exclusion in Greater Sage-Grouse habitat in the Buffalo RMP planning area and in MZ I by alternative. Table 4.52, "Acres of Proposed Utility Corridors in Greater Sage-Grouse Habitat in MZ I" (p. 1316) lists acres of PHMA and GHMA in proposed utility corridors.

Table 4.51. Acres of Rights-of-Way Designations in Greater Sage-Grouse Habitat in MZ I

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ I	*Percent Within Planning Area*	MZ I	*Percent Within Planning Area*
Open to Rights-of-Way				
Alternative A	117,000	96%	1,264,000	52%
Alternative B	5,000	0%	628,000	3%
Alternative C	5,000	0%	1,321,000	54%
Proposed Plan	5,000	0%	932,000	34%
Rights-of-Way Exclusion				
Alternative A	93,000	0%	78,000	0%
Alternative B	559,000	84%	308,000	75%
Alternative C	93,000	0%	106,000	26%
Proposed Plan	119,000	22%	149,000	47%
Rights-of-Way Avoidance				
Alternative A	3,337,000	0%	2,126,000	0%
Alternative B	3,337,000	0%	2,177,000	2%
Alternative C	3,337,000	0%	2,154,000	1%
Proposed Plan	3,449,000	3%	2,363,000	10%

Source: BLM 2015

This table displays the acres of PHMA and GHMA within rights-of-way designations in MZ I; it also displays the percentage of those acres that are found within the planning area.

% percent
GHMA General Habitat Management Area
MZ Management Zone
PHMA Priority Habitat Management Area

Table 4.52. Acres of Proposed Utility Corridors in Greater Sage-Grouse Habitat in MZ I

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ I	*Percent Within Planning Area*	MZ I	*Percent Within Planning Area*
Proposed Utility Corridor				
Alternative A	11,000	0%	77,000	0%
Alternative B	182,000	94%	187,000	59%
Alternative C	11,000	0%	77,000	0%
Proposed Plan	14,000	21%	105,000	27%

Source: BLM 2015

This table displays the acres of PHMA and GHMA within existing and proposed utility corridors in MZ I; it also displays the percentage of those acres that are found within the planning area.

% percent
GHMA General Habitat Management Area
MZ Management Zone
PHMA Priority Habitat Management Area

Alternative A (current management) has the most acres open to ROW development in PHMA. Across MZ I, the action alternatives all close all but 5,000 acres of PHMA to ROWs. For GHMA, Alternative B and the Proposed Plan reduce the number of open acres the most and Alternative C has similar open acreage to Alternative A. Alternative B would have five times more acreage in exclusion areas in PHMA in MZ I compared to current management, while the Proposed Plan would increase exclusion areas in PHMA by approximately 25 percent over current management.

Alternative C would have no increase in PHMA, but a small increase in GHMA. Alternative B proposes the largest acreage of ROW exclusion areas in both PHMA and GHMA, but the Proposed Plan has the most acreage in ROW avoidance areas.

Exclusion and avoidance areas are designed to minimize disturbance to Greater Sage-Grouse populations by limiting the siting of roads that can increase bird mortality, habitat avoidance, and habitat fragmentation, and the location of tall structures that can increase predation, particularly nest predation (Connelly et al. 2004). These impacts would be most prevalent under Alternative A because there would be the most acres open to ROWs in PHMA.

The Proposed Plan relies more on ROW avoidance than exclusion to protect Greater Sage-Grouse habitat. This approach preserves management flexibility in situations where landownership is mixed. Flexibility is also preserved in areas where rerouting ROWs across nonfederal land may result in a longer route, increasing disturbance of Greater Sage-Grouse leks, nests, and brood-rearing and wintering areas more than direct routing across federal land. Because of this flexibility, the Proposed Plan provides the greatest net conservation gain to Greater Sage-Grouse in the Buffalo RMP planning area.

The numbers of ROW authorizations are anticipated to grow in MZ I. Increasing populations, continued energy development, and new communication sites drive the need for new ROWs on BLM-administered lands and those lands not under BLM administration.

New ROW authorizations that require state agency review or approval would be subject to the permitting process and development restrictions, including the disturbance cap, in Greater Sage-Grouse Core Areas under the Wyoming and Montana EOs, as discussed in Section 4.4.9.9.4, "Regional Efforts to Manage Threats to Greater Sage-Grouse" (p. 1296). These stipulations would benefit Greater Sage-Grouse in Core Areas (although excluding many of the Greater Sage-Grouse in the PRB) by encouraging ROW development outside of Core Habitat Areas, restricting surface occupancy within 0.6 mile of occupied leks, prohibiting power lines greater than 115 kV outside of designated corridors, and locating new roads used to transport products or waste over 1.9 miles from occupied leks. These provisions would reduce disturbance to Greater Sage-Grouse populations from human traffic, noise, and increased predation associated with tall structures.

The effect of the alternatives and other conservation actions in the MZ (most notably the Montana and Wyoming EOs) could be synergistic. By implementing restrictions on infrastructure in PHMA and on state and private lands together, the cumulative beneficial effect on Greater Sage-Grouse would be greater than the sum of their individual effects because protections would be applied more consistently across the landscape. This is especially important in areas of mixed land ownership patterns where complementary protections can benefit leks, early brood rearing habitat, or other important areas that do not follow geopolitical boundaries.

In combination with these past, present, and reasonably foreseeable future actions and other BLM proposed plans in MZ I, the Buffalo RMP Proposed Plan would provide the greatest net conservation gain to Greater Sage-Grouse in MZ I. It would accomplish this by providing the flexibility to site ROWs with the least impact on Greater Sage-Grouse habitat, preserving larger blocks of unfragmented habitat for Greater Sage-Grouse populations.

Renewable Energy

Nature and Type of Effects. Impacts on Greater Sage-Grouse from renewable energy development, such as that for wind and solar power, are similar to those from nonrenewable

energy development. Additional concerns associated with wind energy developments are rotor blade noise, structure avoidance, and mortality caused by collisions with turbines (Connelly et al. 2004).

Conditions in the Planning Area and in MZ I. There have been no formal inquiries associated with renewable energy development in the Buffalo RMP planning area. Solar energy has very low potential, while wind energy development is a growing presence in MZ I. However, few of the higher potential areas for wind energy in the planning area are in Greater Sage-Grouse habitat.

Wind turbines indirectly influence 1 percent of PHMA and GHMA across MZ I. Private lands account for 72 percent of wind turbines affecting Greater Sage-Grouse in PHMA and 87 percent in GHMA in MZ I (Manier et al. 2013). Therefore, actions on private land are likely to have a greater potential to reduce the effects of wind energy development than federal actions. Projects that require state agency review or approval would be subject to Wyoming or Montana EO permitting processes. This would encourage wind energy development outside of Core Habitat Areas.

A programmatic EIS by the WAPA and the Department of Energy for the entire upper Great Plains will focus future wind energy developments in specific corridors outside of Greater Sage-Grouse Core Habitat Areas (WAPA 2013).

Impact Analysis. Table 4.53, "Acres of Wind Energy Management Designations in Greater Sage-Grouse Habitat in MZ I" (p. 1318) lists areas of wind energy ROWs by alternative.

Table 4.53. Acres of Wind Energy Management Designations in Greater Sage-Grouse Habitat in MZ I

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ I	***Percent Within Planning Area***	**MZ I**	***Percent Within Planning Area***
Open to Wind Rights-of-Way*				
Alternative A	114,000	98%	1,255,000	53%
Alternative B	2,000	0%	607,000	1%
Alternative C	2,000	0%	1,311,000	54%
Proposed Plan	2,000	0%	655,000	8%
Wind Rights-of-Way Exclusion				
Alternative A	2,725,000	0%	203,000	0%
Alternative B	3,191,000	15%	458,000	56%
Alternative C	2,725,000	0%	231,000	12%
Proposed Plan	2,793,000	3%	479,000	58%
Wind Rights-of-Way Avoidance				
Alternative A	707,000	0%	1,986,000	0%
Alternative B	707,000	0%	2,024,000	2%
Alternative C	707,000	0%	2,013,000	1%
Proposed Plan	776,000	9%	2,285,000	13%

Source: BLM 2015

This table displays the acres of PHMA and GHMA within wind energy management designations in MZ I; it also displays the percentage of those acres that are found within the planning area.

% percent
GHMA General Habitat Management Area
MZ Management Zone
PHMA Priority Habitat Management Area

In the Buffalo RMP planning area, the action alternatives would all close almost all acreage in PHMA to wind energy development. Avoidance areas for renewable energy in Greater Sage-Grouse habitat would be similar under all alternatives. Across MZ I, Proposed Plans in all other BLM planning areas have PHMA as exclusion areas for wind energy. In GHMA, Alternative C would maintain the open acreage of current management; Alternatives B and D would reduce it compared to Alternative A. The Proposed Plan would also increase acreage open to wind ROW in GHMA slightly over current management. Expanding avoidance areas would reduce habitat fragmentation and disturbance to Greater Sage-Grouse populations from noise, traffic, and increased predation.

Although no formal inquiries associated with renewable energy development have occurred in the planning area, there is moderate wind potential in the planning area and across MZ I.

Impacts would be minimized on BLM-administered land across all alternatives by adhering to the wildlife protection provisions of the Wind Energy Development Programmatic EIS (BLM 2005c). Implementation of wind energy avoidance in PHMA in the Buffalo RMP Proposed Plan, in combination with the disturbance caps under the state plans, exclusion of wind development in PHMA and avoidance in GHMA in all other BLM planning areas in the MZ, the protections in the WAPA EIS, and other past, present, and reasonably foreseeable future actions, would provide a net conservation gain to Greater Sage-Grouse in MZ I.

Grazing

Nature and Type of Effects. The remaining sagebrush habitats in MZ I are mostly managed as grazing lands for domestic livestock. Domestic livestock function similarly to the native keystone species bison in the MZ through grazing and management actions related to grazing, by serving as the predominant large herbivore in the ecosystem. Grazing actions do not preclude wildlife and vegetation, but they do influence ecological pathways and species persistence (Bock et al. 1993).

Livestock can influence habitat by modifying plant biomass, plant height and cover, and plant species composition. As a result, livestock grazing could cause changes in habitat that alter species abundance and composition in Greater Sage-Grouse insect prey important to young Greater Sage-Grouse chicks. Changes in plant composition could occur in varying degrees and could change vegetative structure, affecting cover for nesting birds. Grazing could also alter fire regimes (Davies et al. 2010).

Improper livestock grazing management can compact soils, alter nutrient levels, trample vegetation and disturb Greater Sage-Grouse, potentially negatively affecting Greater Sage-Grouse recruitment. Improper cattle and sheep grazing can also reduce invertebrate prey for Greater Sage-Grouse or increase their exposure to predators (Beck and Mitchell 2000, pp. 998-1,000; Knick 2011; Coates 2007, pp. 28-33). Excessive grazing in riparian areas can destabilize streams and riverbanks, cause the loss of riparian shade, and increase sediment and nutrient loads in the aquatic ecosystem (George et al. 2011). Stock watering tanks can contribute to stream and aquifer dewatering and may concentrate livestock movement and congregation in sensitive areas (Vance and Stagliano 2007).

Even periodic overgrazing can damage range resources over the long term. Grazing often exacerbates drought effects when stocking levels are not quickly reduced to match the limited forage production. Excessive grazing can eliminate perennial grasses and lead to expansion of invasive species such as cheatgrass or Japanese brome (Reisner et al. 2013). The degree to which grazing affects habitat depends on several factors, such as the types of grasses being

grazed, the amount of moisture in any given year, the number of animals grazing in an area, the time of grazing, and the grazing system used.

However, grazing can be used to reduce fuel load and reduce the risk of wildfire (Connelly et al. 2004, p. 7, 28-30). Under certain conditions, grazing can reduce the spread of invasive grasses, if applied early in the season before the grasses have dried (Strand and Launchbaugh 2013). Light to moderate grazing does not appear to affect perennial grasses, which are important to nest cover (Strand and Launchbaugh 2013).

Much of the landscape in MZ I is adapted to withstand grazing disturbance, having been grazed by bison before the West was settled (Knick et al. 2011). Since the passage of the 1934 Taylor Grazing Act, range conditions on BLM-administered lands have generally improved due to improved grazing management practices, decreased livestock numbers, and decreased duration of grazing.

In addition, the BLM has applied Standards for Rangeland Health since 1997. The purpose of this practice is to enhance sustainable livestock grazing and wildlife habitat, while protecting watersheds and riparian ecosystems.

Although livestock grazing is the most widespread land use across the sagebrush biome, it exerts a more limited influence on soils and vegetation than land uses that remove or fragment habitat (e.g., mineral extraction or infrastructure development). Greater Sage-Grouse are able to coexist with grazing animals when properly managed. Thus, reducing AUMs or acres open to grazing would not necessarily restore high-quality Greater Sage-Grouse habitat.

Livestock grazing could reduce the suitability of breeding and brood-rearing habitat for Greater Sage-Grouse populations (USFWS 2010). In areas where livestock use was not well managed, invasive forbs may rise in prevalence. Reducing grass height in Greater Sage-Grouse nesting and brood-rearing areas may negatively impact nesting success. However, grazing is only one component of grass height, which is also influenced by soil and weather conditions. For BLM-administered lands, Standards for Rangeland Health require the BLM to ensure that the environment contains all of the necessary components to support viable populations of sensitive, threatened, and endangered species in a given area relative to site potential. The BLM WO IM 2009-018 requires that land health considerations, such as vegetation cover for Greater Sage-Grouse, are primary considerations for prioritizing the processing of grazing authorizations.

Improperly designed or located range improvements could result in livestock overusing important Greater Sage-Grouse areas. For example, improper spring development may change vegetative composition of an area important to broods.

Allowing spring developments along ephemeral streams and wetlands would decrease Greater Sage-Grouse habitat. Springs, seeps, and wetland areas are vitally important to Greater Sage-Grouse broods; therefore, allowing spring developments could reduce resources for Greater Sage-Grouse.

Conditions in the Planning Area and in MZ I. Livestock grazing is the dominant agricultural use in the Great Plains. It is widespread on many land types, including federal and private, across MZ I. Remaining sagebrush habitats in MZ I are mostly managed as grazing lands for domestic livestock. Much of the landscape in MZ I is adapted to grazing, having been grazed by bison before the West was settled. The effects of grazing on sagebrush habitats in this MZ are much

different than effects noted in the Great Basin since the landscape throughout MZ I is adapted to withstand grazing disturbance (Knick et al. 2011).

Literature suggests that moderate grazing is compatible with Greater Sage-Grouse habitat (Strand and Launchbaugh 2013); Thus, closing acres to grazing may not itself benefit or harm Greater Sage-Grouse, but the fences needed to separate BLM lands from other ownerships and close them to grazing would have direct impacts through increased mortality of Greater Sage-Grouse. Possibly equally or more beneficial is restricting range improvements in Greater Sage-Grouse habitat, limiting fencing, and effectively implementing range health standards on grazing allotments in Greater Sage-Grouse habitat.

The COT report objectives for livestock grazing are to manage grazing in a manner consistent with local ecological conditions. This management would maintain or restore healthy sagebrush shrub and native perennial grass and forb communities and conserve essential habitat components for Greater Sage-Grouse. Restoration to meet these standards and adequate monitoring would be required. The COT report also states that land managers should avoid or reduce the impact of range management structures on Greater Sage-Grouse habitat.

Perhaps the most pervasive change associated with grazing management in Greater Sage-Grouse habitats throughout MZ I is the construction of fencing and water developments (Knick et al. 2011). Barbed wire fences contribute to direct mortality through fence collisions (Stevens et al. 2011); water developments may contribute to the increased occurrence of WNv (Walker and Naugle 2011). Fencing is common throughout MZ I; water developments are particularly prevalent in the north-central portion of MZ I, making that area especially susceptible to WNv outbreaks.

Impact Analysis. The BLM manages livestock grazing on 782,102 acres in the planning area under 427 grazing leases. Table 4.54, "Acres Available and Unavailable to Livestock Grazing in Greater Sage-Grouse Habitat in MZ I" (p. 1321) lists the acres of PHMA and GHMA available and unavailable for grazing, by alternative.

Table 4.54. Acres Available and Unavailable to Livestock Grazing in Greater Sage-Grouse Habitat in MZ I

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ I	*Percent Within Planning Area*	MZ I	*Percent Within Planning Area*
Available to Livestock Grazing				
Alternative A	3,548,000	3%	3,432,000	19%
Alternative B	3,441,000	0%	3,079,000	9%
Alternative C	3,441,000	0%	3,540,000	21%
Proposed Plan	3,573,000	4%	3,407,000	18%
Unavailable to Livestock Grazing				
Alternative A	0	0%	1,000	0%
Alternative B	461,000	10%	1,000	0%
Alternative C	0	0%	1,000	0%

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ I	***Percent Within Planning Area***	**MZ I**	***Percent Within Planning Area***
Proposed Plan	3,000	67%	8,000	88%

Source: BLM 2015

This table displays the acres of PHMA and GHMA available and unavailable to livestock grazing in MZ I; it also displays the percentage of those acres that are found within the planning area.

% percent
GHMA General Habitat Management Area
MZ Management Zone
PHMA Priority Habitat Management Area

Acres open to livestock grazing in PHMA and GHMA are similar across all alternatives. Acres closed to livestock grazing would be greatest under Alternative B, which closes PHMA to grazing. In addition, under Alternative B the BLM would not renew grazing leases within 4 miles of leks; therefore, this would result in more restrictive grazing conditions. This would benefit Greater Sage-Grouse by maintaining nesting cover for protection and forage; however, the increased need for fencing to exclude grazing animals on BLM lands could also harm Greater Sage-Grouse by increasing the likelihood of predation and collision.

Alternative C has similar management to Alternative A, so current impacts would continue. The Proposed Plan modestly increases acreage closed to grazing over current management, thereby reducing the possibility for impacts to Greater Sage-Grouse directly related to grazing, but may moderately increase mortality of there is increased fencing associated with the closure. In addition, new grazing guidance under the Proposed Plans would prioritize review of grazing permits in Sagebrush Focal Areas, followed by PHMA outside of Sagebrush Focal Areas (there are no Sagebrush Focal Areas in the Buffalo RMP planning area). Permits and leases may be modified for protection of riparian areas and wet meadows and may include enhanced monitoring and field checks.

Although the acres closed to livestock grazing are similar under Alternatives A and D, under the Proposed Plan, permit review in PHMA and management and monitoring would emphasize achievement of the Wyoming Standards for Rangeland Health. The Proposed Plan also includes restrictions on placing salt or mineral supplements near leks, which would limit trampling damage to habitat in accordance with the COT report objectives.

Because most grazed land in Greater Sage-Grouse habitat in MZ I is privately owned, restrictions on grazing on BLM-administered land may have limited direct effect on population-wide nesting success. areas. However, the construction of fences to enforce the closure of BLM-administered lands to grazing could have a substantial direct effect on Greater Sage-Grouse survival. However, if BLM-administered lands were made unavailable for livestock grazing, as under Alternative B, this could increase grazing pressure on adjacent private lands. Loss of federal grazing permits would pose a threat of indirect adverse effects, including potential conversion of private grazing lands to agriculture, if the loss of federal grazing rights made ranching less economically viable.

Conversion to agriculture is the major threat in the eastern Greater Sage-Grouse range in MZ I, including the Dakotas and Montana. In these areas agricultural conversion is profitable, and patchwork ownership boundaries increase the likelihood of habitat fragmentation. While BLM management may preserve habitat on federal lands, if interspersed private lands are tilled, the

entire landscape may be lost as Greater Sage-Grouse habitat regardless of BLM conservation actions.

The most protective grazing management the BLM can implement for Greater Sage-Grouse habitat is to maintain and improve habitat quality through the implementation of the Rangeland Health Standards on current allotments and by keeping BLM land available for grazing to assist in the maintenance of ranching as a viable land use in sage-grouse habitats.

In the future, temperature increases resulting from climate change may increase crop yields, encouraging conversion of lands not previously used for agriculture. Thus, the most protective grazing management the BLM can implement for Greater Sage-Grouse habitat is to maintain and improve habitat quality through the implementation of the Rangeland Health Standards on current allotments and by keeping BLM land available for grazing to assist in the maintenance of ranching as a viable land use in sage-grouse habitats.

Since 2010, Sage-Grouse Initiative has enhanced rangeland health through rotational grazing systems, re-vegetating former rangeland with sagebrush and perennial grasses and control of invasive weeds. On privately-owned lands, Sage-Grouse Initiative has developed a prescribed grazing approach that balances forage availability with livestock demand. This system allows for adjustments to timing, frequency, and duration of grazing, ensuring rangelands are managed sustainably to provide continued ecological function of sagebrush-steppe. A primary focus of the prescribed grazing approach is maintenance of key plant species, such as deep-rooted perennial grasses that have been shown to be essential for ecological resistance to invasive annual grasses (Reisner et al. 2013, pp. 1047-1048). These actions help to alleviate the adverse impacts associated with improper grazing practices outlined above under Nature and Type of Effects. Within MZ I, Sage-Grouse Initiative has implemented 1,370,269 acres of prescribed grazing systems. This program is likely the largest and most impactful program on private lands within MZ I. Because of its focus on priority areas for conservation, which often overlap PHMA, the Sage-Grouse Initiative's past, present, and reasonably foreseeable work has had and likely will continue to have a cumulative beneficial impact on Greater Sage-Grouse.

In combination with NRCS actions under the Sage-Grouse Initiative, including fence marking, implementation of sustainable grazing management plans, conservation easements, state efforts to maintain ranchland, and other past, present, and reasonably foreseeable future actions, BLM management actions in the Proposed Plan would provide a net conservation gain to Greater Sage-Grouse.

Spread of Weeds

Nature and Type of Effects. As discussed in Chapter 4, invasive weeds alter plant community structure and composition, productivity, nutrient cycling, and hydrology. Invasive weeds also may cause declines in native plant populations, including sagebrush habitat, through such factors as competitive exclusion and niche displacement. Invasive plants reduce and may eliminate vegetation that Greater Sage-Grouse use for food and cover. Invasive weeds fragment existing Greater Sage-Grouse habitat and reduce habitat quality by competitively excluding vegetation essential to Greater Sage-Grouse. Invasive weeds can also create long-term changes in ecosystem processes, such as fire cycles and other disturbance regimes that persist even after an invasive plant is removed (Connelly et al. 2004).

Roads and recreation can promote the spread of invasive weeds through vehicular traffic. Weed infestations can further exacerbate the fragmentation effects of roadways. Irrigation water has

also supported the conversion of native plant communities to hayfields, pasture, and cropland, thus fragmenting sagebrush habitats. Excessive grazing in these habitats can lead to the demise of the most common perennial grasses in this system and an abundance of invasive species such as cheatgrass or Japanese brome (Reisner et al. 2013).

Conditions in the Planning Area and in MZ I. Spread of invasive plants is less prevalent in MZ I and in the planning area due to its cooler, wetter climate compared to Greater Sage-Grouse habitat farther west. Drier, hotter summers promote the spread of cheatgrass and other invasives which establish more slowly in MZ I.

Although cheatgrass does occur, past fire history and research has repeatedly demonstrated a healthy northern mixed-grass prairie plant community is resilient to cheatgrass expansion. Haferkamp (2001) studying annual bromes, including cheatgrass in eastern Montana, concluded there would be no ecological shift of northern mixed-grass prairies toward annual grass dominance. Instead, he concluded the amount and abundance of annual bromes occurring on Northern Great Plains rangeland is cyclic, depending on seedbank, temperature, amount and distribution of precipitation. Expansion of annual bromes in mixed–grass prairie communities is buffered by two long-lived perennial grasses (western wheatgrass and blue grama), where grazing management maintains healthy native mixed-grass prairie vegetation (Haferkamp 2001). Vermiere et al. (2011) studied effects of fire on perennial and annual grasses (including cheatgrass) and found increased production of western wheatgrass and decreased annual grass production following summer fire in the northern mixed-grass prairie. Climate Change research also suggests there would not be a cheatgrass invasion into the Northern Great Plains. Modeling illustrates the median precipitation change scenario (used to identify the most likely future climate change) depicts no increase in cheatgrass climatic habitat within the planning area (Bradley 2009).

The BLM currently manages weed infestations through integrated weed management, including biological, chemical, mechanical, manual, and educational methods. It is guided by the 1991 and 2007 RODs for Vegetation Treatment on BLM Lands in Thirteen Western States (BLM 1991a) and by the 2007 Programmatic Environmental Report (BLM 2007h). Weeds are managed in cooperation with county governments and represent a landscape-level approach across management jurisdictions.

Impact Analysis. Increased activity such as surface disturbance, motorized transportation, and animal and human activity would increase the chance for invasive plants to establish and spread.

Increases in mineral facilities under Alternative C and the Proposed Plan could increase the presence and spread of invasive weeds. Management actions that limit activity near Greater Sage-Grouse habitat and leks would reduce the chance of invasive species spreading and establishing. For example, to reduce disturbance, Alternative B requires livestock supplements be placed a minimum of 0.5 mile from defined sensitive sites (500 feet under Alternative C and the Proposed Plan). The COT report objective for invasive species is to maintain and restore healthy native sagebrush plant communities.

Invasive species on BLM-administered lands would be controlled under all alternatives. This would provide a net conservation benefit to Greater Sage-Grouse by restoring degraded sagebrush habitat and increasing native forbs, thus improving nest cover and food supply.

Relevant cumulative actions that result in surface-disturbing activities would increase the potential for the spread of invasive weeds on both land administered by the BLM and land that it does not administer. Projects subject to the general stipulations outlined in the Wyoming and

Montana EOs are required to control noxious and invasive weed species and to use native seed mixes during reclamation processes. These stipulations would benefit Greater Sage-Grouse Core Habitat Areas. They would accomplish this by limiting the spread or establishment of invasive species, particularly on lands that lack BLM protective regulatory mechanisms.

These stipulations, in combination with state and county noxious weed regulations and other past, present and reasonably foreseeable future actions would provide a net conservation gain to Greater Sage-Grouse habitats and populations in MZ I under the Proposed Plan and the other project alternatives.

Conversion to Agriculture

Nature and Type of Effects. Converting sagebrush habitat to agricultural use, causes direct loss of habitat available for Greater Sage-Grouse. Habitat loss also decreases the connectivity between seasonal habitats, increasing population isolation and fragmentation. Fragmentation then increases the probability for decline of the population, reduced genetic diversity, and extirpation from stochastic events (Knick and Hanser 2011).

In addition to reducing the land area available to support Greater Sage-Grouse, habitat loss and fragmentation likely to exacerbate the effects of other naturally occurring and anthropogenic disturbances and could directly and indirectly increase the likelihood of certain disturbances on the landscape.

Conversion of native habitats to cropland has eliminated or fragmented sagebrush on private lands in areas with deep fertile soils or irrigation potential. Sagebrush remaining in these areas has been limited to the agricultural edge or to relatively unproductive environments.

Biofuel production and high prices for small grains has increased the conversion to cropland of native grasslands or lands formerly enrolled in the Conservation Reserve Program. This conversion of private lands further emphasizes the importance of BLM-administered lands and associated private grazing lands in maintaining large blocks of native grassland and shrubland habitats suitable for Greater Sage-Grouse. Converting native grasslands to agricultural lands not only results in a direct loss of habitats for native wildlife, it fragments remaining habitat.

Conditions in the Planning Area and in MZ I. Across the Great Plains nearly 60 percent of native habitats have been lost to agricultural conversion (Samson et al. 2004) and conversion of sagebrush habitats is the most pervasive and extensive change to the sagebrush ecosystems in MZ I. Cropland currently covers nearly 19 percent of MZ I and influences approximately 50 to 80 percent of sagebrush in MZ I (Knick et al. 2011).

Regional assessments estimate that 7.2 percent of PHMA and GHMA in MZ I are directly influenced by agricultural development. These same assessments estimate that over 99 percent of PHMA and GHMA in MZ I are within approximately 4 miles of agricultural land (Manier et al. 2013). Much of the direct habitat loss from conversion to agriculture has occurred in the northwestern and northeastern portions of MZ I, in Montana and the Dakotas (Knick et al. 2011).

Impact Analysis. The BLM does not convert public lands to agriculture. As such, the only direct authority it has over conversion to agriculture is by retaining or disposing of lands in the realty program. Lands retained under BLM management will not be converted to agriculture.

Disposing of lands could increase the likelihood they will be converted to agriculture, depending on their location and new management authority.

As shown below in Table 4.55, "Acres Identified for Retention and Disposal in Greater Sage-Grouse Habitat in MZ I" (p. 1326), acreages identified for retention vary little in the planning area or in MZ I among the alternatives.

Table 4.55. Acres Identified for Retention and Disposal in Greater Sage-Grouse Habitat in MZ I

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ I	*Percent Within Planning Area*	MZ I	*Percent Within Planning Area*
Acres Identified for Retention				
Alternative A	3,527,000	3%	10,159,000	6%
Alternative B	3,819,000	10%	9,867,000	3%
Alternative C	3,435,000	0%	10,251,000	6%
Proposed Plan	3,572,000	4%	3,279,000	17%
Acres Identified for Disposal				
Alternative A	20,000	100%	179,000	53%
Alternative B	83,000	100%	116,000	28%
Alternative C	0	0%	199,000	58%
Proposed Plan	0	0%	165,000	48%

Source: BLM 2015

This table displays the acres of PHMA and GHMA identified for retention and disposal in MZ I; it also displays the percentage of those acres that are found within the planning area.

% percent
GHMA General Habitat Management Area
MZ Management Zone
PHMA Priority Habitat Management Area

BLM land tenure adjustments could result in Greater Sage-Grouse habitat being converted to agriculture use under Alternative A or B. The Proposed Plan would retain lands identified for disposal with Greater Sage-Grouse habitat. However, land tenure adjustments require site-specific NEPA analysis, and land sales must meet the disposal criteria under applicable law. BLM land tenure adjustments are not anticipated to be a significant contributing element to the threat of agricultural conversion.

Lands identified for disposal in MZ I are typically small isolated parcels that are difficult to manage and do not represent suitable Greater Sage-Grouse habitat. Parcels determined to have Greater Sage-Grouse habitat value would not likely meet the disposal criteria, unless disposal was seen to have a net conservation benefit. Studies of agricultural conversion risk on grasslands have shown a high probability of grassland plots being converted to cropland under current economic and climatic conditions (Rashford et al. 2013). The recent federal Farm Bill tried to discourage converting prairie to cropland by denying crop insurance for such conversions. Nevertheless, if corn and other crop prices remain high, the economic incentive to convert parcels to cropland in Greater Sage-Grouse habitat areas will continue and will potentially increase. Once converted to cropland, acreage is permanently lost as habitat for Greater Sage-Grouse. Fragmentation of habitat from piecemeal conversions of ranchland to tilled cropland can increase disturbance over a large area and cause adjacent areas to become unusable or poor-quality Greater Sage-Grouse habitat.

The BLM has no management authority over private land conversions, but management actions on BLM lands may influence the potential for conversion on adjacent private lands (see grazing section above) The loss of habitat on private lands will reduce the effectiveness of conservation

actions on adjacent BLM-administered lands because the effects of conversion extend onto adjacent lands and this effect increases as a greater percentage of a landscape is converted from sagebrush habitats to other land uses.

Cumulative impacts vary relatively little across alternatives, and BLM management may have little impact on alleviating this threat. Restrictions on grazing on federal land could increase agricultural pressure on adjacent private lands. If the loss of federal grazing rights makes ranching economically unviable, the potential conversion of private grazing lands to agriculture would increase. However, the Proposed Plan does not substantially increase acreage unavailable to grazing.

The COT report objectives for converting land to agriculture are to avoid further loss of sagebrush habitat for agricultural activities (both plant and animal production) and to prioritize restoration. In areas where taking agricultural lands out of production has benefited Greater Sage-Grouse, the programs supporting these actions should be targeted and continued (USFWS 2013). In accordance with this objective, the NRCS's Sage-Grouse Initiative program focuses on maintaining ranchland that provides habitat for Greater Sage-Grouse.

This voluntary program provides private landowners with monetary incentives to protect Greater Sage-Grouse habitat, often through conservation easements. As a result, private land containing Greater Sage-Grouse habitat is protected from conversion to agriculture or other development for the life of the conservation agreement. Conservation easements and other conservation incentives on private lands, such as restoration of water features and fence marking, can enhance the ability of landscapes with mixed ownerships to support Greater Sage-Grouse seasonal habitats. As of 2014, Sage-Grouse Initiative has secured conservation easements on 65,881 acres within MZ I and marked or removed 350 miles of fence (NRCS 2015). These efforts, in conjunction with BLM management and other past, present and reasonably foreseeable future actions, would provide a net conservation gain to Greater Sage-Grouse in MZ I.

Fire

Nature and Type of Effects. Sagebrush killed by wildfire often requires many years to recover, especially after large fires. Contiguous old-growth sagebrush sites are at high fire risk, as are large blocks of contiguous dead sagebrush and sagebrush sites with a substantial cheatgrass understory. Before recovering, these sites are of limited use to Greater Sage-Grouse, except along the edges and in unburned islands.

Because of its widespread impact on habitat, fire has been identified as a primary factor associated with Greater Sage-Grouse population declines, particularly in the Great Basin. Depending on the species of sagebrush and the size of a burn, a return to a full pre-burn community cover can take from 25 to 120 years (Baker 2011). In addition, fires can reduce invertebrate food sources and may facilitate the spread of invasive weeds. However, cheatgrass establishment after fires in MZ I is not currently a concern because resistance to widespread conversion to cheatgrass after fire is generally high throughout MZ I.

BLM management to prevent or control wildfires can also affect Greater Sage-Grouse and habitat. Increased human activity and noise associated with fire suppression fin areas occupied by Greater Sage-Grouse could affect nesting, breeding, and foraging behavior. Important habitats could be altered because of the use of heavy equipment, hand tools, and noise.

In addition, suppression may initially result in higher rates of conifer encroachment in some areas. In the initial stages of encroachment, fuel loadings remain consistent with the sagebrush understory. As conifer encroachment advances, fire return intervals are altered by decreasing understory abundance. The depleted understory causes the stands to become resistant to low-intensity wildfires; over years, the accumulating conifer loads contribute to larger-scale wildfires and confound control efforts due to extreme fire behavior.

Conditions in the Planning Area and in MZ I. Fire risk is generally low across MZ I, with 17 percent of PHMA and GHMA having high risk for fire; however, isolated areas, especially in central Montana, South Dakota, the border between Montana and Wyoming, and eastern Wyoming, are identified as having high fire risk. The risk of fire across other parts of this region needs better documentation (Manier et al. 2013).

In the planning area, fire data from 1990 to 2007 indicates 89 fires burned approximately 150,000 acres, with an average of 8,300 acres burned per year. Unplanned fires affected mixed grass prairie and sagebrush habitats more than any other vegetation type (BLM 2007d).

Impact Analysis. Management actions in the BFO that emphasize wildfire suppression in Greater Sage-Grouse habitat would benefit the species by limiting habitat loss in the event of wildfire. For example, Alternative B includes measures that prioritize suppression within four miles of leks, and the Proposed Plan would prioritize suppression within PHMA. Alternative C would expand the use of prescribed fire compared to current management (Alternative A). Alternative B and the Proposed Plan would restrict the use of prescribed fire in Greater Sage-Grouse habitat. This is in accordance with the COT report objective to retain and restore healthy native sagebrush plant communities within the range of Greater Sage-Grouse.

Recognition of the importance of sagebrush habitat during interagency wildfire response would benefit Greater Sage-Grouse populations in the event of an unplanned fire. The Wyoming and Montana EOs emphasize fire suppression in Core Population Areas, while recognizing other suppression priorities may take precedence. This would benefit Greater Sage-Grouse habitat during wildfire planning and response, particularly on lands not administered by the BLM.

WAFWA's guidance on fire and fuels management for Greater Sage-Grouse conservation (WAFWA 2014) promotes coordination among local fire response agencies similar to a "natural disaster" response; it emphasizes the importance of fuel breaks and the need to incorporate Greater Sage-Grouse habitat objectives in fire management, as well as the use of grazing as a fuel reduction tool.

On the local level, the Northeast Wyoming Sage Grouse Conservation Plan (2014) recommends coordinating with county fire agencies and landowners to develop and implement wildfire suppression guidelines that address Greater Sage-Grouse habitat health and management. However, the conservation plan does not identify a funding source for this action.

The Interagency Standards for Fire and Fire Aviation Operations "Red Book" includes a BMP for Greater Sage-Grouse habitat conservation for wildlife and fuels management (BLM 2013e). This document is a supplemental policy or guidance for the BLM, the USFS, and the USFWS. This BMP would benefit the Greater Sage-Grouse during interagency wildland fire operations. It would do this by using spatial habitat data and predictive services to prioritize and pre-position firefighting resources in important habitat areas. The coordination of federal, state, and local fire prevention actions, changes in fire management, and other past, present, and reasonably foreseeable future actions would provide a net conservation gain to Greater Sage-Grouse in MZ I.

Recreation

Nature and Type of Effects. Recreation such as camping, bicycling, wildlife viewing, horseback riding, fishing, and hunting can be dispersed, concentrated (e.g., OHV use and developed campsites), or permitted (e.g., BLM Special Recreation Permit). The BLM also manages SRMAs, where recreation is a primary resource management consideration.

Recreation on federally administered lands that use the extensive network of double-track and single-track routes have an impact on sagebrush and Greater Sage-Grouse. Ecological impacts of roads and motorized trails are mortality due to collisions; behavior modifications due to noise, activity, and habitat loss; alteration of physical environment; nutrient leaching; erosion; invasive plants spread; increased use; and alteration by humans due to accessibility (Knick et al. 2011). Recreation activities can degrade Greater Sage-Grouse habitat through direct impacts on vegetation and soils, introduction or spread of invasive species, and habitat fragmentation. This occurs in areas of concentrated use, trailheads, staging areas, and routes and trails.

Motorized activities, including OHV use, are expected to have a larger footprint on the landscape. They are anticipated to have the greatest level of impact due to noise levels, compared to nonmotorized uses such as hiking or equestrian use. Cross-country motorized travel, which is permitted in designated areas on BLM-administered lands but not on National Forest System lands, would increase the potential for soil compaction, loss of perennial grasses and forbs, and reduced sagebrush canopy cover. Losses in sagebrush canopy could be the result of repeated, high-frequency, cross-country OHV use over long periods. In addition, the chances of wildfire are increased during the summer, when fire dangers are high and recreation is at its highest.

Dispersed uses expand the human footprint. Closing areas to recreation and reclaiming unused, minimally used, or redundant roads in and around sagebrush habitats during seasonal use by Greater Sage-Grouse may reduce the footprint and presumably impacts on wildlife. Restricting access to important habitat areas during seasonal use (lekking, nesting, brood-rearing, and wintering) may decrease the impacts associated with humans. However, access restriction will not eliminate other impacts, such as invasive plant spread, predator movements, cover loss, and erosion (Manier et al. 2013).

Conditions in the Planning Area and in MZ I. Historically low in the Great Plains, human population densities have increased 666 percent since 1920 (Knick et al. 2011). With expanding population comes greater human impacts (Leu et al. 2008), with many people moving to the Great Plains region because of access to public lands (Hansen et al. 2005).

In the planning area, the pattern of landownership, with limited BLM-administered surface land, makes the area less accessible or desirable for recreation. Nonetheless, approximately 30,000 recreational visits occur annually in the planning area (BLM 2013l). Recreation demands are anticipated to rise across MZ I in recreationally desirable areas.

The COT report objectives for recreation are to maintain healthy native sagebrush communities, based on local ecological conditions, and to manage direct and indirect human disturbance (including noise) to avoid interruption of normal Greater Sage-Grouse behavior (USFWS 2013). Limits on road use under the action alternatives and limits on OHVs would help meet these objectives.

In the Buffalo RMP planning area, travel management planning is underway to determine specific routes that would be available for or closed to motorized vehicle use.

Impact Analysis. Table 4.56, "Acres of Travel Management Designations in Greater Sage-Grouse Habitat in MZ I" (p. 1330) shows acres of travel management designations in Greater Sage-Grouse habitat in MZ I, where data are available.

Table 4.56. Acres of Travel Management Designations in Greater Sage-Grouse Habitat in MZ I

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ I	***Percent Within Planning Area***	**MZ I**	***Percent Within Planning Area***
Open				
Alternative A	111,000	100%	651,000	100%
Alternative B	0	0%	0	0%
Alternative C	0	0%	0	0%
Proposed Plan	0	0%	0	0%
Limited				
Alternative A	3,427,000	0%	2,801,000	0%
Alternative B	3,744,000	8%	2,946,000	5%
Alternative C	3,427,000	0%	3,517,000	20%
Proposed Plan	3,563,000	4%	3,394,000	17%
Closed				
Alternative A	5,000	20%	8,000	25%
Alternative B	154,000	97%	158,000	97%
Alternative C	4,000	0%	34,000	82%
Proposed Plan	5,000	48%	40,000	88%

Source: BLM 2015

This table displays the acres of PHMA and GHMA within travel management designations of open, limited, and closed in MZ I; it also displays the percentage of those acres that are found within the planning area.

% percent
GHMA General Habitat Management Area
MZ Management Zone
PHMA Priority Habitat Management Area

As shown in Table 4.56, "Acres of Travel Management Designations in Greater Sage-Grouse Habitat in MZ I" (p. 1330), acres closed to motorized vehicles would be greatest under Alternative B, compared to current management (Alternative A); Alternative C and the Proposed Plan are comparable to current management. As a result of travel management planning, disturbance to birds and habitat impacts on Greater Sage-Grouse from recreational motorized vehicle use would be greatest under Alternative A; impacts would be reduced most under Alternative B. Acres limited to existing routes are similar under all alternatives.

SRMAs would be designated under Alternatives B and C and the Proposed Plan, with the greatest number of SRMAs under Alternative B. SRMAs allow the BLM to more effectively manage areas for group recreation and minimize disturbance to Greater Sage-Grouse populations. The Proposed Plan would provide a balanced approach, emphasizing recreational use and protecting natural resources.

Implementation of the action alternatives described above, in concert with travel management planning on BLM-administered lands within MZ I, the disturbance caps applied under state plans, and other past, present, and reasonably foreseeable future actions would help reduce the threats from recreation and travel on Greater Sage-Grouse habitats and would provide a net conservation benefit to Greater Sage-Grouse populations in MZ I.

4.4.9.9.7. Conclusions

In addition to BLM management in the Buffalo RMP planning area and other planning areas in MZ I—North Dakota, South Dakota, Miles City, Lewistown, HiLine, and parts of Billings and Wyoming–Greater Sage-Grouse in MZ I will also be impacted by management and conservation at state, regional, tribal, and local levels. This analysis takes into account each alternative in the Buffalo RMP in conjunction with state and private initiatives, and past and present actions at the federal, state, and local levels. The analysis assumes that the Proposed Plans would be implemented in the other BLM RMP planning areas in MZ I.

Some of the most important past and present actions benefitting Greater Sage-Grouse populations on private land in MZ I are the conservation easements and grazing management programs coordinated by the NRCS Sage-Grouse Initiative with private ranchers. In only a few years, Sage-Grouse Initiative has recorded easements on over 65,000 acres in MZ I and established Greater Sage-Grouse-friendly grazing systems on over 1,300,000 acres (NRCS 2015). Sage-Grouse Initiative has also worked with landowners to increase fence marking, seeding of native vegetation, and conifer removal to improve Greater Sage-Grouse habitat quality. Future private conservation efforts enacted through Sage-Grouse Initiative is expected to provide further benefits to Greater Sage-Grouse habitat.

Ranchers in Wyoming are also using Candidate Conservation Agreement with Assurances with the USFWS. Under these instruments, the ranchers voluntarily agree to manage lands to reduce threats to Greater Sage-Grouse in exchange for a guarantee that they will not be subject to additional regulations should the species become listed. While ranchers have used these agreements across Greater Sage-Grouse range, thus far the agreements have been applied to only a small number of ranches in Wyoming and Montana.

These private land conservation efforts complement BLM management on federal lands to provide Greater Sage-Grouse conservation across larger landscapes.

As discussed in Section 4.4.9.9.4, “Regional Efforts to Manage Threats to Greater Sage-Grouse” (p. 1296), both Wyoming and Montana have adopted regulatory statewide plans to promote Greater Sage-Grouse conservation. Wyoming’s plan implements a Core Population Area Strategy with well density limitations, timing restrictions, and a uniform 5 percent disturbance cap across all landownership types. These measures would improve Greater Sage-Grouse population levels if effectively enforced (Copeland et al. 2013). The limitations on timing and density of energy development along with the disturbance cap, and BLM management on lands with federal mineral estate, would act in concert to promote Greater Sage-Grouse conservation and reduce the impacts from energy development on leks, breeding habitat, and wintering habitat. In the Montana plan, a 5 percent limit on anthropogenic disturbance is applied within the Density and Disturbance Calculation Tool examination area (based upon occupied leks within any given Core population area).

However, for the portion of northeast Wyoming in MZ I the state strategy is less effective. This is because the Core Areas were delineated after considerable Greater Sage-Grouse habitat had already been disturbed (Taylor et al. 2012). Montana’s plan, published in September 2014, promotes a statewide conservation strategy on private and state lands. It also calls for a 5 percent disturbance cap for Greater Sage-Grouse habitat, limits well density, and imposes timing restrictions, similar to the approach in Wyoming. Together, these measures would reduce

habitat loss as well as direct disturbance, injury, or mortality of Greater Sage-Grouse populations associated with anthropogenic disturbance across the MZ if effectively enforced.

North Dakota and South Dakota have non-regulatory plans in place to assist with sage-grouse conservation. These plans will not regulate activities permitted by the state but these states contain smaller populations of Greater Sage-Grouse on the edge of the range reducing the overall impact to sage-grouse in MZ I of not having state regulatory plans in the Dakotas.

Habitat restoration is also important for sustaining Greater Sage-Grouse populations. The PRB Greater Sage-Grouse population has declined due to widespread energy development. The population viability analysis concluded that Greater Sage-Grouse are likely to survive energy development, while the impact of WNv is potentially greater and could cause entire populations to die. The current situation is likely better than the population viability analysis, COT report, and other reports concluded because neither the population viability analysis nor the COT report accounted for Connectivity Corridors (they only accounted for the effect of managing Core Population Areas). These analyses were based on a high CBNG potential that has since dropped to less than 25 percent of earlier projections.

The PRB Restoration Program reasonably foresees large-scale habitat restoration; as drill sites go out of production, they would be reclaimed and restored to pre-disturbance conditions. While not all restored habitat is successfully reoccupied by Greater Sage-Grouse, the PRB Restoration Program considers that as energy development ceases and locations are restored to habitat, Greater Sage-Grouse in nearby habitats may recolonize restored areas successively. Greater Sage-Grouse are not anticipated to return to the area in pre-disturbance numbers. However, restoration in areas next to core habitat and extant populations and connectivity habitat will expand the available breeding and wintering habitat for Greater Sage-Grouse, reasonably foreseeing a net conservation gain to the species.

The COT report states that the PRB Greater Sage-Grouse population is at risk of extirpation from development of the vast energy resources in the region. Another risk is WNv, which is difficult to control and particularly dangerous in populations already depleted by habitat fragmentation and loss (USFWS 2013). The population viability analysis for PRB reached similar conclusions (Taylor et al. 2012). However, as described in this analysis, the threat from energy development can be effectively managed by coordinated action from BLM RMP amendments and revisions and state actions, including disturbance caps to limit loss of Greater Sage-Grouse habitat and to protect leks with buffers.

PHMA and GHMA were developed to protect the best habitat and highest population density of Greater Sage-Grouse. BLM restrictions on energy development and associated infrastructure in these habitat areas, and permit requirements for development of federal mineral estate, would help reduce loss and disturbance of Greater Sage-Grouse populations. Under the Proposed Plan, for lands that are already leased, BLM can apply COAs as provisions of drilling permit issuance or renewal. Areas that have already been developed have reduced available Greater Sage-Grouse habitat, but restoration is in progress.

The more challenging threat to Greater Sage-Grouse to manage in MZ I is the conversion of private lands to agriculture. As described above, these conversions are attractive to ranchers as crop prices increase and climate conditions support more tillage. Once tilled, Greater Sage-Grouse habitat is not only lost on the tilled land, but surrounding habitat areas become fragmented and less hospitable to birds. BLM management cannot restrict tillage on private lands, and state governments have limited control over this action but management actions on BLM

lands and state land policies may influence the potential for conversion on adjacent private lands. Conversion to agriculture is primarily influenced indirectly by promoting sustainable grazing and voluntary efforts for conservation, such as the NRCS Sage-Grouse Initiative program's conservation easements.

Alternative A: Current Management

Under Alternative A, current management would continue on BLM-administered lands in the Buffalo RMP planning area. Several protective measures would not be implemented; for example, the BLM would not designate PHMA or GHMA and would not manage any additional ROW avoidance or exclusion areas. Appropriate and allowable uses and restrictions with regard to such activities as mineral leasing and development, recreation, utility corridors, and livestock grazing would also remain unchanged.

Management prescriptions to protect Greater Sage-Grouse currently in place include measures such as requiring anti-perching devices on new power lines within 0.5 mile of occupied Greater Sage-Grouse leks and nesting habitat, and restricting surface disturbance and occupancy within a 0.25-mile radius of the perimeter of occupied (or undetermined) Greater Sage-Grouse leks.

Under current management, despite a court order in place since 2004 barring new leasing in the PRB, widespread energy development has degraded Greater Sage-Grouse habitat in the PRB and GRST populations have declined substantially. The Greater Sage-Grouse viability analysis recently conducted for the Buffalo RMP planning area indicated that the Greater Sage-Grouse populations in northeast Wyoming could be at risk of extirpation from the combined effect of development and WNv (Taylor et al. 2012). However, future drilling in the PRB is expected to have less impact on Greater Sage-Grouse. This may reduce the risk, in conjunction with a planned increase in restoration and continued implementation of the state Core Population Area Strategy.

In the rest of MZ I, other BLM RMP planning efforts would implement their Proposed Plans to improve protection of Greater Sage-Grouse and their habitat. In addition, Greater Sage-Grouse conservation strategies would be implemented on state and private lands. As a result, the lack of protections under the Buffalo RMP Alternative A would be offset to an extent by more protective management elsewhere in MZ I. In the Buffalo RMP planning area, though, continuation of current management would do little to reduce the threats from energy development, mining, and infrastructure on Greater Sage-Grouse wintering and breeding grounds; the Buffalo RMP planning area would likely serve as sink habitat for the MZ-wide population of Greater Sage-Grouse. Although current management actions, including the temporary BLM Greater Sage-Grouse IMs, provide a limited array of conservation measures that are intended to avoid continued degradation of Greater Sage-Grouse habitat in MZ I, they would not be subject to the same development restrictions in Greater Sage-Grouse habitat under the No Action Alternative as they would under the action alternatives. Thus, the No Action Alternative would not meet the goals and objectives in this plan to identify and incorporate conservation measures for Greater Sage-Grouse and would not meet the COT report objectives for present and widespread threats to Greater Sage-Grouse.

Alternative B

Alternative B emphasizes protecting natural resources and is the most restrictive alternative for development within Greater Sage-Grouse habitat. In conjunction with NRCS and state initiatives on private land, several aspects of BLM management under Alternative B would benefit Greater Sage-Grouse conservation at a landscape level. These include increasing lek buffers to 4.0 miles,

imposing winter timing limitations and winter habitat restrictions, and protecting brood-rearing habitat.

Alternative B is also the most restrictive in terms of motorized vehicle use and mineral development; for example, all coal lands outside high development potential areas would be closed and development of leased fluid minerals would be restricted within 4.0 miles of leks.

Alternative B would create the most special designations for resource protection, including for Greater Sage-Grouse. Land disposals and acquisitions would focus on maintaining sagebrush acreage and connectivity. Greater Sage-Grouse habitat objectives would be considered in grazing management in PHMA, and fires would be suppressed in sagebrush areas. Alternative B would site transmission lines in locations that minimize impacts on Greater Sage-Grouse. Lines within 4.0 miles of leks would be managed as ROW exclusion areas.

Implementing these protective measures on BLM-administered lands within the Buffalo RMP planning area would help preserve Greater Sage-Grouse habitat but risks pushing development onto adjacent lands with less restrictive management. Greater Sage-Grouse in MZ I would benefit most in states where nonfederal lands have similarly restrictive measures such as in Core Areas in Wyoming and Montana (though Core Areas do not cover all existing Greater Sage-Grouse populations). North and South Dakota do not have similar orders protecting Greater Sage-Grouse on nonfederal lands; thus, controls on BLM-administered land could displace development onto private land but not reduce overall impacts on Greater Sage-Grouse.

As described above, Alternative B would meet the objectives laid out in the COT report for fire, invasive plants, range management, recreation, and infrastructure. It would address, though may not meet, the COT objectives for energy and mining, because the Greater Sage-Grouse population in the Buffalo RMP planning area is not stable or increasing due to prior disturbances. Under Alternative B, the Greater Sage-Grouse populations across the MZ would retain more of their range and distribution than under current management.

Alternative B would minimize agricultural conversion by retaining lands providing Greater Sage-Grouse habitat. It may result in more indirect impacts from potential conversions of private land providing Greater Sage-Grouse habitat. However, this loss may be limited by the NRCS Sage-Grouse Initiative program, which is helping landowners obtain conservation easements for ranchland providing Greater Sage-Grouse habitat.

Alternative C

Alternative C emphasizes resource development and intensive management practices but with limited restrictions for conservation or Greater Sage-Grouse protection. It is the least restrictive alternative for motorized vehicle use and energy development. Alternative C applies less stringent restrictions on surface-disturbing activities to protect wildlife. It would open all federal coal lands to exploration but would add timing limitations to Greater Sage-Grouse winter concentration areas.

Alternative C's management approach for Greater Sage-Grouse is modestly more protective than current management (Alternative A). COT objectives for energy development, infrastructure, mining, range management, fire, and invasive plants would likely be met in other areas of MZ I due to implementation of other planning areas' Proposed Plans and other conservation efforts on state and private lands. However, within the Buffalo RMP planning area, the limited protective measures would not meet the goals and objectives to identify and incorporate conservation

measures for Greater Sage-Grouse and would not meet the COT report objectives. This could put Greater Sage-Grouse populations in the PRB at risk of further decline.

Proposed Plan

The Proposed Plan emphasizes sustainable development with constraints on resource uses to protect Greater Sage-Grouse and other natural resources. Greater Sage-Grouse protective measures, such as NSO stipulations, would be implemented in and outside of priority habitat.

Under the Proposed Plan, the BLM would improve Greater Sage-Grouse habitat protection over current management. The Proposed Plan would also apply moderate resource constraints, such as CSU and TL stipulations, and would increase constraints on resource uses within a 0.6-mile buffer around leks in Greater Sage-Grouse priority habitat. The 0.6-mile buffer would protect males during the breeding season, while density and disturbance limits would protect nesting females and late brood-rearing habitat.

These provisions would protect Greater Sage-Grouse more than current management and would complement protections on other lands. The Proposed Plan would maintain flexibility for land managers in areas with mixed public and private ownership. In such locations, strict restrictions on development on federal lands could result in more widespread development on private lands, without reducing overall impacts on sagebrush habitat. Flexible management has the potential to minimize impacts on Greater Sage-Grouse populations, for example by permitting a shorter transmission line route through Greater Sage-Grouse habitat across both public and private land.

In conjunction with state and regional planning efforts, implementation of disturbance caps in Greater Sage-Grouse priority habitat, conservation easements on private lands, and implementation of the Proposed Plans for other BLM field offices in MZ I, the Proposed Plan for the Buffalo RMP would meet the goals and objectives for Greater Sage-Grouse in this plan and the objectives laid out in the COT report for fire, invasive plants, range management, recreation, and infrastructure. The Proposed Plan would address, though may not meet, the COT objectives for energy and mining, because the population in the Buffalo RMP planning area is not stable or increasing due to prior disturbances to habitat. Managing ROW exclusion and avoidance areas would help meet the COT objective for infrastructure by limiting ROW development, and would also help to meet the COT objectives for invasive plant species by reducing disturbances that promote the spread of weeds. Implementation of state conservation plans would help meet COT objectives on non- BLM-administered land. Applying a 5 percent disturbance limit under WY and MT Greater Sage-Grouse EOs would reduce disturbance from energy, mining and infrastructure. Removal of encroaching trees near occupied leks and important habitats (e.g., nesting, and wintering) would reduce the rate of conifer incursion and help maintain healthy sagebrush plant communities. The Proposed Plan would minimize agricultural conversion, to the extent that this is within BLM authority. Conversion would be minimized by retaining lands providing Greater Sage-Grouse habitat and by working in conjunction with NRCS efforts to retain private ranchland providing continuous Greater Sage-Grouse habitat and connectivity between habitats. However, converting private lands to agriculture would remain a risk to Greater Sage-Grouse in MZ I under all alternatives.

The Proposed Plan would minimize habitat loss by providing management flexibility to collocate ROWs and maintain grazing permits.

Overall, under the Proposed Plan, future projects in PHMA would be subject to additional restrictions to protect Greater Sage-Grouse that would not be implemented under Alternative A.

This would protect important habitat with the greatest densities of Greater Sage-Grouse over the 20-year analysis period. Thus, Greater Sage-Grouse would experience a net conservation gain under the Proposed Plan.

Summary

Overall, Greater Sage-Grouse populations across MZ I face pressures from energy development, conversion to agriculture, and such stressors as disease, drought, predation, and fire. These threats are magnified under the pressure of habitat fragmentation and the isolation of small populations in the Dakotas, on the eastern edge of the species' range. Private lands being converted to agriculture is also a particularly worrisome threat in this region. Tillage is increasing in Greater Sage-Grouse habitat because of the economic incentive of high crop prices and the patchwork pattern of landownership between federal and private lands that reduces habitat connectivity.

Because widespread habitat fragmentation and degradation have already occurred in northeastern Wyoming, Greater Sage-Grouse in MZ I will depend on a combination of federal conservation actions and development restrictions, private conservation easements, and state disturbance limits to maintain viable habitat in PHMA and GHMA and to sustain Greater Sage-Grouse populations against present and widespread threats. Maintenance of habitat connectivity for sub-populations of Greater Sage-Grouse will protect against losses from disease and wildfire. Either Alternative B or the Proposed Plan would best promote these goals in the Buffalo RMP planning area. These alternatives would be most likely to stabilize Greater Sage-Grouse populations, maintain leks, improve nesting success, and reduce predation in the PRB and throughout MZ I.

Reasonably foreseeable management efforts for control of energy development, mining, infrastructure, grazing, conversion to agriculture, fire, spread of weeds, and recreation are projected to increase through increased coordination of federal, state, and local actions and the implementation of other BLM and USFS Land Use Plan Amendments in MZ I. When the impacts of the Buffalo RMP are added to these actions, this would result in a net conservation gain to Greater Sage-Grouse habitats and populations in MZ I. Though smaller, fringe populations may continue to decline across MZ I in the next twenty years, implementing Alternative B or the Proposed Plan, in combination with the Proposed Plans for other BLM planning areas, development restrictions in the Wyoming and Montana state plans, increased land protections via the NRSC Sage-Grouse Initiative, and local and regional habitat restoration efforts, would effectively conserve the region-wide population of Greater Sage-Grouse in MZ I.

4.4.9.9.8. MZ-Wide Reasonably Foreseeable Future Actions Summary Table

Table 4.57, "Reasonably Foreseeable Future Actions in Management Zone I Likely to Impact Greater Sage-Grouse Habitat" (p. 1337) includes a selection of some of the larger projects from the reasonably foreseeable future actions tables in the RMPAs/Land Use Plan Amendments for MZ I. The full tables can be found in each EIS within the MZ.

Table 4.57. Reasonably Foreseeable Future Actions in Management Zone I Likely to Impact Greater Sage-Grouse Habitat

MZ	Planning Area	Greater Sage-Grouse Population(s) Affected	Project Name	Project Location	Project Description, Estimated Footprint	Project Status
Energy and Mining						
I	Buffalo	Powder River Basin, Wyoming Basin	Greater Crossbow Oil and Gas Exploration and Development Project	Campbell and Converse Counties, Wyoming	Proposed development of 1,500 new oil and gas wells over 110,000 acres of split estate mixed surface ownership lands. There are no BLM surface lands within the proposed development area; however, approximately 62 percent of the mineral estate is managed by the BLM.[1]	Proposed
I	9-Plan	Powder River Basin, Wyoming Basin	Converse County Oil and Gas	Converse County, Wyoming	Proposed development of up to 5,000 new oil and gas wells in northern Converse County, Wyoming. The proposed development area encompasses roughly 1.5 million acres of split estate mixed surface ownership lands, and includes all or parts of three different Greater Sage-Grouse Core Areas.[2]	Proposed
I	Buffalo	Powder River Basin	Buffalo Oil and Gas Leases	Campbell, Johnson, Sheridan Counties, Wyoming	As of 2008, federal oil and gas leases covered approximately 2,533,975 acres in the Buffalo planning area.[3]	Ongoing
I	Miles City	Dakotas	Carter Master Leasing Plan (MLP)	Carter County, Montana	Proposed development of up to 119 oil and gas wells and associated infrastructure. 71 percent of oil and gas estate in MLP Area is comprised of federal mineral estate.[4]	Proposed
I	Miles City	Northern Montana, Yellowstone Watershed	Big Dry RMP Area	13 counties, northeast Montana	Surface coal leasing in the Fort Union Coal Region. 1,674,500 acres of high and moderate development potential (847,379 federal acres) in the RMP area.[5]	Ongoing
I	Miles City	Dakotas, Yellowstone Watershed, Powder River Basin	Surface coal leasing	Southeast Montana	Surface coal leasing in the Powder River Resource area. Lease proposals pending with the BLM comprise 2,242 acres and include the following mines: Spring Creek (1,772 acres), Rosebud (160) acres, Decker (310 acres).[3, 6, 7, 8]	Ongoing and proposed

MZ	Planning Area	Greater Sage-Grouse Population(s) Affected	Project Name	Project Location	Project Description, Estimated Footprint	Project Status
I	Buffalo	Powder River Basin	Powder River Basin Coal Mines	Campbell County, Wyoming	13 operating mines in planning area, and two proposed mines; all are surface coal mines, covering 162,336 federal acres in the Buffalo planning area.[6]	Ongoing and proposed
I	Miles City	Dakotas	Pending Bentonite expansion	Carter County, Montana	Increase in permitted area by 2,050 acres, of which, 1,649 acres would be federal (BLM-administered) and 401 acres would represent private ownership.[5]	Proposed
I	Buffalo	Powder River Basin	Black Hills Bentonite (Mayoworth Area Mine and Peterson Draw/ Willow Creek-Posey Creek/ Tisdale-Wall Creek Areas Mine)	Johnson County, Wyoming	Currently, there are 2 authorized active open-pit bentonite mines, 1 mine pending authorization, and 47 active bentonite mining claims in the Buffalo planning area on federal lands (both federal surface/federal minerals and split estate)[8]	Ongoing and proposed
I	Buffalo	Powder River Basin	Nichols Ranch/ Hank Unit Uranium in-situ Recovery Mining Project	Johnson County, and Campbell County, Wyoming	Pending authorization for a proposed 2,250-acre in-situ uranium recover mine, which includes 303 acres of BLM-administered surface lands. Seven occupied leks occur within 2 miles of the Hank Unit.[9]	Proposed
I	HiLine, Lewistown, Billings, Miles City, North Dakota, South Dakota	Northern Montana, Yellowstone Watershed, Belt Mountains, Powder River Basin, Dakotas	WAPA Upper Great Plains Wind Energy Programmatic EIS	Montana, North and South Dakota, other Great Plains states	Programmatic EIS will identify environmental impacts, mitigation strategies, and review procedures for future wind-energy proposals in the upper great plains region.[10]	Proposed
Rights-of-Way						
I	HiLine, Miles City, South Dakota	Northern Montana, Yellowstone Watershed, Dakotas	Keystone XL Pipeline	Montana, South Dakota, other states	285-mile ROW in Montana and South Dakota, of which 45 miles may occur on BLM-administered lands.[11]	Proposed

MZ	Planning Area	Greater Sage-Grouse Population(s) Affected	Project Name	Project Location	Project Description, Estimated Footprint	Project Status
I	Miles City	Yellowstone Watershed	Tongue River Railroad Project	Colstrip to Decker, Montana	Construction and operation of a 42-mile railroad between Miles City and Colstrip, Montana.[12]	Proposed

[1]Greater Crossbow Oil and Gas EIS: http://www.blm.gov/pgdata/etc/medialib/blm/wy/information/NEPA.Par.24843.File.dat/hot_sheet.pdf.
[2]Convers County Oil and Gas Project: http://www.blm.gov/wy/st/en/info/NEPA/documents/cfo/Converse_County_Oil_and_Gas.html.
[3]Buffalo Oil and Gas Leases: http://www.blm.gov/wy/st/en/programs/Planning/rmps/buffalo/docs.html.
[4]Carter Master Leasing Plan – Miles City RFD. Minerals Appendix of DEIS. P. MIN-164-165: http://www.blm.gov/mt/st/en/fo/miles_city_field_office/rmp/draft_rmp.html.
[5]Miles City RFD, Minerals Appendix of DEIS. P. MIN-165-173: http://www.blm.gov/mt/st/en/fo/miles_city_field_office/rmp/draft_rmp.html.
[6]Powder River RMP Area – Miles City RFD, Minerals Appendix of DEIS. P. MIN-173-188, and Powder River Resource Area RMP (BLM 1984) (http://www.blm.gov/mt/st/en/prog/planning/powder_river.html).
[7]Spring Creek, Rosebud, Decker Mines – Miles City RFD, Minerals Appendix of DEIS. P. MIN-192.
[8]Buffalo Revised Final Mineral Report: http://www.blm.gov/pgdata/etc/medialib/blm/wy/programs/planning/rmps/buffalo/docs.Par.90169.File.dat/RevisedFinalMineralReport_Part1.pdf.
[9]Nichols Ranch/Hank Unit Uranium in-situ Recovery Mining Project: http://www.blm.gov/wy/st/en/info/NEPA/documents/bfo/nichols-ranch.html.
[10]Upper Great Plains Wind Energy PEIS: http://plainswindeis.anl.gov/documents/dpeis/index.cfm..
[11]Keystone XL Pipeline: http://keystonepipeline-xl.state.gov/finalseis/index.htm.
[12]Tongue River Railroad EIS: http://www.tonguerivereis.com/.

BLM Bureau of Land Management
EIS Environmental Impact Statement
MZ Management Zone
MLP Master Leasing Plan
RMP Resource Management Plan
ROW right-of-way
WAPA Western Area Power Administration

4.5. Heritage and Visual Resources

4.5.1. Cultural Resources

Any action that reduces a threat to any of the characteristics which make a cultural resource significant will have a beneficial effect. Any action that results in surface disturbance has the potential to adversely affect cultural resources. Physical effects on cultural resources are typically long term and cannot be reversed. Inventory is required before the BFO authorizes most surface-disturbing activities, regardless of surface ownership. Inventory associated with Section 106 compliance can contribute data relating to site locations, but does not necessarily advance archeological and historic knowledge due to the reactionary nature of the investigations. The BFO will resolve adverse effects to historic properties that may result from authorized uses with methods such as project redesign or data recovery. Adverse effects on the setting of historic properties can be resolved by project redesign with the goal of reducing the visual contrast created by the project. Effects on the settings of historic properties are typically long term due to the time necessary to revegetate disturbed surfaces. Some adverse effects on cultural resources such as TCPs cannot be mitigated, potentially resulting in the denial of certain proposals. Cultural resources will deteriorate through natural agents, unauthorized collection, and vandalism. A risk

of unauthorized collection or vandalism of cultural resources results from casual use activities (such as dispersed recreational activity or OHV use).

4.5.1.1. Methods and Assumptions

The following methods were used to analyze effects on cultural resources:

- The area of analysis is the entire planning area.
- The analysis focuses on data available in 2009, which is assumed to accurately represent the types of resources in the planning area in the future.
- The analysis is primarily qualitative since only 13.8 percent of the planning area is inventoried for cultural resources.

Assumptions

The following analytical assumptions were made, based on available inventory data:

- All surface-disturbing activities must involve inventory with avoidance or mitigation of historic properties.
- Any alternative that results in surface disturbance could lead to inadvertent effects on cultural resources.
- Some cultural resources, especially buried cultural resources, are difficult to locate during inventory and could be inadvertently affected by surface-disturbing activities.
- Throughout the planning area, there is a predicted cultural resource density of 1 site per 172 acres.
- Throughout the planning area, typically 12.6 percent of all cultural resources are historic properties (sites eligible for or listed on the *National Register of Historic Places* [NRHP]).
- The southern Big Horn Mountains have a higher density of cultural resources and unique historic properties, such as rock art and rock shelters.

The following terms are used to define the extent of the environmental consequences:

- Major beneficial – The action would make the protection, preservation, or enhancement of a cultural resource(s) a priority.
- Moderate beneficial – The action would benefit cultural resources by eliminating immediate threats to historic properties, sacred sites, and TCPs from federal authorizations, deterioration through natural agents, unauthorized collection, and vandalism.
- Minor beneficial – The action would benefit cultural resources by reducing immediate threats to historic properties, sacred sites, and TCPs from federal authorizations, deterioration through natural agents, unauthorized collection, and vandalism.
- Negligible beneficial – The effect on the resource would be beneficial, but barely detectable. No historic properties would be affected.
- Negligible adverse – The effect on the resource would be adverse, but barely detectable. No historic properties would be adversely affected.
- Minor adverse – The effect on the resource would be slight but detectable; there would be a small change in the resource. Some cultural resources could be affected, but fewer than 10 historic properties would be adversely affected and effects would be mitigated. There would be a slight chance for unanticipated adverse effects on historic properties.
- Moderate adverse – The effect on the resource would be readily apparent; there would be a measurable change in the resource. Between 11 and 25 historic properties would be adversely affected, although most effects would be mitigated. There would be a moderate chance for unanticipated adverse effects to historic properties.

- Major adverse – The effect on the resource would be obvious; there would be a highly noticeable, long-term, or permanent measurable change in the resource. More than 26 historic properties would be adversely affected, although most effects would be mitigated. TCPs or sacred sites would be adversely affected without adequate mitigation. There would be a high likelihood of unanticipated adverse effects to historic properties.

Significance Criteria

The following are significance criteria for effects on cultural resources:

- Resource management actions would reduce or eliminate the opportunity to avoid or mitigate adverse effects to historic properties.
- Resource management actions would increase the likelihood of natural or man-made effects on cultural resources.
- Resource management actions would reduce or eliminate the opportunity for Native Americans to access sacred sites or TCPs.

4.5.1.2. Impacts Common to All Alternatives

Cultural
Site stabilization and long-term protections would eliminate immediate threats resulting in a benefit cultural resources. Government-to-government relationships with Native American tribes should benefit cultural resources as sites important to tribes are identified and protected.

Physical Resources

Surface disturbance associated with physical resources management actions has the potential to impact cultural resources.

Air Quality
Managing to prevent or restrict particulate air pollution (especially suppressing dust) would reduce immediate threats to the integrity of the setting of certain historic properties such as TCPs or historic trails. Maintaining good air quality could help preserve rock art, which can be adversely affected by atmospheric pollutants.

Soil
Mitigation or stabilization of erosive soils could result in inadvertent adverse effects on buried cultural resources during implementation, but when completed, would preserve intact buried cultural resources by preventing or reducing the immediate threat of erosion.

Water Resources
Water management actions common to all alternatives include managing surface-disturbing activities to prevent degradation of water quality, including reducing channel and bank erosion, and managing water to meet Wyoming Standards for Healthy Rangeland. This would be applied across the entire planning area and would have a minor beneficial effect on cultural resources as the immediate threat of erosion is reduced.

Cave and Karst Resources
Performing cave inventories and significance determinations can identify significant cultural resources. The presence of significant archeological resources must be considered when determining the significance of cave resources. This would have a beneficial effect on cultural

resources as immediate threats to historic properties would be eliminated through cave protection measures. The level of effect would be minor as significant caves are likely to be limited to the Big Horn Mountains portion of the planning area.

Mineral Resources

Minerals development that would involve surface-disturbing activities has the potential to adversely affect cultural resources. Inventories in response to proposals for development, and avoidance or mitigation, can minimize impacts to historic properties. Inventory could adversely affect sites if a discovery inadvertently results in unauthorized collection or vandalism. There can be inadvertent effects if buried sites are not identified through a surface inventory. Effects on historic properties can take place through data recovery. However, when data recovery is completed, aside from destroying part of the site, it limits or diminishes potential opportunities for future research and interpretation. In some cases it may be difficult to mitigate effects on historic properties especially when considering Native American religious or traditional use sites. It is difficult or impossible to mitigate direct adverse effects on TCPs such as Pumpkin Buttes.

Locatable Minerals
BLM surface overlaying federal mineral estate is available for potential locatable minerals exploration and development (777,310 acres) unless it is formally withdrawn. Foreseeable locatable minerals development is anticipated to affect a maximum of 1,455 acres, with potential effects to one historic property. However, uranium development is foreseeable on or near the Pumpkin Buttes TCP, which could result in adverse physical effects and effects on setting that may be impossible to mitigate. This would be a major adverse effect.

Leasable Minerals – Coal
Similar to locatable minerals, the potential acreage available for coal leasing is extensive (4,775,136 acres), but foreseeable activity is confined to central Campbell County and north-central Sheridan County, and is anticipated to affect a maximum of 195,700 acres. The potential adverse effect on historic properties (approximately 130) would be major.

Leasable Minerals – Fluids
Most of the surface overlaying federal mineral estate would be available for leasable fluid minerals exploration and development (3,386,530 acres). Foreseeable leasable fluid minerals development is anticipated to affect a maximum of 22,255 acres. Therefore, the potential adverse effect on historic properties (approximately 20) would be moderate.

Salable Minerals
Most BLM surface overlaying federal mineral estate would be available for salable minerals exploration and development (777,310 acres). Foreseeable salable minerals development is anticipated to affect a maximum of 2,090 acres. Therefore, the potential adverse effect on historic properties (approximately 1) would be minor.

Fire and Fuels Management

Surface disturbing activities associated with fire and fuels management can have an impact on historic properties.

Unplanned Fire (Wildfire) and Planned Fire (Prescribed Fire)
Cultural resources can be inadvertently damaged or destroyed by any fire suppression efforts.

Digging hand lines, constructing fire lines using heavy equipment, and fire-retardant drops can result in adverse effects. Fire rehabilitation can increase the protection of buried cultural resources by preventing or reducing erosion through rapid revegetation of denuded surfaces. Effects from rehabilitation activities (such as seeding and water barring) would be mitigated.

Biological Resources

The following programs do not have any management actions common to all alternatives that would affect cultural resources: **Fish and Wildlife Resources, Special Status Species – Plants and Fish and Invasive Species and Pest Management.**

Special Status Species – Wildlife (including Greater Sage-Grouse)
Any application of NSO stipulations as a result of wildlife management would benefit cultural resources as immediate threats to cultural resources would be reduced as surface disturbance is prohibited.

Vegetation – Forests and Woodlands, Grassland and Shrubland Communities, and Riparian/Wetland Resources
Vegetation surveys could identify plants or plant communities that are important to Native American tribes for traditional uses. Reducing adverse effects on vegetative resources would help stabilize soil and help preserve buried cultural resources.

Heritage and Visual Resources

The **Paleontological Resources** program does not have any management actions common to all alternatives that would affect cultural resources.

Visual
Managing any area as VRM Class I or II and screening, painting, and designing facilities to blend with the surrounding landscape would preserve the integrity of the settings of historic properties such as TCPs or historic trails. This would have a minor beneficial effect on cultural resources as the areas managed as VRM Class I or II within the planning area are limited.

Land Resources

Management of **Lands with Wilderness Characteristics** and management of **Renewable-Energy** development would not include actions common to all alternatives that would directly affect surface-disturbing activities. Therefore, management of those resources would not affect cultural resources.

Forest Products
Management actions common to all alternatives include a prohibition of timber harvest within 200 feet of surface waters. This would protect cultural resources in those areas. The amount of plants harvested for personal use would be very small and not considered to affect cultural resources unless the collection includes species that are significant to tribes. Overall, management actions for forest products common to all alternatives would have a minor beneficial effect on cultural resources.

Lands and Realty
Land exchanges can result in adverse effects if historic properties leave public ownership.

Inventory and associated mitigation of historic properties must be completed before exchanges. However, when considering Native American religious or traditional use of certain sites, it is difficult or impossible to mitigate direct effects on TCPs such as Pumpkin Buttes. The BFO would be responsible for managing any cultural resources on new lands the BLM might acquire. Overall, these management actions would have a negligible adverse effect on cultural resources.

Rights-of-Way and Corridors

Issuing ROW that result in surface-disturbing activities has the potential to adversely affect cultural resources. Inventories in response to proposals for development, and avoidance or mitigation, can minimize effects on historic properties. Inventories could adversely affect sites if discoveries inadvertently resulted in unauthorized collection or vandalism. There can be inadvertent effects if buried sites are not identified through a surface inventory. Effects on historic properties can take place through data recovery. However, when data recovery is completed, aside from destroying part of the site, it limits or diminishes potential opportunities for future research and interpretation. In some cases it may be difficult to mitigate effects on historic properties especially when considering Native American religious or traditional use sites. It is difficult or impossible to mitigate direct adverse effects on TCPs such as Pumpkin Buttes.

Travel and Transportation Management

Acquiring new access to public lands could result in adverse effects on cultural resources from unauthorized collection and vandalism. Unimproved roads designated for use through sites could cause erosion that could damage buried cultural resources. New access routes also could provide or improve tribal access to sacred sites or TCPs. Overall, management of travel and transportation common to all alternatives would have a negligible adverse effect on cultural resources.

Recreation

Effects from dispersed recreational activities are difficult to assess because such activities could affect cultural resources that have yet to be identified. Indirect and inadvertent effects on cultural resources can result from attracting attention or visitation to certain areas such as SRMAs and ACECs. Increased visitation and recreational use can lead to unauthorized collection and vandalism of cultural resources. Providing recreational or public interpretation of cultural and historic resources can enhance appreciation and understanding of the fragile and finite nature of cultural resources. Disturbance would be the greatest in areas of concentrated use, such as hiking trails, developed facilities, and dispersed camping sites. Improving and maintaining recreation sites localizes possible disturbances. Overall, recreation management actions common to all alternatives would have a negligible adverse effect on cultural resources.

Livestock Grazing Management

While direct effects on cultural resources associated with range improvement projects would be mitigated, there could be other effects as a result of livestock grazing. Livestock congregating and trailing at or across locations of cultural resources can damage artifacts and their contexts. Cattle shading and rubbing can damage standing historic structures and prehistoric rock art panels. Excessive trampling at spring sources and along stream banks, cattle trailing, and overgrazing can lead to removal of vegetative cover and affect cultural resources through erosion. These types of effects would generally be localized at particular sites, and could range from short term to irreversible.

Special Designations

There are no management actions for **Scenic or Back Country Byways**, **WSA**s, and **WSR**s common to all alternatives or that vary by alternative that would directly affect surface-disturbing activities. Management of these resources would have no effect on cultural resources; therefore, these resources are not further addressed in the *Cultural Resources* section.

Areas of Critical Environmental Concern and Wilderness Study Areas
Managing areas as ACECs and WSAs would preserve cultural resources because surface-disturbing activities would not be allowed in these areas and public access is typically limited. This management would have a moderate beneficial effect on cultural resources as the immediate threat of surface disturbance is eliminated. WSAs would be managed as such in all alternatives and therefore are not discussed further in this section. If Congress were to release a WSA, then BLM would complete an RMP amendment for any changes in management.

Socioeconomic Resources

There are no social, economic, or health and safety management actions common to all alternatives or specific to individual alternatives that would have a measurable effect on cultural resources. Therefore, these subjects are not further addressed in this section.

4.5.1.3. Alternative A

Cultural Resources
Under Alternative A, establishing site stewardship opportunities on a project-specific basis would likely result in the BFO reacting to external requests. Other priorities would take precedence and the BFO could forego proactive opportunities for public outreach and site preservation. Even though implementation of site stewardship may not be actively promoted by BFO, this management would have a beneficial effect on cultural resources.

Creating Cultural Resource Management Plans (CRMPs) for existing sites and any additional sites that could be eligible for listing on the National Register is intended to more effectively preserve those resources. The existing CRMPs are out of date and need to be updated; developing new CRMPs would benefit cultural resources. Any site listed on the National Register also would warrant a specific management plan, although no sites in the planning area have been listed since the 1970s. There are other sites that likely will never be listed that require management plans to ensure adequate preservation. This management would have a beneficial effect on cultural resources.

Applying an NSO stipulation to mineral leases within 0.25 mile of the Bozeman Trail and Crazy Woman Battle Site is intended to preserve the setting of the sites, although practical application of the NSO stipulation is problematic. Many National Register eligible or significant segments of the Bozeman Trail do not retain their historic settings, and applying an NSO stipulation to all such areas would not be practical. Alternatively, in many cases it is necessary to consider impacts beyond 0.25 mile from the trail to preserve setting. In addition, Alternative A does not adequately address the complexity of preserving the setting of the Bozeman Trail or the Crazy Woman Battle Site, or the numerous other significant sites in the planning area such as the Pumpkin Buttes TCP or Cantonment Reno. Applying NSO stipulations on mineral leases under Alternative A would have a beneficial effect on cultural resources.

Under Alternative A, mitigating impacts to historic properties or their settings on a project-specific basis would adequately address effects at that level. However, it is difficult to assess cumulative

effects on the setting of a specific site if each project is addressed in a separate document. Multiple projects that result in weak or moderate contrast to the setting of a site can result in a cumulative strong contrast. If projects that affect the setting of a site are analyzed on a project-specific basis, the lack of a cumulative impacts analysis could allow for adverse effects. In addition, Alternative A does not consider minerals withdrawals or close to leasing areas with historic properties. This would preclude an opportunity to protect historic properties. This alternative could result in an adverse effect on cultural resources.

Requiring archeological monitors for construction on a project-specific basis could address unanticipated impacts to sites not identified during inventory. Requiring an archeological monitor is based on contractor recommendations, the BFO cultural resources specialists' analysis, and the application of a regional model. Using this strategy, archeological monitors have identified very few sites in the planning area. The lack of discoveries could be due to unusual depositional characteristics in the planning area or inconsistent observations by various monitors. Although not quantifiable, it is likely that there would be a benefit to cultural resources as a result of project-specific archeological monitoring.

Creating programmatic agreements with tribes on a project-specific basis would likely result in the BFO reacting to external requests. Other priorities would take precedence and the BFO might forego such proactive opportunities for effective government-to-government consultations with tribes. Although any agreement would be beneficial, if BFO misses a pro active opportunity to coordinate with tribes, this management could have an adverse effect on cultural resources.

Establishing agreements that provide tribal access to TCPs and sacred sites on BLM surface on a project-specific basis would likely result in the BFO reacting to external requests. Other priorities would take precedence and the BFO might forego such proactive opportunities for effective government-to-government consultations with tribes. Although any agreement would be beneficial, if BFO misses a pro active opportunity to coordinate with tribes, this management could have an adverse effect on cultural resources.

Under Alternative A, mitigating impacts to TCPs and sacred sites on a project-specific basis would adequately address effects at that level. However, it is difficult to assess cumulative effects on the setting of a specific site if each project is addressed in a separate document. Multiple projects that result in weak or moderate contrast to the setting of a site can result in a cumulative strong contrast. If projects that affect the setting of a site are analyzed on a project-specific basis, the lack of a cumulative impacts analysis could allow for major adverse effects. In addition, Alternative A does not consider minerals withdrawals or close to leasing areas containing TCPs or sacred sites. This would preclude an opportunity to protect those properties. This alternative could have an adverse effect on cultural resources.

Requiring Native American monitors for construction on a project-specific basis could address unanticipated impacts to sacred sites or TCPs not identified during inventory. Any requirement for Native American monitors on a project under this alternative would be the result of the BFO reacting to external requests. Other priorities would take precedence and the BFO might forego such proactive opportunities for effective government-to-government consultation with tribes. This alternative could have an adverse effect on cultural resources.

Overall, management actions for cultural resources under Alternative A would have minor beneficial effects on cultural resources in the planning area as immediate threats would be reduced.

Physical Resources

Air Quality
Alternative A air quality management actions would have no effect on cultural resources.

Soil
Any prohibition on surface disturbances or the application of NSO stipulations as a result of soil resources management would benefit cultural resources. Buried cultural resources are essentially a part of soil resources, and any measure to protect soil stability should protect cultural resources. Prohibiting surface disturbance on rock outcrops would protect rock art and rock shelters. Alternative A soils management actions would have a minor beneficial effect on cultural resources by reducing an immediate threat of surface disturbance.

Water Resources
Prohibiting surface disturbance near springs and perennial streams would benefit cultural resources. Buried cultural resources are often located near water sources, especially around springs. Alternative A water management actions would have a minor beneficial effect on cultural resources by reducing immediate threats through prohibiting surface disturbance.

Cave and Karst Resources
Prohibiting surface disturbance near caves would benefit cultural resources. Buried cultural resources are often located in or near cave entrances. Alternative A cave management actions would have a minor beneficial effect on cultural resources by reducing immediate threats through prohibiting surface disturbance.

Mineral Resources

Locatable Minerals
Under Alternative A, withdrawing areas from minerals location would have a major beneficial effect on cultural resources. Minerals withdrawals in the existing game ranges and WSAs would benefit cultural resources, especially considering that some of those areas are in the southern Big Horn Mountains and have a higher density of historic properties than the rest of the planning area. Any surface disturbance, including activities associated with exploration and extraction of locatable minerals, could result in a negligible to major adverse effect on cultural resources. Foreseeable locatable minerals development is anticipated to affect a maximum of 554 acres, which would affect less than one historic property. However, uranium development is foreseeable on or near the Pumpkin Buttes TCP, which could result in adverse effects on the physical characteristics of the site. Since Pumpkin Buttes is significant to multiple tribes and impacts cannot be mitigated, this would be a major adverse effect.

Leasable Minerals – Coal
Under Alternative A, opening all federal coal lands to exploration and leasing on a project-specific basis could result in major adverse effects on cultural resources. Although potential damage to many historic properties could be mitigated through data recovery before mining, mitigation might not be possible for certain types of sites, including historic properties that retain setting, sacred sites, and TCPs. The surface disturbance prediction of 195,700 acres of coal development could affect more than 195 historic properties.

Leasable Minerals – Fluids
Under Alternative A, allowing minerals leasing on all federal mineral estate on a project-specific basis could result in a moderate adverse effect on cultural resources. Many historic properties can be avoided or potential damage mitigated before surface-disturbing

activities. Mitigation might not be possible for certain types of sites, including historic properties that retain setting, sacred sites, and TCPs, which would lead to a major adverse effect. The estimated total acres disturbed associated with construction of well sites, access roads, and pipelines would be approximately 10,575 acres over the total federal fluid mineral estate of 3,386,530 acres. This could result in physical effects on 18 historic properties, although there would be a much larger number of sites, such as the Bozeman Trail and the Pumpkin Buttes TCP, that would experience effects on setting. Overall, Alternative A management of leasable fluid minerals would have a moderate adverse effect on cultural resources.

Salable Minerals
Under Alternative A, prohibiting mineral materials activities in WSAs would have a beneficial effect on cultural resources, especially considering that some of those areas have a higher density of historic properties than the rest of the planning area. Under this alternative, 530 acres would be disturbed, with the potential to affect less than one historic property. This would have a negligible adverse effect on cultural resources.

Fire and Fuels Management

Under Alternative A, fire suppression techniques that result in surface disturbance or retardant drops could have a minor adverse effect on cultural resources. Wildland fire suppression strategies are designed to avoid known historic properties whenever possible.

Biological Resources

Vegetation – Forests and Woodlands, Vegetation – Grassland and Shrubland Communities, and Special Status Species – Plants
Under Alternative A, management of forests and woodlands, grasslands and shrublands, and special status plants would have no effect on cultural resources.

Vegetation – Riparian/Wetland Resources
Any prohibition on surface disturbances or the application of NSO stipulations as a result of riparian and wetlands management would benefit cultural resources. Any measure to protect the stability of vegetation should protect cultural resources. Under Alternative A, these management actions would have a minor beneficial effect on cultural resources by reducing immediate threats through prohibiting surface disturbance.

Invasive Species and Pest Management
Under Alternative A, controlling invasive species could protect plant communities important to Native American tribes for traditional uses. This would have a minor beneficial effect on cultural resources by reducing immediate threats through prohibiting surface disturbance.

Fish and Wildlife Resources – Fish and Special Status Species – Fish
Any prohibitions on surface disturbances or the application of NSO stipulations as a result of fish habitat management would benefit cultural resources. Any measure to protect bank stability should protect cultural resources. This management under Alternative A would have a minor beneficial effect on cultural resources by reducing immediate threats through prohibiting surface disturbance.

Fish and Wildlife Resources – Wildlife and Special Status Species – Wildlife (including Greater Sage-Grouse)

Any prohibitions on surface disturbances or the application of NSO stipulations as a result of wildlife habitat management would benefit cultural resources. Any measure to protect habitat stability should protect cultural resources. This management under Alternative A would have a minor beneficial effect on cultural resources by reducing immediate threats through prohibiting surface disturbance.

Heritage and Visual Resources

Paleontological Resources

Alternative A management of paleontological resources would have no effect on cultural resources.

Visual Resources

Any action that protects visual resources would help preserve the setting of historic properties. Any measure to preserve visual integrity would result in minor beneficial effects on cultural resources.

Land Resources

The alternatives for **Lands with Wilderness Characteristics** will have no effect on cultural resources.

Lands and Realty

Land exchanges can result in adverse effects if historic properties leave public ownership and Alternative A identifies 108,243 acres of BLM-administered lands as available for disposal. Inventory and associated mitigation of historic properties must be completed before exchanges. However, when considering Native American religious or traditional use of certain sites, it is difficult or impossible to mitigate direct effects on TCPs such as Pumpkin Buttes. Overall, these management actions would have a negligible adverse effect on cultural resources due to the potential of historic properties leaving federal control as it is difficult to predict the actual number of acres that will be exchanged or sold.

Forest Products

Under Alternative A, a maximum of 6,000 acres of forest-product related activity is predicted on BLM surface. This could affect six historic properties, which would be a minor adverse effect on cultural resources.

Renewable Energy

Although there have been no renewable-energy projects to date on BLM surface in the planning area, wind-energy projects resulting in 20,000 acres of disturbance are predicted in the future. Renewable-energy development at this scale could have adverse effects on the physical characteristics of 20 historic properties. Lacking specific restrictions, under Alternative A, there would be major adverse effects on the settings of numerous historic properties because wind-energy facilities can create a high visual contrast.

Rights-of-Way and Corridors

Under Alternative A, fully utilizing South Middle Butte as a location for communications towers would result in a major adverse effect on a specific cultural resource. Numerous tribes have stated that allowing any surface disturbance or construction on the Pumpkin Buttes TCP would result in an adverse effect that is impossible to mitigate. Previous decisions have

allowed such uses on the buttes and there are existing roads and structures. However, there would likely be cumulative adverse effects from allowing further uses. The predicted disturbance from ROW actions is 38,762 acres of BLM surface, which could adversely affect 39 historic properties.

Travel and Transportation Management
Under Alternative A, acquiring new access routes to public lands could adversely affect cultural resources through unauthorized collection and vandalism. New access routes also could provide or improve tribal access to sacred sites or TCPs, which would be a beneficial effect. Overall under Alternative A, there would be a negligible adverse effect as sites may be adversely impacted, but it would be difficult to detect the change.

Recreation
Under Alternative A, any prohibition of surface disturbance would beneficially affect cultural resources. This management under Alternative A would have a minor beneficial effect on cultural resources by reducing immediate threats through prohibiting surface disturbance.

Lands with Wilderness Characteristics
The alternatives for lands with wilderness characteristics would have no effect on cultural resources.

Livestock Grazing Management
Restricting livestock grazing under Alternative A would have an indirect beneficial effect on cultural resources. Any management action that restricts the removal of vegetation would indirectly preserve buried cultural resources if soils were stabilized. This management under Alternative A would have a minor beneficial effect on cultural resources by reducing immediate threats through restricting surface disturbance.

Special Designations

Areas of Critical Environmental Concern
Under Alternative A, failure to manage Pumpkin Buttes as an ACEC could have a major adverse effect to cultural resources. Without any surface use restrictions, there could be major, long term impacts to the Pumpkin Buttes TCP.

4.5.1.4. Alternative B

This section describes management actions under Alternative B, which emphasizes resource conservation, and the likely impacts to cultural resources from implementation of Alternative B.

Cultural Resources
Under Alternative B, establishing site stewardship opportunities with the State Historic Preservation Office (SHPO) and other stakeholders would have a beneficial effect on cultural resources. Site stewardship results in increased monitoring of sensitive sites, allowing the BFO to efficiently react to any threats to those sites. Providing site stewardship opportunities would allow the public to participate in preserving and protecting cultural resources sites with little cost to the BLM.

Although natural and human-caused effects on cultural resources are inevitable, CRMPs can be developed and implemented for specific sites to help prevent such effects through active management. Protective measures can include site condition monitoring, site stabilization, road

closures, and signage. Early identification of natural or human-caused effects would allow for successful protective measures. Implementing CRMPs for specific sensitive sites or regions would have a beneficial effect on cultural resources in those areas.

Withdrawing lands from minerals exploration and development and closing to leasing areas with historic properties that retain their historic settings would have a beneficial effect on cultural resources. There are relatively few historic properties in the planning area that retain their historic settings (examples include the Bozeman Trail, Pumpkin Buttes, and certain historic homesteads). It is difficult to avoid or mitigate adverse effects on settings if adjacent federal minerals are leased. If these areas were not leasable or not open to minerals entry, settings would essentially be protected. Prohibiting surface disturbance within five miles of historic properties that retain their historic settings also would have a beneficial effect on cultural resources. However, there are undoubtedly unidentified historic properties in the planning area that retain integrity of setting.

Requiring archeological monitors for all surface-disturbing activities would have a beneficial effect on cultural resources. Archeological monitoring is intended to identify cultural resources not identified before surface-disturbing activities. Cultural resources discovered during archeological monitoring could be avoided or adverse effects on those resources mitigated.

Establishing programmatic agreements with each tribe with which the BFO consults would have a beneficial effect on cultural resources. Such agreements provide a process for consultation and can lead to improved government-to-government relationships. Establishing agreements that provide tribal access to known TCPs also would have a beneficial effect on cultural resources.

Withdrawing lands from minerals exploration and development and closing to leasing in areas with TCPs or sacred sites would have a beneficial effect on cultural resources. It is difficult to avoid or mitigate effects on cultural resources under federal mineral estate when it is leased. If these areas were not leasable or not open to minerals entry, cultural resources sites would essentially be protected. Prohibiting surface disturbance within the settings of TCPs or sacred sites would also have a moderate to major beneficial effect on cultural resources.

Requiring Native American monitors for all surface-disturbing activities would have a beneficial effect on cultural resources. Native American monitoring is intended to identify cultural resources not identified before surface-disturbing activities. Cultural resources discovered during Native American monitoring could be avoided or adverse effects on those resources mitigated.

Overall, management actions for cultural resources under Alternative B would have major beneficial effects on cultural resources in the planning area as immediate threats would be reduced.

Physical Resources

Air Quality

Alternative B air quality management actions would have no effect on cultural resources.

Soil

The frequent application of NSO stipulations and prohibitions on surface disturbance related to soils under Alternative B would benefit cultural resources. The most restrictive soils protections under this alternative would prohibit surface disturbance on 455,090 acres (58%) of BLM surface and 1,514,445 acres (45%) of federal fluid mineral estate. This management would have a minor beneficial effect as immediate threats to cultural resources are reduced through surface disturbance prohibitions.

Water Resources
Under Alternative B, increased prohibitions on surface disturbance and the application of NSO stipulations for management of water resources would have a minor beneficial effect on cultural resources by reducing an immediate threat of surface disturbance.

Cave and Karst Resources
Under Alternative B, developing and implementing CRMPs would benefit cultural resources where historic properties are present in caves. Increased prohibitions on surface disturbance and the application of NSO stipulations for management of cave and karst resources would also have a minor beneficial effect on cultural resources by reducing an immediate threat of surface disturbance.

Mineral Resources

Impacts Common to All Alternatives describes how minerals activities affect soil resources. In general, Alternative B substantially reduces the amount of area available for minerals exploration and development; however, predicted development under Alternative B is not substantially less than predicted for other alternatives.

Locatable Minerals
There are 277 acres predicted to be disturbed (less than one historic property) by locatable minerals development under Alternative B. Alternative B withdrawals from locatable minerals entry would have a major beneficial effect on cultural resources. However, it is likely there would be uranium development on Pumpkin Buttes, which would have a major adverse effect on cultural resources.

Leasable Minerals – Coal
Under Alternative B, closing coal lands to exploration or leasing would benefit cultural resources. However, the surface disturbance prediction of 186,600 acres of coal development could affect 186 historic properties. This would be a major adverse effect.

Leasable Minerals – Fluids
Restricting fluid minerals and other leasable minerals exploration and leasing identified within this alternative related to fluid minerals would benefit cultural resources. This alternative would allow for leasing and development of the federal fluid mineral estate with increased protections cultural resources. The approximate total acres disturbed associated with the construction of well sites, access roads, and pipelines are 286 acres, potentially impacting one historic property, a negligible adverse effect.

Salable Minerals
Closure areas for salable exploration or development in this alternative would be a benefit to cultural resources. Under this alternative, 114 acres (less than one historic property) are forecasted to be disturbed by salable mineral development.

Fire and Fuels Management

Under Alternative B, limiting the use of heavy equipment during fire suppression efforts would have a minor beneficial effect on cultural resources by reducing an immediate threat of surface disturbance.

Biological Resources

Vegetation – Forests and Woodlands
Alternative B management actions for forests and woodlands would have no effect on cultural resources.

Vegetation – Grassland and Shrubland Communities
Under Alternative B, authorizing only native plant species for reclamation projects would benefit cultural resources through the preservation of setting for historic properties. This would have a minor beneficial effect on cultural resources as an immediate threat of potential impacts to setting would be reduced.

Vegetation – Riparian/Wetland Resources
Prohibition of surface disturbance and application of NSOs under the riparian/wetland alternatives would have a beneficial effect on cultural resources. A buffer around riparian areas would prohibit surface disturbance on 23,831 acres of BLM surface and 144,045 acres overlying federal fluid minerals in areas that contain a high likelihood of buried cultural deposits.

Invasive Species and Pest Management
Alternative B management actions for invasive species and pest management would have no effect on cultural resources.

Fish and Wildlife Resources – Fish and Wildlife, Special Status Species – Plants, Fish, and Wildlife (including Greater Sage-Grouse)
Under Alternative B, increased prohibitions on surface disturbance and the application of NSO stipulations for management of all fish and wildlife and SSS would have a minor beneficial effect on cultural resources by reducing an immediate threat of surface disturbance.

Heritage and Visual Resources

Paleontological Resources
Under Alternative B, paleontological resources management actions that prohibit surface disturbance, closes areas to leasing, and withdraw lands from minerals exploration and development would have a minor beneficial effect on cultural resources by reducing an immediate threat of surface disturbance.

Visual Resources
Under Alternative B, managing specific areas as VRM Class II and III could have minor beneficial effects on cultural resources by protecting the settings of historic properties. This would have a minor beneficial effect on cultural resources as an immediate threat of potential impacts to setting would be reduced.

Land Resources

Forest Products
Alternative B management of forest products would have no effect on cultural resources.

Lands and Realty
Land exchanges can result in adverse effects if historic properties leave public ownership and Alternative B identifies 120,722 acres of BLM-administered lands as available for disposal.

Inventory and associated mitigation of historic properties must be completed before exchanges. However, when considering Native American religious or traditional use of certain sites, it is difficult or impossible to mitigate direct effects on TCPs such as Pumpkin Buttes. Overall, these management actions would have a negligible adverse effect on cultural resources due to the potential of historic properties leaving federal control as it is difficult to predict the actual number of acres that will be exchanged or sold.

Renewable Energy
Excluding or avoiding wind-energy development within the settings of historic properties would benefit cultural resources. Management under Alternative B would excludes renewable-energy projects wherever minerals development and other surface-disturbing activities are prohibited, but would not necessarily protect the settings of specific sites. In addition, 5,000 acres of disturbance on BLM surface are predicted. Development at this scale could adversely affect the physical characteristics of five historic properties.

Rights-of-Way and Corridors
Under Alternative B, restricting authorizations for communications sites in the Pumpkin Buttes area and maintaining existing land use authorizations until they expire would have a major beneficial effect on the Pumpkin Buttes TCP. Restricting facilities to protect visual integrity would have a beneficial effect on the setting of historic properties. Retaining BLM-administered lands that have important natural resource values would have a beneficial effect on cultural resources. Management under this alternative would exclude ROW activity from 706,556 acres of BLM surface and restrict communications sites on the Pumpkin Buttes TCP, which would have a beneficial effect on cultural resources. The predicted disturbance from ROW actions is 18,011 acres of BLM surface; this could adversely affect 18 historic properties. Overall the management actions would have a moderate beneficial effect as immediate threats to certain sites are eliminated.

Travel and Transportation Management
Under Alternative B, prohibiting OHV use and limiting vehicle travel would have a minor beneficial effect on cultural resources by reducing an immediate threat of surface disturbance.

Recreation
Under Alternative B, prohibition of surface disturbance would beneficially affect cultural resources by reducing an immediate threat of surface disturbance.

Lands with Wilderness Characteristics
Alternative B management of lands with wilderness characteristics would have no effect on cultural resources.

Livestock Grazing Management
Under Alternative B, locating mineral supplements away from sensitive resources (including historic properties) would benefit cultural resources. Restricting livestock grazing would have an indirect beneficial effect on cultural resources by reducing an immediate threat of surface disturbance.

Special Designations

Areas of Critical Environmental Concern
Under Alternative B, determining that Cantonment Reno and Pumpkin Buttes are ACECs would benefit those cultural resources as site specific protective measures are implemented. There also

would be a benefit to cultural resources in all other ACECs as surface disturbance would be restricted. Overall, this management would have a major beneficial effect on cultural resources as protection, preservation and enhancement of cultural resources would be a priority.

4.5.1.5. Alternative C

This section describes management actions under Alternative C, which emphasizes resource use, and the likely resulting impacts to cultural resources due to its implementation.

Cultural Resources
Unless specifically noted below, Alternative C management actions and effects would be the same as management and effects under Alternative A.

Not establishing site stewardship opportunities could result in adverse effects on cultural resources. Site stewardship provides opportunities for site condition monitoring the BLM cannot normally perform. Monitoring site condition is the best way to identify and prevent natural and human-caused degradation of cultural resources.

Not developing and implementing CRMPs for specific sensitive sites or regions could result in adverse effects on cultural resources. Absent definite plans or process for monitoring and stabilizing cultural resources, historic properties could experience inadvertent neglect.

Applying NSO stipulations to leases to protect the setting of historic properties would have a beneficial effect on cultural resources. However, applying an NSO stipulation to a concept as broad as the setting of a historic property without a well- defined extent might preclude the opportunity to develop a lease.

Not pursuing programmatic agreements with tribes could have an indirect adverse effect on cultural resources. A large part of determining significance for certain cultural resources includes consultations with Native American tribes, and precluding an opportunity to facilitate consultation is counter intuitive. Absent programmatic agreements, tribes could decline to fully consult with BFO, inadvertently leading to adverse effects on cultural resources as a result of federal authorizations.

Applying NSO stipulations to leases to protect sacred sites and TCPs would have a beneficial effect on cultural resources. However, applying an NSO stipulation to a particular site type could preclude the opportunity to develop a lease.

Not involving Native American monitors in any surface-disturbing activity could have an indirect adverse effect on cultural resources. Archeological monitors might not be qualified to perform the same types of monitoring as Native American monitors, and there could be inadvertent adverse effects on cultural resources.

Physical Resources

Air Quality
Alternative C air quality management would have no effect on cultural resources.

Soil
Under Alternative C, allowing surface disturbance in areas with severe erosion hazard could result in inadvertent adverse effects on cultural resources through increased erosion. Allowing

surface occupancy on rock outcrops could lead to adverse effects through the destruction of rock art sites or Native American burial sites. Overall, soils management under Alternative C could have a negligible adverse effect on cultural resources since activities would be allowed in areas that may contain sensitive sites.

Water Resources
Management actions for and effects on water resources would be the same as actions and effects under Alternative A.

Cave and Karst Resources
All restrictions on activities around and in cave and karst resources would have an indirect beneficial effect on cultural resources by reducing an immediate threat of surface disturbance.

Mineral Resources

Locatable Minerals
Under this alternative, 1,455 acres of soils are predicted to be disturbed, with potential adverse effects on one historic property. Uranium development would likely occur on Pumpkin Buttes, which would have a major adverse effect.

Leasable Minerals – Coal
The surface disturbance prediction of 195,700 acres of coal development under Alternative C would affect 195 historic properties. This would have a major adverse effect on cultural resources.

Leasable Minerals – Fluids
Under Alternative C, approximately 22,255 of the 3,386,530 acres of federal fluid mineral estate are predicted to be disturbed from construction of well sites, access roads, and pipelines. This could result in physical impacts to 22 historic properties, although there would be a much larger number of sites, such as sites along the Bozeman Trail and the Pumpkin Buttes TCP that would experience impacts to setting.

Salable Minerals
Under Alternative C, 2,090 acres of soils are predicted to be disturbed, with potential effects on one historic property. This would have a negligible adverse effect on cultural resources.

Fire and Fuels Management

Fire and fuels management would be analyzed on a project-specific basis under Alternative C and would not result in an effect to cultural resources. Alternative C fire and fuels management and effects therefrom would be the same as management and effects under Alternative A.

Biological Resources

Under Alternative C, effects on **Forests and Woodlands**, **Invasive Species and Pest Management**, and **Grassland and Shrubland Communities** would be analyzed on a project-specific basis and would not result in any inadvertent benefits to cultural resources. Alternative C management of these resources and effects on cultural resources would be the same as management and effects under Alternative A.

Vegetation – Riparian/Wetland Resources
Under Alternative C, allowing surface disturbance within 500 feet of riparian and wetland areas could lead to inadvertent negligible adverse effects on cultural resources since buried cultural resources can occur in alluvial deposits and activities would be allowed in areas that may contain sensitive sites.

Fish and Wildlife Resources – Fish and Wildlife and Special Status Species – Plants, Fish, and Wildlife (including Greater Sage-Grouse)
Under Alternative C, any prohibitions on surface disturbance and the application of NSO stipulations for management of fish and wildlife resources and SSS would have a minor beneficial effect on cultural resources by reducing an immediate threat of surface disturbance.

Heritage and Visual Resources

Paleontological Resources
Alternative C management of paleontological resources would have no effect on cultural resources as proposals would be analyzed on a project-specific basis and mitigated where necessary to not result in any effects to cultural resources.

Visual Resources
Any action to protect visual resources would help preserve the setting of historic properties and visual integrity which would result in minor beneficial effects on cultural resources.

Land Resources

Under Alternative C, effects from **Forest Products, Lands and Realty, Renewable Energy, Travel and Transportation Management, Recreation, Lands with Wilderness Characteristics, and Livestock Grazing Management** would be analyzed on a project-specific basis and would not result in any inadvertent benefits to cultural resources. Alternative C management of these resources and resulting effects on cultural resources would be essentially the same as management and effects under Alternative A.

Rights-of-Way and Corridors
Under Alternative C, allowing unrestricted development of communications towers on Pumpkin Buttes would have a major adverse effect on the Pumpkin Buttes TCP.

Special Designations

Areas of Critical Environmental Concern
Under Alternative C, failure to manage Pumpkin Buttes as an ACEC could have a major adverse effect to cultural resources. Without any surface use restrictions, there could be major, long term impacts to the Pumpkin Buttes TCP.

4.5.1.6. Alternative D

This section describes management actions and potential impacts to cultural resources under Alternative D, which generally allows resource use if the activity can be conducted in a manner that conserves physical, biological, and heritage and visual resources, and emphasizes moderate

constraints on resource uses to reduce adverse effects on resource values. Alternative D is the Proposed RMP.

Cultural Resources

Establishing sites stewardship opportunities with SHPO and other stakeholders would be a benefit to cultural resources. Site stewardship results in increased monitoring of sensitive sites, allowing to efficiently react to any threats to those sites. Providing these opportunities allows the public to participate in site preservation and protection with little cost to BLM.

Developing CRMPs for the sites and regions identified under Alternative D would have a beneficial effect on cultural resources in those areas.

Applying NSO stipulations to the sites identified under Alternative D would have a beneficial effect on cultural resources in those areas. Surface disturbance associated with mineral leases would not be allowed in these areas. The NSO will apply to a minimum of a 40 acre block centered on the specific site boundary. If the site boundary was larger than 40 acres, the boundary of the NSO was defined by all the aliquot parts (minimum size of 40 acres) that the site boundary crossed. As a result of the application of the CSU, projects within 3 miles of these sites might need to be modified to create a weak contrast to the setting of specific historic properties. Examples of project modifications that may be necessary to reduce a project to a weak contrast include (but are not limited to), painting infrastructure to blend in with its surroundings, reducing the footprint of surface disturbance, use of smaller or less conspicuous infrastructure or routing roads or pipelines to follow natural contours rather than making straight lines. The CSU would not apply to drilling activities and temporary infrastructure (such as a drill rig or work over rig) used during the drilling process. Some proposals that involve large or conspicuous infrastructure might not be allowed within 3 miles of the sites if adverse effects could not be mitigated to the point where they create a weak (or less) contrast. BFO would need to complete a maintenance action or plan amendment to add any new NSO and/or CSU restrictions to any similar sites that may be discovered after the signing of the RMP. If upon site-specific analysis it is determined by BLM that the setting of any of the sites listed in Cultural-5006 is compromised, the CSU may be waived as described in Appendix H (p. 1959).

Restricting surface disturbance on the sites identified under Alternative D would have a beneficial effect on cultural resources. Allowing undertakings only if they would result in a weak (or less) contrast to the setting of the sites also would have a beneficial effect on cultural resources. Projects within three miles of the sites may need to be modified in order to create a weak contrast to the setting of specific historic properties. Some proposals that contain large or conspicuous infrastructure may not be permitted within three miles of the sites listed in the alternative if the impacts cannot be mitigated to the point where they create a weak contrast or less.

Requiring archeological monitors in accordance with the developed strategy would have a beneficial effect on cultural resources. Archeological monitoring would be required in accordance with a written strategy outlined in a plan based on the best available geomorphologic and archeological data. Proper treatment of cultural resources discovered during archeological monitoring would be outlined in the strategy. Adopting a strategy for archeological monitoring would result in consistency between consultations with the SHPO and tribes, and would improve working relationships. Requiring Native American monitors on a project-specific basis or based on agreements with tribes would have a beneficial effect on cultural resources. Monitoring would likely be required only for large or high-profile projects if it were applied on a project-specific

basis. Determining Native American monitoring based on agreements with tribes would result in consistency in government-to-government consultations and improved working relationships.

Establishing agreements to provide tribal access to the Pumpkin Buttes and other TCPs or sacred sites on BLM surface would result in improved working relationships with tribes and ensure that the field office meets its responsibilities under various statutes and EOs. Establishing agreements to provide tribal access to known TCPs and sacred sites also would have a beneficial effect.

There is currently one documented TCP (Pumpkin Buttes) in the planning area, which would be protected through management actions Cultural 5005, 5006, and 5007. Any other TCPs which may be identified in the future and sacred sites would only be withdrawn from minerals entry or leasing if BFO completed a maintenance action or plan amendment. Impacts to these sites would be mitigated on a project-specific basis. Mitigation might not be possible for certain sacred sites and TCPs, which would require that projects be modified or denied. This management would have a negligible to moderate beneficial effect on cultural resources.

Overall, Alternative D management of cultural resources would have a major beneficial effect as protection, preservation and enhancement of certain cultural resources is a priority.

Physical Resources

Air Quality

Alternative D air quality management actions would have no effect on cultural resources.

Soil

Under Alternative D, the application of any NSO stipulations and prohibiting surface disturbance would benefit cultural resources. This alternative would protect soils by prohibiting surface disturbance on more than 1.5 million acres, which would protect buried cultural resources. Prohibiting surface occupancy on rock outcrops would protect rock art, rock shelters, and Native American burials would reduce an immediate threat of surface disturbance.

Water Resources

Under Alternative D water management, prohibiting surface disturbance and applying NSO stipulations would have a beneficial effect on cultural resources. The stream buffer would protect cultural resources in alluvial deposits on 19,861 acres of BLM surface and 95,172 acres over federal fluid mineral estate.

Cave and Karst Resources

Developing and implementing CRMPs would benefit cultural resources where historic properties are present in caves. Prohibiting surface disturbance and applying CSU stipulations would have a beneficial effect on cultural resources by reducing an immediate threat of surface disturbance.

Mineral Resources

In general, the amount of area available for minerals exploration and development under Alternative D is comparable to that available under Alternative A, as is predicted development. Alternative D incorporates similar levels of resource protections as Alternative A, but with defined exception criteria.

Locatable Minerals
Under this alternative, 1,252 acres of soils are predicted to be disturbed by locatable minerals activities, with the potential to affect one historic property. Uranium development would likely occur on Pumpkin Buttes, which would have a major adverse effect on cultural resources.

Leasable Minerals – Coal
Opening all federal lands to coal exploration or leasing under Alternative D would have an adverse effect on cultural resources. Although mitigation of historic properties would be required prior to coal mining, all archeological sites in mining areas would be destroyed. Although scientific data would be gained through site mitigation, sites that could include data important to future researchers would be destroyed. It is difficult to locate sites that are completely buried and have no expression on the surface or in a cutbank. It is very likely that undiscovered significant buried sites would be destroyed during mining operations. In addition, there might not be mitigation related to the destruction of TCPs or sacred sites. The surface disturbance prediction of 195,700 acres of coal development could adversely affect 195 historic properties.

Leasable Minerals – Fluids
The approximate total acres disturbed associated with the construction of well sites, access roads, and pipelines are 14,869 acres. This could result in physical impacts to 14 historic properties, although there would be a much larger number of sites such as the Bozeman Trail and the Pumpkin Buttes TCP that would experience impacts to setting.

Salable Minerals
Under Alternative D, a predicted 1,193 acres of soils would be disturbed from salable minerals activities, with the potential to affect one historic property.

Fire and Fuels Management

Under Alternative D, restricting the use of heavy equipment for fire suppression within historic properties would benefit cultural resources by reducing an immediate threat of surface disturbance.

Biological Resources

Vegetation – Forests and Woodlands
Alternative D management of forests and woodlands would have no effect on cultural resources.

Vegetation – Grassland and Shrubland Communities
Only authorizing native plant species for reclamation would benefit cultural resources as immediate threats to the setting of sites would be reduced.

Vegetation – Riparian/Wetland Resources
Prohibiting surface disturbance and applying NSO stipulations for riparian and wetland areas would have a beneficial effect on cultural resources. A buffer around riparian and wetland areas would prohibit surface disturbance on 23,831 acres of BLM surface and 144,045 acres overlying federal fluid minerals in areas with a high likelihood to have buried cultural deposits.

Invasive Species and Pests
Alternative D management of invasive species and pests would have no effect on cultural resources.

Fish and Wildlife Resources – Fish and Wildlife and Special Status Species – Plants, Fish, and Wildlife (including Greater Sage-Grouse)
Increasing prohibitions on surface disturbance and applying NSO stipulations for the protection of fish and wildlife resources and SSS would have a beneficial effect on cultural resources by reducing an immediate threat of surface disturbance.

Heritage and Visual Resources

Paleontological Resources
Prohibiting surface disturbance, closing to leasing, and withdrawing lands from minerals activities would have a beneficial effect on cultural resources by reducing an immediate threat of surface disturbance.

Visual
Managing specific areas as VRM Class II and III could have a minor beneficial effect on cultural resources as immediate threats to the setting of sites would be reduced.

Land Resources

Alternative D management of **Forest Products, Recreation, and Lands with Wilderness Characteristics** would have no effect on cultural resources.

Lands and Realty
Land exchanges can result in adverse effects if historic properties leave public ownership. Inventory and associated mitigation of historic properties must be completed before exchanges. However, when considering Native American religious or traditional use of certain sites, it is difficult or impossible to mitigate direct effects on TCPs such as Pumpkin Buttes. The BFO would be responsible for managing any cultural resources on new lands the BLM might acquire. Overall, these management actions would have a negligible adverse effect on cultural resources.

Renewable Energy
Excluding renewable-energy development within 3 miles of historic properties that retain their settings would have a beneficial effect on cultural resources. Restricting renewable-energy development more than 3 miles from historic properties but still visible to the properties that retain their settings would have a beneficial effect on cultural resources. Almost the entire planning area is within sight of at least one historic property that retains its setting. It is likely that any renewable-energy development authorized by the BLM would be required to mitigate impacts to the setting of at least one historic property. However, due to the scattered and interspersed land ownership pattern, there would likely be very few cases in which the BLM would be the lead agency authorizing this type of development. Overall the effect of renewable energy management actions on cultural resources would be minor adverse as there would be a slight but detectable change.

Rights-of-Way and Corridors
Restricting authorizations for communications sites in South Middle Pumpkin Butte to existing towers and prohibiting towers on North Middle Pumpkin Butte would benefit cultural resources. Restricting facilities to protect visual integrity would have a beneficial effect on the settings of historic properties. The predicted disturbance from ROW actions is 38,762 acres of BLM surface, which would adversely affect 38 historic properties. Overall, due to the amount of disturbance, these management actions would have moderate adverse effects on cultural resources.

Travel and Transportation Management
Under Alternative D, prohibiting OHV use and limiting vehicle travel in the transportation alternatives would result in a minor beneficial effect on cultural resources by reducing an immediate threat of surface disturbance.

Livestock Grazing Management
Any restriction of livestock grazing would have an indirect beneficial effect on cultural resources by reducing an immediate threat of surface disturbance.

Special Designations

Areas of Critical Environmental Concern
Under Alternative D, designating Pumpkin Buttes an ACEC would greatly benefit this TCP by making protection, preservation and enhancement of the Pumpkin Buttes TCP a priority. The cultural resource protections given to Cantonment Reno under this alternative negate the justification for determining the area an ACEC. Overall, ACEC management actions would have a moderate beneficial effect on cultural resources.

4.5.1.7. Cumulative Impacts

Actions outside of the scope of BLM authority have the potential to significantly impact cultural resources on and off federal lands. Because of the high visual contrast created by wind-energy projects, they can completely compromise the settings of historic properties, even if they are several miles away. Certain BLM actions intended to preserve the setting of any historic property could be negated by construction wind-energy projects on non-BLM-administered lands. In July of 2010, the Wyoming Industrial Siting Commission permitted a 100 turbine wind energy project which is within clear view of the entire eastern half of the Pumpkin Buttes (Wyoming DEQ 2014). Construction of the project may effectively compromise the setting of the TCP. The project has yet to be constructed, but if it happens, the BLM may no longer consider impacts to the setting of the TCP from federal undertakings. However, prior to doing so BLM must make a formal determination in consultation with the SHPO and all interested parties that the setting of the TCP is no longer intact and a maintenance action or plan amendment may be necessary.

Fee actions constructed in support of federal actions can result in impacts to historic properties. Large CBNG developments often include associated infrastructure that is not permitted through the BLM. Project applicants could connect wells to drain fee minerals, or use previously constructed pipelines on fee surface with a federal plan of development. The BLM has no authority over such private development, which can adversely affect historic properties. For example, the BLM approved several CBNG plans of development containing hundreds of individual wells near the Pumpkin Buttes TCP that were designed to blend into the natural environment to reduce impacts to the setting of the site. The operator also constructed a fee action pipeline with a large storage tank to dispose of water from federal and fee wells. The storage tank created a strong visual contrast to the setting of the TCP. Although the project resulted in an adverse effect, the BLM did not have any regulatory authority over the project.

The nature of split estate minerals development is complex. The BLM has the authority to modify or deny federal undertakings on private surface. However, that authority is limited to the extent of the federal approval. Historic properties on private surface are the property of the surface owner. A surface owner is not obligated to preserve or protect any historic properties they own. The

BLM might go to great lengths to protect a site on private surface from a federal undertaking, but the same site can be legally affected by the landowner at any time.

The cumulative effect of numerous federal approvals can adversely affect historic properties. Archeological inventories reveal the locations of sites, and although the BLM goes to great lengths to protect site location data, that information can get into the wrong hands. BLM authorizations that result in new access can inadvertently lead to impacts to sites from increased visitation by the public. In addition, any time the BLM identifies a site to the public in an interpretive context, there is increased potential for vandalism or looting of the site.

4.5.1.8. Conclusion

Beneficial and adverse effects on cultural resources are typically a reflection of the amount of surface disturbance caused by an authorized activity. Therefore, Alternative B would provide the greatest protections for cultural resources, followed by Alternative D, Alternative A, and Alternative C.

4.5.2. Paleontological Resources

Significant paleontological resources are almost always contained in the bedrock rather than in well-developed soil horizons or more recent alluvial material. Many BLM-administered lands in the planning area exhibit exposed or thinly covered bedrock or badlands topography, which results in a higher potential for the discovery of important fossil localities. Alternatives that include actions that would affect the bedrock could directly affect paleontological resources by physically altering, damaging, or destroying significant paleontological resources or their contextual settings. Alternatives that would increase or make access easier also could have indirect effects, including vandalism, theft of materials, and inadvertent physical damage to significant paleontological resources or their settings. Finally, disposing of lands containing paleontological resources would remove those resources from public ownership, which would mean the loss of any legal protections for those resources and the loss of opportunities for public collecting or education. Conversely, actions that result in data collection and preservation of paleontological resources through research or applied mitigation efforts can be considered beneficial. Acquiring lands with paleontological resources also would be beneficial to the public by providing important protections for significant paleontological resources and increasing opportunities for education and casual collecting.

Surface disturbance would be expected to result in short- and long-term adverse effects to paleontological resources. Short-term effects would occur at the time of disturbance and up to 5 years following disturbance, before full revegetation and soil stabilization. Long-term effects could occur beyond 5 years as a result of erosion that might be associated with altered drainage patterns or reclamation efforts that are not 100 percent effective in soil and landscape stabilization. This erosion could lead to accelerated exposure and subsequent damage to or loss of fossils and their contexts.

4.5.2.1. Methods and Assumptions

Methods and assumptions used in this impact analysis are:

- The management actions and allowable uses with the greatest potential to impact paleontological resources are surface-disturbing activities associated with all resources, changes in land ownership, public accessibility, and OHV use.
- Proactive paleontological resources management can lead to better knowledge, increased protections of those resources, and increased public benefits. Actions such as BLM-initiated studies, identification of hobby collecting areas, and public education and interpretation efforts can lead to better management and use of paleontological resources under all the alternatives. Inventories required before surface disturbance in high-probability areas would result in the identification and evaluation of previously undiscovered resources, which the BLM would then manage accordingly. Surface-disturbing and disruptive activities could dislocate or damage paleontological resources not discovered before surface disturbance (unanticipated discoveries). Destruction of these resources would result in a loss of scientific information and preclude interpretation of the resource values to the public.
- Significant paleontological resources will continue to be found in the planning area, either from the effects of natural erosion and exposure or through mitigation of surface-disturbing activities, as well as research activities.
- Adverse effects on paleontological resources from surface-disturbing activities occur primarily at the time of initial surface disturbance. Therefore, the projected acreage or mileage numbers for short-term surface disturbance are used to quantify impacts to paleontological resources. Erosion resulting from long-term surface disturbance also can adversely affect paleontological resources, but to much less extent because most reclamation efforts will be successful.
- BLM WO IM No. 2009-011 Assessment and Mitigation of Potential Impacts to Paleontological Resources, describe mitigation procedures for paleontological resources. All surface-disturbing activities and land tenure adjustments will follow the procedures in that memorandum.
- Proper application of standard paleontological mitigation practices will identify and recover many significant paleontological resources during disturbance actions.
- Locations of known paleontological resources will be protected either by avoiding the location or full recovery of significant fossils and all related data. Avoidance is the preferred approach in all cases. New locations discovered during mitigation actions will be avoided as much as possible, or full recovery of significant fossils and data will be completed before disturbance activities will be authorized to begin or to resume.
- It is likely that a some significant paleontological resources will be destroyed during surface-disturbing activities because they will not be seen or recovered. This will primarily be a function of the large size of machinery being used, the larger volume of material being disturbed or removed, and the relatively small size of many significant fossils.
- Paleontological resources are considered a part of the surface resource.

Significance Criteria

Adverse effects on paleontological resources would be significant if an action or development causes substantial direct or indirect damage to or destroys important paleontological resources.

4.5.2.2. Impacts Common to All Alternatives

Paleontological Resources

The types of projected impacts to paleontological resources under the alternatives are similar – primarily physical damage, destruction, or other loss of significant fossils, or alteration or loss of contextual information. However, the intensity of these effects would vary by alternative. Implementing paleontological resource mitigation procedures would protect

most paleontological resources and add to the overall public knowledge through recovery of significant fossils and their associated contextual data. However, mitigation measures also can adversely affect development of other resources or implementation of other actions by preventing or otherwise altering project locations or the degree of development. These adverse effects are anticipated to be relatively rare and minor in scope.

Management actions associated with paleontological resources would directly protect paleontological sites through restrictions on surface-disturbing and disruptive activities. These protective measures are required by law before any surface-disturbing or disruptive activity and include measures such as paleontological resource inventory and mitigation of potential effects, generally through avoidance. In areas where inventory, evaluation, and avoidance are not considered adequate to preserve paleontological resources, mitigation measures would be prescribed on a case-by-case basis, depending on the nature of the action and the type of paleontological resource involved. Mitigation measures would ensure that a proposed action would not significantly affect known paleontological sites. These management actions would apply to any proposed actions that have the potential to affect paleontological resources. Paleontological resource inventory, recordation, evaluation, and data recovery excavation would increase the site database and further our understanding of fauna and flora from geologic times. This increased knowledge would allow for the implementation of revised and more appropriate practices to manage future undertakings. Data recovery excavations would remove all or a portion of paleontological materials at sites, but would require an approved research design to minimize future data loss if new data-recovery and analysis techniques were developed.

Physical Resources

Management actions common to all alternatives for air quality and cave and karst resources would have a negligible effect on paleontological resources. Surface disturbance from management of soil resources would be evaluated on a project-specific basis. The effects of surface disturbance for actions associated with water resources would be managed. Overall, physical resources management actions common to all alternatives would have a minor beneficial effect on paleontological resources.

Mineral Resources

Under all alternatives, most lands in the planning area would be open for minerals exploration and development. Mineral development with it's associated mitigation would have both adverse and beneficial impacts. Mitigation of paleontological resources associated with mineral development will have a beneficial impact as surface fossils will be documented. Surface resources will be identified, collected, and mitigated as the result of predisturbance activity. However, the actual disturbance has the potential of adversely affecting unknown subsurface material. Thus, paleontological resources in the subsurface could be adversely impacted if operators do not recognize the fossils that may be inadvertently uncovered.

Locatable minerals activities shall not knowingly disturb, alter, injure, or destroy any scientifically important paleontological remains, such activities may require mitigation plans be in effect before and during surface-disturbing activities. Impacts to paleontological resources from activities associated with leasable coal and fluid minerals management would have the potential to directly and indirectly affect paleontological resources because of the amount of surface disturbance involved in those actions. Management actions for other leasable minerals would be minimal,

since there is limited potential in the planning area. Overall the level of effect from mineral actions would be minor adverse.

Fire and Fuels Management

Wildland fire suppression activities (e.g., constructing of fire lines, bulldozing access roads, and general movement of heavy equipment) and post-fire rehabilitation activities would have an adverse effect on paleontological resources. Displacing paleontological resources adversely affects the potential to understand the context of the site and limits the ability to extrapolate data. Because of the unplanned nature of wildland fires, effects on paleontological resources from wildland fires and suppression activities are generally assessed and mitigated subsequent to the fire.

Biological Resources

Actions designed to maintain vegetative resources and manage wildlife habitat would indirectly protect paleontological resources by managing surface disturbance and minimizing soil erosion. This would help prevent the degradation of soils that might contain paleontological resources.

Heritage and Visual Resources

Cultural resources management actions common to all alternatives would have a negligible beneficial effect on paleontological resources. Visual Resources management actions common to all alternatives would have no effect on paleontological resources.

Land Resources

Lands and Realty

Disposing of BLM surface with known or previously undocumented paleontological resources would have an adverse effect on paleontological resources because of the lack of protective measures when lands are under private ownership. However, before disposal, lands would be examined for significant resource values, including paleontological resource values. If significant values are present, the parcels with those values could be removed from the disposal or considered for other protective actions. Conversely, acquiring lands in the planning area would have a beneficial effect on paleontological resources because of the protective measures offered under federal ownership. Lands could be acquired through direct purchase, legislative mandates, donations, condemnations, or exchanges. Resource values could be included in the identification of desired parcels, so important paleontological resources could be targeted for acquisition. At present, there are no acquisitions pending specifically for paleontological values.

Rights-of-Way and Corridors

ROW management actions affect paleontological resources. Requiring paleontological resources inventory, recordation, and mitigation procedures in conjunction with ROW actions would help protect most paleontological resources from significant damage and increase the database of known paleontological resource sites.

Travel and Transportation Management

Any road creation or substantial improvement or maintenance work, or any increase in OHV use would result in increased access to public lands that might not presently be readily accessible.

Road construction or new surface disturbance during maintenance also could adversely affect paleontological resources (see the discussion above on surface-disturbing activities). Therefore, adverse effects, such as looting, vandalism, and inadvertent physical damage, on previously remote paleontological resources could increase from an increase in use or development. Most use in Open areas is casual one-time use, so there would be very little increase in erosion, which typically is a result of repeated travel. If a vehicle drives directly on fragile fossils, significant paleontological resources could be damaged or destroyed, but this would be an extremely rare occurrence. Many of the existing roads and trails have not been examined for the presence of significant paleontological resources; therefore there would be a potential for loss of these resources on the acres presently in use. This would represent a major adverse effect on paleontological resources. OHV use on improved roads would have a negligible effect on paleontological resources. However, most unimproved two-track roads and vehicle routes in the planning area have not been inventoried for paleontological resources, which would increase the potential for unmitigated impacts. OHV use of these roads and vehicle routes would disturb or displace paleontological resources within the roadways. Inappropriate use of unimproved roads and vehicle routes by OHVs would accelerate erosion and indirectly disturb deposits that contain paleontological resources. Where effects on paleontological resources from OHV use are identified, there could be closures to motorized vehicle use to protect sensitive paleontological resources. Adverse effects on paleontological resources from OHV use off of roads and vehicle routes for necessary tasks would be negligible.

Recreation

Promoting recreation throughout the planning area could increase the amount of incidental or purposeful disturbance of paleontological resources. Unauthorized disturbance would result in displacement or loss (either complete or partial) of the paleontological resource involved. Displacement of paleontological resources adversely affects the potential to understand the context of the site and limits the ability to extrapolate data. Recreation management would affect paleontological resources by pursuing new access areas and consolidating public lands to increase recreational opportunities in these new areas, which would increase the potential for incidental or purposeful disturbance of paleontological resources. Facilitating use of these areas would result in increased surface-disturbing and disruptive recreational activity and the loss of vegetative cover, which would increase the potential to expose and destroy paleontological resources. The area of greatest overlap between paleontological resources and recreation is at the Dry Creek Petrified Tree site (2,567 acres).

Special Designations

Surface-use restrictions associated with management of special designation areas (ACECs, Scenic or BCBs, WSRs, and WSAs) would indirectly protect paleontological resources in these areas by reducing the potential for unanticipated discoveries and subsequent loss of paleontological information. Management could restrict the amount and size of surface disturbance, indirectly decreasing the potential to disturb buried paleontological deposits in special designation areas. Management of special designation areas would encourage recreation and development of facilities, which could result in direct damage to paleontological resources through surface-disturbing activities and indirect affect those resources through the greater presence of human activity. Paleontological resource surveys and appropriate mitigation would be completed before any new facilities were constructed in high-fossil-yield formations. Protections afforded to special designation areas (i.e., intensive management of surface-disturbing and disruptive activities) would indirectly protect paleontological resources in these areas by reducing the

potential for unanticipated discoveries and subsequent loss of data. ROW exclusion requirements and stipulations in special designation areas would provide the greatest level of protection by prohibiting surface-disturbing activities.

Socioeconomic Resources

Management actions for socioeconomic resources would have a negligible beneficial effect on paleontological resources.

4.5.2.3. Alternative A

Alternative A would continue management in accordance with the 1985 RMP as amended and maintained. This section describes potential impacts to paleontological resources from management actions for those and other resources under Alternative A.

Paleontological Resources
See *Impacts Common to All Alternatives* above.

Physical Resources

Alternative A management actions for air quality and cave and karst resources would have a negligible effect on paleontological resources. Surface disturbance from management of soil resources would be evaluated on a project-specific basis. Limited surface disturbance for management actions for Soil with NSO stipulations is allowed. The effects of surface disturbance for actions associated with water resources would be managed on a project-specific basis. Overall, Alternative A physical resources management actions would have a minor beneficial effect on paleontological resources.

Mineral Resources

Under Alternative A, withdrawals and restrictions in specific areas would close these areas to locatable minerals entry and future land disposal actions. This would provide additional protections to paleontological resources in these areas by reducing surface-disturbing and disruptive activities and eliminating the possibility of placing undiscovered paleontological resources outside federal jurisdiction.

Mineral development with it's associated mitigation would have both adverse and beneficial impacts. Mitigation of paleontological resources associated with mineral development will have a beneficial impact as surface fossils will be documented. Surface resources will be identified, collected, and mitigated as the result of predisturbance activity. However, the actual disturbance has the potential of adversely affecting unknown subsurface material. Thus, paleontological resources in the subsurface could be adversely impacted if operators do not recognize the fossils that may be inadvertently uncovered. Overall the level of effect would be minor adverse.

Fire and Fuels Management

Under Alternative A, wildland fire suppression activities would be limited, which could protect natural and cultural resources. This would help reduce damage to paleontological resources

from suppression activities by considering these resources when determining the degree and locations of suppression activities.

Biological Resources

Alternative A would allow project-specific effects from biological resources management actions, and would prohibit surface-disturbing activities, occupancy, and disruptive activities in specific areas. Protections afforded for species and habitat would indirectly protect paleontological resources by restricting the amounts and sizes of disturbances that could adversely affect paleontological resources through displacement or loss. Surface-use restrictions associated with management of wildlife and fisheries would indirectly protect paleontological resources in specific areas by reducing the potential for unanticipated discoveries and subsequent loss of information about paleontological resources. Surface-disturbing and disruptive activities would be managed, and could restrict the amounts and sizes of surface disturbance, indirectly decreasing the potential to adversely affect paleontological deposits in these areas.

Heritage and Visual Resources

Cultural resources management actions common to all alternatives would have a minor beneficial effect on paleontological resources. Visual resources management actions would have no effect on paleontological resources.

Land Resources

No effects from management of **Forest Products, Renewable Energy, ROW and Corridors, or Lands with Wilderness Characteristics** are anticipated to occur to paleontological resources and will not be addressed further in this section.

Lands and Realty
Development activities associated with lands and realty actions could affect paleontological resources. Because of the large-scale nature of these types of developments, there would be a potential to adversely affect paleontological sites. Areas with important resource values such as significant paleontological resources would be avoided where possible to reduce the effects of these types of developments. Where it becomes necessary to place developments in the avoidance areas, effects would be intensively managed. In addition, oil and gas leasing, locatable minerals entry, and mineral materials disposals would be managed. This management could restrict the amounts and sizes of surface disturbance, decreasing the potential for adverse effects on paleontological deposits in these areas.

Under Alternative A, 108,243 acres of BLM surface are identified for disposal through sales or exchange due to small parcel size or other management considerations. This could have a major adverse effect on paleontological resources. However, before disposal, these lands would be examined for significant resource values, including paleontological values. If significant values are present, the parcels with those values might be removed from the disposal or considered for other protective actions. Conversely, acquiring lands in the planning area would have a beneficial effect on paleontological resources due to the protective measures offered under federal ownership.

Travel and Transportation Management
Alternative A would seasonally open 37,646 acres to motorized travel, would designate motorized

travel on 737,166 acres of existing roads and trails, and close 3,650 acres to motorized travel. Most use in Open areas would be casual one-time use, so there would be very little increase in erosion, which typically is a result of repeated travel. If a vehicle drove directly on fragile fossils, significant paleontological resources could be damaged or destroyed. However, this would be an extremely rare occurrence. Many of the existing roads and trails have not been examined for the presence of significant paleontological resources; therefore, there would be a potential for loss of these resources on the acres where motorized travel would be Open or Limited. This would have a major adverse effect on paleontological resources.

Recreation
Although there could be impacts to paleontological resources from recreation activities, Alternative A would manage certain recreation areas to limit surface disturbance. Applying an NSO stipulation for development activities in developed and undeveloped recreation sites and intensively managing such activity would limit surface disturbance and thereby help prevent damage to paleontological resources in these areas. Recommending withdrawal to locatable minerals entry and closing developed recreation sites and mineral materials disposal would provide further protection from surface-disturbing and disruptive activities.

Livestock Grazing Management
Constructing livestock range improvements could damage or dislocate paleontological resources in these areas not discovered before surface disturbance. Standard inventory and mitigation procedures in high-fossil-yield areas in conjunction with range improvement actions would protect most paleontological resources from significant damage and would increase the database of known paleontological sites. A small but proportional number of these sites would be adversely affected as a result of unanticipated discoveries, but the effects would be mitigated through standard treatment measures. Designing livestock grazing systems to improve or maintain desired range conditions would maintain vegetative cover and soil stability, and thereby prevent the indirect exposure and deterioration of paleontological resources.

Special Designations

Alternative A would not designate ACECs and would continue current management of areas proposed for ACEC designation under other alternatives. If not designated wilderness, specific WSAs could be opened for oil and gas development. Alternative A management of special designations would have a negligible adverse effect on paleontological resources.

Socioeconomic Resources

Alternative A effects on paleontological resources from management actions related to socioeconomic resources would be beneficial but negligible.

4.5.2.4. Alternative B

This section describes management actions under Alternative B, which emphasizes resource conservation, and the likely impacts to paleontological resources from management of those and other resources from implementation of Alternative B.

Paleontological Resources
Alternative B would require paleontological surveys on all PFYC Class 3, 4, and 5 formations potentially affected by proposed activities, and would require monitoring of

surface-disturbing activities on Class 4 and 5 formations and on Class 3 formations as needed. Alternative B would not specify areas for casual collecting; could designate special management areas for paleontological resources; could withdraw or close areas to locatable minerals leasing in areas of important paleontological resources; and could prohibit salable minerals exploration and development in areas of important paleontological resources. Assessments of paleontological resources would be actively solicited and cooperative agreements proactively supported under Alternative B. These management actions would have a major beneficial effect on paleontological resources.

Physical Resources

Alternative B management of air quality and cave and karst resources would have a negligible effect on paleontological resources. Prohibited surface disturbance associated with management actions for soil and water would have a beneficial effect on paleontological resources.

Mineral Resources

Alternative B effects on paleontological resources from minerals management would be similar to effects under Alternative A, but Alternative B would include more withdrawals and restrictions. However, there is always the opportunity with subsurface activities that paleontological resources will be damaged; therefore, the level of effect is minor adverse.

Fire and Fuels Management

Under Alternative B, limiting the use of heavy equipment during fire suppression efforts would have a minor beneficial effect on paleontological resources. However, Alternative B includes full suppression of wildfires, which would allow fuels to build up and increase the intensity of wildfires. If wildfires increased in intensity, the result would be increased soil erosion, greater loss of vegetation, slower recovery of plant communities, and the consequential indirect deterioration of paleontological properties. The potential for damage to paleontological resources from fire suppression activities decreases when there are fewer surface-disturbing suppression activities.

Biological Resources

Alternative B would prohibit surface-disturbing activities, occupancy, and disruptive activities in specific areas, and apply NSO, CSU, and TLS stipulations in certain areas. Alternative B protections for fish, wildlife, and plant species and their habitats would indirectly protect paleontological resources by restricting the amounts and sizes of disturbances that could adversely affect paleontological resources through displacement or loss. Surface-use restrictions associated with management of wildlife and fisheries would indirectly protect paleontological resources in specific areas by reducing the potential for unanticipated discoveries and subsequent loss of paleontological information. Surface-disturbing and disruptive activities would be managed, which could restrict the amounts and sizes of surface disturbances, indirectly decreasing the potential to adversely affect paleontological deposits in these areas. Alternative B effects on paleontological resources from management of biological resources would be similar to effects under Alternative A, but Alternative B would include more restrictions on surface disturbance.

Heritage and Visual Resources

Alternative B cultural resources management actions, such as site stewardship, withdrawals from minerals exploration and development, closures to minerals leasing, and prohibitions on surface disturbance would have a minor beneficial effect on paleontological resources. Visual resources management actions would have no effect on paleontological resources.

Land Resources

Lands and Realty

The BLM surface acreage identified for possible disposal under Alternative B is 120,722 acres and would represent a major adverse effect on paleontological resources. Consideration of resource values would affect the actual number of acres disposed of, and parcels with important resource values would be retained. Under this alternative, more restrictions would be applied during consideration of approvals, so resource values present in the tracts would more often result in retention of parcels. Disposing of BLM surface acres would adversely affect paleontological resources as described under Alternative A, but under Alternative B, fewer acres would be transferred to public ownership.

Travel and Transportation Management

The types of impacts anticipated to occur from road development and OHV use under Alternative B are the same as described for Alternative A, but less intense. Alternative B would include the least amount of development and the most restrictions (as represented by acres of surface disturbance listed in Appendix G (p. 1937)), and close 625,854 acres to motorized use and limit motorized use elsewhere to designated roads and trails. These actions would have an indirect, beneficial effect on paleontological resources. Overall, the impacts to paleontological resources from TTM actions would be moderate beneficial.

Recreation

Alternative B management actions for recreation promote protection of paleontological resources. It is feasible that increased education could potentially reduce the level of vandalism or unauthorized removal of specimens.

Special Designations

Alternative B would designate eight ACECs, including Dry Creek Petrified Tree and Pumpkin Buttes, both known to contain significant paleontological resources, and would prohibit surface-disturbing activities in those special designations. Motorized and mechanized equipment use would be prohibited in WSAs. Surface-use restrictions associated with management of special designation areas would indirectly protect paleontological resources in these areas by reducing the potential for unanticipated discoveries and subsequent loss of paleontological information. The Dry Creek Petrified Tree area would require intensive management of surface-disturbing and disruptive activities. Intensive management could restrict the amounts and sizes of surface disturbance, indirectly decreasing the potential to disturb buried paleontological deposits.

Socioeconomic Resources

Alternative B management of socioeconomic resources would have a negligible beneficial effect on paleontological resources.

4.5.2.5. Alternative C

This section describes management actions under Alternative C, which emphasizes resource use, and the likely resulting impacts to paleontological resources due management of those and other resources from its implementation.

Paleontological Resources
Alternative C would require paleontological resource surveys on all PFYC Class 4 and 5 formations potentially affected by proposed activities, could require monitoring on a project-specific basis, and could specify areas for casual collecting. Areas of important paleontological resources would not be designated under this alternative. Alternative C would not withdraw areas of important paleontological resources from locatable minerals entry, and would allow minerals leasing and salable minerals exploration in those areas. Partnerships to assess paleontological resources would be evaluated and established as appropriate.

Physical Resources

Under Alternative C, there would be negligible effects on paleontological resources from management actions associated with air quality and cave and karst resources. Soils management actions would allow surface-disturbing activities and water management actions would allow surface occupancy. There would be no NSO stipulations under Alternative C. Overall, Alternative C management of physical resources would have a moderate adverse effect on paleontological resources.

Mineral Resources

Under Alternative C, there would be no new locatable minerals withdrawals and all areas would be open to locatable minerals entry. This would provide fewer protections for paleontological resources by increasing surface-disturbing and disruptive activities.

Fire and Fuels Management

Alternative C would allow the use of heavy equipment for fire suppression and include full fire protection strategies and tactics. This would have a major adverse effect on paleontological resources because more wildland fires would be suppressed. Increasing suppression would increase the potential for catastrophic fires over the long term through the buildup of flammable materials that would damage a wider range of paleontological resource types.

Biological Resources

Alternative C biological resources management would allow or include limited restrictions on surface-disturbing activities, surface occupancy, and disruptive activities in specific areas, and would not apply NSO, CSU, and TLS stipulations or would apply those stipulations in a limited manner in certain areas. This management would have a minor adverse effect on paleontological resources.

Heritage and Visual Resources

Effects on paleontological resources from Alternative C management actions for cultural resources would be minor beneficial. Alternative C cultural resources management would not include site stewardship, minerals withdrawals, closures to minerals leasing, or prohibitions on surface disturbance. Visual resources management actions would have no effect on paleontological resources.

Land Resources

Lands and Realty
The BLM surface acreages identified for disposal under Alternative C is 120,722 acres, which would represent a major adverse effect. Considering resource values would affect the actual number of acres disposed of, and parcels with high resource values would be retained. Retention criteria under Alternative C would be at a lower level than under Alternative B, which would result in less acreage retained for resource values.

Travel and Transportation Management
The types of effects anticipated under Alternative C from road development and motorized vehicle use would be the same as those under Alternative A; however, there would be more acres under Alternative C where vehicle restrictions or closures would be applied than under Alternative A. Alternative C management would decrease development compared to Alternative A (as represented by surface disturbance numbers in Appendix G (p. 1937)), but would increase development and use compared to Alternative B. Alternative C would designate fewer acres for travel Limited to existing roads and trails or where travel is Closed than Alternative A.

Recreation
Impacts from Alternative C for Recreation would generally be the same as those from Impacts Common to All as there would not be strict protective measures limiting surface disturbance in SRMAs.

Special Designations

Alternative C would not designate ACECs, but would prohibit motorized and mechanized equipment in WSAs.

Socioeconomic Resources

Effects on paleontological resources from Alternative C management of socioeconomic resources would be negligible.

4.5.2.6. Alternative D

This section describes management actions and potential impacts to paleontological resources under Alternative D, which generally allows resource use if the activity can be conducted in a manner that conserves physical, biological, and heritage and visual resources, and emphasizes moderate constraints on resource uses to reduce adverse effects on resource values. Alternative D is the Proposed RMP.

Paleontological Resources
Under Alternative D, paleontological resource surveys would be required on PFYC

Class 4 and 5 formations and Class 3 formations (as needed) potentially affected by proposed activities, and monitoring would be required for surface-disturbing activities based on survey results. Areas for casual collecting would not be specified; special management areas for paleontological resources could be designated; areas of important paleontological resources would be avoided during locatable and salable minerals development; NSO stipulations could be applied to minerals leases in areas of important paleontological resources; locatable minerals withdrawals and closures to minerals leasing in areas of important paleontological resources could be initiated; and salable minerals exploration and development in areas of important paleontological resources could be prohibited. Under Alternative D, partnerships to assess paleontological resources would be evaluated and established as appropriate, and cooperative agreements proactively supported. Alternative D management of paleontological resources would have a major beneficial effect on those resources.

Physical Resources

Under Alternative D, there would be negligible effects on paleontological resources from management actions for air quality and caves and karst resources. The alternative would allow surface disturbances for management of soils and water, which would have a major adverse effect on paleontological resources.

Mineral Resources

Alternative D effects on paleontological resources from locatable minerals and mineral materials management would be similar to effects under Alternative B.

Fire and Fuels Management

Alternative D effects on paleontological resources from fire and fuels management would be similar to effects under Alternative B.

Biological Resources

Alternative D would prohibit surface-disturbing activities, surface occupancy, and disruptive activities in specific areas and would apply NSO, CSU, and TLS stipulations in certain areas. Effects on paleontological resources from Alternative D management of biological resources would be similar to effects under Alternative B.

Heritage and Visual Resources

Minor beneficial effects would occur for paleontological resources from Alternative D management actions for cultural resources that would include site stewardship, minerals withdrawals, closures to minerals leasing, prohibitions on surface disturbance, and NSO and CSU stipulations, and would allow surface disturbance in certain areas. Visual resources management actions would have no effect on paleontological resources.

Land Resources

Lands and Realty

The BLM surface acreages identified for possible disposal under Alternative D is 120,722 acres and therefore would represent a major adverse effect on paleontological resources. Considering resource values would affect the actual number of acres disposed of, and parcels containing important resource values would be retained. Under this Alternative D, restrictions would be applied during consideration of approvals, so resource values present in the parcels would more often result in the parcels being retained. Disposing of BLM surface acres would have an adverse effect on paleontological resources as described for alternatives A and B; however, under Alternative D, acres transferred out of public ownership would be appropriately assessed for paleontological resources before disposal.

Travel and Transportation Management
The types of effects from road development and OHV use under Alternative D would be the same as under alternatives A, B, and C, but the intensity of effects would vary. In relation to the other alternatives, Alternative D includes determinable amounts of assessment and mitigation. These actions would have an indirect adverse effect on paleontological resources. Alternative D largely limits vehicle use to designated routes, while alternatives A and C would Open areas to such use. Keeping vehicles to defined routes under Alternative D should help protect paleontological resources better than alternatives A and C.

Recreation
Alternative D management actions for recreation seeks to balance recreational opportunities with protection of paleontological resources. It is feasible that increased education could potentially reduce the level of vandalism or unauthorized removal of specimens.

Special Designations

The ACEC with the greatest overlap of paleontological resources (Dry Creek Petrified Tree) would not be designated. However, Pumpkin Buttes TCP would protect some paleontological resources. Alternative D would prohibit motorized and mechanized equipment use in WSAs. Surface-use restrictions associated with management of special designations would indirectly protect paleontological resources in these areas by reducing the potential for unanticipated discoveries and subsequent loss of paleontological information.

Socioeconomic Resources

Effects on paleontological resources from management actions for socioeconomic resources be negligible beneficial.

4.5.2.7. Cumulative Impacts

Effects on paleontological resources from past and present actions (federal and non-federal) are part of the affected environment and are described in Chapter 3. Effects from foreseeable federal actions are described by alternative above. The primary non-BLM-authorized activities in the planning area relate to energy development, including ROW and livestock grazing. Non-federal actions will affect paleontological resources similar to federal actions; however the extent of disturbances and mitigation measures would vary. Paleontological resources belong to the surface estate and, except for leasable minerals, typically are not mitigated unless the surface estate is federal. Adverse effects to paleontological resources would likely be greater on non-federal surface, because there would be fewer federal mitigation measures implemented.

4.5.2.8. Conclusion

Allowable uses and management actions described for the alternatives were used to determine potential effects on paleontological resources. Meaningful differences in surface-disturbing activities; land disposal and acquisition; transportation and access; and proactive management form the basis for the following conclusion: Effects on paleontological resources under the alternatives would be similar, but the intensity of effects would vary by alternative. Proactive paleontological resource management actions would result in beneficial effects under all alternatives. Potential effects on paleontological resources under Alternative A would be the most adverse, whereas potential effects under alternatives B and D would be the least adverse. Potential adverse effects on paleontological resources under Alternative C would be approximately intermediate in intensity.

4.5.3. Visual Resources

BLM-administered public lands contain many outstanding scenic landscapes. While these lands provide a place to enjoy the beauty of nature, they also are used for a multitude of other activities. Any activities on these lands, such as recreation, mining, timber harvesting, grazing, or road development have the potential to disturb the surface of the landscape and adversely affect scenic values. VRM is a system for minimizing the visual effects of surface-disturbing activities and maintaining scenic values for the future. Disturbances that draw the viewer's attention or contrast with the basic elements (form, line, color, or texture) of a given landscape affect the viewer's perceptions.

Adverse effects include the addition of visual intrusions such as roads and facilities, or the removal of natural materials such as soil and vegetation). Beneficial effects are normally a direct result of post-disturbance reclamation efforts. Allowable uses and management actions that could affect visual resources primarily include surface development and vegetation management.

4.5.3.1. Methods and Assumptions

The BFO completed a Visual Resources Inventory in 2009 (BLM 2009b). This visual resources impacts analysis and its conclusions include a review of the VRI for the planning area, coordination with BLM specialists and information provided by cooperating agencies.

This section describes the methods and assumptions used in the impact analysis for visual resources. The assumptions and methods include, but are not limited to:

- VRM Classes are assigned to BLM-administered surface only.
- BMPs to protect scenic resources should be incorporated into project planning for all federal actions, including actions on split estate.
- VRM class objectives are not discretionary; all BLM-administered surface will be managed to meet the VRM objectives established during the RMP revision, and all subsequent management actions will be held to that objective. VRM class objectives provide for varying degrees of change to (effect on) the visual quality of the landscape and vary by alternative.
- Projects located on BLM surface would be designed or mitigated to meet the established VRM objectives of a given location. A proposed action would have a significant effect on visual resources if that action does not conform to the corresponding VRM class for an area and cannot be mitigated.

- If VRM objectives are not incorporated into project design or able to be mitigated in a site-specific analysis, either the application must be denied, an EIS must be prepared or the land use plan must be amended to assign the appropriate VRM Class that would accommodate approval of a permit or action.
- The VRI was created using quantifiable and consistent methods to classify the planning area based on the visual attributes and the visual sensitivity of the area.
- For site-specific projects, the visual resource analysis will focus on the individual visual values (Scenic Quality, Sensitivity and Distance Zones) in context of aesthetic elements and their relative frequency in the landscape rather than the aggregated values assigned through a VRI class.
- Scenic resources will remain in demand from local residents who want to maintain scenic quality, local businesses that depend on tourism, and increasing numbers of recreationists in the planning area.
- Temporary structures, defined as present on BLM-administered lands for less than 90 days, are not subject to visual effects mitigation.
- Future development and other land use activities described under each alternative are compared to recommended VRM classes, existing visual conditions, and the degree of measurable contrast to the natural environment to determine potential effects.
- To adequately describe the potential effects under each alternative in the context of the capacity for differing landscapes to absorb visual intrusions, actions potentially affecting visual resources are divided into general categories, as follows: high-profile developments, low-profile or short-term projects, and resource management prescriptions.
- A contrast rating evaluation will be performed for all surface-disturbing activities in VRM Class I, II, and III areas to determine effects on visual resources. Effects on visual resources that would not meet VRM class objectives will require mitigation in accordance with the VRM objectives. Contrast rating evaluations may or may not be required for high visual impact activities and projects in VRM Class IV areas. All projects within VRM Class IV will be required to minimize and mitigate effects to visual resources.
- Trends in visual change can be quantified using the scoring for the cultural modification factor of scenic quality in the VRI in comparison to implementation of a proposed action.
- The USFS manages approximately 720,000 acres of surface within the planning area. This analysis does not include any determination on visual resources management of lands outside of BLM jurisdiction. However, the objectives outlined for visual resources on lands manage by USFS (or other federal agencies, as appropriate) will be taken into consideration and consultation will take place for compatible visual/scenic resource management across jurisdictional boundaries where applicable.
- Management decisions that limit the amount of surface disturbance or that encourage the placement of projects away from the viewshed of publicly accessible areas and routes (roads, trails, and navigable waterways) will benefit visual resources, but must be weighed against impacts to other resources (soil, wildlife, etc.).
- Most oil and gas development is expected to occur in the PRB.
- Coal mining operations would be most likely to occur in Campbell County (PRB).
- Disposal of public lands would remove all VRM designations and accompanying objectives for protection of their scenic values.

The following terms are used to define the extent of environmental consequences:

- Negligible – The effect on the visual resource would be barely detectable; general stipulations would be sufficient to mitigate adverse effects on the visual resource. This term would also be

used to describe impacts from prescription of a particular VRM class for less than one percent of the BLM-administered land in the planning area.

- Minor – The effect on the visual resource would be slight but detectable; there would be a small change in the visual resource. General stipulations would not be sufficient to mitigate adverse effects on the visual resource; additional review or simulations might be necessary. This level of impact is considered to be out of conformance with VRM Class I and II management objectives, which may require additional mitigation of proposed actions, serve as the basis for denying the proposed action, or require a land use plan amendment to alter the VRM Class to one compatible with proposed action. This term would also be used to describe impacts from prescription of a particular VRM class for 1-5 percent of the BLM-administered land in the planning area.
- Moderate – The effect on the visual resource would be readily apparent; there would be a measurable change in the visual resource. General stipulations would not be sufficient to mitigate adverse effects on the visual resource; alternative sites or a change in project design might be necessary. This level of impact is considered to be out of conformance with VRM Class I, II, and areas of high visual sensitivity, which may require additional mitigation of proposed actions, serve as the basis for denying the proposed action, or require a land use plan amendment to alter the VRM Class to one compatible with proposed action. This term would also be used to describe impacts from prescription of a particular VRM class for 5–10 percent of the BLM-administered land in the planning area.
- Major – The effect on the visual resource would great; there would be a highly noticeable, long-term, or permanent measurable change at the project site. Administrative stipulations would not be sufficient to mitigate adverse effects on the visual resource; alternative sites or a change in project design would be necessary. This level of impact is considered to be out of conformance with VRM Class I, II and III, which may require additional mitigation of proposed actions, serve as the basis for denying the proposed action, or require a land use plan amendment to alter the VRM Class to one compatible with proposed action. This term would also be used to describe impacts from prescription of a particular VRM class for 10 percent of the BLM-administered land in the planning area.
- An adverse effect on the visual quality of the landscape occurs when a management action creates noticeable surface disturbance that contrasts with the form, line, color, or texture of the landscape. The intensity of such effects would vary by alternative and by project based on the scale of development and the designated VRM class.
- Activities that require substantial road building, clearing of vegetation, or other activities that introduce noticeable visual contrast to the landscape have the greatest potential to affect visual resources. Even when such activities meet the established VRM objectives, their adverse effects should be mitigated when possible. Low-profile, dispersed developments (e.g., range improvements) have less effect due to the increased ability to blend this development with natural landscapes. High-profile developments (such as transmission lines and wind turbines) have more effect on the visual environment due to increased visibility and less ability to mimic natural elements.
- Visual resources would be degraded primarily by surface-disturbing activities, such as those associated with ROW construction (e.g., pipelines, transmission lines, and communications lines) and oil and gas facilities (e.g., well pads, reserve pits, and roads). The development of permanent structures would result in long-term degradation of scenic quality and in some cases could become the dominant feature on the landscape. The degree of effect would depend on the projected amount of development and the effectiveness of mitigation measures (design strategies such as siting, painting, and screening). Other activities, such as vegetation

manipulation (e.g., prescribed fire) and OHV use, would affect scenic quality by removing soil and vegetation and creating temporary, short-term intrusions on the landscape.
- Project development would affect all landscape character elements, as follows:
  - **Form** – By introducing forms such as clearings in the vegetation or structures that contrast with natural forms of the landscape.
  - **Line** – By introducing lines such as roads or ROW that contrast with natural lines.
  - **Color** – By causing changes in color such as exposing soil or introducing structures with colors that contrast with the natural colors in the landscape.
  - **Texture** – By changing the texture of the land or structures; for example, by placing a smooth structure against a coarse background of vegetation.

Significance Criteria

In addition to the scale of effects described above, an adverse effect on visual resources as a result of project actions would be considered potentially significant if:
- An action would violate objectives associated with VRM and its magnitude would be such that it cannot be mitigated at the site-specific analysis level.
- An action would be inconsistent with the objectives for the VRM class in the project area and a land use plan amendment would be necessary to accommodate the action.

4.5.3.2. Impacts Common to All Alternatives

This section describes specific management actions and resulting impacts to visual resources common to all alternatives. The generic changes to the basic visual elements from a typical action is discussed where applicable, however, only the impact from the "common to all" alternatives are considered when discussing the scale of impacts. There would be no impacts from **Cave and Karst Resources, Lands and Realty, Social and Economic Conditions, and Health and Safety**, and these resources will not be discussed further in the *Visual Resources* section.

Visual Resources
Managing WSAs under VRM Class I objectives is mandated and helps to meet WSA management goals and objectives. The visual quality of WSAs will be protected under both Manual 6330 (BLM 2012c) and the VRM Class I objectives, which would retain visual quality until Congress provides alternative direction for their management. WSRs generally are managed as VRM Class I areas. In total 30,103 acres would be managed as VRM Class I. Providing for automatic alteration of the VRM class of a designated WSR (Middle Fork Powder River is suitable, eligible and recommended) would eliminate the need for an RMP amendment when Congress acts. The objectives for VRM Class I management allow virtually no change to the visual character of the landscape. In Class II areas, projects may be seen but may not create enough effect (i.e., contrast with the surrounding landscape) to attract the attention of the casual observer. Therefore, there would be no effect on the visual quality of the landscape in Class I areas, and effects in Class II areas would be negligible. However, ongoing resource use and development in Class III and Class IV areas would have the potential to adversely affect visual resources. This is particularly true in areas that are currently natural in appearance.

Although resource development activities may meet VRM Class III and Class IV objectives, the fact that projects are seen and attract attention (Class III) or may dominate the view of the casual observer (Class IV) means they would affect visual resources (the scenic quality or character of the landscape). For Class III and Class IV areas that currently have ongoing development

activities, additional development would add to the cumulative effects from development in those areas. In other words, more surface disturbance or structures would add to the cumulative effects of resource development on the visual quality of the landscape. Incorporating BMPs for visual resources into project planning for federal actions would alleviate impacts to visual resources on split estate. Requiring permanent facilities and structures to blend with the surrounding landscape (except where safety dictates otherwise) would help protect visual resources in the planning area.

Physical Resources

Air Quality

Working with stakeholders to reduce dust emissions would improve visibility and would have a slight but detectable beneficial effect on visual resources. Air quality monitors consist of an aluminum frame equipped with monitoring systems that collect air quality and weather data. Currently, there are two monitors on BLM-administered land in the planning area, and agency partners have requested several additional monitors in the planning area. If properly mitigated through site placement and painting with standard environmental colors, the small number of additional monitors would have a slight adverse effect. Overall, the air quality management actions have a minor beneficial effect on visual resources management.

Soil and Water Resources

Actions protecting soil or water resources would generally benefit visual resources by maintaining the natural character of the landscape. Requiring an approved reclamation plan for surface-disturbing activities would have a readily apparent and moderate beneficial effect on visual resources.

Mineral Resources

Locatable Minerals and Salable Minerals

Effects on visual resources from the extraction of solid mineral depend on the methods used and the size of operation. Materials stockpiles and reserve pits also would create color contrast between the greens of vegetation and the browns of soils. Support structures from any aboveground support facilities also would affect line, form, color, and texture by introducing vertical lines from buildings into a predominately horizontal landscape. Colors would contrast between the greens of vegetation and the building colors. Buildings introduce a smooth texture into a more coarse texture of the vegetation, and a more geometric square or rectangular form into the more random and irregular form of the landscape. Depending on the sizes and geographic extents of operations, mineral activities could attract the attention of the casual observer.

Leasable Minerals - Coal

Large-scale surface mining is highly noticeable, nearly impossible to mitigate visually, and would have a major adverse effect on visual resources during the life of the mine. The line, form, color, and texture of mined areas would be affected through the removal of vegetative cover and stockpiled materials, which would create form contrast between the mined areas and the stockpiled materials and the background landforms. Materials stockpiles and reserve pits also would create color contrast between the greens of vegetation and the browns of soils. Texture would change from a natural medium, subtle texture of vegetation to a course, rough contrast of disrupted soils and organic materials. There could be changes in line from the irregular, weak line of the natural landscape to a regular, strong line between natural vegetation and disturbed

landscape. The impact would affect only the portions of the planning area that are within the viewshed of the mine and would generally be limited to southern and central Campbell County.

Leasable Minerals - Fluids
Opening all oil and gas mineral estate to leasing except where specifically identified as closed could have a major impact to visual resources across all alternatives. Continuing to develop fluid minerals resources would affect the visual environment through surface disturbance and construction related to the recovery of minerals resources. Deferring fluid minerals leasing to accommodate recovery of coal resources would result in a stronger contrast in affected areas over the short term, because coal extraction requires more intensive disturbance of the land than fluid minerals.

Effects from mineral resource development is often further intensified by the presence of lights. The ability to substantially shield the nighttime sky from the ambient light created by fluid minerals drilling operations is somewhat limited by operational safety requirements. Night lighting in the immediate area of gas field development, and potentially in large areas surrounding the gas fields, would significantly reduce the nighttime viewing experiences of individuals.

Visual resources in areas available for minerals resource development would likely be more substantially affected over the long term. BLM-administered surface in the planning area with high mineral potential classified as VRM Classes II would have the highest level of conflict between mineral development and VRM objectives. Mineral resource development with appropriate mitigation would be compatible in VRM Class III and IV areas, but would still produce impacts to the aesthetic environment.

Fire and Fuels Management

Fuels reduction and unplanned ignitions result in localized, temporary alteration of the landscape. The effects of fire and fuels reduction in the planning area would be negligible to minor. Rehabilitating fire lines will reduce the impacts to visual resources, resulting in fewer adverse effects from wildfire and prescribed burns. The effects of rehabilitating fire lines would be short-term and negligible beneficial.

Unplanned and prescribed fires affect visual resources by changing the line, color, and texture of burned areas in contrast to the surrounding unburned areas. Line would change from a more regular, smooth line to an irregular, jagged line along the adjacent burned and unburned area in the foreground and middleground zones. Short-term effects on color would be expected in burned areas until the areas were revegetated. Fire can enhance color over time by creating more diversity in the hues and colors associated with a more diverse vegetative composition. Vegetative texture can change from a medium to fine, dense texture in natural areas to a coarse, sparse texture in burned areas as a result of fire. Burned areas, if viewed in the foreground-middleground and background zones, would attract the attention of the casual observer and would be minor and adverse.

Biological Resources

Vegetation – Forests and Woodlands, Grassland and Shrubland Communities, and Riparian/Wetland Resources, Invasive Species and Pest Management, and Fish and Wildlife Resources – Fish
Management actions designed to protect vegetation resources would generally protect scenic

quality and landscape character. However, vegetative treatments (chemical or mechanical) can have a temporary adverse effect on visual resources. Proposed treatments would be subject to interdisciplinary review before implementation to reduce adverse effects. Management of vegetation, riparian areas, and fish habitat would generally limit the amount of surface-disturbing activities and associated removal of vegetation. Measures to prevent noxious weeds would reduce the amount of non-native (and often visually contrasting) vegetation present in the planning area, resulting in a beneficial effect to visual resources. Where these actions overlap with VRM Class I and Class II areas, there would be an increase in the potential for such landscapes to retain or preserve their existing visual character. Overall, the vegetation and fish management actions would have a moderate beneficial effect on visual resources management.

Fish and Wildlife Resources – Wildlife and Special Status Species – Plants, Fish, and Wildlife (including Greater Sage-Grouse)

Restrictions on facility development related to wildlife concerns are generally beneficial to VRM. However, constraints based on wildlife will likely take precedence over VRM when proposed mitigation measures for VRM conflict with sensitive wildlife resources (e.g., a well cannot be relocated closer to a raptor nest to reduce impacts to visual resources; or wind turbines become more visible to prevent wildlife collision). Management of vegetation diversity and structure would benefit visual resources as long as the basic elements of the landscape are repeated; if applied across the planning area, the effects would be moderate and long term.

Actions designed to prevent surface disturbance (e.g., CSU and NSO stipulations) and disturbance to wildlife and SSS would indirectly limit the level of change to characteristic landscapes, which would benefit VRM. Where these actions overlap with VRM Class I and Class II areas, there would be an increase in the potential for such landscapes to retain or preserve their existing visual character.

Heritage and Visual Resources

Cultural Resources and Paleontological Resources

Measures to protect cultural and paleontological resources generally benefit visual resources. The visual landscape is considered a component of the cultural setting, and areas considered important to Native Americans would likely experience additional protection for retention of natural visual settings.

Land Resources

Forest Products

Timber and firewood harvest activities would have effects similar to those described above for fire and fuels management because timber activities can primarily affect line, form, color, and texture. The removal of trees changes the density of vegetation, a characteristic of texture. Changes in line from the irregular, weak line of the natural landscape to a regular, strong line between natural vegetation and the harvest area depends on the harvest technique. Removing vegetation changes form from the irregular shape of the vegetation to a regular geometric shape. There would be changes in color from the deeper hue of trees to the more diverse colors of lower-growing vegetation. Clear-cutting would have the greatest effect on visual resources, while select cutting would have the least. Depending on the size of the operation, timber harvest activities could attract the attention of the casual observer in the foreground-middleground and background zones, and even the seldom seen zone. These effects would be limited to the portions of the

planning area that are forested (mostly located in the southern Big Horn Mountains), which would have a minor adverse effect on visual resources. Forest products would potentially impact visual resources where harvest of minor wood products through the sale of permits would occur. Some of these harvests would potentially occur in VRM Class II areas, but the acreage would be small and locations of harvest would not be readily visible from key observation points, so visual impacts are anticipated to be minor and short term.

Renewable Energy

Cooperation with stakeholders to coordinate renewable energy development could produce either an adverse or beneficial effect on visual resources. It can be surmised from the alternative that wind-energy development would be allowed except in areas made administratively unavailable to renewable energy. Promoting opportunities for scientific research and renewable energy would likely include the placement of meteorological towers, which are temporary, tall structures equipped with blinking lights. The adverse effects on visual resources from wind-energy development are difficult to mitigate. Current regulations require turbines to be painted white, usually a noticeable difference from the colors of the natural landscape. Additionally, the requisite red blinking lights detract from the naturalness of the night sky. There are also changes to the line and form of the landscape as a consequence of placing large (250-400 feet) vertical structures, with motion, in a horizontal landscape. Wind turbines could conceivably be allowed within VRM Class III areas with appropriate mitigation and by siting facilities at an adequate distance (~8 miles or more) away from Key Observation Points to reduce the visual dominance to a scale appropriate to the landscape setting. The portions of the field office with the highest wind potential are generally located in areas with the most unique and intact visual settings. Developing guidelines for determining where wind-energy may be developed would be the first step in projecting effects on visual resources. Renewable energy development would significantly detract from the typical visual settings in the planning area by creating linear and focal visual intrusions on the horizon, and would create an industrial setting. The scale of impacts will be dependent on the size and location of a given project.

Rights-of-Way and Corridors

Land use authorizations such as leases and ROW could adversely affect visual resources. Most of effects from utilities would be from support structures for powerlines, communications sites, and weather stations, which would introduce straight, vertical lines into a horizontal landscape. Effects on color would include changes from the matte greens of natural vegetation to glossy reflective colors of metal structures and other colors of facilities such as buildings or towers. Effects on texture and form would include changes from irregular, random textures of vegetation to smooth, definite geometric shapes of buildings. Collocating ROW would reduce the overall disturbance in the planning area, but could temporarily increase adverse effects on visual resources on a localized level. Below-ground utilities and some above-ground facilities associated with ROW would be compatible with VRM Class II if properly mitigated.

Travel and Transportation Management

TTM would maintain an adequate road network across the planning area. Development of the transportation network within the planning area would potentially alter visual resources and would likely attract the attention of a casual observer. Adverse effects on visual resources from route construction or OHV use include changes in color, line, and texture on the landscape. In addition, fugitive dust from construction activities and from the use of gravel or natural material roads also has an adverse effect on visual resources. However, fugitive dust is a short-term effect that can be temporary and would depend on the amount of traffic on a road. Limiting travel to designated routes rather than allowing travel on existing routes would benefit visual resource

as undesignated routes would be closed and allowed to reclaim. Designating areas Open to OHV use would adversely affect visual resources through road proliferation and vegetation loss. Designating areas "Closed" to OHV use would protect visual resources from the effects of unsustainable OHV use. Road closures and restricted access would enhance the visual settings of the area by removing contrasting linear elements from the natural landscape. Impacts from TTM would have minor adverse effects on visual resources.

Recreation

Recreation activities such as development of recreational facilities would affect visual resources by introducing straight, vertical lines and smooth textures into a predominantly horizontal, random landscape. Increased use of existing and new facilities would affect visual resources by introducing different colors into a predominantly green and brown landscape. Some of the facilities could be made of reflective materials, making them more visible from long distances. Buildings and other structures introduce a more geometric square or rectangle form into the more random and irregular form of the landscape. Proper design and construction techniques can reduce effects on visual resources from recreation facilities and help maintain a more natural-appearing landscape. If viewed from a higher observation point, facilities and recreation activities in the foreground-middleground zone would attract the attention of the casual observer. Depending on size, facilities in the background zone also could attract the attention of the casual observer. As viewed from ground level, only activities in the foreground-middleground zone would attract the attention of the casual observer.

Lands With Wilderness Characteristics

Protections related to lands with wilderness characteristics would vary by alternative; however, the lands with wilderness characteristics area would generally benefit from VRM if managed according to the inventory class or if afforded VRM Class II protection through alternatives related to the management of wilderness characteristics.

Livestock Grazing Management

Livestock grazing management and rangeland management often require the construction or maintenance of range improvements, including fences and stockwater tanks. While such features can create contrast in the line and texture of the landscape, range improvements are usually low-profile developments with a minor effect on visual resources. Implementing the *Wyoming Standards for Healthy Rangelands* would reduce the potential for overgrazing, which can create a contrast in the color and texture of the landscape. The beneficial effect on visual resources from rangeland management across the planning area would be minor and long term.

Special Designations

Stipulations to protect areas with special designations would generally protect visual resources. The three WSAs are currently managed under BLM Manual 6330 – Management of Wilderness Study Areas, which provides protection for the visual setting. Similarly, the Middle Fork Powder River is managed under Manual 6400 which protects the canyon and the viewshed of the river corridor. Protections related to ACECs and BCBs would vary by alternative. Table 4.58, "Estimated BLM Surface Acreage of Visual Resource Management Classes by Alternative" (p. 1386) lists the estimated BLM surface acreages of VRM classes under each alternative.

Table 4.58. Estimated BLM Surface Acreage of Visual Resource Management Classes by Alternative

	Alternative A[1]	Alternative B	Alternative C	Alternative D
VRM Class I (acres)	30,103	30,103	30,103	30,103
VRM Class II (acres)	127,594	217,021	0	112,329
VRM Class III (acres)	63,583	276,107	167,334	379,429
VRM Class IV (acres)	559,674	258,866	584,500	260,238

Source: BLM 2012f

[1]The 1985 RMP did not designate any Class I areas, but the three Wilderness Study Areas and Middle Fork Powder River corridor that is suitable and eligible for Wild and Scenic River designation are managed as such. The 1985 RMP did designate 702 acres of Class V, which is no longer a VRM classification.

BLM Bureau of Land Management
VRM Visual Resource Management

4.5.3.3. Alternative A

Alternative A would continue management in accordance with the 1985 RMP as amended and maintained. This section describes potential impacts to visual resources from management actions for those and other resources under Alternative A. The following resources would have no discernible impacts under Alternative A: **Air Quality, Water Resources, Grassland and Shrubland Communities, Livestock Grazing Management, Scenic and Back Country Byways, Wilderness Study Areas, and Socioeconomic Resources.**

Visual Resources
Alternative A would place almost 71 percent of BLM surface in the planning area in VRM Class IV, which allows effects on visual resources that would change the character of the landscape and would dominate the view of the casual observer. Only 19 percent of BLM surface would be managed as VRM Class II areas and approximately 10 percent as VRM Class III.

The current VRM classes cannot be traced to a science-based study of the planning area and therefore could be considered arbitrary. Careful consideration should be given to a quantifiable method for assigning the VRM classes. Current VRM classes were designed to protect visual resources along major travel routes; however, the mixed land tenure along many routes (e.g., Interstate 90) can make protection of visual resources across the landscape obsolete. In addition, the current VRM classes do not adequately account for VRM of recently acquired parcels. Finally, using visual simulations on a project-specific basis has resulted in inconsistent VRM mitigation measures applied across the planning area due to discrepancies in the level of analyses for proposed actions in relation to visual resources, particularly in VRM Class III and IV areas. A more uniform approach to using these simulations (e.g., based on visual sensitivity and VRM class) would benefit visual resources.

Physical Resources

Soil
Prohibiting surface-disturbing activities in areas of severe erosion, on steep slopes and in areas with poor reclamation potential will generally reduce development in areas with high visibility (slope faces) and would produce moderate beneficial effects visual resources.

Mineral Resources

Locatable Minerals and Salable Minerals
Under Alternative A, locatable minerals would be restricted in WSAs (28,931 acres) and winter game ranges (4,583 acres), a minor beneficial impact to the visual resource. For salable minerals, prohibitions are limited to the WSAs only, producing a minor beneficial effect on visual resources. However, the majority of the planning area would remain open to locatable and salable mineral development, resulting in a net major adverse effect on visual resources.

Leasable Minerals - Coal and Fluids
Under Alternative A, 96 percent of the planning area would be available for oil and gas leasing or for coal development, and effects from accompanying development would be widespread throughout the area. Effects would include those from low-profile developments such as access roads and CBNG wells and high-profile developments such as open pit mines and oil rigs. The adverse effect on visual resources in the PRB would be major and long term. Elsewhere in the planning area, the effect of mineral resource development would be less severe.

Fire and Fuels Management

Under Alternative A, restricting the use of heavier or larger types of suppression equipment in some areas could benefit visual resources, because the extent of disturbance related to fire suppression often increases as the size of equipment increases. Rehabilitating disturbance related to fire and fire suppression could temporarily increase the amount of disturbance in an area, but the long-term effects on visual resources would be beneficial.

Biological Resources

Vegetation – Forests and Woodlands, Riparian/Wetland Resources, and Invasive Species and Pest Management
There were slight but detectable beneficial impacts from the forests and woodlands resource through stipulations of vegetation treatment design. Additionally, prohibitions on surface-disturbing activities within 500 feet of water produced a minor beneficial impact to visual resources from the riparian/wetland resource. Controlling noxious weeds is also generally beneficial to the visual resource.

Fish and Wildlife Resources – Fish and Wildlife and Special Status Species – Plants, Fish, and Wildlife (including Greater Sage-Grouse)
Management related to biological resources that may affect visual resources were generally not previously addressed. There would be little to no effect from fish, wildlife and all SSS resources in Alternative A.

Heritage and Visual Resources

Cultural Resources
Management alternatives related to cultural resources that may affect visual resources were generally not previously addressed. However, some provisions to protect the viewshed of the Bozeman Trail and Pumpkin Buttes were applied in Alternative A. The overall impact to the visual resource is moderate and long term.

Paleontological Resources

Management related to paleontological resources that may affect visual resources were generally not previously addressed. There would be little to no effect from paleontological resources in Alternative A.

Land Resources

Forest Products

Basing timber harvest on a desired production level could adversely affect visual resources by producing an unsustainable level of forestry activity. A size limitation on individual clear-cuts would benefit visual resources by restricting the amount of vegetation removal on a local scale. Fencing regeneration areas would adversely affect visual resources over the short term by drawing attention to the area, but would have a beneficial effect over the long term by promoting successful regeneration. Overall, impacts from forest product activities using BMPs would have a slight but detectable, minor adverse effect on visual resources.

Renewable Energy

Under Alternative A, renewable energy issues would be considered on a project-specific basis. Wind-energy development would not be compatible with areas currently classified as VRM Class II without a plan amendment. The majority of the southern Big Horn Mountains, which is the area with the highest wind potential, would be protected under this alternative. Conversely, the majority of the PRB would likely allow wind-energy development under Alternative A.

Rights-of-Way and Corridors

ROW associated with utilities or roads would create linear features across the landscape. However, Alternative A would have less stipulations on the placement of ROW and above ground utilities. The degree of impact would depend on the scale of the individual project. Overall a minor adverse effect is anticipated on visual resources management.

Travel and Transportation Management

Alternative A would designate more areas as Open compared to other alternatives. This could allow unmanaged OHV use, to the detriment of visual resources as user created routes often produce contrast with natural vegetation.

Recreation

Management alternatives related to recreation resources that may affect visual resources were generally not previously addressed. Stipulations to protect recreational opportunities in Mosier Gulch and Dry Creek Petrified Tree would also protect visual resources. Overall, there would be a negligible beneficial effect from recreation in Alternative A.

Lands with Wilderness Characteristics

There were no decisions related to lands with wilderness characteristics in Alternative A. Thus, there would be no effect from this resource.

Special Designations

Areas of Critical Environmental Concern and Wild and Scenic Rivers

There were no decisions related to ACECs or WSRs in Alternative A. Thus, there would be no effect from these resources.

4.5.3.4. Alternative B

This section describes management actions under Alternative B, which emphasizes resource conservation, and the likely impacts to visual resources from implementation of Alternative B. Effects would be similar to those described under *Impacts Common to All Alternatives*, and also would include the effects below.

Visual Resources
Alternative B would place 67 percent of BLM surface in the planning area in VRM Class III and Class IV, which provide for varying degrees of visual effects from resource development activities. Compared to Alternative A, the acreage in Class II would be increased to 28 percent of the planning area and the acreage in Class III would be increased to 35 percent. The acreage in Class IV would be decreased to 33 percent of the planning area.

Basing VRM classifications on the corresponding VRI class provides some consistency between an objective science-based inventory and management decisions. This approach will further require that the BLM consider the existing character of the landscape identified in the VRI (BLM 2009b) and the context of the individual scenic quality, sensitivity and distance zones at the site-specific analysis level to ensure VRM Class Objectives are met. By including special emphasis areas in VRM Class II, sensitive visual resources are ensured administrative protection. Currently, several areas with high recreational value or cultural significance are managed as VRM Class III and Class IV. Managing special emphasis areas as VRM Class II would ensure that the visual resources are adequately protected, which in turn, would protect the unique settings and other resource values present in these areas. Prohibiting surface disturbance in areas with historic properties to retain the integrity of the setting also would retain the integrity of the visual resources. However, constraints based on cultural resources will likely take precedence over VRM when proposed mitigation measures for VRM conflict with an eligible cultural site. Completing a visual simulation and mitigation design for all proposed actions within or viewable from VRM Classes I, II, and III would benefit visual resources because potential effects for sensitive areas would be properly identified and mitigated.

Physical Resources

Soil
Prohibiting surface-disturbing activities in areas of severe erosion, on steep slopes and in areas with poor reclamation potential will produce moderate beneficial effects visual resources by decreasing the likelihood of development in area with high visibility (slopes).

Mineral Resources

Locatable Minerals and Salable Minerals
Alternative B proposes the greatest restrictions to mineral resource development, however, the adverse effects to visual resources from permissible locatable and salable development would remain scattered throughout the planning area. Development would be readily apparent to the casual observer within the viewshed of each project. The net effect to the visual resource would be moderate and adverse.

Leasable Minerals – Coal and Fluids
Under Alternative B, nearly half of the planning area would be closed to oil and gas leasing and a

quarter would be unavailable for coal development. The remaining lands would be subject to additional constraints compared to Alternative A. Development would be readily apparent to the casual observer within the viewshed of each project. The adverse effect on visual resources in the PRB would be moderate and long term. Elsewhere in the planning area, the effect of mineral resource development would be less.

Fire and Fuels Management

Under Alternative B, limiting heavy equipment usage for fire suppression to areas immediately adjacent to existing roads would benefit visual resources because future disturbance from such equipment would be limited to areas of existing disturbance. Rehabilitating disturbance related to fire and fire suppression could temporarily increase the amount of disturbance in an area, but the long-term effects would benefit visual resources.

Biological Resources

Vegetation – Forests and Woodlands and Riparian/Wetland Resources, Invasive Species and Pest Management, Fish and Wildlife Resources – Fish, and Special Status Species – Plants and Fish
Alternative B management actions would limit the amount of surface disturbance compared to Alternative A by encouraging the placement of structures away from the viewshed of waterways, which often are sensitive to disturbance due to public support for the recreational values present. Measures to protect vegetation would benefit visual resources.

Fish and Wildlife Resources – Wildlife
Increasing prohibitions on above-ground powerlines would benefit visual resources because the disturbance time associated with burying lines is shorter and the disturbance is less noticeable than traditional aboveground utility lines. Requiring installation of anti-perching devices on new high-voltage powerlines could increase the visibility of the powerlines, increasing the level of effects on visual resources at a local level.

Special Status Species – Wildlife (including Greater Sage-Grouse)
Any action that increases the visibility of human structures, including fencing designs for the protection of Greater Sage-Grouse, would be detrimental to visual resources. Considering the VRM classes designated under this alternative, the small size of the fence markers, and the relative size of Greater Sage-Grouse habitat where theses measures would be applied, on a planning area basis the effect should be minor. Prohibitions on development related to protection of sensitive species (buffering leks, riparian areas, etc.) may also increase protection of visual resources in the PRB and along creeks and rivers. However, protection of sensitive species would likely take priority over protection of visual resources in site-specific decisions. The overall impact is expected to be minor and long-term.

Heritage and Visual Resources

Cultural Resources
Initiating withdrawals to protect cultural resources would produce a beneficial effect on visual resources. Specifically, a protection of the visual horizon up to 5 miles from historic properties would include a substantial portion of the planning area. The overall impact to the visual resource is moderate and long term.

Paleontological Resources
Initiating withdrawals or closing to leasing to protect paleontological resources would produce a beneficial effect on visual resources. Given the small portion of the planning area with high quality specimens, the overall impact to the visual resource would be negligible.

Land Resources

Forest Products
Designing timber harvest areas to have meandering boundaries, follow topography, and avoid natural barriers would help mitigate adverse effects on visual resources. The benefits would be detectable by the casual observer.

Renewable Energy
Renewable energy development would be excluded from the majority of the planning area, a major beneficial effect to visual resources. Considering the VRM classifications, wind development potential and renewable energy exclusion and avoidance areas, very little development would be permitted under this alternative.

Rights-of-Way and Corridors
While disturbance associated with ROW development generally creates adverse impacts to visual resources, ROW grants would avoid the placement of above-ground facilities along major transportation routes to protect visual resources. This would result in a minor beneficial effect to visual resources along routes. co-location of ROW and facilities would be required, which would increase the visibility of a project at the site-specific level, but would benefit visual resources overall by reducing the amount of surface disturbance.

Travel and Transportation Management
Designating areas Closed to OHV use and limiting OHV use in other areas to designated roads and trails would increase the ability to protect such areas from OHV-related effects on visual resources. Alternative B would close or limit motorized use across much of the planning area, and would result in considerably fewer adverse effects on visual resources as a result of unmanaged motorized recreation.

Recreation
Under Alternative B, designating eight SRMAs (55,529 acres; 7.0% of BLM surface) would increase the acreage under VRM Class II management. Additionally, development within SRMAs would be restricted, to the benefit of the visual resources.

Lands with Wilderness Characteristics
Under Alternative B, 12,237 acres (1.5% of BLM surface) would be managed as VRM Class II. Additionally, development within the lands with wilderness characteristics would be restricted, to the benefit of the visual resources.

Special Designations

Areas of Critical Environmental Concern
Designation of eight ACECs (511,000 acres; 65% of BLM surface) under Alternative B would substantially increase the acreage managed as VRM Class II. Almost all of the ACECs include scenic values as relevant and important, and designation would increase protections for visual resources.

Wild and Scenic Rivers
Under Alternative B, the outstanding and remarkable values, including visual values, of the Middle Fork Powder River would be protected regardless of a Congressional designation. The Middle Fork Powder River canyon (9.5 miles in length, 0.5-mile buffer of river; 0.7% of BLM surface) would be managed as VRM Class II.

4.5.3.5. Alternative C

This section describes management actions under Alternative C, which emphasizes resource use, and the likely resulting impacts to visual resources due management of those and other resources from its implementation.

Effects under Alternative C would be similar to those described under *Impacts Common to All Alternatives*, and also would include the effects below.

Visual Resources
Alternative C would place 95 percent of BLM surface in the planning area in VRM Classes III and IV, which provide for varying degrees of effects on visual resources from resource development activities.

This alternative would result in the greatest degree of adverse effects on visual resources of any of the alternatives. The Alternative C surface acreage under VRM Class IV management would be 584,500 acres; the surface acreage under VRM Class III management would be 167,334 acres (21%), and no areas would be designated as VRM Class II. This alternative would allow effects on visual resources that would change the character of the landscape and dominate the view of the casual observer (Class IV) on 74 percent of the total public land surface in the planning area. Effects would result from surface disturbance and construction of structures, primarily (but not exclusively) from the oil and gas industry. Vegetative manipulation, range improvement projects, and communications facilities also would affect visual resources. There would be adverse effects on form, line, color, and texture.

BLM would generally manage high visual values for moderate levels of visual change under this alternative. Managing VRI Class II areas as VRM Class III areas would reduce the protection of visual resources in VRI Class II areas that were formerly protected under the VRM Class II objectives. Such management is not likely to adequately protect sensitive areas such as recreation areas and cultural sites. Allowing surface disturbance in areas with historic properties could affect visual resources because mitigation would be decided on a project-specific basis. Under Alternative C, areas with VRI Class III values would be managed for major modification that may visually dominate the landscape under a VRM Class IV designation. The adverse effects could be major and long term. Finally, using visual simulations on a project-specific basis has resulted in inconsistent VRM mitigation measures applied across the planning area due to discrepancies in the level of analyses for proposed actions in relation to visual resources, particularly in VRM Class III and IV areas. A more uniform approach to using these simulations (e.g., based on visual sensitivity and VRM class) would benefit visual resources.

Physical Resources

Soil
Allowing surface disturbing-activities in areas of severe erosion, on steep slopes which are

highly visible, and in areas with poor reclamation potential will produce moderate adverse effects visual resources.

Mineral Resources

Locatable Minerals and Salable Minerals
The effects from locatable and salable minerals would essentially be the same as Alternative A.

Leasable Minerals - Coal and Fluids
Under Alternative C, most of the planning area would be available for oil and gas leasing, and adverse effects on visual resources from accompanying development would be widespread throughout the planning area. Effects would include those from low-profile developments such as access roads and CBNG wells and high-profile developments such as oil rigs. The adverse effect in the PRB would be major and long term. Elsewhere in the planning area, the adverse effect on visual resources from mineral resources development would be less severe.

Fire and Fuels Management

Under Alternative C, using heavy equipment for fire suppression with few tactical constraints could be inconsistent with visual resource values. Heavy equipment would be likely to increase the amount of disturbance in a given area compared to hand tools. Rehabilitating only suppression-related damage would ignore damage from wildfire and prescribed fire. The effects on visual resources would depend on the locations and extents of such fires, but should be minor and short term.

Biological Resources

Vegetation – Forests and Woodlands
Utilizing intensive management tactics such as large clear-cuts would have a minor effect on visual resources depending on the location and intensity of related projects.

Vegetation – Riparian/Wetland Resources, Invasive Species and Pest Management, Fish and Wildlife Resources – Fish, and Special Status Species – Plants and Fish
Under Alternative C, removing limitations on the amount of surface disturbance in the viewshed of waterways would have an adverse effect on visual resources. The effect of allowing surface disturbance near streams and waterways would be minor and long term.

Fish and Wildlife Resources – Wildlife
The effect of not requiring operators to bury all new low-voltage utility lines or to require anti-perching devices on powerlines would increase visibility and generally be adverse.

Allowing facility development or prohibiting renewable-energy projects and occupancy in elk crucial winter range and calving areas would have adverse effects on visual resources. Under Alternative C, visual resources will be considered on a case-by-case basis as projects are proposed.

Special Status Species – Wildlife (including Greater Sage-Grouse)
Under Alternative C, there would be no special provisions to increase visibility of fencing, thus there would be no effect on visual resources from this alternative.

Heritage and Visual Resources

Cultural Resources
Alternative C allows for surface disturbance with appropriate mitigation, but does not define standards. Therefore adverse effects to the setting of historic properties and visual resources are likely. The overall impact to the visual resource is moderate and adverse.

Paleontological Resources
Withdrawals or closing to leasing to protect paleontological resources would not occur under Alternative C. Given the small portion of the planning area with high quality specimens, the overall impact to the visual resource would be negligible.

Land Resources

Forest Products
Under Alternative C, allowing timber harvests without limits on the sizes or shapes of harvest areas could adversely affect visual resources. Under this alternative, visual resources would be considered on a case-by-case basis as projects are proposed. Depending on the size and location of projects, the effect would be moderate.

Renewable Energy
Renewable energy development would be allowed where consistent with other resource values. Because Alternative C would not designate any VRM Class II areas and would place the vast majority of the planning area in VRM Class IV, wind-energy development could take place across the planning area with little requirements for visual mitigation. The effects to the visual resources would be major and adverse.

Rights-of-Way and Corridors
ROW grants would not avoid the placement of above-ground facilities along major transportation routes to protect visual resources, resulting in a moderate adverse effect to visual resources.

Travel and Transportation Management
Under Alternative C, designating areas Open to OHV use could adversely affect visual resources through road proliferation and vegetation loss. On the other hand, designating areas Closed to OHV use and limiting OHV use to designated roads and trails would increase the ability to protect such areas from OHV-related effects on visual resources. This alternative would open fewer acres to OHV use than Alternative A and would therefore result in fewer adverse effects on visual resources than Alternative A.

Recreation
While several SRMAs would be designated (30,570 acres; 3.9% of BLM surface), and recreational use would be a priority in those areas, there would essentially be no protective management decisions associated with SRMAs.

Lands with Wilderness Characteristics
There would be no prescriptions related to protection of lands with wilderness characteristics, and therefore there would be no effect from this resource.

4.5.3.6. Alternative D

This section describes management actions and potential impacts to visual resources under Alternative D, which generally allows resource use if the activity can be conducted in a manner that conserves physical, biological, and heritage and visual resources, and emphasizes moderate constraints on resource uses to reduce adverse effects on resource values. Alternative D is the Proposed RMP.

Effects on visual resources under Alternative D would be similar to those described under *Impacts Common to All Alternatives*, and also would include the effects below.

Visual Resources
Alternative D would place 81 percent of BLM surface in the planning area in VRM Classes III and IV, which provide for varying degrees of effects on visual resources from resource development activities. This alternative would allow effects on visual resources that would change the character of the landscape and dominate the view of the casual observer (Class IV) on 260,238 acres or 32 percent of the total BLM surface in the planning area. Class II management would encompass 112,329 acres (14%) of the planning area, and the Class III management would affect 379,429 acres (49%).

Basing VRM classifications on the corresponding VRI class provides some consistency between an objective science-based inventory and management decisions. This approach will further require that the BLM consider the existing character of the landscape identified in the VRI (BLM 2009b) and the context of the individual scenic quality, sensitivity and distance zones at the site-specific analysis level to ensure VRM Class Objectives are met. By including special emphasis areas in VRM Class II, sensitive visual resources are ensured administrative protection. Currently, several areas with high recreational value or cultural significance are managed as VRM Class III and Class IV. Managing special emphasis areas as VRM Class II would ensure that the visual resources are adequately protected, which in turn, would protect the unique setting and other resource values present in these areas. Prohibiting surface disturbance in areas with defined historic properties to retain the integrity of the settings also would retain the integrity of the visual resources at the local level. However, constraints based on cultural resources would likely take precedence over VRM when proposed mitigation measures for VRM conflict with an eligible cultural site. Completing a visual simulation and mitigation design for all proposed actions in VRM Class I and II areas and sensitive Class III areas would benefit visual resources because potential effects to sensitive areas would be properly identified and mitigated.

Physical Resources

Soil
Increasing requirement for reclamation related to surface-disturbing activities in areas of severe erosion, on steep slopes, and in areas with poor reclamation potential will produce minor beneficial effects visual resources.

Mineral Resources

Locatable Minerals and Salable Minerals
Alternative D proposes moderate restrictions to mineral resource development, however, the adverse effects to visual resources from permissible locatable and salable development would

remain scattered throughout the planning area. The net effect to the visual resource would be moderate and adverse.

Leasable Minerals – Coal and Fluids
Under Alternative D, the majority of the planning area would be available for oil and gas leasing, and adverse effects on visual resources from accompanying development would be widespread throughout the planning area. The remaining lands would be subject to additional constraints compared to Alternative A, but the measures would generally be insufficient to prevent a substantial impact to the visual resource. The adverse effect in the PRB would be major and long term. Elsewhere in the planning area, the effect of mineral resources development would be less severe.

Fire and Fuels Management

Under Alternative D, limiting the use of heavy equipment for fire suppression to areas immediately adjacent to existing roads would benefit visual resources because future disturbance from such equipment would be limited to areas of existing disturbance. Rehabilitating disturbance related to fire and fire suppression could temporarily increase the amount of disturbance in an area, but the long-term effects would benefit visual resources.

Biological Resources

Vegetation Resources, Invasive Species and Pest Management, Fish and Wildlife Resources – Fish, and Special Status Species - Plants and Fish
Management decisions under Alternative D that limit the amount of surface disturbance or encourage placement of structures away from the viewshed of waterways, which often are sensitive to disturbance due to public support for the recreational values present, would benefit visual resources. Restrictions on facility development or renewable-energy projects are generally beneficial to visual resources. Utilizing intensive management tactics would have an adverse effect on visual resources depending on the location and intensity of related projects. The beneficial and adverse management actions interact to result in an overall negligible. beneficial effect on visual resources.

Fish and Wildlife Resources – Wildlife and Special Status Species – Wildlife (including Greater Sage-Grouse)
Requiring new low-voltage utility lines to be buried would benefit visual resources because the disturbance time associated with burying lines is shorter and the disturbance less noticeable than traditional aboveground utility lines.

Modifying fences to protect Greater Sage-Grouse could increase the visibility of fences and could adversely affect visual resources. Considering the VRM classifications designated under this alternative, the small size of the fence markers, and the relative size of Greater Sage-Grouse habitat where theses measures would be applied, on a planning area basis the adverse effect should be negligible.

Heritage and Visual Resources

Cultural Resources
Applying NSOs and increasing stipulations on surface disturbance to protect cultural resources

would produce a beneficial effect on visual resources. The overall impact to the visual resource is moderate and long term.

Paleontological Resources
Applying NSOs and increasing stipulations on surface disturbance to protect paleontological resources would produce a beneficial effect on visual resources. Given the small portion of the planning area with high quality specimens, the overall impact to the visual resource would be negligible.

Land Resources

Forest Products
Under Alternative D, failure to place limitations on timber harvest size would increase the potential size of a forestry action and could adversely affect visual resources through the potential permitting of larger-scale operations. Because of resource protections set forth under other resources (ACECs, etc.) in areas with commercial timber, the overall impact to visual resources would be minor.

Renewable Energy
Renewable energy development would be excluded from the portions of the planning area with the highest VRM classifications, a major beneficial effect to visual resources. Given the VRM classifications, wind development potential and renewable energy exclusion and avoidance areas, some development would be permitted under this alternative, but would likely take place out of the more visually desirable portions of the planning area.

Rights-of-Way and Corridors
ROW grants would require a resource protection plan for the placement of above-ground facilities along major transportation routes to protect visual resources, resulting in a negligible beneficial effect to visual resources. co-location of ROW and facilities would be preferred, which would increase the visibility of a project at the site-specific level, but would benefit visual resources overall by reducing the amount of surface disturbance.

Travel and Transportation Management and Recreation
Designating areas Open to OHV use would reduce the potential for adverse effects on visual resources through road proliferation and vegetation loss. On the other hand, designating areas Closed to OHV use and limiting OHV use to designated roads and trails would increase the ability to protect such areas from OHV-related effects on visual resources. This alternative would open many fewer acres to OHV use than Alternative A and would therefore result in considerably fewer adverse effects on visual resources from unmanaged motorized recreation than Alternative A. Under Alternative D, designating eight SRMAs would increase the acreage under VRM Class II management.

Recreation
Under Alternative D, designating seven SRMAs (54,160 acres; 6.9% of BLM surface) would increase the acreage under VRM Class II management. Additionally, development within SRMAs would be restricted, to the benefit of the visual resources.

Lands with Wilderness Characteristics
Under Alternative D, 6,864 acres (0.9% of BLM surface) would be managed as VRM Class II. Additionally, development within the lands with wilderness characteristics would be restricted to the benefit of the visual resources.

Special Designations

Areas of Critical Environmental Concern
Under Alternative D, designation of two ACECs would increase the acreage under VRM Class II management. Each of the ACECs includes scenic values as relevant and important, and designation would increase protections for visual resources.

Wild and Scenic Rivers
Under Alternative D, the outstanding and remarkable values, including visual values, of the Middle Fork Powder River would be protected regardless of a Congressional designation.

4.5.3.7. Cumulative Impacts

Renewable-energy projects, utility and pipeline projects, communications towers, oil and gas development, and other surface-disturbing developments would degrade the scenic quality of landscapes through development of associated roads, barren ground, and facilities associated with industrial development. These effects on visual resources would result primarily from surface disturbance combined with other industrial activities on both federal and non-federal lands. Development activities on private and state lands with no federal jurisdiction would have the greatest potential for cumulative effects on the natural setting of the landscape as these projects are generally not subject to visual quality mitigation. Large-scale and high-profile developments such as wind turbines and communications towers and disturbance areas would affect the integrity of settings. In combination with these, some large-scale developments outside federal jurisdiction would alter the landscape surrounding these sites to the point that the development would exceed the prescribed VRM objectives for adjacent federal surface. The incremental damage to and loss of visual integrity would result in a landscape altered from a natural setting to an industrial setting. Under all alternatives, adverse effects on visual resources would be avoided or mitigated by VRM program actions, through special designations, and through BMPs and by VRM program actions (contrast ratings, visual simulations and mitigation measures, etc.) or COAs prescribed to protect visual resources.

Historic uses in the planning area include livestock grazing, forestry actions, and conventional oil production. These uses have negligible to minor effects on visual resources. In the past 10 years, increased minerals extraction in the planning area has resulted in widespread surface disturbance and linear utility development that have altered the appearance of the landscape. The degree of visual change currently imposed on the landscape can be extracted from the VRI scenic quality ratings using the scores for the cultural modification factor.

The presence of federal (BLM and USFS) lands in the planning area has an overall beneficial effect on visual resources because the BLM and the USFS are required to consider scenic resources. Although management activities by other federal agencies would likely maintain or enhance visual resources through management objectives or mitigation measures, surface-disturbing activities on non-federal land adjacent to BLM surface could affect visual resources if activities that are incompatible with prescribed VRM class objectives occur in the viewsheds of those areas.

4.5.3.8. Conclusion

Under Alternative A, the direct effect on visual setting associated with surface disturbance and facility development would continue throughout the planning area and have the potential to affect areas that are highly valued by the public, such as cultural sites and recreational areas, more than all other alternatives. This conclusion is based on the outdated VRI under Alternative A.

Overall, Alternative B would have the fewest adverse impacts to visual resources because other management actions under this alternative would be restricted to certain geographic areas, cover proportionately less area, or would be buffered from other resources, therefore producing smaller, more localized disturbances to visual resources. Alternatives A and C would allow considerably more disturbance compared to Alternative B, while Alternative D would allow slightly more disturbance. The order of the alternatives in ascending degree of potential severity of effects on visual resources from least adverse to most adverse is Alternative B, Alternative D, Alternative A, and Alternative C.

4.6. Land Resources

4.6.1. Forest Products

4.6.1.1. Methods and Assumptions

This section describes potential effects on the forest product program from BLM management of resources and resource uses under the alternatives. The *Forest Products* section of Chapter 3 describes the BLM forest products program. Actions that reduce the utilization of forest products are considered adverse; actions that promote forest product use are considered beneficial.

Assumptions

- This impact analysis and its conclusions are based on interdisciplinary team knowledge of resources in the planning area, reviews of existing literature, and information from other agencies.
- Spatial analysis was performed using the ESRI ArcGIS 10.0 computer software.
- Effects are quantified where possible. In the absence of quantitative data, best professional judgment was used. Effects are sometimes described using ranges of potential impacts or in qualitative terms, if appropriate.
- Forest inventory data were collected in 2005.
- The resource analysis concentrates on the 16,234 acres of BLM surface within the six forest management areas, because that is where most forest product activities are predicted to occur. However, because opportunities and interest arise in the scattered woodlands for various products, the analysis also considers those lands.

Short-term effects would result during initial surface disturbance (product removal) before commercial quality product is regenerated, or from decreases to forest product quality. Long-term adverse effects would be changes in the sustainability of the desired forest products. The scale of effects would be the same as identified in the Introduction of Chapter 4.

4.6.1.2. Impacts Common to All Alternatives

Forest Products
Under all alternatives, timber harvest would be prohibited within 200 feet of surface water. This would prohibit forest product activities on 396 acres (2.21%) of the forest management areas, a minor adverse effect.

Physical Resources

Air Quality
Restrictions on vegetative treatments to prevent adverse effects on air quality would vary depending on air quality conditions in the immediate area at the time of proposed treatments. Potential short-term adverse effects on vegetative treatments include planning and timing restrictions to minimize emissions associated with fugitive dust or smoke. This effect would be minor. Implementing measures to mitigate adverse effects on air quality by reducing dust emissions could adversely affect forest product sales. However, because such mitigation would not be likely to prevent forest product sales, the effect would be minor.

Soil
Soil types and conditions could affect forest management. Timber harvest could be restricted in areas with unstable soils or particularly steep terrain. This would have a moderate adverse effect on forest product sales.

Water Resources
Timber harvesting could be limited in areas with high-value water resources. It would be necessary to modify timber sales and stand improvement projects, which would have a moderate adverse effect on the forest product resource.

Cave and Karst Resources
Common to all management actions are procedural, conducting inventories and mapping, which would add negligible time and financial costs to forest product projects.

Mineral Resources

Almost the entire planning area would be available for exploration and development of locatable, salable, and fluid minerals under all alternatives. Coal leasing would be limited to areas with high potential for coal development in areas of central Campbell County and north-central Sheridan County.

Locatable Minerals
Public lands not formally withdrawn from mineral entry would be available for locatable mineral development. At present, locatable mineral operations affect 0.3 percent of BLM-administered forest and woodland communities, 138 and 92 acres, respectively. The trend in locatable minerals development is predicted to be similar throughout the planning period. This would have a negligible adverse effect on forest products as the presence of mineral claims could limit forest product sales.

Leasable Minerals – Coal
The potential acreage available for coal leasing is extensive, but the foreseeable activity would be confined to central Campbell County and north-central Sheridan County, and

would only affect the scattered woodlands. Therefore, coal development activities would not have a noticeable effect on forest products and is not further discussed in this section.

Leasable Minerals – Fluids
Federal fluid mineral estate in the planning area would be available to fluid minerals leasing unless it is identified as closed. Based on the predicted activity from oil and gas operators surveyed as part of the reasonably foreseeable development forecast, conventional oil and gas development (potential of low to moderate 10 to 40 wells per township could occur on 3,468 acres (13%) of BLM-administered woodlands. CBNG development could occur on 5,737 acres (22%) of BLM-administered woodlands. Physical disturbance and the loss of vegetation would be much less than the acreage where fluid minerals activity occurs, typically less than two percent for CBNG. The result have a minor adverse effect on forest products.

Salable Minerals
There are 205 acres (1.2%) of sand and gravel deposits in forest management areas (Billy Creek and the Horn). With the typically small size of salable minerals development, small acreages would be removed from forest production. The foreseeable development scenarios for all alternatives predict less than one percent of BLM surface would be disturbed through salable minerals development. Although sand and gravel deposits are present in slightly more than one percent of the forest management areas, it is not likely the entire amount of predicted salable minerals development would occur in forest management areas. Therefore, salable minerals development would have a negligible adverse effect on the forest products program.

Fire and Fuels Management

Fire management can affect forestry activities. Fuels treatment projects in forested areas can reduce the potential for wildfire by reducing the fuels source. These projects can reduce the amount of woody material on the ground and alter the structure of both the understory and overstory, changing the stand composition and structure. These projects also could open seed beds and help regeneration, helping make forest products a sustainable resource. Wildland fire use for resource benefit also could affect forestry. In areas where this practice is allowed, wildland fire could alter stand composition, structure, and function. Wildland fire could change the seral state of the forest or woodland. Potential commercial material (e.g., sawlogs and firewood) could be burned and no longer be salvageable. Fire and fuels management actions common to all alternatives when considered as a whole would have a moderate beneficial effect on forest products.

Biological Resources

Vegetation – Forests and Woodlands
There are no forest and woodland management actions common to all alternatives.

Vegetation – Grassland and Shrubland Communities
Grassland and shrubland communities overlap forest and woodland communities and play an important role in creating vegetative mosaics and diversity; which benefits forest and woodland health and therefore forest products. When products are removed, this allows for residual vegetation to protect the soil and water resources promoting forest product regeneration. Grassland and shrubland management actions common to all alternatives would have a moderate beneficial effect on forest products.

Vegetation – Riparian/Wetland Resources
The Wyoming Forestry requires streamside MZs in harvesting operations. These zones are located with consideration of slope, aspect, stream type, and stream life. This could reduce the acres available for the harvest of forest products, which would be a moderate adverse effect.

Invasive Species and Pest Management
The regulations for controlling invasive species could increase the cost for the removal of forest products. Requirements to flush equipment and reseed only with approved seed are examples of the restrictions that would increase the cost of harvesting forest products. At the same time, the ability to control pests in forests plays a vital role in forest product removal. Invasive species and pest management actions common to all alternatives overall would have a minor adverse effect on forests products due to the increased costs associated with invasive species requirements.

Fish and Wildlife Resources – Fish and Special Status Species – Fish
The management actions common to all alternatives would restrict forest product activities near fish bearing waters. There are 3,432 acres (19%) of the forest management areas within 0.25 mile of fish-bearing waterbodies. Because commercial sales would be restricted, but not prohibited, the impact is minor. Special status fish are presently limited to the Tongue River drainage which does not contain any commercial forests; therefore, there would be no effect to forest products from special status fish species and they will not be discussed further in this section.

Fish and Wildlife Resources – Wildlife and Special Status Species – Wildlife (including Greater Sage-Grouse)
The management of wildlife and special status wildlife species and their habitats would have an effect on the forest product program. Management would include precluding or placing seasonal restrictions on timber harvest in areas with habitat for these species, such as raptors and their nests. Overall, wildlife management actions common to all alternatives would have a moderate adverse effect on forest products.

Heritage and Visual Resources

Cultural Resources
Protection of significant cultural resources could indirectly affect the forest products program through increased costs to avoid sites that require protection, and delay projects. Significant sites are rare and typically small, the impacts to the forest product program would be negligible.

Paleontological Resources
Retention of public lands with significant paleontological values would likely have no effect on the forest products program as such areas are rare, typically small, and unlikely to occur within commercial forest areas.

Visual Resources
Visual resources management actions common to all alternatives would likely not have discernible impacts on the forest products program as the primary requirement would be to screen or paint non-temporary facilities. Typically there would not be any non-temporary facilities associated with forest product sales.

Land Resources

Lands and Realty
There are no lands and realty management actions common to all alternatives that would directly affect the forest products program.

Renewable Energy
Management actions common to all alternatives are procedural, requiring cooperation, and would not directly affect forest products.

Rights-of-Way and Corridors
Placing ROW corridors adjacent to roads and other disturbance corridors would benefit the forest products program by preventing corridors through commercially suitable stands. The potential for new access roads in forest management areas could allow for better access to forest products, thereby increasing demand for those products. Because few ROW actions are anticipated in forest management areas, ROW and corridors management common to all alternatives would have a minor beneficial effect on forest products.

Travel and Transportation Management
TTM actions common to all alternatives could increase access to forest product areas through negotiating access to isolated parcels of public lands, evaluating and potentially retaining roads constructed for other programs, and minimizing surface disturbance. Few transportation actions are anticipated in the forest management areas. This management would have a minor beneficial effect on forest products.

Recreation
The effects of dispersed recreation on forest products are related primarily to access, which is discussed under *Travel and Transportation Management*. Management actions for developed recreation sites and SRMAs could affect the forest products program by removing some areas from commercial production. Since there is little overlap with developed recreation sites, SRMAs and forest management areas these management actions would have a negligible adverse effect on forest products.

Lands with Wilderness Characteristics
Newly acquired lands are unlikely to meet the size and naturalness requirements for wilderness characteristics and therefore would not affect the forest products program.

Livestock Grazing Management
Appropriate livestock grazing would be authorized under all alternatives. Livestock grazing tends to be compatible with forest product production, except in areas of aspen or other deciduous hardwood regeneration. There have been very few commercial sales of hardwoods. Therefore, the effect of livestock grazing on the forest products program would be negligible.

Special Designations

Areas of Critical Environmental Concern
Proposed management of ACECs has no measurable effect on the forest products resource, as the two resources do not overlap, and will not be discussed further in this section.

Scenic or Back Country Byways
The analysis of suggested byways would not affect the forest products resource. However, Byway designation could increase traffic flow, and therefore increase the need for safety measures and

increase costs for logging and hauling activities. This would have a minor adverse effect on the forest products program.

Wild and Scenic Rivers
The portion of the Middle Fork Powder River that is suitable and eligible for WSR designation does not intersect a forest management area. Management of WSRs would not affect the forest products resource and will not be discussed further in this section.

Wilderness Study Areas
WSAs do not overlap with forest management areas. Management of WSAs would not affect the forest products resource and will not be discussed further in this section.

Socioeconomic Resources

There are no social, economic, or health and safety management actions common to all alternatives, or by alternative, that would have a measurable effect on the forest products program. Therefore, socioeconomic resources are not further addressed in this section.

4.6.1.3. Alternative A

This section describes management actions and potential effects associated with the continuation of the current management and provides a baseline to identify potential consequences to the forest products program. The effects described above under Impacts Common to All Alternatives would be in addition to the effects described below for management actions under Alternative A.

Forest Products
The primary management actions under Alternative A would allow the sale of minor forest products from throughout the planning area, offer approximately 18 MMbf of saw timber during the planning period, and limit clear-cuts to 20 acres. These actions would provide for an active forest products program. Because there would be some restrictions on the program, the beneficial effects of this management would be moderate.

Physical Resources

Air Quality
Under Alternative A, air quality monitoring would be required of forest product projects expected to approach or exceed emission standards. Few sales would likely be required to perform monitoring, and the monitoring would likely not prevent any sales. The effect on the forest product program would be negligible adverse.

Soil
Alternative A soils management actions include prohibiting surface-disturbing activities seasonally in areas of severe erosion hazard, on slopes equal to or greater than 25 percent, and in areas with poor reclamation suitability. All three prohibitions have an undefined allowance for waivers, and therefore would not prohibit potential forest product sales outright. The seasonal prohibition would have an effect because it could delay sale activities, which are already limited seasonally by winter weather. There are 10,058 acres (56%) of the forest management areas on slopes equal to or greater than 25 percent, and 6,203 acres (35%) of the forest management areas in areas rated as having poor reclamation suitability. Silviculture treatments are typically less damaging to soil resources than other surface-disturbing activities, and are commonly authorized

when other activities might not be. With the exception of clear-cuts, not all overstory trees are removed; the understory typically is not removed, and physical disturbance to soils is limited. All of this reduces adverse effects on soils compared to other surface-disturbing activities. Therefore, although more than 10 percent of the forest management areas have sensitive soils, the effect on the forest product program would be moderate.

Water Resources

The only water management action under Alternative A that would directly affect forest products is a 500-foot restriction on surface-disturbing activities around springs, reservoirs, water wells, and perennial streams. Like many management actions under Alternative A, the authorized officer can waive the prohibition. This buffer would affect 58,445 acres of forest management areas and therefore restrict product removal from these zones. Forest product sales within 500 feet of water resources would be considered on a project-specific basis. Overall, the effect of Alternative A water management actions on the forest products program would be moderate adverse.

Cave and Karst Resources

Under Alternative A, forest product sales in cave and karst areas would be considered on a project-specific basis. Karst formations are present primarily along the Big Horn Mountains and include the forest management areas. Restrictions on forest product activities would likely be confined to buffers around the entrances to significant caves. At present, there is only one documented significant cave in the forest management areas. Alternative A cave and karst management would have a negligible adverse effect on the forest products program.

Mineral Resources

Locatable Minerals

Under Alternative A, existing withdrawals from locatable minerals entry would continue. At present, locatable minerals operations affect 0.3 percent of BLM-administered forest and woodlands communities (138 and 92 acres, respectively). The trend in locatable minerals development is predicted to be similar throughout the planning period. This would have a negligible adverse effect on forest products as the presence of mineral claims could limit forest product sales.

Leasable Minerals – Fluids

Based on the predicted leasable fluid minerals activity under Alternative A, conventional activity (potential of moderate or above) could occur on 1,209 acres (2.7%) of BLM-administered forest lands and 1,942 acres (7.4%) of woodlands. CBNG activity could occur on 2,148 acres (4.7%) of BLM-administered forest lands and 5,779 acres (22.1%) of woodlands. Physical disturbance and the loss of vegetation would be much less than the acreage where fluid minerals activity occurs, typically less than two percent for CBNG. The result would be a minor adverse effect on forest and woodland resources.

Salable Minerals

Salable mineral activities could prevent potential forest product sales. The estimated areas of salable mineral activity during the planning period would be 530 acres (Appendix G (p. 1937)) a minor adverse effect on the ability to provide forest product sales.

Fire and Fuels Management

Alternative A would give priority to fire suppression in commercial timber areas and provide for prescribed fire to support vegetation management objectives. The suppression efforts, utilizing the different levels and restricting some types of suppression, would have a beneficial effect on forest products. Fuels reduction projects could be performed in forested areas to reduce the potential hazard of wildfire. These projects can alter the structure of both the understory and overstory of trees, changing the composition and structure of the stand and leading to increased productivity and desirability for forest products. This would have a major beneficial effect on the forest products program.

Biological Resources

Vegetation – Forests and Woodlands
Under Alternative A, designing forest management treatments to meet overall resource management objectives would have a major beneficial effect on the forest products program. Forest management areas could be managed for forest product production.

Vegetation – Grassland and Shrubland Communities
The present RMP does not contain any grassland and shrubland management decisions, therefore their management would be considered on a project specific basis. Grassland and shrubland communities are often adjacent to and intermingled with forest and woodland communities; therefore restrictions within grass and shrub communities could limit access to commercial forests. Such limitations are expected to be rare, therefore the effect would be negligible.

Vegetation – Riparian/Wetland Resources
Alternative A would prohibit surface-disturbing activities within 500 feet of springs, reservoirs, water wells, and perennial streams. This would affect approximately 23,831 acres, unless the authorized officer waives the prohibition. Aspens, cottonwoods, ash, and willows often grow in these moist areas, and this management would limit actions to ensure the reproduction and maintenance of these species. However, this would have a negligible adverse effect on the forest products program because historically, these species have not played a major role in the forest products market.

Invasive Species and Pest Management
Weed and pest control is limited to biological means, sanitation and salvage harvest to remove insect and disease trees. Forest products are derived from treated lands. Measures to control invasive plant species, would increase the operational expenses of some harvest operations. Applications to make the forest and woodlands more resilient to infestations will produce forest product opportunities. Overall, management of invasive species and pests would benefit forest products to a moderate degree by reducing forest pest infestations.

Fish and Wildlife Resources – Fish
There are no fisheries management actions under Alternative A. Therefore, effects are considered on a project-specific basis. Forest product sales would likely be controlled and potentially prohibited near fish-bearing streams. This would have a minor adverse effect on the forest products program as few commercial sales would likely be prevented.

Fish and Wildlife Resources – Wildlife
Big game and raptor management actions under Alternative A would have a major adverse effect on the forest products program. At present, there are no documented raptor nests within 0.5 mile of the forest management areas, but this is likely due to inadequate inventory data, not the absence

of nesting raptors. The Alternative A management action with the greatest effect would be the prohibition of timber harvest activities in crucial elk habitat or hiding cover. At present 11,153 acres (62.1%) of the forest management areas provide elk hiding cover.

Special Status Species – Plants
Alternative A does not include management for special status plant species except on a project specific basis. Forest products projects would consider special status plants. However, because special status plants are typically rare and have small populations, it is not likely they would have more than a negligible adverse effect on the forest product program.

Special Status Species – Wildlife (including Greater Sage-Grouse)
At present, there are no documented raptor nests, bald eagle nests, or bald eagle roosts in the forest management areas, but there is potential for all to occur. Alternative A does not include management actions for amphibians and reptiles; therefore, they are considered on a project-specific basis. There are 4,680 acres (26.1%) of amphibian and reptile habitat in the forest management areas. Forest product sales would have to consider SSS during planning and projects might have to be modified or relocated. It is not likely that any projects could not be accommodated. The effect on the forest products program would be moderate adverse.

Heritage and Visual Resources

Cultural Resources
Alternative A does not include cultural resources management actions that would directly affect the forest product program, because none of the cultural resources sites identified for management are in the forest management areas. Cultural resources would be considered on a project-specific basis, and a cultural resources inventory would be required during project planning. Projects might have to be modified to prevent adverse effects on cultural resources, but it is not likely that a forest product sale would be canceled. The adverse effect on the forest products program would be negligible.

Paleontological Resources
Alternative A does not include management for the protection of paleontological resources, but would consider effects on a project-specific basis. Implementing protective measures for paleontological resources could require avoidance and other mitigation measures for proposed forest product sales. These measures could require that sales projects be relocated or redesigned. It is not likely that a forest product sale would be canceled, and the effect on the forest products program would be negligible.

Visual Resources
Alternative A would manage 14,727 acres (82.1%) of the forest management areas under VRM Class II. Activities in Class II areas should not attract the attention of the casual observer. This management would affect the designs, types, sizes, and shapes of timber harvests, but would not prohibit them. For example, clear-cuts could be kept small and irregular in shape to mimic natural forest openings. VRM Class III and IV areas have greater management flexibility. The effect on the forest products program would be moderate adverse.

Land Resources

Lands and Realty
The BLM-administered land ownership pattern in the planning area is scattered, interspersed

with private, state, and lands administered by other federal government agencies. Land tenure adjustments would occur on a project specific-basis under Alternative A, with an emphasis on acquiring areas adjacent to existing blocks of BLM surface and disposing of isolated BLM parcels. The forest management areas are mostly within large blocks of BLM surface. Consolidating surface lands could facilitate forest product management by providing for a more contiguous public land base. Acquisitions are primarily driven by outside proponents; therefore, the result would be a minor beneficial effect on the forest products program.

Renewable Energy
The present RMP does not contain any renewable energy decisions and therefore any proposals would be considered on a project specific basis. The forest management areas have wind energy potential, but commercial projects are not anticipated due to the costs associated with removing the forest cover for siting solar panels. Therefore, no effects are expected to the forest products program.

Rights-of-Way and Corridors
New ROW could increase access to forest products. Alternative A would prohibit ROW on slopes equal to or greater than 25 percent. There are 10,058 acres (56.0%) of the forest management areas with slopes equal to or greater than 25 percent. Few ROW applications are anticipated for forest management areas, therefore ROW prohibition effects on the forest products program would be minor.

Travel and Transportation Management
Alternative A would limit motorized vehicle use to existing roads and vehicle routes on public lands in and around forest management areas, which would minimize potential damage to forest products. Public access would have the potential to adversely affect forest products (e.g., through damage to regenerating forests by illegal off-road travel and through theft of forest products). Such incidents have been rare and are anticipated to remain rare; therefore, the effect on the forest products program would be negligible adverse.

Recreation
Management actions for developed recreation sites and SRMAs would remove some areas from commercial production. Since there is little overlap between developed recreation sites or SRMAs and recreation site development is anticipated to disturb approximately 5 acres, these management actions would have a negligible adverse effect on forest products.

Lands with Wilderness Characteristics
Alternative A would continue to manage forest management areas for forest products and other resources. There would be no effect on the forest products program.

Livestock Grazing Management
Alternative A would require rest from grazing in vegetative treatment areas for one year following treatment, and defer livestock grazing a second year. Rest and deferment would provide aspen and other hardwoods some time to regenerate. One year of livestock grazing rest likely not be sufficient for aspens to grow beyond the reach of livestock. This effect on the forest products program would be negligible adverse.

Special Designations

Scenic or Back Country Byways
Alternative A does not include special designations or recommendations for scenic or BCBs.

4.6.1.4. Alternative B

This section describes management actions under Alternative B, which would emphasize resource conservation, and the resulting effects on the forest products program due to their implementation. The effects described above under *Impacts Common to All Alternatives* would be in addition to the effects described below for management actions under Alternative B.

Forest Products (minor adverse)
Alternative B would allow timber sales only within the forest management areas and would manage sales to keep forest products within ecologically sustainable limits. These actions would limit the forest products program, a minor adverse effect.

Physical Resources

Air Quality
Under Alternative B, potential restrictions on forest product sales to prevent adverse effects on air quality would vary depending on air quality conditions in the immediate area at the time of proposed sales. Few projects would likely be required to perform monitoring, and the monitoring would likely not prevent any sales. Potential short-term adverse effects include planning and timing restrictions to minimize emissions associated with fugitive dust or smoke. The effect on the forest product program would be negligible adverse.

Soil
Alternative B soils management actions include prohibitions on surface-disturbing activities in areas of severe erosion hazard, on slopes equal to or greater than 25 percent, in areas with poor reclamation suitability, and on miscellaneous soil types. There are 30,819 acres (60%) of the forest management areas with slopes equal to or greater than 25 percent, and 6,203 acres (35%) of the forest management areas on soils with poor reclamation suitability. Alternative B prohibitions on surface-disturbing activities in these areas would have a major adverse effect on the forest products program.

Water Resources
Alternative B would prohibit surface disturbance within 500 feet of springs, reservoirs, water wells, and perennial streams. The water management buffer would affect 1,010 acres (5.6%) of the forest management areas. The effect of Alternative B water management actions on the forest product program would be moderate adverse.

Cave and Karst Resources
Alternative B would prohibit surface-disturbing activities, including most silviculture activities, in cave and karst areas. There are karst formations along the Big Horn Mountains, including in the six forest management areas. Alternative B cave and karst management would have a major adverse effect on the forest products program.

Mineral Resources

Locatable Minerals
Alternative B would recommend withdrawal from minerals entry 15,870 acres (31%) of BLM-administered forest lands and 10,777 acres (41%) of woodlands. This would have major beneficial effect on forest program by preventing potential claims that could interfere with forest product activities.

Leasable Minerals – Fluids
Based on the predicted fluid minerals activity under Alternative B, conventional activity (potential of moderate or above) could occur on 340 acres (1.0%) of BLM-administered forest lands and 812 acres (6.9%) of woodlands. CBNG activity could occur on 900 acres (2.7%) of BLM-administered forest lands and 2,820 acres (24.0%) of woodlands. Physical disturbance and loss of vegetation would be much less than the acreage where fluid minerals activity occurs, typically less than two percent for CBNG. The result would be a minor adverse effect to potential forest product sales.

Salable Minerals
Salable mineral activities could prevent potential forest product sales. The estimated areas of salable mineral activity during the planning period would be 114 acres (Appendix G (p. 1937)), a negligible adverse effect on the ability to provide forest product sales.

Fire and Fuels Management

Unplanned Fire (Wildfire)
Alternative B would use full suppression strategies in commercial timber areas. Full suppression strategies can have a moderate beneficial effect on the forest products program because while most fires would be suppressed the accumulation of fuels could lead to a large uncontrollable fire.

Planned Fire (Prescribed Fire)
Alternative B would provide for fire and other treatments to restore fire-adapted ecosystems. Planned vegetative treatments would be for the benefit of ecosystem health, with forest product suitability a minor consideration. The effect on the forest product program would likely be moderate beneficial, for protection from wildfire and making soil available for forest regeneration.

Biological Resources

Vegetation – Forests and Woodlands
Alternative B would minimize silviculture treatments and allow natural processes to run their course. The forest products program would be minimal and limited to situations where silviculture treatments would only be applied to reduce hazardous conditions. This would have a major adverse effect on the forest products program.

Vegetation – Grassland and Shrubland Communities
Requiring native plant species for reclamation activities would contribute to ecosystem health by promoting biological diversity. However, native species can be difficult to establish, costing time and resources, limiting the benefit to moderate.

Vegetation – Riparian/Wetland Resources
A 500-foot buffer of water bodies would reduce acres available for harvest activities. The effect on the forest products program would be moderate adverse.

Invasive Species and Pest Management
Alternative B would allow aerial applications of insecticides. However, this has not been the preferred treatment in forest management areas. Sanitation harvest and biological treatments are the most common treatments. Forest product sales would likely include measures to control

invasive species and pests, and more forest acreage would likely be treated than under other alternatives. Operational expenses would increase, but the overall effect on the forest products program would be minor beneficial.

Fish and Wildlife Resources – Fish
Alternative B would prohibit surface-disturbing activities, including forest product sales, within 0.25 mile of fish-bearing waterbodies. The prohibition would affect 3,432 acres (19%) of the forest management areas. This would have a major adverse effect on the forest products program.

Fish and Wildlife Resources – Wildlife
Big game and raptor management actions under Alternative B would have the greatest effect on the forest products program. Timber harvest activities would be prohibited within crucial elk habitat or hiding cover (which currently includes 11,153 acres, or 62%, of the forest management areas). Wildlife management actions would have a major adverse effect on the forest products program.

Special Status Species – Plants
Surveys for special status plant species would be required during planning for forest product projects, and the projects would be required to avoid adverse effects to special status plant habitat. Projects would likely have to be modified, including changing their locations. Limber pine is designated as a BLM Wyoming Sensitive Species and will require special management for protection. These management actions could severely limit forest product sales.

Special Status Species – Wildlife (including Greater Sage-Grouse)
Alternative B would prohibit surface-disturbing activities, including forest product sales, on amphibian and reptile habitat in the forest management areas (4,680 acres, or 26%). Protections for northern goshawks and other SSS residing in forested areas would seasonally restrict and could prevent forest management activities. These actions would have a major adverse effect on the forest products program.

Heritage and Visual Resources

Cultural Resources
Alternative B would prohibit surface disturbance, including forest product sales, up to 5 miles from historic properties. This action would affect 6,475 acres (36%) of the forest management areas, and have a major adverse effect on the forest products program.

Paleontological Resources
Forest product activities could be prohibited in areas with paleontological resources of high quality or importance. However, at present, there are no high-quality paleontological areas in the forest management areas, and typically the areas are small. Forest product sales could be located to avoid paleontological sites. Therefore, the effect on the forest products program would negligible adverse.

Visual Resources
Alternative B would manage 14,909 acres (83%) of the forest management areas under VRM Class II. This management would affect the designs, types, sizes, and shapes and locations of timber harvests, but would not prohibit them. The effect on the forest products program would be moderate adverse because projects would need to meet the VRM requirements.

Land Resources

Lands and Realty
Alternative B would place a priority on retaining and acquiring lands with natural resource values. Consolidating surface lands could facilitate forest product management by providing for a more contiguous public land base, creating better access, and additional acres for forest production.

Renewable Energy
Portions of the Big Horn Mountains and PRB area have a potential for renewable-energy (e.g., wind) development. Renewable energy would be prohibited in the Big Horn Mountains thus avoiding potential conflict with forest product sales.

Rights-of-Way and Corridors
Alternative B would prohibit ROW on slopes equal to or greater than 25 percent.
There are 10,058 acres (56%) of the forest management areas with slopes equal to or greater than 25 percent. Few ROW applications are anticipated for in forest management areas. Therefore, the adverse effect of the slope prohibition on the forest products program would be minor.

Travel and Transportation Management
Alternative B TTM actions would have a moderate beneficial effect on the forest product program. The extension of new access roads in forest and woodland areas could allow for better access to resources, which could benefit timber sales. Expanded road access also could mean easier access for wood cutters and other users of forest products, thereby increasing the demand for forest products.

Recreation
Alternative B designates 55,529 acres as SRMAs. Forest product removal could be adversely affected in these areas as surface-disturbing activities would be restricted within SRMAs. Commercial forest product sales are unlikely within SRMAs due to the small overlap with recreation areas and thus the restrictions would have a negligible to minor effect.

Lands with Wilderness Characteristics
Alternative B would manage 12,237 acres for wilderness characteristics. Commercial woodcutting would be prohibited unless for environmental restoration. The lands with wilderness characteristics unit is predominately forested, however the steep topography limits the potential for commercial woodcutting. This would result in a minor to moderate adverse impact to the forest products resource depending on technological advancements in forest management or the economic market for timber in the area.

Livestock Grazing Management
Alternative B would rest vegetative treatment areas for two years following treatment. Two years of rest from livestock grazing rest could be sufficient for some aspen to grow beyond the reach of livestock. The effect on the forest products program would be moderate beneficial.

Special Designations

Scenic or Back Country Byways
Under Alternative B, designating Slip Road and Hazelton Road as BCBs could increase the traffic flow and create safety issues with forest product removal and hauling operations. This would have a minor adverse effect on forest management.

4.6.1.5. Alternative C

This section describes management actions under Alternative C, which would emphasize resource utilization, and the resulting effects on the forest products program. The effects described above under *Impacts Common to All Alternatives* would be in addition to the effects described below for management actions under Alternative C.

Forest Products
The management actions under Alternative C would allow the sale of forest products throughout the planning area, maximize economic potential, and not limit the design or shape of timber harvests. These actions would provide for an active forest products program that emphasizes economic return. There would be few restrictions on the program; therefore, the beneficial effect of this management would be major.

Physical Resources

Air Quality
Alternative C management would not require air quality monitoring for forest product projects.

Soil
Alternative C soils management actions would include allowing surface-disturbing activities in areas with severe erosion hazard, on slopes equal to or greater than 25 percent, in areas with poor reclamation suitability, and on miscellaneous soil types. Silviculture treatments would be designed to accommodate the slope, erosion potential, and soil moisture content consistent with the Wyoming Forestry BMPs. These management actions would allow forest product sales on sensitive soils in the planning area, which comprise much more than 10 percent of the forest management areas. Therefore, this would have a major beneficial effect on the forest products program.

Water Resources
Alternative C would allow surface disturbances within 500 feet of springs, reservoirs, water wells, and perennial streams. This management would allow for project-specific adjustments for slope, aspect, stream type, and other conditions. Wyoming Forestry BMPs and other mitigation measures would be incorporated to reduce adverse effects on water resources. There would be some costs associated with incorporating BMPs and other mitigation measures, however; the overall result would be a moderate beneficial effect on the forest products program.

Cave and Karst Resources
Management actions include establishing buffers from significant cave entrances to minimize effects from surface-disturbing activities. Presently, there is only one documented significant cave within the Forest Management Areas. Alternative C cave and karst management would result in a negligible adverse impact to the forest products program.

Mineral Resources

Locatable Minerals
Alternative C would not recommend any additional minerals withdrawals. At present, locatable minerals operations affect 0.3 percent of BLM-administered forest and woodlands communities, 138 and 92 acres, respectively. The locatable minerals development trend is predicted to be

similar throughout the planning period, and the effect on forest and woodland resources would be negligible adverse.

Leasable Minerals – Fluids
Based on the predicted fluid minerals activity under Alternative C, conventional activity (potential of moderate or above) could occur on 1,205 acres (2.7%) of BLM-administered forest lands and 1,936 acres (7.7%) of woodlands. CBNG activity could occur on 2,057 acres (4.7%) of BLM-administered forest lands and 5,512 acres (21.8%) of woodlands. Physical disturbance and loss of vegetation would be much less than the acreage where fluid minerals activity occurs, typically less than two percent for CBNG. The result would be a minor adverse effect on forest and woodland resources.

Salable Minerals
Salable mineral activities could prevent potential forest product sales. The estimated areas of salable mineral activity during the planning period would be 2,090 acres (Appendix G (p. 1937)), a minor adverse effect on the ability to provide forest product sales.

Fire and Fuels Management

Alternative C would allow full suppression across the planning area and provide for prescribed fire to support commodity production. Planned vegetation management projects could be used to increase the productivity and desirability of forest products. These actions are moderately beneficial as full suppression can increase the risk of fuel buildup and risk of an uncontrollable wildfire.

Biological Resources

Vegetation – Forests and Woodlands
Alternative C would have a major beneficial effect on the forest products program. Designing treatments to maximize forest health would improve opportunities for a sustained forest products program. Clear-cut size would not be regulated. Old-growth forests could be managed to emphasize saw timber or other forest products.

Vegetation – Grassland and Shrubland Communities
Allowing the planting of desirable non-native species could speed reclamation and vegetation recovery, a beneficial effect for the ecosystem and therefore, forest product production.

Vegetation – Riparian/Wetland Resources
Alternative C management would allow surface disturbance within 500 feet of springs, reservoirs, water wells, and perennial streams. This management would allow for project-specific adjustments for slope, aspect, stream type, and other conditions. Wyoming Forestry BMPs and other mitigation measures would be incorporated to reduce adverse effects to riparian and wetland resources. Although there would be some costs associated with incorporating BMPs and other mitigation, the overall result would be a major beneficial effect on the forest products program.

Invasive Species and Pest Management
Under Alternative C, invasive species pest management would continue in the forest management areas, with treatment areas and methods determined annually. Management emphasis only on the State of Wyoming list would be a limiting factor in forest and woodlands pest management. Forest

product sales could include measures to control invasive species, which would increase operating expenses. Overall, there would be a minor adverse effect on the forest products program.

Fish and Wildlife Resources – Fish
Alternative C would allow forest product sales within 0.25 mile of fish-bearing waterbodies consistent with other resource values. This management would affect 3,432 acres (19%) of the forest management areas. Forest management activities could be subject to some regulation for the protection of other resources, but protective buffers would not be likely to extend more than 500 feet from fish-bearing waters. The effect on the forest products program would be moderate beneficial.

Fish and Wildlife Resources – Wildlife
Alternative C would allow forest product activities in elk habitat and near raptor nests, with mitigation appropriate for multiple resource management. The overall result would likely be a major beneficial effect to the forest products program.

Special Status Species – Plants
Under Alternative C, adverse effects on documented special status plant populations would be avoided. Surveys would be required all listed proposed, or candidate species. If any populations of such plants were found during surveys, projects would likely be modified, including change their locations. With the limber pine being designated as a BLM Wyoming Sensitive Species, this will impact forest product projects, as this species is often intermixed with commercial species.

Special Status Species – Wildlife (including Greater Sage-Grouse)
At present, there are no documented raptor nests, bald eagle nests, or bald eagle roosts in the forest management areas. There are 4,680 acres (26%) of amphibian and reptile habitat in the forest management areas that would be available for forest product sales. Forest product projects would consider SSS during planning, and projects might have to be modified. This would have a minor adverse effect on the forest products program as forest product sales would require modifications but would not be prohibited.

Heritage and Visual Resources

Cultural Resources
Alternative C would allow surface disturbance in areas surrounding historic sites. Effects on cultural resources would be considered on a project-specific basis. A cultural resource inventory would be required during project planning. Projects might have to be modified to prevent adverse effects on cultural resources. It is not likely that a forest product sale would be canceled. The effect on the forest products program would be negligible adverse.

Paleontological Resources
Alternative C would require surveys and monitoring of paleontological resources in PFYC Class 4 and 5 formations during surface-disturbing activities. Forest product activities could be prohibited in areas containing paleontological resources of high quality or importance. However, at present there are no high-quality paleontological areas in the forest management areas, and areas of such resources are typically small. Forest product sales could be located to avoid paleontological resource sites. Therefore, the effect on the forest products program would be negligible adverse.

Visual Resources

Under Alternative C, managing most of the planning area as VRM Class III or IV would have a beneficial effect on forest product activities because there would be few restrictions for the protection of visual resources. This would allow harvesting of all areas that are needed for forest health and sustainability, therefore product availability would increase.

Land Resources

Lands and Realty

Under Alternative C, disposing of lands that have resource value would have an adverse effect on the forest products program. Removing the option of acquiring lands adjacent to the larger public land blocks also would have a long-term adverse effect by denying opportunities to acquire lands with forest product potential. These management actions could have a major effect on the forest products program. However, it is not anticipated that there would be an active disposal campaign and therefore the impact would likely be minor.

Renewable Energy

Under Alternative C, renewable-energy development must be consistent with all other resource values. All public lands in the planning area would be open to such development. The forest management areas have wind energy potential, but commercial projects are not anticipated due to the costs associated with removing the forest cover for siting solar panels. Therefore, no effects are expected to the forest products program.

Rights-of-Way and Corridors

Alternative C would allow ROW on slopes equal to or greater than 25 percent, which could increase access to forest products. However, few ROW applications are anticipated in the forest management areas. Therefore, the beneficial effect on the forest products program would be minor.

Travel and Transportation Management

Under Alternative C, allowing motorized vehicle use on saturated soils and steep slopes would have a long-term adverse effect on forest and woodland areas. This management would open all roads to motorized vehicle use and would allow access to management areas where regeneration could be damaged by OHV use. The adverse effect on forest and woodlands regeneration and therefore products would be minor.

Recreation

Alternative C designates 30,570 acres as SRMAs. Forest product removal could be adversely affected in these areas as surface-disturbing activities could be limited or require intense mitigation within SRMAs. The forecast is that 20 acres would be disturbed for recreation facilities over the planning period, it is unlikely any facilities would be proposed in the commercial forest areas. Commercial forest product sales are unlikely within SRMAs due to the small overlap with recreation areas and thus the restrictions would have a negligible effect.

Lands with Wilderness Characteristics

Alternative C does not propose any management related to lands with wilderness characteristics, thus there would be no effect on the forest products resource.

Livestock Grazing Management

Under Alternative C, allowing livestock grazing in regeneration areas and after prescribed fire would affect the sustainability and health of forests and woodlands by limiting species and

age-class diversity. This would have a major adverse effect on the future availability of forest products.

Special Designations

Scenic or Back Country Byways
Alternative C does not include special designations or recommendations for scenic or BCBs.

4.6.1.6. Alternative D

This section describes management actions under Alternative D, the Proposed RMP, and the likely resulting effects on forest products due to its implementation. The effects described above under *Impacts Common to All Alternatives* would be in addition to the effects described below for management actions under Alternative D.

Forest Products
Forest Products Management actions under Alternative D would allow the sale of forest products in portions of the planning area, with accommodations for other resource values such as wildlife and special designations, a moderate benefit.

Physical Resources

Air Quality
Under Alternative D, effects on the forest products program would be possible if product sales are anticipated to exceed or approach ambient air quality standards. However, few forest product projects are large enough or have durations long enough to warrant monitoring.

Soil
Under Alternative D, disturbances would be considered in areas with severe erosion hazard, on slopes equal to or greater than 25 percent, and in areas with poor reclamation suitability where the soil resources could be appropriately mitigated. There are 40,032 acres of forest and woodland on slopes equal to or greater than 25 percent suitability that would be limited for forest products removal due to safety, inaccessibility, and soil conservation. This would have a moderate adverse effect on the forest product program.

Water Resources
Alternative D water management would allow surface disturbance within 500 feet of springs, reservoirs, water wells, and perennial streams where water quality could be protected. Project design features and mitigation would ensure that water resources are protected while allowing for activities such as forest product sales and silviculture treatments. Wyoming Forestry BMPs require a 200-foot buffer and other mitigation measures incorporated into project designs. The overall result would be a minor adverse effect (less than 5% of forest and woodlands affected) on the forest products program.

Cave and Karst Resources
Alternative D would require a disturbance-free buffer around the entrances and passages of significant caves. This could require the relocation or redesign of individual projects, but likely would not prevent any forest product sales. At present, there is only one documented significant cave in the forest management areas. Alternative D cave and karst management would have a negligible effect on the forest products program.

Mineral Resources

Locatable Minerals

Alternative D would not recommend any additional minerals withdrawals. At present, locatable minerals operations affect 0.3 percent of BLM-administered forest and woodlands communities, 138 and 92 acres, respectively. The locatable minerals development trend is predicted to be similar throughout the planning period, and the effect on forest and woodland resources would be negligible adverse.

Leasable Minerals – Fluids

Based on the predicted fluid minerals activity under Alternative D, conventional activity (potential of moderate or above) could occur on 949 acres (2.2%) of BLM-administered forest lands and 1,576 acres (6.5%) of woodlands. CBNG activity could occur on 1,968 acres (4.6%) of BLM-administered forest lands and 5,350 acres (22.1%) of woodlands. Physical disturbance and loss of vegetation would be much less than the acreage where fluid minerals activity occurs, typically less than two percent for CBNG. However, this could result in fragmentation of adjoining stands of forest and woodland vegetation. The result would be a minor adverse effect on forest products.

Salable Minerals

Salable mineral activities could prevent potential forest product sales. The estimated areas of salable mineral activity during the planning period would be 1,193 acres (Appendix G (p. 1937)) a minor adverse effect on the ability to provide forest product sales.

Fire And Fuels Management

Alternative D would prioritize fire suppression based on resource goals and objectives. Forest management areas would receive a higher suppression priority compared to other forested areas. Prescribed fire and other vegetative treatments would be performed to support vegetation management objectives. These projects can alter the structure of both the understory and overstory of trees, changing the composition and structure of the stand and leading to increased productivity and desirability for forest products. Vegetation treatments can keep fuel loads down reducing the risk of an uncontrollable wildfire. This management would have a major beneficial effect on the forest products program.

Biological Resources

Vegetation – Forests and Woodlands

Alternative D would utilize silviculture treatments, including intensive tactics to maximize forest health, while emphasizing multiple resource values. Old-growth forests and aspen communities would be maintained and encouraged with multiple treatments. These management actions would benefit the forest products program and promote forest products through making forests and woodlands sustainable.

Vegetation – Grassland and Shrubland Communities

Allowing desirable non-native plant species for short-term reclamation activities could speed reclamation and vegetation recovery, a beneficial effect for the ecosystem and therefore, forest product production.

Vegetation – Riparian/Wetland Resources
Alternative D riparian management would allow surface disturbance within 500 feet of springs, reservoirs, water wells, and perennial streams with adequate protection. Project design features and mitigation would ensure that riparian and wetland resources are protected while allowing for forest product sales. Wyoming Forestry BMPs require a 200-foot buffer and other mitigation measures incorporated into project designs. The overall result would be a minor beneficial effect (less than 5% of forest and woodlands affected) on the forest products program.

Invasive Species and Pest Management
Alternative D would allow aerial applications of insecticides. BLM specialists would be allowed to determine tree species and areas of treatment. This would benefit forest product sales, including salvage sales. Invasive species pest control would continue in the forest management areas, with priority given to treatment areas that could be a safety factor for the public, and forests and woodlands that have increased mortality. Forest product sales would likely include measures to control invasive species. The cost of control measures is outweighed by the benefit to forest product productions, so that overall these management actions are a minor benefit to the forest product program.

Fish and Wildlife Resources – Fish
Alternative D would allow forest product sales within 0.25 mile of fish-bearing waterbodies where fish objectives can be met. This management would affect 3,432 acres (19%) of the forest management areas. Forest management activities would be subject to restrictions for the protection of fish and other resources, but the restriction would likely extend no more than 500 feet from fish-bearing waters. The effect on the forest products program would moderate adverse.

Fish and Wildlife Resources – Wildlife
Under Alternative D, forest product activities would be required to maintain current amounts of crucial elk habitat and hiding cover. This would constrain, but not prohibit, well-planned forest product sales. Restrictions on disturbances in calving areas and big-game corridors, and the buffers around raptor nests would have the greatest effect on forest products by limiting the timing forest products removal, the types of removal, and the sizes of the harvest areas.

Special Status Species – Plants
Alternative D would require surveys for special status plant species during planning for forest product projects in modeled habitat, and would require that adverse effects on populations of this species be avoided. There are populations of limber pine throughout the forest and woodlands. The projects will need to be adapted to assure the regeneration and the survival of this tree species and any and all others that are designated and were found in the proposed project areas, the projects could be modified, including relocation.

Special Status Species – Wildlife (including Greater Sage-Grouse)
Most of the forest and woodland areas include amphibian and reptile habitat and their protective buffers. Forest product sales would have to protect SSS, and this measure would affect harvesting activities. Locating amphibians and reptiles through surveys would result in loss of time to implement forest product sales.

Heritage and Visual Resources

Cultural Resources
Under Alternative D, the cultural resources program would develop CRPPs for the protection

and preservation of identified geographic areas. These could include a prohibition on surface-disturbing activities for specifically identified sites containing historic properties that retain their historic settings, and appropriate mitigation for surface-disturbing activities for the protection of TCPs, sacred sites, and other culturally sensitive areas. At present, none of the identified sites where surface-disturbing activities would be prohibited are in the forest management areas.

To protect the setting of historic properties, surface-disturbing activities could be restricted up to three miles from the sensitive cultural sites, which would affect 15,694 acres (87%) of the forest management areas. Forest product sales projects would have to mitigate adverse effects on cultural resources, which could include relocating the projects.

Paleontological Resources
Alternative D would require surveys and monitoring of paleontological resources in PFYC Class 4 and higher formations. Forest product activities could be prohibited in areas containing paleontological resources of high quality or importance. However, at present there are no high-quality paleontological areas in the forest management areas, and such areas typically are small. Forest product sales could be located to avoid paleontological sites. Therefore, the effect on the forest products program would be negligible adverse.

Visual Resources
Alternative D would manage 10,997 acres (61%) of the forest management areas under VRM Class II. This management would affect the designs, types, sizes, locations, and shapes of timber harvests, but would not prohibit them. The effect on the forest products program would be moderate adverse because projects would need to meet the VRM requirements.

Land Resources

Lands and Realty
Management under Alternative D would actively pursue land tenure adjustments to consolidate BLM surface estate and dispose of small, isolated parcels of BLM-administered land or lands have limited natural resource values. Consolidating surface lands would benefit the forest products program by providing for a more contiguous public land base and resolving access issues.

Renewable Energy
Under Alternative D, excluding renewable-energy development in the southern Big Horn Mountains would protect and preserve the larger forest management areas for forest production and product removal.

Rights-of-Way and Corridors
Alternative D would seek to avoid ROWs on slopes equal to or greater than 25 percent. There are 10,058 acres (56%) of the forest management areas with slopes equal to or greater than 25 percent. Few ROW applications are anticipated for the forest management areas, and combined with the slope restriction versus prohibition, this would result in a negligible effect on the forest products program.

Travel and Transportation Management
Under Alternative D, allowing motorized vehicle use on designated routes and managing roads consistent with forest and woodland resources would have a moderate beneficial effect on forest and woodlands management by preventing off-road use which damages regeneration.

Recreation
Alternative D designates 54,160 acres as SRMAs. Forest product removal could be adversely affected in these areas as surface-disturbing activities would be restricted within SRMAs. The forecast is that 20 acres would be disturbed for recreation facilities over the planning period, it is unlikely any facilities would be proposed in the commercial forest areas. Commercial forest product sales are unlikely within SRMAs due to the small overlap with recreation areas and thus the restrictions would have a negligible to minor effect.

Lands with Wilderness Characteristics
Alternative D would manage 6,864 acres for wilderness characteristics. The proposed alternative will prohibit commercial woodcutting unless it is a by-product of environmental restoration. The lands with wilderness characteristics unit is predominately forested, however the steep topography limits the potential for commercial products. This alternative would result in a minor adverse impact to the forest products resource.

Livestock Grazing Management
Alternative D would rest or defer livestock grazing in vegetative treatment areas until resource objectives are met. In the forest management areas, the resource objectives would likely include vegetation regeneration. The effect on the forest products program would be major as forest product production would be sustained.

Special Designations

Scenic or Back Country Byways
Under Alternative D, designating Slip Road and Hazelton Road as BCBs could increase the traffic flow and create safety issues with forest product removal and hauling operations. This would have a minor adverse effect on forest management.

4.6.1.7. Cumulative Impacts

Forest products derived from forest and woodland management activities play an important role in supporting the socioeconomics of the community and supporting other resources in forest and woodland communities.

The intermingling of private, state, and USFS lands with BLM-administered lands throughout the planning area ensures that activities outside BLM control would continue. Timber harvest activities, silviculture treatments, and development of housing and other structures on private, State of Wyoming, and USFS lands would leave roads in place and reduce forest and woodland acres by creating more fragmentation and edge effects. This could delay implementation of BLM harvest activities, fuel reduction activities, or silviculture activities until effects associated with the activities are mitigated or are no longer a factor. However, using these same roads to manage BLM-administered lands would result in fewer roads being built, and the BLM would have the option of mitigating the effects of roads on BLM-administered lands.

As private land is fragmented, there will be less forest product activity because having numerous landowners to negotiate with will make it more difficult to gain access to the adjacent public lands.

4.6.1.8. Conclusion

Alternative B would place the greatest restrictions on the forest products program, and Alternative C the least. Alternative D provides for forest product sales and other land uses while conserving resource values.

4.6.2. Lands and Realty

The land ownership pattern in the planning area is scattered and interspersed with private and state lands and other agency-administered lands. Through the lands and realty program, lands in the planning area will be acquired or disposed of through exchanges, sales, or the R&PP Act of 1926 (as amended, 43 U.S.C. 869 et seq.). Exchange is the preferred method of land tenure adjustments and must be considered before other land tenure adjustment methods. Approximately 120,722 acres in the planning area are identified for disposal (Appendix L (p. 2211)). This section describes potential impacts to the lands and realty program from land actions within the program and management actions for other resources and programs.

4.6.2.1. Methods and Assumptions

In an effort to consolidate ownership and improve access and management opportunities, adjustments will focus on disposing of scattered, isolated parcels while acquiring lands adjacent to larger blocks of BLM-administered public lands. This will decrease conflicts between public land users and private landowners, and decrease the cost of public land administration. Adjustments also will provide community expansion opportunities.

Impact analyses and conclusions are based on interdisciplinary team knowledge of resources in the planning area, reviews of existing literature, and information provided by other agencies. Spatial analysis was performed using computer software. Effects are quantified where possible. In the absence of quantitative data, effects are described using ranges of potential effects or in qualitative terms if information is available and appropriate.

Demand for land tenure adjustments (e.g., retention, and disposal and acquisition [primarily through exchange]) will likely increase during the planning period. Land tenure adjustments will benefit the overall administration of the lands and realty program by improving the BFO ability to administer resources and protect resource values. If there are effects that were not beneficial and could not be properly mitigated, a land tenure adjustment will not be considered. Certain lands will not be considered for disposal unless they are exchanged with lands of equal or greater value, including functional resource value or monetary value.

Assumptions

This analysis uses the following assumptions:

- The demand for land tenure adjustments and land use authorizations will increase over the life of the plan.
- Lands with known minerals values or lands likely to include minerals values will generally be retained. Alluvial valley floors will generally be retained under federal ownership to protect the resource. Consistent with the Surface Mining Control and Reclamation Act of 1977, minerals owned or leased by other entities, and occurring in alluvial valley floors will

be considered for exchange. Currently there is one alluvial valley floor exchange proposal that is being entertained.

- Unless identified for disposal, all BLM-administered lands will generally be retained in federal ownership to protect resource values. Because of their limited presence in the planning area, the BFO will generally retain lands with aquatic resources, agricultural potential, and wetland/riparian habitat.
- Disposal of small, isolated parcels of public land will enhance efficiency in management of the remaining public lands. Accomplishing these types of disposals will increase the BFO financial ability to pursue land tenure adjustments.
- Land acquisitions will occur, when appropriate, if required to meet the goals and objectives of other resources programs (e.g., cultural resources, fish and wildlife, and recreation).
- Resolving trespass issues on public lands will continue during the planning period. Avoiding inadvertent trespass by people accessing public lands will be addressed through the use of appropriate signs and access authorizations.
- Existing withdrawals will be retained throughout the planning period unless it is determined, through a withdrawal review, that existing withdrawal(s) should be revoked or modified. Management will consider withdrawals on surface and minerals estate on a project-specific basis. In addition, review of withdrawal proposals from other agencies will be addressed on a project-specific basis.
- There are multiple resource values on a given land parcel making acquisition into public ownership more desirable or decreasing the potential for disposal.
- Opportunities for land tenure adjustments are substantially reduced due to increased demand for other land use authorizations. For example: a higher priority is placed upon the ROW, or renewable energy programs not providing sufficient time for BLM realty specialists to devote to the lands and realty program, as well as budget constraints.

4.6.2.2. Impacts Common to All Alternatives

Lands and Realty

There are no proposed management actions common to all alternatives that would adversely effect the lands and realty program. The management actions provide for a flexible and diverse lands and realty program. Lands and realty management common to all alternatives management seeks to improve access to public land and enable better overall management of BLM-administered land. Lands and realty management would consider R&PP leases on a project specific basis and prohibit subsequent uses on these lands unless they are compatible with R&PP authorization. Lands and realty management common to all alternatives would consider FLPMA leases and permits, acquisitions to include easements, exchanges, sales, and withdrawals on a case-by-case basis. Consider land withdrawals for other agencies and review withdrawal proposals on a project specific basis. Review existing land withdrawals to determine if the use is consistent with the intent of the withdrawal and whether the withdrawal should be continued, modified, revoked or terminated. Review existing land classifications and segregations on a case-by-case basis to determine whether this land management is appropriate and should be continued, modified, or terminated. Lands on which withdrawals, classifications, and segregations have been terminated or revoked, will be managed in a manner consistent with the adjacent land within the planning area, opening the lands. Lands meeting the identified disposal criteria will have priority consideration for disposal. Land exchanges, sales, and purchases would help to consolidate the relatively fragmented public land ownership pattern within the planning area and allow for better management of public lands over the long term. Consolidating public land holdings improves access to public lands, reducing the number of access easements needed and helping to reduce

encroachment problems from adjacent property owners. Avoid the potential of inadvertent trespass on public lands through the use of appropriate signage and access authorizations.

Overall, lands and realty management actions common to all alternatives would have a major beneficial effect on the lands and realty program.

Physical Resources

Air Quality

There are no air quality management actions common to all alternatives or that vary by alternative that would effect the acquisition, disposal, or withdrawal of public lands; therefore air quality will not be addressed further in the *Lands and Realty* section.

Soil

The soil management actions common to all alternatives and by alternative all discuss surface-disturbing activities and would not affect the acquisition, disposal, or withdrawal of public lands. Soil is typically not a primary resource when considering a proposed land tenure adjustment. Proposed soil management actions would have no effect on the lands and realty program and will not be addressed further in the *Lands and Realty* section.

Water Resources

The water management actions common to all alternatives and those that vary by alternative all relate to surface disturbance or water use; they would not affect the acquisition, disposal, or withdrawal of public lands. The presence or absence of water would be a primary factor when considering proposed land tenure adjustments. Water will not be addressed further in the *Lands and Realty* section.

Cave and Karst Resources

The cave and karst management actions common to all alternatives and those that vary by alternative are not directly related to land tenure adjustments; they would not affect the acquisition, disposal, or withdrawal of public lands. The presence or absence of significant caves would be a primary factor when considering proposed land tenure adjustments. Cave and karst resources will not be addressed further in the *Lands and Realty* section.

Mineral Resources

Mineral resource (locatable, leasables, salables) management actions common to all alternatives and those that vary by alternative are not directly related to land tenure adjustments. The management actions relate to what lands would be available for mineral development. The proposed management actions would not affect the acquisition, disposal, or withdrawal of public lands. The presence or absence of a federal mineral resource would be a primary factor when considering proposed land tenure adjustments. Mineral resources will not be addressed further in the *Lands and Realty* section.

Fire and Fuels Management

Fire and fuels management actions common to all alternatives and those that vary by alternative pertain to managing planned and unplanned fires. They do not directly related to land tenure adjustments and would not effect the land and realty program; fire and fuels management will not be addressed further in the *Lands and Realty* section.

Biological Resources

There are no management actions common to all alternatives or by alternative for vegetation resources (forest and woodland communities, grassland and shrubland communities, riparian and wetland communities, and invasive species) or fish and wildlife species, including SSS, that propose to acquire or dispose of public lands. The presence or absence of particular biological resources (e.g., riparian and wetland communities, SSS habitat) would be a primary factor when considering proposed land tenure adjustments. Biological resources will not be addressed further in the *Lands and Realty* section.

Heritage and Visual Resources

There are no management actions common to all alternatives or by alternative for heritage resources (cultural, and paleontological) or visual resources, that propose to acquire, dispose, or withdrawal of public lands. The presence or absence of heritage resources would be a primary factor when considering proposed land tenure adjustments, lands with significant paleontological values would be retained in federal ownership and visual resources would likely be a secondary consideration. Heritage and visual resources will not be addressed further in the *Lands and Realty* section.

Land Resources

Management actions common to all alternatives and management actions by alternative for all land resources (**Forest Products, ROW and corridors, Travel and Transportation Management, Recreation, Lands with Wilderness Characteristics, and Livestock Grazing Management**) with the exception of Lands and Realty do not propose to acquire, dispose, or withdrawal of public lands. Designated stock driveways withdrawals and livestock trails will be retained. The presence or absence of commercial forests, legally accessible public lands, recreational opportunities, wilderness characteristics, and forage productions would all be primary factors when considering proposed land tenure adjustments. Lands and realty will be the only resource addressed further in the *Lands and Realty* section.

Special Designations

There are no management actions common to all alternatives or by alternative for special designations (ACECs, BCBs, WSRs, and WSAs) that propose to acquire, dispose, or withdrawal of public lands. The presence or absence of special designations would be a primary factor when considering proposed land tenure adjustments. Special designations will not be addressed further in the *Lands and Realty* section.

Social and Economic Resources

There are no management actions common to all alternatives or by alternative for social and economic resources or health and safety that propose to acquire, dispose, or withdrawal of public lands. Social and economic resources would likely be a minor factor when considering proposed land tenure adjustments. Social and economic resources will not be addressed further in the *Lands and Realty* section.

4.6.2.3. Alternative A

Alternative A would continue management in accordance with the 1985 RMP as amended and maintained.

Lands and Realty
Alternative A would support the acquisition of lands or interests in lands from willing private and state entities on a project specific basis. Priority would be given to lands adjacent to larger blocks of BLM-administered public lands, particularly those with high recreational potential. In acquiring lands or interests in lands from willing sellers the BLM will initially consider the following: (1) any lands considered void of important natural resource values could be exchanged for the acquired lands, and (2) during the planning period, the BLM will not engage in acquisitions resulting in an overall net gain of publicly administered lands. Acquiring easements will result from access needs that will improve administration of public lands. Acquiring lands with important natural resource values will require coordination with other resource disciplines, appropriate to the acquisition.

Over the last 25 years, the identified disposal lands were reduced by approximately 30,500 acres. However, authorizations related to oil and gas development have taken precedence over land tenure adjustments. CBNG activity is expected to continue, although reasonably foreseeable development data show a steady reduction in CBNG development and increase in federal conventional development. Therefore, it would be reasonable to assume that the overall decrease in land disposals would be similar to the last planning period. Assuming this pattern continues, an average disposal rate of 1,200 acres per year under Alternative A would have a major effect on the lands and realty program through the disposal of small, isolated parcels. This would increase multiple resource management opportunities in a more contiguous land ownership pattern.

Approximately 108,243 acres of BLM-administered lands identified for disposal and have high priority consideration for exchange, public sale, or transfer of jurisdiction to another agency, subject to the disposal criteria. Lands with high surface values would generally be retained, although BLM would consider disposal of lands having agricultural potential and water through sale, exchange or Desert Land Entry.

Overall, Alternative A lands and realty management actions would have a moderate beneficial effect on the lands and realty program, by improving the ability to administer resources and protect resource values.

4.6.2.4. Alternative B

Alternative B would emphasize resource conservation.

Lands and Realty
Alternative B management would pursue all lands available for acquisition in the planning area, without regard to their priority of major blocks of public land consolidation and high recreational or natural resource values. If land acquisitions occur, the effect would likely be beneficial.

All lands identified for disposal will be examined for the presence of high-value resources. Lands with high surface values would be retained, including those with agricultural potential. The BFO would generally retain lands identified for disposal, having natural resource values, until all other

identified disposal lands (those with no natural resource values) were disposed of. This practice would have an adverse effect on the ROW program.

Alternative B management would recommend withdrawal of mineral lands within 4.0 miles of Greater Sage-Grouse leks and winter concentration areas. In proposed large withdrawals, the analysis that must be made is a review of the adequacy of application of the 43 CFR 3809 surface management regulations with mitigation impacts, consistent with whatever cumulative disturbance threshold is allowed in a particular Priority Habitat Area. Such analysis would clearly demonstrate that application of the 43 CFR 3809 surface management regulations could not adequately control or mitigate impacts when considering the Priority Habitat Area as a whole and only under this circumstance can a withdrawal be justified. Withdrawal recommendation would apply to proposals not associated with mineral activity unless the land management is consistent with Greater Sage-Grouse conservation measures.

Alternative B would pursue easements to access public lands that would benefit BLM management for any resource value and pursue land tenure adjustments on lands holding Category C allotments and sales, in accordance with other resource values. Areas within 4.0 miles of leks and winter concentration areas would be recommended for withdrawal to protect Greater Sage-Grouse habitat.

Overall, Alternative B lands and realty management actions would have a moderate beneficial effect on the lands and realty program, by improving the ability to administer resources and protect resource values.

4.6.2.5. Alternative C

Alternative C would emphasize resource use.

Lands and Realty
Under Alternative C, the BLM would not acquire lands or interests in lands. This would eliminate the agency's ability to gain access to some BLM-administered parcels. This would inhibit the BFO ability to manage resources and multiple uses, and would limit recreational opportunities. The consequences would be continued higher costs because of the difficulty and time-consuming efforts required to obtain access through private lands to administer multiple uses manage natural resources, and to negotiate conflicts for activities and development with other land owners where federal actions would cross ownership boundaries.

Under Alternative C, the BLM would not retain lands identified for disposal having important natural resource values, until all other land identified for disposal are disposed of (Map 54). Alternative C management would not acquire land in areas adjacent to major blocks of public land and high recreational potential, or pursue easements to facilitate BLM management.

Under Alternative C, the BLM would dispose of lands having agricultural or water potential. Lands and realty management would allow land tenure adjustments for lands holding Category C allotments and sales independent of other resource values. Overall, Alternative C would have a major adverse effect on the lands and realty program, by limiting access to isolated parcels and would not improve the ability to administer resources and protect resource values.

4.6.2.6. Alternative D

Alternative D would generally allow resource use if the activity can be conducted in a manner that conserves physical, biological, and heritage and visual resources, and would emphasize moderate constraints on resource uses to reduce adverse effects on resource values. Alternative D is the Proposed RMP.

Lands and Realty
Under Alternative D, priority would be given to acquiring lands or interests in lands in areas adjacent to large blocks of BLM-administered lands and pursue easements accessing public lands that would benefit any resource value on a project specific basis.

Alternative D management would actively pursue disposal of all identified disposal lands and other lands not identified but meeting appropriate disposal criteria. These parcels would be examined for the presence of high-value resources. Approximately 85 percent of BLM surface in the planning area is identified for retention and management, whereas approximately 120,722 acres (15%) is identified for disposal (Map 54 and Appendix L (p. 2211)). Lands with high surface values would be retained, including those with agricultural potential. The BFO would generally retain lands identified for disposal, but possessing natural resource values, until all other identified disposal lands (those with no natural resource values) were disposed of. Actively disposing of identified disposal lands would have a beneficial effect on the lands and realty program.

Alternative D management would not classify, open or make available any BLM surface in the planning area for agricultural leasing or agricultural entry under either Desert Land Entry or Indian Allotment for one or more of the following reasons: rugged topography, presence of sensitive resources, lack of water or access, small parcel size, and/or unsuitable soils.

The BLM would pursue land tenure adjustments related to custodial grazing allotments. Under Alternative D, disposing of these types of grazing lands would decrease the potential need for the public to request land use authorizations. It would therefore eliminate the need to monitor activities on these small, isolated parcels that are generally surrounded by private land. There are 171,749 acres (22%) of BLM-administered lands in the planning area under custodial allotments. Disposing of these acres would have a major beneficial effect on the lands and realty program.

Overall, Alternative D lands and realty management actions would have a major beneficial effect on the program by reducing small isolated parcels that are difficult to manage.

4.6.2.7. Cumulative Impacts

There is a high interest in pursuing land tenure adjustments amongst the BLM, the state, local government, and private land owners. The difficulties in pursuing action are typically finding equitable resources, in terms of funding or resource values (appraisal, mineral deposits, etc.), or BLM staff availability. The predominant land use activities within the planning area are energy development and livestock production. Both have tremendous potential to influence land tenure adjustments. Many past land tenure proposals have been related to livestock production, and many future proposals are anticipated, with the objective of consolidating land ownership. Mineral resources have also prompted several past land tenure adjustments as the BLM or another party has desired to consolidate mineral ownership. For example the Pittsburgh-Midway Coal exchange where BLM exchanged federal coal lands with Pittsburgh Midway for several of their private

surface holdings. The presence of surface oil and gas facilities, or other energy facilities, would likely deter land tenure adjustments, unless mineral rights were a component of the adjustment.

4.6.2.8. Conclusion

Under Alternative A, the BFO would not pursue land tenure adjustments, but would consider adjustments on a case-by-case basis. This would likely result in minimal effort to consolidate land ownership patterns, which would cause continued increases in uses on fractionated parcels; continued conflicts with adjacent land owners; continued administrative costs associated with managing the scattered land ownership pattern; and continued trespass incidence. Special management areas (e.g., SRMAs) would continue to be difficult to access and manage, increasing administrative costs continuing the incidence of trespass across BLM-administered or private and state lands.

Alternative B would allow the lands and realty program to actively pursue land tenure adjustments, but does not prioritize based on resource values or other factors.

Alternative C would significantly limit opportunities for land tenure adjustments, compounding the effects described under Alternative A.

Alternative D would provide directed land tenure management to allow multiple resource uses, conservation, access and protection while maintaining or improving the overall health of the landscape.

In summary, Alternative A would have a moderate beneficial impact to the lands and realty program, Alternative B would have a moderate beneficial impacts to the lands and realty, Alternative C would have a major adverse impact and Alternative D would have a major beneficial impact to the lands and realty program.

4.6.3. Renewable Energy

The BLM manages renewable energy as part of the ROW program. Renewable-energy sources can include wind, solar, thermal, and water. Other renewable-energy sources not yet identified might also fall under this program in the future. Wind presents the greatest renewable-energy potential in the planning area and is therefore, used in this analysis. This section describes potential effects on renewable-energy management from management actions for other resources and other management programs. Chapter 3 describes existing conditions concerning the renewable-energy program.

4.6.3.1. Methods and Assumptions

Assumptions

- The effects analysis focuses on the constraints (adverse effects) that would decrease opportunities for renewable-energy development authorizations.
- The effects analysis focuses on the opportunities (beneficial effects) that would increase opportunities for renewable-energy development.
- Surface-disturbing effects would occur from the implementation of management actions primarily designed to protect natural resources by preventing or minimizing effects on

those resources. In other words, the types and degrees of limitations and restrictions on renewable-energy development authorizations depends on the locations of sensitive or high-value resources and the potential for environmental effects on those resources.
- The demand for land use authorizations will continue during the planning period, and will likely remain a primary function of the overall lands and realty program. Land use authorizations would be considered on a project-specific basis and consistent with other resource objectives.
- The demand for compliance monitoring and reclamation activities will likely continue to increase throughout the planning period.
- The BFO would cooperate with stakeholders to promote opportunities for scientific research for renewable energy in accordance with other resource values; and coordinate renewable-energy opportunities in accordance with other resource values.
- The effects analysis and conclusions are based on the 49,694 acres of BLM surface in the planning area with a wind power class rating of good (5) or higher.

Significance Criteria

In addition to acreage where renewable-energy development is excluded, adverse effects on renewable-energy development could be considered significant if there are substantial limitations placed on how to develop renewable energy, such as increased wildlife protections or visual resource constraints.

4.6.3.2. Impacts Common to All Alternatives

Renewable Energy
Future renewable-energy development projects could include wind, solar, hydropower, or other energy-development activities. Cooperation with stakeholders for scientific research and development opportunities would facilitate the renewable-energy program. Cooperative efforts are more likely to be supported by the public and therefore increase opportunity for renewable development. The beneficial effect of cooperation would be moderate.

Physical Resources

Air Quality
Air quality management actions common to all alternatives include implementing mitigation measures such as dust suppression and cooperative efforts to reduce dust emissions. These actions could require ongoing monitoring for compliance and decreased opportunity, which add cost to renewable-energy projects and therefore would have a minor adverse effect on the renewable-energy program.

Soil
Soils management actions common to all alternatives include an onsite evaluation of proposed renewable-energy activities, mitigation of adverse effects on soils where necessary, and site-specific reclamation plans. None of these actions would affect where renewable energy could be developed, but would require time and other resources to address. Mitigation measures and site-specific reclamation plans on soils would decrease opportunities for renewable-energy development, this would have a minor adverse effect.

Water Resources
Water management actions common to all alternatives include managing surface-disturbing

activities to prevent degradation of water quality, and managing water to meet Wyoming Standards for Healthy Rangelands. These actions would be applied across the entire planning area, which would have a minor adverse effect by decreasing areas for renewable-energy development.

Cave and Karst Resources
The cave and karst program does not have any management actions common to all alternatives that would affect the renewable energy program

Mineral Resources

Under management actions common to all alternatives, almost the entire planning area would be available for exploration and development of locatable, leasable fluid, and salable minerals. Coal leasing would be limited to the high development potential areas of central Campbell County and northern Sheridan County, which does not overlap areas with wind-energy potential rated good or higher. Coal activity in the planning area would have no effect on renewable-energy development and is not further addressed in the *Renewable Energy* section.

Locatable Minerals
Areas with locatable minerals development would likely be unable to accommodate other energy development. There is minimal overlap between existing locatable minerals activities and areas with wind-energy potential rated good or higher. The maximum foreseeable locatable minerals development is 1,455 acres of BLM surface (0.2%) in the planning area. Therefore, the potential for locatable minerals development to adversely affect renewable-energy development would be negligible.

Leasable Minerals – Coal
Federal coal lands identified acceptable for further coal leasing considerations are available for LBAs, lease modifications, emergency leases, and exchanges. Coal leasing would be limited to areas mostly in central Campbell County. Coal activity in the planning area would have no effect on renewable-energy development and is not further addressed in the *Renewable Energy* section.

Leasable Minerals – Fluids
Oil and gas development activities are anticipated to be compatible with other energy-development activities, potentially even sharing infrastructure such as roads. The foreseeable development scenarios for all alternatives predict that fluid minerals development would disturb less than one percent of BLM surface in the planning area. Overall, fluid minerals development would likely have a negligible beneficial effect on renewable-energy development. There is no discernible difference between the alternatives and therefore fluid minerals will not be discussed further in this section.

Salable Minerals
With the wide spacing of meteorological towers and typically small size of salable minerals development, the two land uses are anticipated to be compatible, potentially even sharing infrastructure such as roads. Salable minerals would likely be needed to construct access roads and pads for renewable energy infrastructure. The foreseeable development scenarios for all alternatives predict that salable minerals development would disturb less than one percent of BLM surface in the planning area. Overall, salable minerals development would likely have a negligible beneficial effect on renewable-energy development, by sharing infrastructure and increase opportunity for development.

Although mineral resource development would vary across the alternatives, the trade-offs described above would apply to all alternatives. In this respect effects, would not be highly variable among the alternatives, and therefore not discussed for each alternative.

Fire and Fuels Management

Unplanned Fire (Wildfire) and Planned Fire (Prescribed Fire)
Fire and fuels management would not have actions common to all alternatives or by alternative that would affect renewable-energy development. Therefore, fire and fuels management is not further addressed in the *Renewable Energy* section.

Biological Resources

Management actions for biological resources are designed to protect those resources typically by limiting surface-disturbing activities such as renewable-energy development.

There are no management actions common to all alternatives for **Vegetation – Forests and Woodlands**, **Fish and Wildlife Resources – Fish**, or **Special Status Species – Plants and Fish** that would affect the renewable-energy program. The forest and woodland management actions that do vary by alternative do not regulate land use activities other than timber harvest, and therefore would have no effect on the renewable-energy program. Therefore, forests and woodlands are not further addressed in the *Renewable Energy* section.

Vegetation – Grassland and Shrubland Communities
Grass and shrub vegetation communities cover most of the planning area. renewable-energy facilities would be sited to reduce adverse effects on vegetation impacts, which could result in the relocation or redesign of renewable-energy projects before authorization. The overall adverse effect would be slight but detectable on renewable-energy development from this management and would be minor.

Vegetation – Riparian/Wetland Resources
Prohibiting of renewable-energy activities would be required to prevent the degradation, loss, or destruction of riparian and wetland communities; which would most likely exclude renewable-energy development from these communities. Riparian and wetland management actions common to all alternatives would have a negligible adverse effect on renewable-energy development due to the limited amount (207 acres or 0.03%) of riparian and wetland communities on BLM-administered lands within the planning area.

Invasive Species and Pest Management
Renewable-energy proponents would be required to limit surface disturbance to prevent weed spread, use certified seed during reclamation, and treat reclamation for invasive species. Collectively, these actions would be barely detectable and decrease opportunity, which would have a negligible adverse effect on renewable-energy development.

Fish and Wildlife Resources – Wildlife and Special Status Species – Wildlife (including Greater Sage-Grouse)
Wildlife and SSS management actions common to all alternatives include mitigation for surface-disturbing activities; maintaining or improving wildlife habitats; protecting crucial wildlife habitats; managing, maintaining, and restoring Greater Sage-Grouse habitat; and a permanent disturbance-free buffer for bald eagle nests. Collectively, these actions would be

readily apparent and have a moderate adverse effect on renewable-energy development by causing the relocation, modification, or redesign of renewable-energy projects.

Special Status Species – Fish
Special status fish distribution is limited to northwestern Sheridan County, where there is little potential for renewable-energy development. Therefore, management of special status fish would not affect the renewable-energy program, and special status fish are not further addressed in the *Renewable Energy* section.

Heritage and Visual Resources

There are no management actions common to all alternatives for **Cultural Resources** or **Paleontological Resources** that would affect renewable-energy development.

Visual Resources
A management action common to all alternatives is the requirement for permanent facilities to blend with the surrounding landscape. This requirement is secondary to managing within the VRM class, meaning that although facilities might be visible within VRM Class II through IV areas, mitigation for adverse effects on visual resources should be included wherever possible. Because this management action would not prohibit renewable-energy development, but would decrease development opportunity and increase costs of the projects, the adverse effect on renewable-energy development would be negligible.

Land Resources

The following programs do not include any management actions common to all alternatives that would affect the renewable-energy program: **Lands and Realty, Recreation**, and **Lands with Wilderness Characteristics**.

Forest vegetation and renewable-energy potential overlap in the southern Big Horn Mountains. However, with the abundance of shrubland and grassland vegetation in the planning area, including in the southern Big Horn Mountains, it is highly unlikely that renewable-energy development would be proposed in forest communities. Therefore, the forest product program should not affect the renewable-energy program and is not further addressed in the *Renewable Energy* section.

Rights-of-Way and Corridors
The designation of ROW corridors preferably adjacent to roads and other disturbance corridors could affect the design of renewable-energy projects by limiting the placement of powerlines and other facilities. Because these management actions would not prohibit development and there would be a small change to the resource with decreased opportunity for development, their level of effect would be minor adverse.

Travel and Transportation Management
TTM actions under each alternative regulate motorized vehicle access for recreational use, and would not affect the potential for renewable-energy development. Management actions common to all alternatives would include standards for the location, design, and maintenance of roads. These actions would require some expenditures of time and money by renewable-energy developers for compliance, but would not limit renewable-energy development. Therefore, TTM are not further addressed in the *Renewable Energy* section.

Livestock Grazing Management
Livestock grazing management actions under each alternative would not prohibit or limit other land uses. Therefore, livestock grazing would have no effect on renewable-energy development, and is not further addressed in the *Renewable Energy* section.

Special Designations

Scenic or Back Country Byways designation would not affect other activities; therefore, byways are not further addressed in the *Renewable Energy* section. WSAs and WSRs are managed to a non-impairment standard under respective Interim Management Policies (IMPs) until Congress acts to designate these areas or release them from consideration. Renewable-energy development is limited to these areas due to the constraints mandated in BLM Manual 6330 – Management of Wilderness Study Areas. The only special designation addressed by alternative is ACECs.

Areas of Critical Environmental Concern
There are no management actions common to all alternatives for ACECs.

Socioeconomic Resources

There are no **Social and Economic Conditions** or **Health and Safety** management actions common to all alternatives or by alternative that would have a measurable effect on the renewable-energy program. Therefore, these topics are not further addressed in the *Renewable Energy* section.

4.6.3.3. Alternative A

Alternative A would continue management in accordance with the 1985 RMP as amended and maintained.

Renewable Energy
There are no management actions related to renewable-energy in the 1985 RMP; therefore, the entire planning area would be available to renewable-energy development under Alternative A, and proposals would be considered on a project-specific basis. There have been no renewable-energy projects to date. Under Alternative A, 49,694 acres (6%) of the planning area have a wind potential rating of good or higher, and the BFO anticipates up to 20,000 acres of BLM surface would be developed during the planning period. Renewable-energy development at this scale would have a major beneficial effect on the renewable-energy program.

Physical Resources

Air Quality
Alternative A would require air quality monitoring for renewable-energy projects expected to approach or exceed emissions standards. It is likely that few renewable-energy projects would be required to monitor air quality, and the monitoring would not prevent any renewable-energy projects. Due to the effects being barely detectable and a decrease in opportunities for development, the over all effect on renewable-energy development from this management action would be negligible adverse.

Soil
Alternative A soils management actions that affect the renewable-energy program include prohibitions on surface-disturbing activities seasonally in areas of severe erosion hazard, on slopes equal to or greater than 25 percent, and in areas with poor reclamation suitability. All three prohibitions have an undefined allowance for waivers, and therefore would not outright prohibit renewable-energy development. The seasonal prohibition would have an adverse effect because it could delay renewable-energy development, but would not prevent any proposed projects. A total of 25,705 acres (52%) of BLM surface in the planning area with a wind-potential rating of good or higher is rated as having poor reclamation suitability. Although more than 10 percent of the areas with renewable-energy potential also have sensitive soils, because the authorized officer could waive the surface disturbance prohibition, when the proponents could demonstrate an ability to protect the soil resource, there would be limited development opportunities and an adverse effect on the renewable-energy program would be reduced to moderate.

Water Resources
Under Alternative A, surface-disturbing activities would be prohibited near waterbodies unless the authorized officer waived the prohibition. The water buffer affects 697 acres (1%) of BLM surface in the planning area with potential for wind-energy development. However, because the authorized officer could waive the prohibition, when the proponent could demonstrate an ability to protect the soil resource, the effect on renewable-energy development would be negligible. Renewable-energy projects requiring water resources would be considered on a project-specific basis. Overall, the effect of Alternative A water management on renewable-energy development would be negligible adverse, due to the reduced opportunity for development.

Cave and Karst Resources
Under Alternative A, renewable-energy projects in cave and karst areas would be considered on a project-specific basis. Karst formations are located primarily along the Big Horn Mountains; therefore, the overlap between karst formations and renewable-energy potential on BLM surface, would be limited to 44,559 acres (6%) in the southern Big Horn Mountains. Restrictions on renewable-energy development would likely be confined to buffers around significant caves, which would further limit the area of potential overlap. Alternative A management of cave and karst resources would have a negligible adverse effect on the renewable-energy program, due to decreased opportunity for development.

Mineral Resources

Locatable Minerals
Under Alternative A, locatable minerals development would be considered on a project-specific basis. The predicted locatable minerals development under Alternative A would disturb 554 acres. This is less than one percent of the planning area, primarily in areas without wind-energy development potential. The effect on the renewable-energy program would be negligible adverse with decreased development opportunities.

Salable Minerals
With the wide spacing of met-towers and typically small size of salable mineral development the two land uses are anticipated to be compatible potentially even sharing infrastructure such as roads. The foreseeable development scenarios for all alternatives predict less than one percent of BLM surface would be disturbed. Overall, salable mineral development would likely have a negligible beneficial effect on renewable-energy development.

Biological Resources

Under Alternative A, management actions for biological resources are designed to protect those resources, typically by limiting surface-disturbing activities.

Vegetation – Grassland and Shrubland Communities
Alternative A does not include management actions for grassland and shrubland communities. Reclamation activities would be consistent with the BLM reclamation policy. Compliance with the reclamation policy would be barely detectable on grassland and shrubland communities and restrict development opportunities, and therefore have a negligible adverse effect on renewable-energy development.

Vegetation – Riparian/Wetland Resources
Under Alternative A, surface-disturbing activities would be prohibited within 500 feet of riparian resources unless the authorized officer waives the prohibition. Although 23,831 acres (3.0%) of BLM surface in the planning area are within the riparian buffer, only 944 acres (less than 1%) of BLM surface, have wind-energy potential rated good or higher. This management action would likely decrease development opportunities and have a negligible adverse effect on renewable-energy development.

Invasive Species and Pest Management
Alternative A management actions would focus on the control of invasive plant species in cooperation with the counties and project proponents. Renewable-energy developers would be expected to control invasive species as part of their authorizations. The time and costs associated with control activities would decrease development opportunities and have a negligible adverse effect renewable-energy development.

Fish and Wildlife Resources – Fish
Alternative A does not include management actions specific to fish. Renewable-energy projects would consider fish and incorporate BMPs to mitigate adverse effects on fish. The effect on the renewable-energy program would likely decrease development opportunity and would be negligible adverse.

Fish and Wildlife Resources – Wildlife and Special Status Species – Wildlife (including Greater Sage-Grouse)
Under Alternative A, management of wildlife habitat would affect uses administered by the ROW associated with renewable energy. Implementing species-specific conservation measures for BLM-administered sensitive wildlife species and prohibiting actions that would affect Threatened or Endangered species could result in the denial or relocation of proposed public land uses.

The wildlife and SSS wildlife management actions under Alternative A with the greatest effect on renewable-energy development are prohibiting surface-disturbing activities on BLM surface with a wind-energy potential rating of good or higher, including within the Ed O. Taylor winter game range (2,406 acres, or 5% of the federal wind resource) and within biological buffers of raptor nests (1,186 acres or 2% of the federal wind resource). At present, there are no documented Greater Sage-Grouse leks within 0.25 mile or plains sharp-tailed grouse within 750 feet of areas with wind-energy development potential. However, it should be noted that much of the wildlife data, particularly for raptors and both grouse species, have been collected in association with CBNG development; therefore, there is little data associated with the southern Big Horn Mountains. It is doubtful, even with complete wildlife data for the southern Big Horn

Mountains, that renewable-energy development would be prohibited on more than five percent of the better wind-energy potential areas. Timing limitations could delay renewable-energy development, however, they typically do not prevent development. Overall, the Alternative A effect on renewable-energy development from management of wildlife and special status wildlife species would be minor adverse.

Special Status Species – Plants
Under Alternative A there is no previous management action decision for SSS plants. Renewable-energy development would be considered on a case-by-case basis. Populations are typically small in acreage and within specialized habitats, avoiding populations should not be a burden to renewable-energy proponents. This management action would have no effect on the renewable-energy development.

Heritage and Visual Resources

Cultural Resources and Paleontological Resources
Under Alternative A, CRMPs would be developed for sites identified nominated for listing on the National Register. However, none of the nominated sites coincide with areas of wind-energy development potential rated good or higher. Other than developing the CRMPs, Alternative A would not regulate surface-disturbing activities in relation to cultural or paleontological resources, but would consider effects on a project-specific basis. Implementing protective measures for cultural or paleontological resources could require avoidance and other mitigation measures for proposed land uses near these resources. These measures could result in the relocation or redesign of proposed uses before authorization. Because cultural and paleontological resources occur throughout the planning area, effects could vary in degree throughout the planning area. However, Alternative A does not prohibit renewable-energy development as part of cultural and paleontological resources management, but could decrease development opportunities, and the effect of this management on renewable-energy development would be negligible adverse.

Visual Resources
Under Alternative A, 45,524 acres (92%) of BLM surface in the planning area with wind-energy development potential rated good or higher would be managed as VRM Class II areas. Renewable-energy development would be incompatible within VRM Class II. Therefore, the effect on renewable-energy development would be major adverse.

Land Resources

The following programs do not have any management actions under Alternative A that would affect the renewable-energy program: **Travel and Transportation Management, Recreation,** and **lands with wilderness characteristics**.

Lands and Realty
The BLM-administered land ownership pattern in the planning area is scattered, and interspersed with private and state lands and other agency- administered lands. Under Alternative A, land tenure adjustments would occur on a project-specific basis, with an emphasis on acquiring areas adjacent to existing blocks of BLM surface and disposing of isolated BLM parcels, which are difficult to administer. Consolidating surface lands would facilitate renewable-energy development by providing for a more contiguous public land base and by encouraging such development near communities. The result would be a minor beneficial effect on renewable-energy development.

Rights-of-Way and Corridors
The Alternative A ROW and designated corridors program includes management actions related to soils and exclusion and avoidance areas. The effects of these management actions on renewable-energy are described in the soils and renewable-energy sections above. The only Alternative A management actions not previously discussed that could affect the renewable-energy program concern transmission line placement. Because these management actions would not exclude renewable-energy development, but do constrain the locations of transmission lines to serve renewable-energy projects, the effect would be minor adverse.

Recreation
Alternative A would prohibit surface-disturbing activities within 0.5 mile of the Dry Creek Petrified Tree EEA. Renewable-energy development would not be likely, because wind-energy potential in that area is rated as poor. Therefore, there would be no effect on renewable-energy development from the Renewable Energy management action.

Lands with Wilderness Characteristics
Alternative A does not include management actions for areas with wilderness characteristics and would not manage BLM-administered lands outside the three WSAs for wilderness characteristics. This management would have no effect on the renewable-energy program.

Special Designations

Areas of Critical Environmental Concern
Alternative A would not designate ACECs in the planning area, and there would no effect on renewable-energy development from ACEC management.

4.6.3.4. Alternative B

Alternative B would emphasize resource conservation.

Renewable Energy
Alternative B would exclude renewable-energy development on 730,530 acres (84%) of BLM surface in the planning area, and recommend avoidance on another 45,441 acres (13%) of BLM surface with a wind-energy potential rating of good or higher. The remaining acreage in the planning area would be available for renewable-energy consideration. The exclusion and avoidance areas at the renewable-energy scale would have a major adverse effect on renewable-energy development by decreasing opportunities for development.

Physical Resources

Air Quality
Alternative B would require air quality monitoring for renewable-energy projects expected to approach or exceed emissions standards. Few renewable-energy projects would likely be required to perform monitoring and the monitoring would not prevent any renewable-energy projects, although it would decrease development opportunity. The effect on renewable-energy development would be negligible adverse.

Soil
Soils management actions under Alternative B. include prohibitions on surface-disturbing activities in areas with severe erosion hazard, on slopes equal to or greater than 25 percent,

in areas with poor reclamation suitability, and on miscellaneous soils types. All prohibitions would be absolute, with no allowance for waivers. A total of 25,705 acres (52%) of BLM surface in the planning area with wind-energy potential rated good or higher is rated as having poor reclamation suitability. The surface-disturbing prohibitions under Alternative B soils management would have a major adverse effect on renewable-energy development by decreasing opportunities for development.

Water Resources
Alternative B would prohibit surface disturbance within 500 feet of springs, reservoirs, water wells, or perennial stream. Land use authorizations would be routed to avoid these areas. The water buffer would affect 697 acres (1%) of BLM surface with wind-energy development potential. This action would have a minor adverse effect renewable-energy development by decreasing opportunities for development.

Cave and Karst Resources
Alternative B would prohibit surface-disturbing activities in cave and karst areas.
BLM surface with karst-bearing formations and renewable-energy potential is limited to 44,559 acres (6%) in the southern Big Horn Mountains. This management would have a minor adverse effect on renewable-energy energy by decreasing opportunities for development.

Mineral Resources

Locatable Minerals
Under Alternative B, foreseeable locatable minerals development would disturb 277 acres, which is less than one percent of BLM surface in the planning area. Most of these areas would likely not coincide with areas that have wind-energy potential. Therefore, decreasing opportunities for development would have an adverse effect on renewable-energy development and would be negligible.

Salable Minerals
With the wide spacing of met-towers and typically small size of salable mineral development the two land uses are anticipated to be compatible potentially even sharing infrastructure such as roads. The foreseeable development scenarios for all alternatives predict less than one percent of BLM surface would be disturbed. Overall, salable mineral development would likely have a negligible beneficial effect on renewable-energy development.

Biological Resources

Vegetation – Grassland and Shrubland Communities
Under Alternative B, native plant species would be required for reclamation. Native species could increase the reclamation time and cost, but would not restrict, but would decrease renewable-energy development. The anticipated effect on the renewable-energy program would be negligible adverse.

Vegetation – Riparian/Wetland Resources
Under Alternative B, surface-disturbing activities would be prohibited within 500 feet of riparian resources. Although 23,831 acres (3%) of BLM surface in the planning area are within the riparian buffer, only 944 of those acres have wind-energy potential rated good or higher, and would decrease development opportunity. Therefore, Alternative B management of riparian and wetland communities would likely have a negligible adverse effect on renewable-energy development.

Invasive Species and Pest Management
Alternative B would take an aggressive approach to managing invasive species. Renewable-energy developers would be expected to control invasive species as part of their authorizations. The time and cost associated with control activities would decrease development opportunities and have a negligible adverse effect on renewable-energy development.

Fish and Wildlife Resources – Fish
Alternative B would prohibit surface-disturbing activities, including renewable-energy development, within 0.25 mile of fish-bearing waters. There are 3,994 acres (8.0%) of BLM surface within the fisheries buffer in areas with wind-energy potential rated good or higher, all confined to the southern Big Horn Mountains. The result would be a moderate adverse effect on the renewable-energy program.

Fish and Wildlife Resources – Wildlife and Special Status Species – Wildlife (including Greater Sage-Grouse)
The wildlife and SSS wildlife management actions under Alternative B that would have the greatest effect on renewable-energy development are prohibitions on surface-disturbing activities on BLM surface with wind-energy potential rated good or higher in the Ed O. Taylor winter game range (2,406 acres, or 5%), within big-game migration corridors (3,688 acres, or 7%), within elk crucial ranges (20,470 acres, or 41%), within elk security habitat (35,915 acres, or 72%), and within biological buffers for raptor nests (1,186 acres, or 2%). Renewable-energy development would be prohibited on BLM surface with wind potential of good or better that are within 4.0 miles of Greater Sage-Grouse leks or winter concentration areas. At present, there are no documented plains sharp-tailed grouse within 750 feet of areas with wind-energy development potential. The effect on renewable-energy development would be major adverse particularly from the management of big game (general wildlife) and Greater Sage-Grouse (SSS) and decreasing development opportunities.

Special Status Species – Plants
Alternative B would allow renewable-energy development in special status plant habitat, but not within known populations. Because populations are typically small in acreage and within specialized habitats, avoiding populations should not be a burden to renewable-energy proponents. This management action would prohibit ROW within suitable habitat which includes the South Big Horns, and would have a slight and detectable effect on the renewable-energy development. Overall this would have a minor adverse effect by limiting development to the renewable-energy program.

Heritage and Visual Resources

Cultural Resources
Alternative B would prohibit surface disturbance up to 5 miles from historic properties. This action would affect 33,879 acres (68%) of BLM surface in the planning area with wind-energy potential rated good or higher and decrease development opportunity. This would have a major adverse effect on renewable-energy development.

Paleontological Resources
Alternative B would regulate surveying and monitoring of paleontological resources during surface-disturbing activities. Renewable-energy activities could be prohibited in areas with paleontological resources of high quality or importance. However, at present, there are no high-quality paleontological areas in potential renewable-energy development areas, such

areas are typically small, and renewable-energy projects could be located to avoid the sites. Therefore, the effect on renewable-energy development would be negligible adverse due to the decreased opportunity for development.

Visual Resources
Under Alternative B, 5,838 acres (12%) and 12,544 acres (25%) of BLM surface with wind-energy development potential would be managed as VRM Class I and II, respectively. Renewable-energy development would be incompatible with these VRM classes and decrease development opportunity. This would have a major adverse effect or renewable-energy development.

Land Resources

Lands and Realty
Alternative B would place a priority on retaining and acquiring lands with natural resource values. Consolidating surface lands would facilitate renewable-energy development by providing for a more contiguous public land base and by encouraging such development near communities. This would have a minor beneficial effect on renewable-energy development.

Rights-of-Way and Corridors
Alternative B would restrict major transmission and utility lines to identified ROW corridors, of which only one would overlap (52 acres, or 0.1%) an area with wind-energy potential rated good or higher. This management action would essentially preclude renewable-energy development from the planning area, a major adverse effect.

Recreation
Alternative B would prohibit surface-disturbing activities in designated SRMAs unless those activities would be consistent with other resource values. There are 2,101 acres (4%) of BLM surface in identified SRMAs that also have wind-energy potential rated good or higher. This management action would have a minor adverse effect on renewable-energy development by decreasing opportunity for development.

Lands with Wilderness Characteristics
Alternative B would manage the lands with wilderness characteristics area to emphasize natural values, thereby prohibiting renewable-energy development on 12,237 acres (17%) of BLM surface with wind-energy potential rated good or higher. This exclusion would have a major adverse effect on the renewable-energy program.

Special Designations

Areas of Critical Environmental Concern
Alternative B would designate eight ACECs, within which renewable-energy development would be prohibited. The Pumpkin Buttes ACEC has 888 acres (2%) of BLM surface with wind-energy potential rated good or higher. Designating the Pumpkin Buttes ACEC would have a minor adverse effect on renewable-energy program.

4.6.3.5. Alternative C

Alternative C would emphasize resource use.

Renewable Energy (major beneficial)
Renewable energy development would be allowed anywhere in the planning area, consistent with other resource values. This would have a major beneficial effect on renewable energy development.

Physical Resources

Air Quality
Alternative C would not require air quality monitoring for renewable-energy projects. The effect on the renewable-energy program would be readily apparent with measurable change to air quality and would increase opportunity for development. This would have a moderate beneficial effect on renewable-energy development.

Soil
Under Alternative C, requests for disturbances would be considered in areas of severe erosion hazard, on slopes equal to or greater than 25 percent, in areas with poor reclamation suitability, and on miscellaneous soils types. This would allow renewable-energy development on all sensitive soils in the planning area. BMPs and other mitigation measures would be incorporated to reduce and localize renewable-energy effects on sensitive soils. Overall, Alternative C soils management would have a negligible adverse effect on renewable-energy development due to the limited amount of acres rated good or higher for renewable-energy the effect would be barely detectable and decrease opportunities for development.

Water Resources
Alternative C would allow surface disturbance within 500 feet of springs, reservoirs, water wells, and perennial streams. Land use authorizations would be routed to avoid these areas. BMPs and other mitigation measures would be incorporated to reduce and localize renewable-energy effects on water resources. Overall, Alternative C water management would have a negligible adverse effect on renewable-energy development due to the limited number of acres rated good or higher and the effect would barely be detectable with decreased opportunities for development.

Cave and Karst Resources
Under Alternative C, site-specific buffers would likely prohibit surface-disturbing activities near significant caves. This could result in the relocation or redesign of individual facilities, but likely would not prevent any renewable-energy project authorizations. Overall, Alternative C management of cave and karst resources would barely be detectable and decrease opportunities for development this would have a negligible adverse effect on renewable-energy management.

Mineral Resources

Locatable Minerals
Under Alternative C, foreseeable locatable minerals development would disturb 1,455 acres, less than one percent of BLM surface. This would have a negligible adverse effect on renewable-energy development with decreased opportunity for development.

Salable Minerals
With the wide spacing of met-towers and typically small size of salable mineral development the two land uses are anticipated to be compatible potentially even sharing infrastructure such as roads. The foreseeable development scenarios for all alternatives predict less than one percent of

BLM surface would be disturbed. Overall, salable mineral development would likely have a negligible beneficial effect on renewable-energy development.

Biological Resources

Vegetation – Grassland and Shrubland Communities
Under Alternative C, the BLM would authorize native and non-native plant species for initial reclamation activities. There would be some time and financial expense for renewable-energy proponents to plan and perform reclamation, but renewable-energy activities would not be restricted, although it could decrease development opportunity. The anticipated effect on the renewable-energy program would be a negligible adverse effect.

Vegetation – Riparian/Wetland Resources
Alternative C would allow surface-disturbing activities in riparian communities; BMPs would be incorporated to mitigate adverse effects to riparian resources. This management action would likely be barely detectable and decrease opportunity, and would have a negligible adverse effect on renewable-energy development.

Invasive Species and Pest Management
Under Alternative C, renewable-energy developers would be expected to control invasive species as part of their authorizations. The time and costs associated with control activities and decrease opportunity would have a negligible adverse effect on renewable-energy development.

Fish and Wildlife Resources – Fish
Alternative C would allow surface-disturbing activities, including renewable-energy development, within 0.25 mile of fish-bearing waters. Fish and other resource values would be considered during project analyses. There are 3,994 acres (8.0%) of BLM surface in the fisheries buffer with a wind-energy potential rating of good or higher, all confined to the southern Big Horn Mountains. Because Alternative C fish management would allow development and decrease development opportunity, this would have a minor adverse effect on the renewable-energy program.

Fish and Wildlife Resources – Wildlife and Special Status Species – Wildlife (including Greater Sage-Grouse)
Alternative C would allow renewable-energy development on BLM surface with a wind-energy potential of good or higher within the Ed O. Taylor winter game range (2,406 acres, or 5%), within big game migration corridors (3,688 acres, or 7%), within elk crucial ranges (20,470 acres, or 41%), within elk security habitat (35,915 acre or 72%), within biological buffers for raptor nests (1,186 acres, or 2%), and near Greater Sage-Grouse and plains sharp-tailed grouse leks. At present, there are no documented Greater Sage-Grouse leks or plains sharp-tailed grouse within 0.25 mile of areas with wind-energy development potential. However renewable-energy development proposals must consider and mitigate adverse effects on wildlife and other resource values. Alternative C wildlife management would have a minor adverse effect on renewable-energy program with decreased development opportunities.

Special Status Species – Plants
Alternative C would allow renewable-energy development in special status plant habitat, but not within known populations. Because populations are typically small in acreage and within specialized habitats, avoiding populations should not be a burden to renewable-energy proponents. This management would barely be detectable but could decrease opportunity, having

a negligible adverse effect by avoiding populations that are small and isolated or relocating sites on renewable-energy development.

Heritage and Visual Resources

Cultural Resources

Alternative C would not prohibit surface-disturbing activities from any large areas of the planning area, but rather would manage cultural sites individually with site-specific mitigation. Implementing mitigation for potential adverse effects on cultural resources would require avoidance and other protective measures for renewable-energy development proposed near these resources. These measures could result in the relocation or redesign of proposed renewable-energy development structures and infrastructure, but should not prevent renewable-energy projects. The effect on the renewable-energy program would be negligible adverse.

Paleontological Resources

Alternative C would regulate surveying and monitoring of paleontological resources during surface-disturbing activities. The effects of renewable-energy activities would be mitigated in areas with paleontological resources of high quality or importance. The effect on renewable-energy development would be negligible adverse with barely detectable effects and decreased development opportunities.

Visual Resources

There would be no areas in the planning area managed as VRM Class II. Under Alternative C, 8,443 acres (17.0%) of BLM surface in the planning area with wind-energy development potential would be managed as VRM Class III; renewable-energy development would not be precluded, but could be heavily regulated to prevent more than a moderate change to the landscape. Overall, Alternative C management of visual resources would have a moderate adverse effect on renewable-energy development.

Land Resources

Lands and Realty

Under Alternative C management, the BLM would not acquire lands or interests in lands. This would eliminate the BLM ability to gain access to some BLM-administered parcels and inhibit the BFO ability to manage resources and uses such as renewable-energy. The consequences of this would be continued higher costs for the BLM and renewable-energy proponents because of the difficulty and time required to obtain access through private lands. Alternative C would have a minor adverse effect on renewable-energy development.

Rights-of-Way and Corridors

The only management actions for Alternative C not previously discussed that could affect the renewable-energy program concern transmission line placement. These management actions do not exclude renewable-energy development, but do constrain the locations of major transmission and utility lines to serve renewable-energy developments. This would have a slight but detectable effect with an overall minor adverse effect on renewable-energy development.

Recreation

Alternative C would designate six SRMAs (30,570 acres). Renewable-energy development could be authorized if in those areas if it would be compatible with other resource values. Because

renewable-energy development conflicts with recreation and other values are likely within some SRMAs, effects on renewable-energy development would be minor adverse.

Lands with Wilderness Characteristics
Under Alternative C, lands with wilderness characteristics areas would be managed consistent with management for the surrounding areas. This would likely allow for renewable-energy development except for immediately adjacent to the current WSAs and Middle Fork WSR. Because these areas coincide with areas that have a wind-energy potential rating good or higher, the Renewable Energy management action would readily be apparent and would decrease opportunity development this would have a moderate adverse effect on the renewable-energy program.

Special Designations

Areas of Critical Environmental Concern
Alternative C would not designate any ACECs. Therefore, there would be no effect on renewable-energy development.

4.6.3.6. Alternative D

Alternative D would generally allow resource use if the activity can be conducted in a manner that conserves physical, biological, and heritage and visual resources, and would emphasize moderate constraints on resource uses to reduce adverse effects on resource values. Alternative D is the Proposed RMP.

Renewable Energy
Under Alternative D, renewable-energy development would be excluded on 352,067 acres (45%) of BLM surface. Exclusion at this scale would have a major adverse effect on renewable-energy program.

Physical Resources

Air Quality
Air quality monitoring would be required of renewable energy projects expected to approach or exceed emission standards. Few renewable energy projects would likely be required to conduct monitoring and the monitoring would not prevent any renewable energy projects. The effect on renewable energy development would be negligible adverse and would decrease development opportunities.

Soil
Under Alternative D, requests for disturbances would be considered under defined conditions within areas with severe erosion hazard, on slopes equal to or greater than 25 percent, and in areas with poor reclamation suitability with an approved reclamation and stabilization plan. Surface-disturbing activities would be required to avoid miscellaneous soils types unless they have an approved project construction and site-specific reclamation plan. This would allow renewable-energy development on sensitive soils in the planning area while adequately protecting soil resources. Soils with poor reclamation suitability coincide with 25,705 acres (52%) of BLM surface in the planning area with wind-energy development potential. Although more than 10 percent of the planning area has sensitive soils, Alternative D soils management would

have a moderate adverse effect on the renewable-energy program due to the provisions allowing for disturbance of sensitive soils.

Water Resources
Alternative D would allow surface disturbance that would meet resource objectives within 500 feet of springs, non-CBNG reservoirs, water wells, and perennial streams on 697 acres (1%) of BLM surface in the planning area with wind-energy development potential. Land use authorizations might be rerouted to avoid these areas, but rerouting would be required only if the objectives could not be met. BMPs and other mitigation measures would be incorporated to reduce and localize renewable-energy effects on water resources. This would have a negligible adverse effect on the renewable-energy program by decreasing development opportunity.

Cave and Karst Resources
Alternative D would require a disturbance-free buffer around entrances and passages of significant caves. This could result in the relocation or redesign of individual facilities, but would not likely prevent any renewable-energy project authorizations. This would have a negligible adverse effect on renewable-energy development.

Mineral Resources

Locatable Minerals
Under Alternative D, most of the planning area would be available for locatable minerals development. However, because foreseeable locatable minerals development would disturb 1,252 acres, less than one percent of BLM surface, the effect on renewable-energy program would be negligible adverse and decrease development opportunity.

Salable Minerals
With the wide spacing of met-towers and typically small size of salable mineral development the two land uses are anticipated to be compatible potentially even sharing infrastructure such as roads. The foreseeable development scenarios for all alternatives predict less than one percent of BLM surface would be disturbed. Overall, salable mineral development would likely have a negligible beneficial effect on renewable-energy development.

Biological Resources

Vegetation – Grassland and Shrubland Communities
Under Alternative D, grassland and shrubland management objectives would allow desirable non-native plant species for short-term reclamation. This action would provide more opportunities to mitigate the effects of surface-disturbing activities from approved ROW actions. There would be some time and financial expense for renewable-energy proponents to plan and perform reclamation, but renewable-energy activities would not be restricted. The anticipated effect on the renewable-energy program is barely detectable with decrease opportunity for development and therefore, would be negligible adverse.

Vegetation – Riparian/Wetland Resources
Alternative D would allow surface-disturbing activities within 500 feet of riparian resources in accordance with identified criteria. Although 23,831 acres (3%) of BLM surface in the planning area are within the riparian buffer, only 944 of those acres (less than 1%) have wind-energy potential rated good or higher. Therefore, Alternative D management of riparian and wetland

communities would have a negligible adverse effect on renewable-energy program by decreasing development opportunity.

Invasive Species and Pest Management
Alternative D would take a moderate approach to managing invasive species. Renewable-energy developers would be expected to control invasive species as part of their authorizations. The time and cost associated with control activities would have a negligible adverse effect on renewable-energy development.

Fish and Wildlife Resources – Fish
Alternative D would allow surface-disturbing activities, including renewable-energy development, within 0.25 mile of fish-bearing waters where fish resource objectives can be met. There are 3,994 acres (0.5%) of BLM surface in the planning area within the fisheries buffer with a wind-energy potential rating of good or higher, all confined to the southern Big Horn Mountains. Alternative D fish management would have negligible adverse effect on the renewable-energy program by decreasing development opportunity.

Fish and Wildlife Resources – Wildlife and Special Status Species – Wildlife (including Greater Sage-Grouse)
The wildlife and SSS wildlife management actions under Alternative D that would have the greatest effect on renewable-energy development are prohibitions on surface-disturbing activities on BLM surface with wind-energy potential rated good or higher in the Ed O. Taylor winter game range (2,406 acres, or 5%), within big game migration corridors (3,688 acres, or 7%), within elk security habitat (35,915 acres, or 72%), within Greater Sage-Grouse Priority Habitat Area (Core Population Areas and Core Population Connectivity Corridors) (6,521 acres, or 13%), and within biological buffers for special status raptor nests (1,186 acres, or 2%). Within the Core Population Areas and Core Population Connectivity Corridors, renewable-energy development would be limited to no more than 5 percent total disturbance per 640 acres and protected within 0.6 mile of Greater Sage-Grouse leks. At present, there are no documented Greater Sage-Grouse leks within 0.6 mile of areas with wind-energy development potential of good or higher. Avoid commercial renewable energy projects in Greater Sage-Grouse core population areas unless it can be demonstrated that the activity would not result in declines of core Greater Sage-Grouse populations. The effect on renewable-energy development would be moderate adverse from management of general wildlife because there would be restricted development and provisions to allow for renewable-energy development with appropriate mitigation, and major adverse from management of special status wildlife species because of the development restrictions in Greater Sage-Grouse Core Population Areas.

Special Status Species – Plants

Alternative D would allow renewable-energy development in special status plant habitat, but not within known populations. Because populations are typically small in acreage and within specialized habitats, avoiding populations should not be a burden to renewable-energy proponents. This management would barely be detectable and would decrease opportunity and would have a negligible adverse effect on renewable-energy program.

Heritage and Visual Resources

Cultural Resources
Under Alternative D, the cultural resources program would develop CRPPs for the protection

and preservation of identified geographic areas. These could include a prohibition on surface-disturbing activities for specifically identified sites containing historic properties that retain their historic settings, and appropriate mitigation for surface-disturbing activities for the protection of TCPs, sacred sites, and other culturally sensitive areas. To protect the settings of the identified historic properties, surface-disturbing activities could be restricted up to 3 miles from the sensitive cultural sites. These management actions would prohibit renewable-energy development on 1,694 acres (3%) and restrict renewable-energy development on 38,648 acres (78%) of BLM surface in the planning area with a wind-energy potential rating of good or higher. Although the prohibition would not affect 5 percent of the potential wind-energy resource, because so much of the potential wind-energy resource would be in the restriction area (for which mitigation could include prohibition), the effect on renewable-energy development would be moderate adverse.

Paleontological Resources
Alternative D would regulate surveying and monitoring of paleontological resources during surface-disturbing activities. Renewable-energy activities would avoid areas with high-quality or high importance paleontological resources. The effect on renewable-energy development would be barely detectable and therefore be a negligible adverse.

Visual Resources
Under Alternative D, 5,838 acres (12%) and 9,833 acres (20%) of BLM surface in the planning area with wind-energy development potential would be managed as VRM Classes I and II, respectively. Renewable-energy development would be incompatible with these VRM classes, and there would be a major adverse effect on wind-energy development from the Renewable Energy management.

Land Resources

Lands and Realty
Management under Alternative D would actively pursue land tenure adjustments to consolidate BLM surface estate and dispose of lands that are small and isolated or have limited natural resource values. Consolidating surface lands would facilitate renewable-energy development by providing for a more contiguous public land base and by encouraging such development near communities. The end result would effect less than 5 percent of BLM surface having a wind potential rating of good or higher, which would have a minor beneficial effect on renewable-energy development.

Rights-of-Way and Corridors
Under Alternative D, these management actions would not exclude renewable-energy development, but would allow transmission lines within existing ROW and designated corridors and other disturbance areas when resource objectives can be met. Constrain the locations of transmission and utility lines to serve renewable-energy developments. There would be a small change and therefore renewable-energy authorizations would have a minor adverse effect on renewable-energy development.

Recreation
Alternative D would allow surface-disturbing activities in seven designated SRMAs for administrative purposes only. This management action would prohibit renewable-energy development on 2,101 acres (4%) of BLM surface in the planning area with a wind-energy potential rating of good or higher. This management action would have a minor adverse effect on renewable-energy development.

Lands with Wilderness Characteristics (moderate adverse
Alternative D would manage 6,864 acres for natural values, which would prohibit most surface-disturbing activities in an area with a wind-energy potential rating of good or higher. This would have a moderate adverse effect on the renewable-energy program.

Special Designations

Areas of Critical Environmental Concern
Alternative D would designate two ACECs, within which renewable-energy development would be prohibited. The Pumpkin Buttes ACEC has 888 acres (2%) of BLM surface in the planning area with wind-energy potential of good or higher. Designating the Pumpkin Buttes ACEC would have a minor adverse effect on renewable-energy development.

4.6.3.7. Cumulative Impacts

Wind-energy projects are the most likely form of renewable energy projects in the planning area. The most likely area for development is in the southeast quarter of the planning area where there is very little BLM surface. There are currently two non-federal wind-energy developments proposed within viewshed of Pumpkin Buttes. The maximum estimated foreseeable non-federal renewable-energy development is 323,636 acres. Reasonably foreseeable development assumptions indicate renewable-energy development could affect up to 75,240 acres of BLM-administered lands in the planning area. Furthermore, oil and gas development will affect approximately 39,000 acres (cumulatively), or less than 5 percent of the planning area.

There could be interest in developing other forms of renewable energy development throughout most of the planning area. Renewable-energy technology is changing and could improve future opportunities for other renewable-energy projects not specifically identified in this analysis. Management actions not identified for specific projects in this analysis would refer to the appropriate resource management goals and objectives to ensure conformance to the land use plan.

4.6.4. Rights-of-Way and Corridors

This section describes potential impacts on the ROW program from land actions within the program and management actions by other resources programs. The ROW program supports public land use interests by responding to public requests for federal land use authorizations, ROW, permits and leases including; roads, pipelines, fiber optic lines, communication sites, powerlines and power stations, compressor sites, injection wells, etc. This program also acts as a support program for all other resource programs.

Corridor management involves aligning multiple authorizations within identified primary linear routes and development centers to minimize the overall effects to the landscape, wildlife, and natural resources. Chapter 3 describes existing conditions concerning this program.

Significance Criteria effects to ROW management would be considered substantial if any of the following occur:

- Substantial reduction in opportunity for ROW authorizations and related development activities.
- Substantial reduction in the opportunity for land tenure adjustments, limiting connectivity and contiguity for ROW development authorizations.

4.6.4.1. Methods and Assumptions

Impact analysis and conclusions are based on interdisciplinary team knowledge of resources in the planning area, reviews of existing literature, and information provided by other agencies. Spatial analysis was performed using the ESRI ArcGIS Desktop 10.0 computer software. Effects are quantified where possible. In the absence of quantitative data, effects are described using ranges of potential effects on the qualitative terms if information is available and appropriate.

Assumptions

- The demand for ROW authorizations will increase during the planning period, and shall remain a primary function of the realty program. Consideration of land use authorizations would be addressed on a project specific basis, and shall be consistent with other resource objectives.
- The demand for compliance monitoring and reclamation activities would continue to increase over the life of the planning period.
- Resolving trespass issues on public lands would continue over the life of the planing period. Avoidance of inadvertent trespass by people accessing public lands would be addressed through the use of appropriate signs and access authorizations.
- Denial or alternative routes or site locations of ROWs based on management actions for other resource programs would have an adverse effect by decreasing development opportunities.
- Exclusion areas would be areas with sensitive resource values, such as WSAs, city boundaries, WSRs and commercial airports; no authorizations would be allowed.
- Avoidance areas would be areas with sensitive resource values and authorizations would be compatible with the purpose for which the area was designated, such as wildlife and cultural buffered areas and areas of high erosion hazard and steep slopes.
- Sharing existing infrastructure such as roads for other resource and management actions would reduce trespass potential, increase ROW development opportunities and would benefit the ROW and corridor program.

The discussion of the effects on the ROW program under each Alternative encompasses all influences from land use authorizations. The effects on the ROW program focuses on the constraints and opportunities for ROW authorizations (e.g., for pipelines, powerlines, transmission lines, roads, reservoirs and communication sites, etc.). Surface-disturbing effects would occur from the implementation of management actions primarily designed to protect natural resources by preventing or minimizing effects on those resources. In other words, the type and degree of limitations and restrictions placed on ROW authorizations depend on the location of sensitive or high-value resources and the potential for environmental effects on those resources. This analysis would determine whether the implementation of management actions for other resource programs influences or modifies the location, size, or design of a given ROW proposal. In some cases, management actions for other resources would cause a denial or redesign; or require an alternate route or site location of a given proposal.

4.6.4.2. Impacts Common to All Alternatives

Rights-of-Way and Corridors (major beneficial)
ROW authorizations in Northern Sheridan County and Campbell County would be minimized due to substantial amounts of coal development that adversely affect multiple use opportunities on public lands.

Energy development through mineral and renewable resources would continue into the foreseeable future and would require authorizing uses to facilitate development during the plan period. Currently, more than 90 percent of the workload under ROW management is related to oil and gas development authorizations, monitoring, and reclamation.

ROW corridors would be designated to minimize surface disturbances and effects to other resources. ROWs would primarily be placed in or adjacent to existing disturbed areas associated with other existing ROW authorizations, or constructed roads and highways and would be the preferred future location. ROW development would benefit from placement of ROWs in a corridor where land use conflicts have been eliminated or reduced. Designated corridors given preference are intended to reduce resource and land use conflicts as much as possible; which would reduce the potential for modification, or mitigation needed to approve a ROW and develop infrastructure and facilities. Designating and preferring the location of ROW authorizations in corridors could also create adverse impacts to ROWs by preventing the location of ROWs along the most direct route for the intended purpose, or preventing additional ROW authorizations in a corridor if the maximum safe density of existing powerlines or pipelines is reached. Designated ROW corridors would be utilized with major ROW projects, such as intrastate pipelines and transmission lines.

The BFO would maintain a transportation management system in cooperation with appropriate state and local agencies to meet public and resource management needs; provide reasonable access across public land to private land, subject to other resource values; and develop a communication site management plan for all existing and newly identified communication site concentration areas.

Increasing demand for GHG emission mitigation measures is increasing interests for pore space disturbances, or uses. These are considered a lands and realty action and require a land use permit and ROW authorization for geologic studies and injection wells. The majority of the planning area could be utilized for these activities.

Overall the common to all alternatives in the majority of the planning area could be utilized for multiple use ROW and corridors and would have a major beneficial effect on the ROW program.

Physical Resources

Air Quality

Air quality management would include implementing air quality impact mitigation measures or COAs (within BLM's authority) to reduce emissions from current levels in the planning area and work cooperatively to encourage industry and other permittees to adopt measures to reduce emissions. These actions could require ongoing monitoring for compliance and decreased development opportunity, adding cost to ROW and corridor projects, and would be an ongoing requirement for ROW actions in the planning area. This management would have a minor adverse effect on the ROW program.

Soil

Using soil surveys and onsite investigation would ensure proper use of soil resources. Applying appropriate mitigation (including project relocation or denial) and requiring an approved reclamation plan would ensure all disturbances were effectively remediated to BLM standards. Authorized surface-disturbing activities would include plans for reclamation; site-specific reclamation actions would reflect the complexity of the project, environmental concerns, and reclamation potential of the site. Applying mitigation measures if necessary, could include relocating the disturbance to a more suitable soil type, or deny the authorization.

There are approximately 215,496 acres of BLM-administered surface lands identified as highly erosive by wind and water with little opportunity for successful mitigation and reclamation. These areas include Powder River Breaks, Recluse, Spotted Horse, Durham Ranch, and north of the community of Wright; South of Gillette Highway 59 to Hilight Road includes numerous hills with substantial amounts of scoria; Kaycee areas, including Tisdale Mountain have significant amounts of Bentonite, which limits development opportunities. Implementing management actions for vegetation and soil protection would place land use restrictions on those areas. This would result in the limitation or avoidance of overall disturbance when reclamation would be difficult, extensive, or where reclamation is known to fail.

Limitations for disturbance on all identified lands with highly erosive soils and poor reclamation potential would include consideration for minimizing surface-disturbing activities within those areas as well as those identified as having slopes of more than 25 percent (approximately 133,689 acres, see Map 4). The Lands and Realty staff would incorporate stipulations or COAs appropriate for successful mitigation and reclamation of those disturbed areas. The overall effect for disturbances on difficult to reclaim and steep soils as described would have a minor adverse effect on the ROW program.

Water Resources
Water quality and watershed management actions common to all alternatives would likely cause changes in the locations or design of some projects, but would not be likely to prohibit realty actions in most of the planning area. Water management actions common to all alternatives would not be substantial and would have a minor adverse effect on the ROW program.

Cave and Karst Resources
Management actions common to all alternatives for cave and karst resources are procedural actions (inventories) and would have no effect on the ROW program. As a BMP land use requests will not be considered for locations with known or suspected cave and karst values. Protecting these resources has not historically had an effect on the ROW program, and would likely have no effect on land uses in the future.

Mineral Resources

Locatable Minerals
Lands not formally withdrawn or segregated from mineral entry would be open for the exploration and development of locatable minerals. However, foreseeable locatable mineral development would affect 1,455 acres of BLM surface (0.2%) in the planning area. Designation of ROW corridors and siting new ROW adjacent to existing disturbances to minimize surface disturbance, which may necessitate modifying the siting of some roads and access routes, which would decrease development opportunity. This would have a negligible adverse effect on the ROW program.

Leasable Minerals – Coal
Similarly, the potential acreage available for coal leasing is extensive, but the foreseeable activity would disturb a maximum of 195,700 acres (less than 1% of BLM-administered coal area), all in central Campbell County and north-central Sheridan County (Map 11). Overall, coal leasing would result in a negligible adverse effect on the ROW program by decreasing development opportunities within the leased coal areas.

Leasable Minerals – Fluids
Authorizations related to oil and gas development would continue to require lessees to conduct operations in a manner that minimizes adverse effects to other resources and other land uses and users. Considerable oil and gas development is likely to continue during the planning period. CBNG and conventional potential is approximately 52 percent of federal fluid minerals. Energy development is currently the resource dominate surface-disturbing activity under the ROW program, with some of the largest CBNG reserves found in the PRB. Oil and gas development activities are anticipated to be compatible with other energy-development activities, potentially sharing infrastructure such as roads, structures and utility corridors, and increasing development opportunities. Therefore, oil and gas (fluid) development would have a major beneficial effect on the ROW program.

Although mineral resource development would vary across the alternatives, the trade-offs described above would apply to all alternatives. In this respect, effects would not be highly variable among the alternatives, and therefore not discussed for each alternative.

Salable Minerals
The BFO would make most lands in the planning area, including federally administered surface, minerals, and split estate, available for mineral materials exploration and development. Salable minerals projects are relatively rare; these actions likely have an overall negligible adverse effect, due to possible increased costs from limited projects and would decrease development opportunities. The maximum predicted disturbance from ROW actions related to salable minerals is 2,090 acres of BLM surface lands (0.2%). This would have a negligible adverse effect on the ROW program.

Fire and Fuels Management

Fire and fuels management will have no effect on the ROW program and will not be discussed any further in the ROW and corridors section.

Biological Resources

Management actions for biological resources are designed to be protective of the biological resources typically by limiting surface-disturbing activities.

Vegetation – Forests and Woodlands
There are no management actions common to all alternatives for forests and woodlands that affect the ROW and corridor program. The forest and woodland management actions that do vary by alternative do not regulate land use activities other than timber harvest, and therefore would have no effect on the ROW and corridor program. Therefore, forests and woodlands are not further addressed in the *ROW and Corridors* section.

Vegetation – Grassland and Shrubland Communities
Achieving a high level of species diversity, meeting the Wyoming Standards for Healthy Rangelands for vegetation, and preventing or minimizing soil erosion would result in the relocation or redesign of projects before they are authorized, when appropriate. Achieving diversity as well as an integrated management approach (e.g., mechanical, chemical, biological treatments, prescribed fire, and grazing management techniques) to maintain, restore, and enhance the health and diversity of plant communities to achieve resource or multi-resource objectives would be managed to maintain sustainable forage levels for livestock and wildlife habitats.

Manage grasslands and shrublands to protect, preserve, or enhance plant communities. Managing the siting of facilities and related infrastructure (utility corridors, roads) would reduce effects to vegetation resources, and managing the planning and development of ROWs would reduce effects to the vegetation resource.

Short-term effects would occur with disturbance and reclamation activities. Application of appropriate mitigation measures would limit or avoid long-term effects on the resources.

Long-term effects primarily occur from roads and powerlines. They would continue to occur in the planning area and would likely include further disturbances from roads, overhead powerlines, and some structures (e.g., abandoned structures from current mineral energy development, and future energy development structures like wind towers and potentially solar fields, or others not yet identified). Grass and shrub vegetation communities cover most of the planning area, ROW projects would be sited to reduce affects on vegetation impacts, which could result in relocation or redesign; therefore management common to all alternatives would have a major adverse effect on the ROW and corridor program.

Vegetation – Riparian/Wetland Resources
ROW management would strive to prevent degradation, loss, or destruction of riparian/wetland habitat, prohibit conflicting uses within riparian research areas and special enclosures, such as waterfowl supporting reservoirs and wetland systems on springs and streams, and evaluate CBNG created riparian and wetland systems for retention or reclamation. Riparian areas are generally held under BLM administration for the conservation, maintenance, and improvement to wildlife and natural resources. For all proposed surface disturbances, the BFO would prohibit surface disturbances that would have adverse effects on water sources that support wetland and riparian conditions. If a water source is considered important to other natural resource discipline(s), the parcel would be retained under BLM administration. There is 2 percent of riparian and wetland communities on BLM-administered lands within the planning area. Retaining these lands and avoiding disturbances that would affect riparian and wetland communities would likely have a minor adverse effect on the ROW program and would decrease development opportunities.

Invasive Species and Pest Management
ROW authorizations would require operators and users to manage to limit surface disturbance to prevent weed spread, using an IPM approach consistent with DOI Manual 517. This program would limit surface disturbance to the minimum needed for safe project completion to limit the spread of invasive species, and require permit holders to use vegetation products certified to be free of invasive species on all BLM-administered projects and lands. Collectively these measures would barely be detectable and decrease ROW development opportunity, having a minor adverse effect on the ROW program.

Fish and Wildlife Resources – Wildlife and Special Status Species – Wildlife (including Greater Sage-Grouse)
ROW authorizations would include stipulations or COA requiring authorized users to construct new fences to avoid adverse effects on wildlife and in accordance with BLM Fencing Handbook 1741-1 (BLM 1989), WO IM 2010–022 (BLM 2009e), and to promote the maintenance and improvement of habitat for migratory bird species of conservation concern in a manner consistent with national, regional, and statewide bird conservation priorities. Projects that could affect SSS fish would be modified or denied as appropriate. Stipulations or COAs would also require users to minimize disturbances that would result in alterations to springs and riparian Greater Sage-Grouse habitat.

Water facilities would be designed with protective features to reduce the risk of mosquito infestations resulting in an increase of WNv, and reduce the risk of mortality of Greater Sage-Grouse from drowning or entrapment.

Overall, management of fish and wildlife habitat and SSS will effect uses administered by the ROW program through the implementation of mitigation measures designed to protect them. Implementing species-specific protection measures for BLM-administered sensitive plant and wildlife species and prohibiting actions that would affect Threatened or Endangered species could result in the relocation of proposed disturbances and uses. This would effect approximately eight percent of the area and would decrease ROW development opportunities. Overall, there would be a moderate adverse effect on the ROW and corridor program.

Fish and Wildlife Resources – Fish and Special Status Species – Plants and Fish
The current RMP does not have any management actions that pertain directly to the ROW and corridor program due to the limited amount of occupied fisheries and species status plant habitat.

Heritage and Visual Resources

Cultural Resources
Because there are known cultural resources throughout the planning area, and because it is likely that additional cultural resources would be discovered, there could be varying degrees of effects throughout the planning area. Implementing protective measures and site stabilization for cultural resources would require avoidance and other mitigation measures for ROW actions proposed near such resources. These measures could result in the relocation, redesign or denial of proposed land uses.

Communication towers, compressor stations, tanks, and wind turbines would have the potential to directly effect the visual integrity of classes of cultural properties that derive their significance from natural settings and settings relatively devoid of modern intrusion. This resource would not have a significant effect on the ROW program, but would increase cost for development. Overall, this would have a minor adverse effect on the ROW program.

Paleontological Resources
Survey and monitoring activities for paleontological resources will occur during the entire planning period. Any paleontological resources discovered would be protected in accordance with the appropriate protective laws under all alternatives. Dry Creek Petrified Tree EEA would continue to be protected from land use effects. The protection and monitoring of paleontological resources would be considered not significant, although it would decrease development opportunity. This would have a negligible adverse effect on the ROW program.

Visual Resources
Any facilities or structures proposed in WSAs would be designed so as not to impair wilderness suitability. If the Middle Fork Powder River is designated by Congress as a WSR, the river would be managed as VRM Class I. Areas rated as VRI Class IV that do not contain special emphasis areas would be managed as VRM Class IV. Authorizations would require non-temporary facilities and structures to be screened, painted, and designed to blend with the surrounding landscape except where safety indicates otherwise.

Managing the planning area to meet VRM objectives could affect the locations, routes, heights, and colors of proposed uses and associated facilities. Additional effort would be required to design projects to meet the objectives of the specific VRM class designation of an area in which a

land use is proposed. Some additional project planning might be necessary for proposed projects within VRM Class III areas to ensure that the landscape is partially retained. The ROW program could require intensive mitigation measures, or preclude uses proposed in VRM Class II areas.

A management action common to all alternatives is the requirement for non temporary facilities to blend with surrounding landscape. This requirement is secondary to managing within the VRM class, meaning, although facilities may be visible within VRM Class II-IV, mitigation for visual effects should be included wherever possible. Because this management action does not prohibit ROW development the cost would increase and therefore decrease ROW development opportunity. The effect on the ROW program is a minor adverse effect.

Land Resources

Forest Products

Forest management areas within 200 feet of surface waters would be prohibited and affect less than one percent of the planning area. ROW and corridors would be denied or relocated, which would increase costs and decrease ROW development opportunities. The Lands and Realty staff will coordinate activities affecting forest products as necessary. This would have a negligible adverse effect for the ROW and corridor program.

Lands and Realty

R&PP applications would be considered on a project specific basis, and prohibit subsequent uses on these lands unless they were compatible with each R&PP authorization. Consideration for land use authorizations (permits, leases, etc.) would occur on a project specific basis consistent with other resource objectives. Consideration for withdrawals for surface and minerals and review withdrawal proposals from other agencies would occur on a project specific basis. Lands meeting the identified disposal criteria would have priority consideration for disposal.

The land ownership pattern in the planning area is scattered interspersed with private and state lands and other government agency administered lands. The lands and realty program will make land tenure adjustments through acquiring and disposing of lands through exchange, sale or through R&PP Act of 1926 patents. This would facilitate the location and routing of uses by providing for a more contiguous public land base and by encouraging such developments near communities.

Approximately 108,243 acres (7% of BLM surface) are identified for disposal. Disposal of small, isolated parcels would improve ROW management by reducing effects to the land by resolving access and adjacent landowner conflicts by 14 percent.

Trespass Resolution

Access easements would help resolve trespassing issues on public land. Inadvertent trespass would also be minimized through the use of appropriate signage. Other resource uses may affect trespassing incidences through the increased use of BLM-administered lands. Road development resulting from mineral development, grazing activities, and recreation would likely have a minor effect on trespass management. ROW management would include avoiding potential of inadvertent trespass by people accessing public lands through the use of appropriate signs and access authorizations. This level of effect is minor.

Custodial Allotments

Marginal grazing allotments on small, isolated parcels that are surrounded by private land owners are difficult to manage and contribute little to the rangeland management program. The BFO

would consider disposing of these properties through sale or exchange, improving management opportunities for higher priority grazing allotments. If these types of parcels are sold and taken out of the grazing system, management opportunities would improve by eliminating the need to manage ROW on these isolated, difficult to access, parcels.

Overall, the common to all management actions would likely have a moderate beneficial effect on the ROW program.

Renewable Energy
The BFO would cooperate with stakeholders to promote opportunities for scientific research for renewable energy in accordance with other resource values. This includes coordinating renewable energy development opportunities in accordance with other resource values.

Energy development in the planning area is expected to continue during the planning period. Future activities may include wind, solar, hydropower, or other energy development activities not yet identified. As a result of these ongoing uses, reclamation activities would continue to increase into the foreseeable future.

The National Renewable Energy Laboratory (NREL) identifies the planning area as having some solar energy development potential, but is not identified for large solar energy fields or high concentration areas. However, future interest is possible with improved technology. The affect is expected to be negligible and not be substantial.

NREL identifies good to excellent potential wind-energy development, and is beginning to enter the planning area on private surface. This would likely result in future applications for wind-energy projects over the life of the plan. Wind energy requires thousands of acres, and could eliminate other uses. Considerations for national energy needs would include other resources to minimize or avoid adverse effects to meet other relevant resource laws. Interests for renewable energy development would increase the need for ROWs, creating a major beneficial effect on the ROW program.

Travel and Transportation Management
TTM would affect the ROW program by increasing the number of easements issued per year to provide reasonable access to other government managed lands (federal, state, and local), and privately owned lands. Inventory all roads on public land and develop a transportation plan to identify roads/trails for closure or maintenance. Inventory, designate, number and sign all roads and trials. Post signs authorizing uses and activities. This could lead to less trespass incidents, including illegal dumping, unauthorized access to other agency managed or privately owned lands, and unauthorized grazing access. Providing ROWs to maintain or improve transportation needs would be potentially substantial and would continue into the foreseeable future. Overall, TTM would have a moderate beneficial effect on the ROW program.

Recreation
Demands for recreation related activities on public lands could increase the need for ROWs to access these areas. This would increase opportunities for willful trespass, dumping, and other illegal uses, requiring recreation management, BMPs, the presence of law enforcement, and monitoring uses on public lands, the presence of recreational sites would preclude the location of certain land use authorizations. Overall, recreation management common to all alternatives would not be substantial and would have a minor adverse effect on the ROW program.

Lands with Wilderness Characteristics
Areas managed for wilderness characteristics would preclude any ROW actions in those areas, consisting of approximately less than one percent of BLM surface in the planning area. The majority of the planning area is open for development, however, this would only have a minor adverse effect on the ROW program.

Livestock Grazing Management
Livestock grazing activities will likely have a short-term adverse effects on reclamation efforts under ROW management because livestock often use the reclaimed areas as forage and travel corridors. The use of BMPs to meet the Wyoming Standards for Healthy Rangeland would minimize any long-term effects. Mitigation actions could include deferring or temporarily limiting grazing on recently reclaimed areas to alleviate long-term effects. Livestock grazing management actions under each alternative would not prohibit or limit other land uses. Therefore, livestock, grazing management would have no effect on the ROW development and is not further addressed in the *ROW and Corridors* section.

Special Designations

Potential effects from all special designations whether existing or proposed, would primarily be minimal and would vary by the management prescriptions associated with each special designation. Intensive management could affect the ROW program by altering land disturbance and use locations. WSA management would impose the greatest restriction on ROW management actions, while the other special designations management actions would impose fewer restrictions on proposed disturbance activities. Surface-disturbing activities in ACEC could be allowed in consideration of other resource programs.

Land uses within the boundaries of special designations will be restricted to protect or conserve resource values, such as Gardner Mountain WSA (6,423 acres), North Fork WSA (10,089 acres), and Fortification Creek WSA (12,419 acres). The total acres managed for this resource is less than five percent of the planning area. Management of special designations common to all alternatives would have a minor adverse effect on the ROW program.

WSAs and WSRs are managed to a non-impairment standard under respective IMPs and BLM Manual 6330 – Management of Wilderness Study Areas until Congress acts to designate these areas or release them from consideration.

Socioeconomic Resources

There are no **Social**, **Economic**, or **Health and Safety** management actions common to all alternatives that would have a measurable effect on the ROW and corridor program. Therefore, these topics will not be further addressed in the *ROW and Corridors* section.

4.6.4.3. Alternative A

Alternative A would continue management in accordance with the 1985 RMP as amended and maintained.

Rights-of-Way and Corridors
Alternative A, the predicted overall disturbance from ROW actions is 38,762 acres (4.96%) of BLM surface in the planning area. Identified ROW Transmission lines and

transportation facilities would primarily be placed within ROW corridors, where feasible and appropriate. The BFO expects to receive ongoing interests in activities related to oil and gas development (e.g., reservoirs, utilities, sites, and roads). Incorporating BMPs by meeting required road standards and ensuring proper reclamation measures would minimize effects to the greatest extent possible. Use of existing infrastructure, or surface structures where feasible, would increase ROW development opportunities.

Under Alternative A, 32,378 acres of BLM surface would be designated ROW corridors (Map 57). There are seven identified ROW corridors in the planning area the Powder River, Echeta Road, Interstate 90, Highway 59 North, Interstate 25, Powder River Breaks, and Highway 14/16. There are no management restrictions on these corridors, allowing subsurface, surface, or above ground authorizations. Although lines must be buried in Greater Sage-Grouse Core Population Area, unless the line is within one half mile either side of existing 115 kV or larger transmission lines creating a corridor no wider than one mile wide.

Under Alternative A, prohibit communications sites on North Middle Pumpkin Butte, unless it becomes absolutely necessary to use the butte for the line-of-sight needs, such as microwave transmission, and limit authorizations to South Middle Pumpkin Butte until that area has been fully utilized, unless the decision is waived.

Alternative A would have a minor beneficial effect on the ROW and corridor program.

Physical Resources

Air Quality

Alternative A would require air quality monitoring for ROW and corridor projects expected to approach or exceed emission standards, analysis would be performed on activities with expected effects to air resources, and modeling may be performed on a project-specific basis. This would not have a substantial effect on the ROW program and would decrease development opportunities. Overall this management action would have a negligible adverse effect to the ROW program.

Soil

Under Alternative A, soils management actions within the 1985 RMP affecting the ROW program include no surface-disturbing seasonally within areas of severe erosion hazard, prohibit surface-disturbing activities on slopes of more than 25 percent, and within areas having poor reclamation suitability, approximately 170,590 acres, (22%) of BLM surface. All three prohibitions have an undefined allowance for waivers on surface-disturbing activities on soils with poor reclamation suitability and would not protect the soils, primarily because the authorized officer could waive the restrictions. The inadequate protection of soils with poor reclamation suitability on 455,090 acres (58%) of BLM surface in the planning area would have a moderate adverse effect on the ROW program. Even though more than 10 percent of the area identified in the ROW program contain sensitive soils, because the surface disturbance prohibition is conditional, the effect is considered to be a moderate adverse effect by requiring stipulations and COA which would eliminate or minimize adverse effects, and monitoring to ensure compliance associated with authorized activities would potentially decrease development opportunities.

Water Resources

Under Alternative A, water resources would be managed following current management principles. For all proposed surface disturbances, the BFO would prohibit surface disturbance within 500 feet of any spring, reservoir, water well, or perennial stream unless the prohibition

is waived by the authorized officer on a project specific basis, approximately 19,861 acres (2.0%) of BLM surface. Land use authorizations would be rerouted to avoid these areas which would require a ROW project to be considered on a project specific basis and could decrease development opportunities. Therefore, Alternative A water management would have a minor adverse effect on the ROW program.

Cave and Karst Resources
Cave and karst formations are characterized by steep cliffs, rocky outcrops, and sensitive soils under desirable ROW and corridor locations. Under Alternative A, no previous management decision was made, therefore current ROW projects in cave and karst areas would be considered on a project specific basis resulting in a slight but detectable effect and proposals would be denied, rerouted or deferred, decreasing development opportunities; overall this would have a minor adverse effect to the ROW program.

Mineral Resources

Locatable Minerals
Locatable minerals management is considered on a project specific basis under Alternative A. Because foreseeable locatable mineral development is estimated to disturb 554 acres of surface (less than 1% of the planning area), locatable minerals projects are extremely rare (most crossings/use of BLM surface would qualify as legitimate occupancy under 43 CFR 3715) which could increase costs and therefore decrease development opportunities, effects on the ROW program would have a negligible adverse effect.

Leasable Mineral – Coal
Reasonably foreseeable coal development would be localized and would likely occur on 195,700 net disturbance acres (less than 1% of BLM-administered coal area) in central Campbell County and north-central Sheridan County. Coal development would limit ROW development opportunities in the planning area. Under Alternative A, this could have a negligible adverse effect on the ROW program.

Salable Minerals
Under Alternative A, salable minerals management is considered on a project specific basis. Reasonable foreseeable salable mineral development is estimated to disturb 530 acres of surface (less than 1% of the planning area), and would increase development opportunities by sharing infrastructures, such as roads. Effects on the ROW program would have a negligible beneficial effect.

Biological Resources

Vegetation – Grassland and Shrubland Communities
Under Alternative A there are no decisions within the 1985 RMP related to grassland and shrubland management; therefore management would follow current policies and regulations. Reclamation activities would have to be consistent with the BLM Wyoming reclamation policy. Application of appropriate mitigation activities would limit or avoid long-term effects, and short-term effects would occur from vegetative removal and would require appropriate placement, storage, and replacement to minimize or avoid long-term effects. Grassland and shrub vegetation communities cover most of the planning area (over 10%), and ROW projects would be sited to reduce adverse effects on vegetation impacts, which would result in the relocation or redesign of

ROW projects before authorization, decreasing development opportunities. Overall this would result in a major adverse effect to ROW and corridor program.

Vegetation – Riparian/Wetland Resources
For all proposed surface disturbances, the BFO would prohibit surface disturbance within 500 feet of water sources that support wetland and riparian conditions, which account for 2 percent of BLM surface in the planning area. If a water source is considered important to other natural resource discipline(s) the action would be considered and mitigation measures would limit or prevent effects and land use, therefore decreasing ROW development opportunities. Minimizing or preventing disturbances would have a minor adverse effect on the ROW and corridor program.

Invasive Species and Pest Management
The only current management action is to control noxious weeds in cooperation with the counties. This management will have no effect on the ROW program.

Fish and Wildlife Resources – Wildlife and Special Status Species – Wildlife (including Greater Sage-Grouse)
Under Alternative A, management of fish and wildlife habitat and SSS plant and wildlife species would effect uses administered by the ROW program through the implementation of mitigation measures designed to protect those biological resources. Implementing species-specific protective measures for sensitive plant and wildlife species and prohibiting actions that would affect Threatened or Endangered species could result in the denial or relocation of proposed public land uses. The following management actions apply:

- Restrict surface disturbance and occupancy within a 0.25-mile radius (3,594 acres) of the center of Greater Sage-Grouse strutting grounds, year round, no exceptions. Prohibit surface disturbance within an additional 1.75-mile radius (203,724 acres) from March 15 to June 30. The effect on the resources is approximately 27 percent; this would have a major adverse effect on the ROW program.
- Prohibit surface disturbance and occupancy within 750 feet of sharp-tailed grouse leks (323 acres) at any time. The effect on the resource is approximately less than one percent. This would have a negligible adverse effect on ROW.
- Prohibit surface disturbance within an additional 0.64-mile radius of sharp-tailed grouse leks (7,607 acres) from April 1 through May 30. The effect on the resource is approximately one percent. There would be a minor adverse effect on ROW.
- Preclude new surface-disturbing activities within 0.5 mile of raptor nests (385,148 acres) that could cause increased stress to and/or displacement of animals during the critical time period (February 1 to July 31). The effect on the resource is approximately 23 percent. This would have a major adverse effect on ROW.
- Prohibit surface disturbance or occupancy within a biologic buffer zone around active nests of special status raptor species. Under current management, this action is considered minor, adverse.

Any disturbing land use proposal that would disturb areas containing fish bearing waters, and areas with special status fish species, would be addressed on a case by case basis.

These management actions would delay, or reroute ROW proposals, decreasing opportunities. Overall, Alternative A management of wildlife and special status wildlife would have a major adverse effect on the ROW and corridor program although there are provisions for exceptions, which would reduce the impacts of these management actions.

Fish and Wildlife Resources – Fish and Special Status Species – Plants and Fish
The current RMP does not have any management actions that pertain directly to ROW and corridor management. Proposals would be considered on a project-specific basis, and would likely have negligible effects on the ROW and corridor program due to the limited amount of occupied fisheries and special status plant habitat.

Heritage and Visual Resources

Cultural Resources
Under Alternative A, implementing protective measures for cultural resources would require avoidance and other mitigation measures for proposed land uses near these resources. These measures could result in the relocation or redesign of proposed use before they could be authorized. Because there are known cultural resources throughout the planning area, and because it is likely that additional cultural resources would be discovered, effects could vary in degree throughout the planning area. Land use proposals within the view shed of the Bozeman trail would be denied unless the authorized officer waives the prohibition. Cultural and resource specialists would be included during the scoping and analysis of potential effects, and survey and monitoring activities for proposed uses would be identified in each analysis for land uses. Alternative A, cultural resource management would likely have a moderate adverse effect on the ROW program.

Paleontological Resources
Under Alternative A, implementing protective measures for paleontological resources would require avoidance and other mitigation measures for proposed land uses near these resources. These measures could result in the relocation or redesign of proposed uses before they are authorized. Because there are known paleontological resources throughout the planning area, and because it is likely that additional paleontological resources would be discovered effects could occur in and vary in degrees throughout the planning area. Paleontological and resource specialists would be included during the scoping and analysis of potential effects, and survey and monitoring activities for proposed uses would be identified in each analysis for land uses. Under Alternative A, the Dry Creek Petrified Tree EEA would continue to be protected from the adverse effects of land use, and casual collection areas would be designated on a case-by-case basis. Public lands with significant paleontological values would be retained. Overall, Alternative A management of paleontological resources would have a minor adverse effect on the ROW program.

Visual Resources
Under Alternative A, managing the planning area to meet VRM objectives could affect the locations, routes, heights, and colors of proposed land uses and associated facilities. ROW development or other resource use could be considered within the line-of-site of VRM classes. Disturbance in forested areas could cause habitat fragmentation and affect visual resources. Additional effort would be required to design projects to meet the objectives of the specific VRM class designation of an area in which a use is proposed. Visual resources are considered with proposed land uses. Effect on visual resources would be minimized or prevented, appropriate to the VRM classes.

Pumpkin Buttes is a significant VRM feature. All proposed land use actions in the view shed of Pumpkin Buttes would consider and minimize or prevent adverse effects on visual resources coordination with the cultural resources program, consistent with national objectives, and resource management objectives. Some additional project planning might be necessary for VRM Class III areas to ensure that the landscape is partially retained. Considerations for national energy

priorities or other land uses, could reduce VRM classifications. There are 127,594 acres (16%) of BLM surface classified as VRM II, which would reduce but not prohibit surface disturbances.

Overall, Alternative A management of visual resources would have a moderate adverse effect on the ROW program.

Land Resources

Under Alternative A, the following programs do not have any management actions that would affect the ROW program: **Travel and Transportation Management, Recreation**, **Lands with Wilderness Characteristics**, and **Livestock Grazing Management**, and therefore will not be discussed any further in this section.

Forest Products
Alternative A forest management areas within 200 feet of surface waters would be prohibited, affecting less than one percent of the planning area. ROW and corridors would be denied or relocated, which would increase costs and decrease ROW development opportunities. The Lands and Realty staff will coordinate activities affecting forest products as necessary. This would have a negligible adverse effect for on the ROW and corridor program.

Lands and Realty
Under Alternative A, management supports the acquisition of lands or interests in lands from willing private and state entities on a project specific basis. Priority would be given to those lands adjacent to larger blocks of BLM-administered public lands, particularly those with high recreational potential. In acquiring state lands or interests in lands from willing sellers the BLM would initially consider the following: (1) any lands considered void of important natural resource values could be exchanged for the acquired lands and (2) during the planning period, the BLM would not engage in acquisitions resulting in an overall net gain of publicly administered lands. Acquiring easements would result from access needs that would improve administration of public lands. Acquiring lands with important natural resource values would require coordination with other resource disciplines, appropriate to the acquisition.

Over the last 25 years, the identified disposal lands were reduced by approximately 30,500 acres (3%). However, authorizations related to oil and gas development have taken precedence over land tenure adjustments. This activity is expected to continue, although reasonably foreseeable development data shows a steady reduction in CBNG development; and continued or increased conventional oil development. Therefore, it would be reasonable to assume that the overall decrease in land disposals would be similar to the last planning period. Assuming this pattern continues, an average disposal rate of 1,200 acres per year under Alternative A would have a major beneficial effect on the ROW program through the disposal of small, isolated parcels. This would increase multiple resource management opportunities in a more contiguous land ownership pattern.

Lands with high surface values would generally be retained, although lands could be disposed of if determined to benefit the recipient. This includes land with water and agricultural potential. The BFO would consider selling lands with agricultural development or through the Desert Land Entry Act.

Overall, Alternative A Lands and Realty management actions would have a minor beneficial effect on the ROW program.

Renewable Energy
Alternative A, there are no management actions related to renewable energy in the 1985 RMP: therefore, the entire planning area would allow renewable energy development across the planning area without specific or defined criteria. There are no renewable-energy projects to date. Under Alternative A, the BFO anticipates approximately 20,000 acres (3%) of BLM surface in the planning area during the planning period would be developed, increasing ROW development opportunities. Development on this scale would have a minor beneficial effect on the ROW program and corridor program.

Special Designations

Under Alternative A, potential effects on ROW actions from management of special designations would be minimal even though it would vary by the management prescriptions associated with each special designation area. Intensive management could affect the ROW program by altering locations of land uses.

Areas of Critical Environmental Concern and Scenic or Back Country Byways
Under Alternative A, there are currently no ACECs and scenic or national BCBs designated in the planning area; this would have no effect on the ROW program.

Wild and Scenic Rivers
Under Alternative A, there is one potential WSR, the Middle Fork Powder River, which will be managed in accordance with the Middle Fork Powder River Interim Management Plan until congress acts upon the management. This would decrease ROW development opportunities and would have a negligible adverse effect on the ROW program.

Wilderness Study Areas
WSA management would impose the greatest restrictions on ROW management actions of all special designations. Any development or activity within the boundaries of a WSA would be restricted to protect or conserve resource values while meeting national and resource management objectives. This management would affect less than five percent of the planning area (6,423 acres in the Gardner Mountain WSA, 10,089 acres in the North Fork Powder River WSA, and 12,419 acres in the Fortification Creek WSA) resulting in a minor adverse effect on the ROW program.

4.6.4.4. Alternative B

Alternative B would emphasize resource conservation.

Rights-of-Way and Corridors
Management under Alternative B would exclude ROW and corridor activity from 706,556 acres (69%) of BLM surface and restrict communications sites. Prohibit new authorizations for communication sites in the Pumpkin Buttes area and maintain existing lands use authorization until they expire and require co-location of new communication sites within designated areas. The predicted disturbance from ROW actions is 18,011 acres (2.3%) of BLM surface, which would result in a minor adverse effect by limiting opportunities for ROW development across the planning area.

Under Alternative B, a total of 29,126 acres of BLM surface are designated for transportation and utility major ROW corridors (Map 58). The Echeta Road, Highway 14/16, Highway 59 North,

Interstate 25, Interstate 90, and Powder River corridors would be authorized, removing Powder River Breaks corridor and resulting in 3,167 fewer acres of BLM surface as ROW corridors. Management actions would not allow above ground authorizations only subsurface authorizations.

Under Alternative B, ROWs would be prohibited from surface-disturbing activities on slopes equal to or greater than 25 percent. The BFO expects ongoing interests in overhead powerline development. Transmission lines associated with ROW development would be placed within identified ROW corridors and all other above ground facilities would avoid major transportation routes to prevent visual resources. Overall, this management would likely have a major adverse effect on the ROW program due to the potential need for transmission lines outside identified corridors and require actions that are not feasible or appropriate for the proposed use, therefore decreasing development opportunities.

Physical Resources

Air Quality

Under Alternative B, management actions would require air quality monitoring, and quantitative air quality modeling of industrial activities (e.g., oil and gas field development or mining activities) to determine the potential impacts of proposed emission sources and subsequently potential mitigation strategies for projects expected to approach or exceed emission standards at the project level. This would not have a substantial effect, but would decrease ROW development opportunities; overall there would be a negligible adverse effect to the ROW and corridor program.

Soil

Under Alternative B, requests for disturbances on slopes equal to or greater than 25 percent and soils with poor reclamation suitability, badlands, rock outcrops, biologic crusts, and slopes susceptible to movement would not be considered and the authorized officer would not waive the prohibition on such disturbances. This would prevent disturbance on approximately 28 percent of the planning area. Preventing or minimizing soil erosion would result in the relocation or redesign of proposed projects before they could be authorized, decreasing development opportunities. Alternative B would prohibit ROW development on 215,496 acres (28%) of BLM surface in the planning area, which would have a major adverse effect to ROW development.

Water Resources

Under Alternative B, surface-disturbing activities would be prohibited within 500 feet of springs, reservoirs, water wells, and perennial streams and associated riparian habitat. A NSO stipulation for any mineral leases would also be applied to ROWs within 500 feet of the same features. Additionally, no surface discharge of produced water would be allowed from federal mineral development, and oil and gas wells could not be converted to water supply wells.

This would encompass 19,861 acres (2.5%) of BLM surface in the planning area. Proposed projects would be rerouted to avoid these areas and would decrease development opportunities. Before authorizing a ROW, the BLM would consider important resource values. Overall, Alternative B water management actions would have a minor adverse effect on the ROW and corridor program.

Cave and Karst Resources

Cave and karst formations are characterized by steep cliffs, rocky outcrops, and sensitive soils. Alternative B, would prohibit surface-disturbing and disruptive activities in these areas, a total of 101,455 acres prohibited from ROW development; 13 percent of BLM surface in

the planning area. ROWs would not likely occur on these types of surface conditions. Therefore, there would be a minor adverse effect to the ROW program.

Mineral Resources

Locatable Minerals

Locatable minerals management recommend withdrawals from mineral entry for areas identified to conserve other resource values under Alternative B. Because foreseeable locatable mineral development is estimated to disturb 277 acres of surface (less than 1% of the planning area), locatable minerals projects are extremely rare and would increase costs due to the limited number of projects, development opportunities would be decreased and effects on the ROW program would have a negligible adverse effect.

Leasable Minerals - Coal

Under Alternative B, the reasonable surface disturbance prediction of 186,600 net acres of coal is identified as acceptable for further coal leasing consideration (less than 1% of BLM-administered coal) in the planning area. This action would decrease ROW development opportunities and therefore would have a negligible adverse effect on the ROW program.

Salable Minerals

Salable minerals management is to close or restrict from mineral exploration and development and to conserve other resource values under Alternative B. Because reasonable foreseeable mineral development is estimated to disturb 114 acres of surface (less than 1% of the planning area), sharing infrastructure such as roads would increase ROW development and would have a negligible beneficial effects on the ROW program.

Biological Resources

Vegetation – Grassland and Shrubland Communities

Under Alternative B, reclamation activities would have to be consistent with the BLM reclamation policy. Authorizing only native plant species for all reclamation activities and applying appropriate mitigation measures activities would limit or prevent long-term effects. Short-term effects would occur from vegetation disturbance and would require appropriate placement, storage, and replacement to minimize or prevent long-term effects. Long-term vegetation disturbance effects would primarily occur from roads and associated structures that support ROW projects. Native species could increase the reclamation time and cost, but would not restrict ROW development opportunities. Overall, this management would result in a negligible adverse effect to the ROW and corridor program.

Vegetation – Riparian/Wetland Resources

Riparian areas are generally held under BLM administration for the conservation, maintenance, and improvement of wildlife and natural resources. Under Alternative B, surface-disturbing activities and disruptive activities would be prohibited within 500 feet of riparian/wetlands systems, aquatic habitats, and floodplains, approximately 2 percent of BLM surface in the planning area. Proposed projects would be rerouted to avoid these areas, therefore decreasing ROW development opportunities. Overall, Alternative B riparian and wetland management would likely have a minor adverse effect on the ROW program.

Invasive Species and Pest Management

Alternative B would take an aggressive approach to managing invasive species. Under Alternative

B, 15,000 acres (2%) of BLM surface in the planning area are predicted to be treated. The time and cost associated with control activities would decrease ROW development opportunities. This would have a minor adverse effect on the ROW program.

Fish and Wildlife Resources – Fish and Wildlife
Alternative B, management of fish and wildlife habitat would effect uses administered by the ROW program through the implementation of mitigation measures designed to protect those resources. Surface disturbance and occupancy would be prohibited in the Ed O. Taylor (3,896 acres), Kerns (163 acres), and Amsden Creek (525 acres) winter ranges for big game. This would effect less than one percent of the planning area and have a negligible adverse effect on the ROW program. Surface-disturbing and disruptive activities would not be allowed in crucial elk winter range (50,586 acres) between November 15 and April 30, and in elk calving areas (37,549 acres) from May 1 to June 30. This would have a minor adverse effect on the ROW program. No land uses would be authorized on elk crucial winter range and calving areas. This would affect approximately four percent of the planning area and would have a minor adverse effect on the ROW program. Surface-disturbing activities in or near priority big-game migration and travel corridors would not be allowed. Elk security habitat would require a no net loss in the year round range (132,148 acres, or 17% of BLM surface in the planning area).

Alternative B management would prohibit surface disturbance and occupancy within 0.25 mile (940 acres, or 0.12% of BLM surface in the planning area) of the center of sharp-tailed grouse leks year round and with no exceptions. Surface disturbance and occupancy would be prohibited within a 2 mile radius of sharp-tailed grouse leks (323 acres) from April 1 through May 30. This would affect approximately 0.04 percent of BLM surface in the planning area.

Alternative B management would prohibit surface-disturbing activities potentially disruptive to nesting raptors within 1.5 miles of an active raptor nests of high federal interest (255,129 acres, or 33% of BLM surface in the planning area) during specific time periods: golden eagle, barn owl, and great horned owl would be from February 1 to July 15; osprey, merlin, sharp-shinned hawk, kestrel, prairie falcon, northern harrier, Swainson's hawk, and Cooper's hawk from April 1 to July 31; red-tailed hawk, short-eared owl, long-eared owl, and screech owl would be from March 1 to July 31.

Overall Alternative B would have a minor adverse effect on the ROW development program by incorporating stipulations, and mitigation activities to avoid or minimize effects on fish and wildlife resources which increase cost and time, decreasing ROW development opportunities.

Special Status Species – Plants, Fish, and Wildlife (including Greater Sage-Grouse)
The SSS management actions under Alternative B would have the greatest effect on the ROW program. Implementing species-specific protective measures for sensitive plant and wildlife species and prohibiting actions that affect Threatened or Endangered species could result in the denial or relocation of proposed public land uses.

Alternative B SSS plants management actions prohibit surface-disturbing activities that could adversely impact special status plant species habitat, mineral exploration and development, all motor vehicles use including uses related to fire suppression and geophysical exploration, ROWs within habitat, and the use of explosives and blasting (Map 34).

Under Alternative B, SSS fish, the proposed surface-disturbing activities within 0.25 mile of fish bearing waters would not be authorized (51,745 acres, 1% of BLM surface in the planning area),

and prohibit impoundments and instream structures where adverse impacts on special status fish species and their habitat would potentially occur.

Alternative B, special status wildlife would require enlarging and enhancing habitat and habitat connectivity for SSS; maintaining the integrity of traditional wildlife migration and travel corridors; locating and managing facilities to minimize noise impacts on SSS; managing surface-disturbing and disruptive activities to minimize impacts on special status wildlife and their habitats; and prohibiting surface-disturbance activities in all prairie dog colonies (Map 35). Alternative B special status upland game birds management actions, would prohibit renewable-energy projects within Greater Sage-Grouse nesting, brood-rearing and winter habitat, require anti-perching devices on existing and new powerlines in occupied Greater Sage-Grouse habitat, and habitat identified for restoration; prohibit surface-disturbing and disruptive activities, occupancy within 4.0 miles of the perimeter of occupied or undetermined Greater Sage-Grouse leks and winter habitat concentration areas; prohibit surface-disturbing and disruptive activities in nesting and early brood-rearing habitat greater than 4.0 miles of occupied and undetermined Greater Sage-Grouse leks, from March 1 to July 15; prohibit surface-disturbing and disruptive activities within winter habitat greater than 4.0 miles of Greater Sage-Grouse winter concentration areas, from November 15 to March 14; prohibit surface-disturbing and disruptive activities within 4.0 miles of winter concentration areas, from November 15 to March 14; and allow no more than one disturbance and 3 percent total surface disturbance per 640 acres within the DDCT analysis area to demonstrate and restore disturbed sagebrush communities on BLM surface.

Alternative B special status upland game birds management within Priority Habitat Area would exclude all ROWs except where valid existing rights exist; prohibit mineral material sales; avoid constructed roads beyond 4 miles of occupied and undetermined Greater Sage-Grouse leks and winter concentration areas; recommend area for withdrawal; and retire grazing allotments.

Alternative B special status upland game birds management within general habitat areas would avoid ROWs and require full reclamation bonding specific to the site and sufficient to cover costs required for full reclamation.

Alternative B special status raptors would establish a year-round disturbance-free buffer zone of at least 0.5 mile following the Clear Creek, Crazy Woman Creek, Piney Creek, Powder River and Tongue River riparian corridors used by bald eagles (Map 41). This buffer may be adjusted to one mile or greater based on topographic features, visibility, disturbance and human activity levels. This buffer zone restriction will be based on site specific information and coordinated with the USFWS's Wyoming Field Office, which will provide written concurrence. Prohibit surface disturbance and occupancy within a biologic buffer zone around active nests of special status raptors. Apply TLS prohibiting surface-disturbing and disruptive activities to nesting raptors within 1.5 miles of a SSS raptor nest during the following time periods: January 1 to August 15 for bald eagle; March 1 to July 31 for ferruginous hawk and peregrine falcon; April 15 to September 15 for burrowing owl; April 1 to August 31 for northern goshawk (Map 32). Alternative B would also apply a year-round biological buffer zone for raptors of high federal interest during critical times (255,129 acres, 33% of BLM surface in the planning area).

Alternative B special status amphibians, reptiles, and bats would prohibit surface-disturbing and disruptive activities in the following areas: (1) identified 100-year floodplains; (2) areas within the 1,640 feet (500 meters) of perennial waters, springs, playas, wells, and wetlands; (3) areas within 100 feet of ephemeral channels; and (4) within 1,640 feet (500 meters) of south-facing rock outcrops.

Overall, the management of SSS plants, wildlife, and fish, would have a major adverse effect on the ROW and corridor program, decreasing ROW development opportunities.

Heritage and Visual Resources

Cultural Resources

Under Alternative B, implementing protective measures for cultural resources would require that land authorizations be avoided within the boundaries of historic properties and within 5 miles of the visual horizon (whichever is closer) of historic properties that retain their historic settings. This would affect 330,592 acres (42%) of BLM surface in the planning area. Each analysis of a proposed land use would include cultural resource specialists during the scoping and analysis of potential impacts, and identify survey and monitoring activities for proposed uses. Surface-disturbing activities would be prohibited in areas with historic properties that retain their historic settings, TCPs, sacred sites, and other culturally sensitive areas. Alternative B management of cultural resources would have a major adverse effect on the ROW program.

Paleontological Resources

Alternative B management actions for paleontological resources would require field surveys on all PFYC Class 3, 4, and 5 formations potentially affected by proposed activities and monitoring of surface-disturbing activities on all Class 4 and 5 formations (class 5 formations are 3.6% of BLM surface), and as needed for Class 3 formations. Designate areas containing paleontological resources of high quality or importance for special management, as they are identified, this management action would decrease ROW development opportunities. Therefore, Alternative B would have a minor adverse effect on ROW the program.

Visual Resources

Under Alternative B, managing the planning area to meet VRM objectives would affect the locations, routes, heights, and colors of proposed land uses and associated facilities. WSAs (28,931 acres) and Middle Fork Powder River would be managed as VRM Class I; manage all VRI Class II areas and special emphasis areas as VRM Class III; and manage all VRI Class III areas outside special emphasis areas as VRM Class III. Under Alternative B areas inventoried as Class II and special emphasis areas would be managed as VRM Class II. There are 217,021 acres (28%) of BLM surface in the planning area classified as VRM Class II; however, because surface disturbance would be reduced but not prohibited, ROW development opportunities would decrease. VRM could change the location of or preclude a ROW development action. This would have a major adverse effect on the ROW program by restricting the majority of potential ROW development opportunities.

Land Resources

Forest Products

Under Alternative B, forest management areas within 200 feet of surface waters would be prohibited and affect less than one percent of the planning area. ROW and corridors would be denied or relocated which would increase costs and decrease ROW development opportunities. The Lands and Realty staff will coordinate activities affecting forest products as necessary. This would have a negligible adverse effect for on the ROW and corridor program.

Lands and Realty

Under Alternative B, management would pursue all lands for acquisition. All lands would be considered, regardless of their recreational or natural resource values. Acquired lands would

include those that improve administrative access, or lie adjacent to or near other large blocks of public lands. Under this Alternative, the impact would moderately effect all resources, including interests for ROW development, and escalate management responsibilities and land use authorization opportunities. The reasonably foreseeable activities associated with land acquisitions is minimal. The most likely foreseeable activities would occur with retaining lands identified for disposal.

Alternative B, would pursue easements to access public land that would benefit BLM management for any resource value and pursue land tenure adjustments on lands holding custodial grazing allotments and sales, in accordance with other resource values.

All lands identified for disposal would be examined for the presence of high-value resources. There are approximately 108,243 acres (14% BLM surface) currently identified for disposal. Lands containing high surface values will generally be retained, including those with agricultural potential. The BFO would pursue land tenure adjustment on lands identified for disposal having no natural resource values prior to pursuing lands identified for disposal having natural resource values, generally the management action would be to retain these lands identified for disposal until after the lands identified as having no natural resource value have been disposed of. This management practice would consolidate lands, decreasing trespass potential and would increase ROW development opportunities; this would have a major beneficial effect on ROW and corridor program.

Renewable Energy

Under Alternative B, 730,530 acres (84%) of BLM surface in the planning area would be excluded and 45,441 acres (11%) would be avoided for renewable energy development. This Alternative would eliminate most of the lands from ROW development. Management would exclude renewable-energy projects wherever mineral development and other surface-disturbing activities are prohibited, and allow ROW development where other surface-disturbing activities are allowed. A predicted 5,000 acres (1%) of BLM surface would be disturbed from renewable-energy development during the planning period. Overall, renewable-energy development at that scale would have a minor adverse effect on the ROW program by restricting development opportunities.

Travel and Transportation Management

Under Alternative B, TTM would limit motorized vehicle use to designated routes within the stock driveways, allow over-snow vehicle use consistent with motorized use designations, and limit motorized travel to designated roads and trails on 137,126 acres (57%) of BLM surface, consistent with other resource values, prohibit motorized vehicle use from November 15 to April 30 within the big game crucial winter ranges, close areas to motorized vehicle use to protect sensitive resources on 625,854 acres of BLM surface, and allow travel off identified designated routes to signed areas only under a special use permit. Authorizations would provide reasonable access to other federally managed lands, state lands and privately owned lands. Alternative B would evaluate existing routes in the vicinity of any new system roads for closure and reclamation consistent with other resource values, as well as close areas for motorized vehicles to protect sensitive resources as defined in the corresponding special designation and resource sections of Alternative B. This management would have a major adverse effect on the ROW program restricting development opportunities.

Recreation

Alternative B, recreation management actions would be prioritized for 55,529 acres, (7%) of the planning area, and divide the planning area into the Southern Big Horn Mountains

ERMA and Buffalo ERMA. This could restrict ROW development opportunities by limiting allowable surface disturbance from facilities and infrastructure. Overall, this would have a moderate adverse effect to the ROW program.

Lands with Wilderness Characteristics
Alternative B would manage lands with wilderness characteristics to emphasis primitive recreational opportunities and natural values. Lands with wilderness characteristics include 12,237 acres (less than 1%) of BLM surface in the planning area. Management prohibitions would be closed or limit vehicles to designated roads and trails; manage for visual resources as Class II; close the area to mineral leasing; recommend withdrawal to locatable mineral entry; close areas to salable minerals; exclude ROWs; prohibit renewable-energy development; prohibit commercial wood cutting only when the by-product would be an environmental restoration; and prohibit all other surface-disturbing activities not compatible with retaining or enhancing the areas natural values. Overall, this exclusion would have a minor adverse effect on the ROW program.

Special Designations

Areas of Critical Environmental Concern , Wilderness Study Areas, Scenic or Back Country Byways, and Wild and Scenic Rivers
Under Alternative B ROW actions would be restricted in all special designation areas. Management prescriptions associated with each special designation would take precedence over ROW projects. WSA management would impose the greatest restrictions on ROW management actions, while other management of other special area designations would impose fewer restrictions on proposed disturbance activities. Any development or activity within the boundaries of special designation areas would be restricted to protect or conserve resource values while meeting national and resource management objectives when necessary. ACECs would affect 511,000 acres (69%) (major adverse) and WSAs 28,931 acres (4%) (minor adverse) of BLM surface in the planning area. Byway designation should not affect ROW authorization, but could adversely affect the perception of ROWs and therefore be a consideration in proposing ROWs along a designated byway, having a negligible adverse effect. Alternative B would designate one Middle Fork Powder River WSR, which would prohibit ROW development. If congress denies this nomination, management will continue in accordance with the Middle Fork Powder River Interim Management Plan to retain its free-flowing characteristics and outstanding resource value; this would have a negligible adverse effect.

4.6.4.5. Alternative C

Rights-of-Way and Corridors
Management under Alternative C would allow ROW and ROW corridor actions unless they are specifically excluded, developing and designating transportation and utility ROW and ROW corridors. The predicted disturbance from ROW actions under Alternative C is 57,083 acres (7.3%) of BLM surface in the planning area.

Under Alternative C, authorizations for communications sites in the Pumpkin Buttes area would be allowed without first fully utilizing the South Middle Butte and co-location would not be required on new communication site proposals, and authorize communication sites on North Middle Butte regardless of line-of-site needs.

Under Alternative C, surface-disturbing activities on soils with a severe erosion hazard, on slopes equal to or greater than 25 percent, on soils with poor reclamation potential, and on miscellaneous soil types would be allowed.

Under Alternative C, designate a total of 32,293 acres of BLM surface for transportation and utility ROW corridors, with no management action restrictions allowing subsurface, surface or above ground authorizations. There are seven identified corridors: Echeta Road, Highway 14/16, Highway 59 North, Interstate 25, Interstate 90, Powder River, and the Powder River Breaks. Corridors would be designated for above ground facilities such as overhead distribution powerlines and would be placed adjacent to existing major transportation routes. Linear ROW transmission lines would be authorized consistent with other resource values. Activities generally excluded from ROW corridors include mineral materials disposals, range and wildlife habitat improvements involving surface disturbance and facility construction, campgrounds and public recreation facilities, and other facilities that would attract public use. Facilities would not be placed adjacent to each other if there would be resource conflicts or issues with safety or incompatibility. Designated corridors would vary by total width, numbers, types, extents, and compatibility with other surface-disturbing activities or other public uses.

Under BMPs, ROW holders are encouraged to use existing disturbed corridors, as well as coordinate with other authorized users for construction, maintenance and reclamation activities. Corridor management would decrease ROW development opportunities across the planning area and would have a minor adverse effect on the ROW and corridor program.

Physical Resources

Air Quality

Under Alternative C, quantitative air quality modeling of industrial activities would not be required for ROW and corridor projects. The effect on the ROW and corridor program would be potentially not substantial and would increase opportunity for development. This would have a negligible beneficial effect on the ROW program.

Soil

Under Alternative C, requests for disturbances on slopes equal to or greater than 25 percent and soils with severe erosion hazard and poor reclamation potential would be considered. Allowing surface-disturbing activities on miscellaneous soil types would have a major adverse effect on soil resources.

This would increase disturbance on approximately 28 percent of the planning area failing to protect 218,928 acres of BLM surface and increase development opportunities. Consistent implementation of BMP would strive to minimize those effects and localize them where there are determined sensitive vegetation and soils. This would have a major beneficial effect to the ROW program.

Water Resources

Alternative C, surface-disturbing activities would not be prohibited within 500 feet of springs, reservoirs, water wells, perennial streams, and associated riparian habitat approximately 19,861 acres of BLM surface. An NSO stipulation for any mineral leases would not be applied within 500 feet of the same features. Additionally, surface discharge of produced water would be allowed from federal mineral development; and oil and gas wells could be converted for water supply wells.

Riparian areas are generally held under BLM administration for the conservation, maintenance, and improvement of wildlife and natural resources. Land use authorizations would be rerouted to avoid these areas and would decrease development opportunities. Overall, this would have a minor adverse effect.

Cave and Karst Resources
Under Alternative C, cave and karst management requirements would effect 13 percent of BLM surface in the planning area, requiring a buffer around significant cave entrances. Generally, the BLM would not likely authorize land uses where there are known or likely cave and karst resources. The effect would be slight but detectable, and ROWs would be denied or rerouted which would decrease development opportunities. Therefore, this would have a minor adverse effect on the ROW program.

Minerals Resources

Locatable Minerals and Salable Minerals
Alternative C would allow ROW projects in other minerals development areas where land uses would be compatible, and would locate projects to lands appropriate to meet other resource objectives and minimize conflicts with other development activities. Many of these improvements would benefit the ROW program by utilizing previously disturbed areas, or corridors, and roads. However, some activities may cause ROW projects to be modified, relocated, or denied, decreasing ROW development opportunities. Because foreseeable mineral development is estimated to disturb locatable minerals 1,455 acres of surface (less than 1% of the planning area), and salable minerals 2,090 acres (0.2%), mineral management and development activities would have a negligible, beneficial effect on the ROW program.

Leasable Minerals - Coal
The Alternative C reasonable surface disturbance prediction of 195,700 net acres of coal identified as acceptable for further coal leasing consideration (less than 1% of BLM-administered coal). This would decrease ROW development opportunities, and would have a negligible adverse effect on the ROW program.

Biological Resources

Vegetation – Grassland and Shrubland Communities
Under Alternative C, the BLM would authorize native and non-native plant species for initial reclamation activities. This could have a major beneficial effect on ROW development by allowing the use of non-native species for interim or short-term reclamation. Alternative C management would increase the success of soil stabilization and vegetation recovery efforts and increase the probability of achieving long-term reclamation goals.

Vegetation – Riparian/Wetland Resources
Under Alternative C, surface-disturbing and disruptive activities are allowed within 500 feet of riparian/wetlands systems, aquatic habitats, and floodplains consistent with other resource values. Proposed projects would not need to be rerouted to avoid these areas. ROW development opportunities would decrease when considering other resource values and ROWs would be denied or rerouted. Overall, Alternative C water management actions would have a minor (2%) adverse effect on the ROW and corridor program.

Invasive Species and Pest Management
Alternative C would take a conservative approach to managing invasive species. Under this alternative disturbances are predicted to affect approximately four percent of BLM acres, treating 10,000 acres (1.2%) of BLM surface in the planning area. This would not decrease or increase ROW development opportunities and therefore, would have no effect on the ROW program.

Fish and Wildlife Resources – Fish and Wildlife and Special Status Species – Plants, Fish, and Wildlife (including Greater Sage-Grouse)
Alternative C would generally allow disturbances where resource objectives can be met in areas with fish and wildlife resources. Management of fish and wildlife habitat and SSS would affect uses administered by the ROWs associated with a ROW, through the implementation of mitigation measures designed to protect them. Implementing species-specific protective measures for sensitive plant and wildlife species and prohibiting actions that would affect Threatened or Endangered species could result in the denial or relocation of proposed public land uses, but those uses would generally be allowed. This would develop ROW opportunities and would have a minor adverse effect to the ROW development program.

Heritage and Visual Resources

Cultural Resources
Under Alternative C, protective measures for cultural resources would require avoidance and other mitigation measures for ROW development proposed near these resources. These measures could result in the relocation or redesign of proposed structures and infrastructure, and appropriate stipulations such as NSO and CSU to protect the setting. Because there are known cultural resources throughout the planning area, and because it is likely that additional cultural resources will be discovered, the effects would vary by degree throughout the planning area. Construction activities that disturb the ground surface and subsurface in ROW corridors, and which are the result of ROW approvals, associated with ROW development, would have the potential to directly effect cultural resources, particularly if the resources were not identified prior to the construction activity. It is relatively common for road and pipeline construction through culturally sensitive sediments to lead to subsurface prehistoric discoveries. Data recovery excavations that enhance understanding of prehistory could often mitigate the effect on discoveries. There would likely be considerable effects where undocumented NRHP-eligible archeological sites are affected but have not been recognized (and therefore are not being treated as a discovery). ROW actions that result in construction of structures visible on or above the surface (e.g., communication towers, compressor stations, tanks, and wind turbines) would have the potential to directly effect the visual integrity of those classes of cultural properties that derive their significance from natural settings and settings relatively devoid of modern intrusion. Overall, Alternative C cultural resource management would likely have a minor adverse effect on the ROW program.

Paleontological Resources
Under Alternative C, implementing protective measures for paleontological resources will require field surveys for PFYC Classes 4 and 5. The BLM would monitor those areas on a project specific basis and identify and designate casual collection areas for common invertebrate, plant, and petrified wood fossil collection by the public. Because there are known paleontological resources throughout the planning area, Class 5 totals approximately 28,177 acres or approximately 3.6 percent of BLM surface, and because it is likely that additional paleontological resources would be discovered, effects on the ROW program would vary by degrees throughout the planning area. ROW proposal would be denied or relocated to retain

public lands with significant paleontological values, decreasing development opportunities. This would have a minor adverse effects on the ROW program.

Visual Resources
Under Alternative C, managing the planning area to meet visual objectives could affect the locations, routes, heights, and colors of proposed land uses and associated facilities. Renewable energy development or other resource use may be considered within the line-of-site of VRM classifications. Development of disturbance in forested areas could cause habitat fragmentation and visual effects. Additional effort would be required to design projects to meet the objectives of the specific VRM class designation of an area, where a use is proposed and utilize visual simulations on a project specific basis. Under Alternative C, VRI Class II areas would be managed as VRM Class II, and VRI Class III areas would be managed as VRM Class IV. Pumpkin Buttes is a significant VRM feature. All proposed land use actions within the viewshed of the Pumpkin Buttes would consider visual effects, although management under this alternative would allow those effects. Some additional project planning might be necessary for VRM Class III areas to ensure that the landscape is partially retained. Considerations for national energy priorities could lower VRM classifications. Alternative C management would consider intensive mitigation measures for ROW development actions but would not preclude authorizations in those areas; this would decrease development opportunity. This would likely effect less than one percent BLM surface in the planning area have a minor adverse effect on the ROW program.

Land Resources

Forest Products
Management under Alternative C would affect less than one percent of BLM surface resulting in a negligible adverse effect to the ROW program. ROW proposals would be denied or rerouted and decrease ROW develop opportunities.

Lands and Realty
Under this Alternative, management would not acquire state or private lands, or interests in lands. This would eliminate the agency's ability to gain access to some BLM-administered parcels, both large blocks, as well as small, isolated areas. This would inhibit BFO's ability to manage resources, multiple uses, and limit recreational opportunities. The consequences of this would be continued higher costs because of the difficulty and time consuming efforts required to obtain access through private lands for administrating multiple uses; management of natural resources; and negotiating conflicts for activities and development with other land owners where federal actions cross ownership boundaries. Overall, Alternative C would have a major adverse effect on the ROW program.

Renewable Energy
Management under Alternative C, would exclude 28,551 acres, or 4 percent of BLM-administrated surface, and avoid 618,676 acres or 79 percent of BLM surface, where inconsistent with other resource values. Renewable-energy development would be allowed on 134,875 acres (17%) of BLM surface. Renewable-energy development at this scale would have a major beneficial effect on the ROW program, increasing ROW development opportunities.

Travel and Transportation Management
Alternative C TTM would open stock driveways to motorized vehicles, allow over-snow vehicle use, allow motorized vehicle use within habitat of SSS consistent with travel management designations for that area, and would not close or reclaim existing routes in the vicinity of any

new system roads but would close areas to motorized vehicle use to protect sensitive resources on approximately 28,931 acres (3%). Motorized vehicle travel would be limited to designated road and trails on 723,497 acres, consistent with other resource values. Authorizations would provide reasonable access to other federally managed lands, state lands and privately owned lands and would likely increase the number of ROWs. Appropriate signs would be placed where needed to minimize or avoid inadvertent trespass. This management would have a minor beneficial effect on the ROW program.

Recreation
Under Alternative C, management would designate Burnt Hollow, Petrified Tree, Middle Fork Powder River, Mosier Gulch, Welch Ranch, Weston Hills, and Hole in the Wall as SRMAs that would be protected from development and land use authorizations. This would prohibit ROW actions on 30,570 acres (4%) of BLM surface in the planning area and would have a minor adverse effect on the ROW program.

Lands with Wilderness Characteristics
Alternative C would not manage any areas within the planning area for wilderness characteristics, therefore there would be no effect.

Special Designations

Areas of Critical Environmental Concern and Scenic or Back Country Byways
Under Alternative C, ROW actions would be allowed in accordance to management for surrounding management areas. There would not be any ACEC designations and no evaluation of roads within the planning area for National Back Country or Scenic Byway areas. These designations would therefore have no effect on ROW program.

Wild and Scenic Rivers
Under Alternative C, if congress denies the Middle Fork Powder River WSR nomination, special provisions related to protection of free-flowing characteristics and outstanding value would not apply. This would have no effect to the ROW program.

Wilderness Study Areas
Should congress act to designate or release WSAs, a plan amendment would take place. Overall, this would have a minor adverse effect on the ROW program.

4.6.4.6. Alternative D

Rights-of-Way and Corridors
Under Alternative D, ROW and corridors authorizations would be excluded from 79,777 acres (10%) and avoid 321,148 acres (41%) of BLM surface in the planning area, while allowing ROW and corridor authorizations on 381,176 acres (48%) of BLM surface use, but would be limited to existing ROWs and other disturbed areas. Surface-disturbing activities could be allowed on soils with a severe erosion hazard, on slopes equal to greater than 25 percent, and on soils with poor reclamation suitability with an approved construction, stabilization and reclamation plan.

Identify and designate communication site areas, and, within management designated sites, require additional communication sites to be co-located. Manage authorizations for communications sites in the Pumpkin Buttes area for cultural and visual resources, and, within

designated areas, require additional communication sites be co-located. Proposals outside designated areas will be evaluated on a project specific basis and co-locate where possible. Limit new communication authorizations on the Pumpkin Buttes to existing towers, while prohibiting communication sites on North Middle Butte.

Under Alternative D, a total of 32,293 acres of BLM surface would be designated for use as major transportation and utility ROW corridors in cooperation with the State of Wyoming. Echeta road, Highway 14/16, Highway 59 North, Interstate 25, Interstate 90, Powder River and the Powder River Breaks corridors would be identified. Management actions would apply to the Powder River and Powder River Breaks corridor requiring all authorizations to be subsurface or buried. As well as lines must be buried within Greater Sage-Grouse Core Population Area, unless the line is within one mile of either side of 115 kV or larger transmission line creating a corridor no wider than one mile wide.

Alternative D, ROW and corridor management would allow transmission lines and above ground facilities, such as compressor and electric distribution lines, within existing ROW and designated corridors when resource objectives can be met. This management would decrease development opportunities and have a major adverse effect on the ROW and corridor program.

Physical Resources

Air Quality

Under Alternative D, air quality monitoring would be required of ROW projects expected to approach or exceed ambient air quality standard emissions. Few ROW projects would likely be required to conduct monitoring and the monitoring would not prevent any ROW projects. The effect on ROW and corridor development would not be substantial, but would decrease opportunity for development having a negligible adverse effect.

Soil

Alternative D soils management activities would allow surface-disturbing activities on soils with a severe erosion hazard with an approved project construction plan and site specific reclamation plan to conserve the soil and meet reclamation and resource objectives.

Alternative D, would protect 215,496 acres or 28 percent of BLM surface in the planning area with soils with severe erosion hazard; 455,090 acres or 58 percent of BLM surface possessing soils without poor reclamation suitability with an approved reclamation plan; and on slopes less than 25 percent or greater (170,590 acres or 22% of BLM surface). Alternative D would avoid surface-disturbing activities by placing a CSU on areas containing LRP such as badlands, rock outcrops and slopes susceptible to mass movement (218,928 acres or 28% of BLM surface).

Analyses and decisions for proposed ROW actions would include appropriate consideration for soil management and other related resource management objectives, and include construction, reclamation and stabilization plans, or CSU stipulations when warranted. This management action would increase costs and decrease development opportunities. Under Alternative D, soil management across the planning area has a moderate adverse effect on the ROW program.

Water Resources

Alternative D would allow surface disturbance within 500 feet of springs, non-CBNG reservoirs, water wells, and perennial streams where water and other resource objectives can be met, based on management decisions for other resource values on 19,861 acres of BLM surface,

and allow on-channel reservoirs effecting natural stream flow regimes in consideration of other resource values.

Before they are authorized, land uses might be rerouted to avoid these areas, but this would not be required. Furthermore, although a water source is considered important to other natural resource discipline(s), the parcel could be disposed of if other conditions warrant the action (see discussion under Alternative D Lands and Realty). Additionally, surface discharges of produced water would be allowed from federal mineral development, and oil and gas wells could be converted to water supply wells in consideration of other resource values. Retaining these lands and avoiding disturbances that would adversely effect water resources would likely have a minor adverse effect on the ROW program by decreasing development opportunities.

Cave and Karst Resources
Alternative D would require a CSU stipulation identifying a disturbance free buffer around cave entrances and passages of significant caves. This would prohibit ROW actions on 11 acres of BLM surface in the planning area. However, ROW and corridor actions would not be likely in cave and karst areas, so this management would have a minor adverse effect on the ROW program.

Mineral Resources

Locatable Minerals
Under Alternative D, most of the planning area would be available for locatable minerals development. However, because foreseeable locatable mineral development is predicted to disturb only an estimated 1,252 acres (less than 1%) area disturbed. These ROW are rare, therefore increasing costs and decreasing development opportunities; the effect on the ROW program would be negligible adverse.

Leasable Minerals - Coal
Reasonably foreseeable coal development would be localized and would likely occur on 195,700 net acres (less than 1% of BLM-administered coal area) located in central Campbell County and north-central Sheridan County. Federal coal lands identified acceptable for further coal leasing considerations are available for LBA's, lease modifications, emergency leases, and exchanges. ROW and corridors could be denied, relocated, or deferred if an active coal lease is in place, decreasing development opportunities. Overall, Alternative D would have a negligible adverse effect on the ROW development program.

Salable Minerals
Salable management is considered on a project specific basis under Alternative D. Because foreseeable salable mineral development is estimated to disturb 1,193 acres of surface (less than 1% of the planning area). Salable minerals projects are relatively rare, although infrastructure such as roads would be shared and would increase ROW development opportunities; effects on the ROW program would be negligible beneficial.

Biological Resources

Vegetation – Grassland and Shrubland Communities
Under Alternative D, grassland and shrubland management objectives would allow desirable non-native plant species for short-term reclamation activities as a component in an authorized reclamation plan (followed up with planting of native species). Newly proposed powerlines and

ground facilities would be allowed within existing ROW and other disturbance areas, increasing development opportunities. This action would provide opportunities for mitigating surface disturbance from approved ROW and corridor actions and would be located in greater than ten percent of all grassland and shrubland communities in the planning area. This would have a major beneficial effect on the ROW program.

Vegetation – Riparian/Wetland Resources
Alternative D would allow surface disturbance within 500 feet of water sources that supply wetland and riparian conditions where resource objectives can be met and apply CSU stipulations, based on management decisions for other resource values (e.g., soils). There are 23,831 acres (3%) of BLM surface in the planning within the riparian buffer. Before they are authorized, land uses might be rerouted to avoid these areas, but this would not be required. Newly proposed powerlines and ground facilities would be allowed within existing ROWs and other disturbance areas, increasing development opportunities. Overall, this management would have a moderate beneficial effect on the ROW program.

Invasive Species and Pest Management
Alternative D would take a moderate approach to managing invasive species. Under Alternative D, 12,000 acres (2%) of BLM surface are predicted to be treated. Newly proposed powerlines and ground facilities would be allowed within existing ROW and other disturbance areas. All these actions would limit spread of invasive species and pest where ROWs are limited or avoid proper ecological conditions, vegetative communities, and habitat types will remain intact limiting invasive species establishment and spread. Alternative D would help mitigate adverse effects on ROW corridors and decrease development opportunities. This would have a minor adverse effect on the ROW and corridor program.

Fish and Wildlife Resources – Fish
Alternative D would allow surface-disturbing activities within 0.25 mile of naturally occurring waterbodies containing native and desirable non-native fish species by applying a CSU stipulation; where fish resource objectives can be met. Design crossings of waterbodies identified as supporting fish would be designed to allow fish passage and restore important instream segments for fish habitat in accordance with WGFD priorities. The BLM would cooperate with WGFD in introducing or reintroducing native and desirable non-native in support of WGFD and BLM objectives.

Under Alternative D, the BLM BFO would maintain or enhance streams and riparian areas associated with Blue and Red Ribbon streams, Powder River, Tongue River, and other areas, for desired fisheries potential and incorporate fisheries enhancement in reservoir design consistent with other resources. Overall, this would affect 51,745 acres (1%) of BLM surface in the planning area and have a moderate adverse effect on the ROW program.

Fish and Wildlife Resources – Wildlife
Under Alternative D, the BLM BFO would manage access to protect crucial habitats in cooperation with WGFD and other stakeholders and inventory, record, and report existing type, condition and location of BLM fences. Land use authorizations would require powerlines to be designed to minimize impacts to other wildlife related impacts and will be constructed in accordance with the latest APLIC standards to minimize raptor use of these poles and would prohibit above ground distribution powerlines unless identified in an approved distribution plan. Renewable energy projects would be prohibited in big game crucial winter range, elk calving areas, and identified big game priority travel corridors (Map 29). Surface disturbance

and occupancy would be prohibited in the Ed O. Taylor, Kerns, Bud Love, and Amsden Creek winter ranges for big game and activity in crucial big game winter range, and in elk calving areas during specified dates (Map 29). This management would affect almost 13 percent of the planning area but would not prohibit ROW authorizations. Eighty five percent of existing security habitat would be retained and measured from roads within elk seasonal ranges (132,148 acres, or 17% of BLM surface in the planning area).

Although the acreages above suggest there would be a major adverse effect on the ROW program from Alternative D wildlife management, overall effect would be moderate. Interests for surface-disturbing activities in these areas would be constrained to the requirements identified above to alleviate potential adverse effects on the resource values. Most of the planning area would remain open for ROW interests and approvals.

Alternative D management would seasonally prohibit surface-disturbing and disruptive activities around active raptor nests using USFWS Wyoming Ecological Services' recommended spatial buffers for breeding raptors. Spatial buffers may be modified based on auditory and visual impacts, as well as topography and other ecological characteristics surrounding the nest site. The BLM may coordinate buffer distances with the WGFD and/or USFWS. This would provide opportunities to authorize surface-disturbing activities, requiring users to adhere to specified requirements. Land use authorizations would require users to avoid surface disturbance or occupancy within 0.25 mile of the perimeter of occupied sharp-tailed grouse leks and avoid human activity between 6 PM to 8 AM from March 15 to May 31, and avoid areas within 2 miles from April 1 to July 31. This would effect less than one percent of the BLM surface in the planning area, and would have a minor adverse effect on the ROW program.

Alternative D would allow surface disturbance and occupancy within the USFWS Wyoming Ecological Services' recommended spatial buffers for breeding raptors when nest productivity would not be harmed (Map 33). Spatial buffers may be modified based on auditory and visual impacts, as well as the topography and other ecological characteristics surrounding the nest site. BLM may coordinate buffer distances with the WGFD and/or the USFWS. This would affect 255,129 acres (33%) of BLM surface in the planning area. The BLM would prohibit surface-disturbing activities that could disrupt nesting raptors within the USFWS recommended buffer of an active raptor nest during specified periods. This management would have a moderate beneficial effect on the ROW program, because it would create use opportunities for the public while adhering to specified criteria to protect raptor species of conservation concern.

Overall, Alternative D wildlife management would have a moderate adverse effect on the ROW and corridor program.

Special Status Species – Plants
Alternative D would allow ROW development in habitat for special status plant species but not within known populations of such plants; after surveys establish site-specific botanic buffers, no surface-disturbing activities that could adversely effect special status plant species would be permitted.

This would affect 126,811 acres, 16 percent of BLM surface in the planning area, and have a major adverse effect on the ROW program by decreasing more potential for land use authorizations for the public.

Special Status Species – Fish
Alternative D would prohibit new surface-disturbing activities within 0.25 mile of

any waters containing special status fish species (Map 28), unless the activities would benefit the species. Exceptions must demonstrate that potential adverse effects could be avoided and the proposed action is the least environmentally damaging alternative. In addition, the alternative would apply an NSO stipulation with 0.25 mile of any waters containing special status fish species and allow instream structures only where adverse effects on special status fish species and their habitat, can be avoided. This would affect less than one percent of BLM surface in the planning area and decrease development opportunities from denial of ROW proposals. This would have a negligible adverse effect on the ROW program.

Special Status Species – Wildlife (including Greater Sage-Grouse)
Alternative D special status wildlife species management would locate and manage facilities to mitigate the adverse effects of noise on SSS and maintain or enhance the integrity of migration corridors, and identified special status wildlife species. This alternative would manage surface-disturbing and disruptive activities to mitigate adverse effects on special status wildlife species and their habitats as well as allowing surface-disturbing and disruptive activities within active prairie dog colonies on BLM surface that do not adversely impact suitable habitat. This management would have a moderate adverse effect on the ROW program.

Under Alternative D management action for SSS wildlife. Powerlines (distribution and transmission) will be designed to minimize wildlife related impacts. These actions include but are not limited to:

- Avoid areas of high avian use such as water bodies (including ponds, lakes, rivers, streams and wetlands), ridge tops, prairie dog colonies, Greater Sage-Grouse Core Population and Core Population Connectivity Areas, and sharp-tailed grouse leks. (PRB Final EIS, EO 2011–05)
- Prohibit uses within 0.6 mile of Greater Sage-Grouse Core Population and Core Population Connectivity Area leks unless within an established corridor or it can be demonstrated that the activity will not cause Greater Sage-Grouse population declines. Transmission and collector lines are not permitted if they are outside designated corridors or at distances greater than 0.5 mile of an existing 115 kV or greater powerlines, unless there is demonstration of no decline in Greater Sage-Grouse populations. ROWs for residential and agriculture distribution lines will be evaluated on a project specific basis. (EO 2011–05)
- Within general Sage-Grouse habitat (outside core population and connectivity areas) overhead powerlines will be located at least 0.5 mile from Greater Sage-Grouse breeding and nesting grounds. (PRB Final EIS)
- Any new powerlines authorized within the above identified areas will be buried or if overhead then marked to increase visibility and perch-guarded to prevent raptor perching. (PRB Final EIS)

Alternative D would apply the following surface-disturbing activities to the extent necessary to prevent unnecessary or undue degradation in Greater Sage-Grouse Core Population Areas:

- Prohibit surface disturbing activities, disruptive activities, and occupancy within 0.6 mile of the perimeter of occupied Greater Sage-Grouse leks (independent of habitat suitability).
- Allow on average no more than one oil and gas or mining location and no more than 5 percent total surface disturbance per 640 acres within the DDCT analysis area (4 mile buffer of occupied leks within 4 miles of proposed surface disturbance restricted to Core Population Area and Connectivity Corridor). Design and manage facilities to prevent WNv transmission. Avoid overhead electric transmission lines and bury electrical distribution lines where possible; if not possible, then locate overhead lines at least 0.6 miles from the perimeter of occupied Greater Sage-Grouse leks and install raptor perch guards. Prohibit electric overhead transmission lines

unless within one-half mile either side of existing 115 kV or larger transmission lines creating a corridor no wider than one mile. Limit noise sources to 10 dBA above ambient noise measured at the perimeter of occupied Greater Sage-Grouse leks from March 1 to May 15 6 PM to 8 AM unless scientific findings indicate a different noise level is appropriate. In addition, limit noise sources in other important Greater Sage-Grouse habitats if research and/or policy indicate the need. Locate new roads, used to transport products or waste, greater than 1.9 miles and other new roads, such as roads for site access, greater than 0.6 miles from the perimeter of occupied Greater Sage-Grouse leks. Construct roads to minimum design standards needed.

- Restore disturbed sagebrush communities on BLM surface to meet the Wyoming DEQ community-specific full shrub density standard (Chapter 4 Rules and Regulations, option III) for all predisturbance shrub species and 5 percent minimum canopy cover of sagebrush. A 90 percent confidence interval is required to demonstrate achievement of the standard. The standard must be demonstrated the last year of the responsibility period, and all planted shrubs shall have been in place for at least two years.
- Prohibit surface disturbing and disruptive activities from March 15 to June 30 (independent of habitat suitability).
- Prohibit surface disturbing and disruptive activities within Greater Sage-Grouse winter concentration areas from December 1 to March 14.

Alternative D would apply the following to surface-disturbing activities to the extent necessary to prevent unnecessary or undue degradation and to manage as follows within Greater Sage-Grouse Core Population Connectivity Corridors:

- Prohibit surface-disturbing activities, disruptive activities and occupancy within 0.6 mile of the perimeter of occupied Greater Sage-Grouse leks (independent of habitat suitability).
- Allow no more than 5 percent total surface disturbance per 640 acres within the DDCT analysis area (4 mile buffer of occupied leks within 4 miles of proposed surface disturbance, restricted to Core Population and Core Population Connectivity Corridors). Design and manage facilities to prevent WNv transmission. Avoid overhead electric transmission lines and bury electric distribution lines where possible; if not possible, locate overhead lines at least 0.6 miles from the perimeter of occupied Greater Sage-Grouse leks and install raptor perch guards. Locate new roads, used to transport products or waste, greater than 1.9 miles and other, new such as site access, greater than 0.6 mile from the perimeter of the occupied Greater Sage-Grouse leks. Construct roads to minimum design standards needed, and facilities with motion, light sources, noise (10 decibels above ambient), with a height greater than 4.5 feet.
- Restore disturbed sagebrush communities on BLM surface to meet the Wyoming DEQ community-specific full shrub density standard (Chapter 4 Rules and Regulations, option III) for all predisturbance shrub species and 5 percent minimum canopy cover of sagebrush. A 90 percent confidence interval is required to demonstrate achievement of the standard. The standard must be demonstrated the last year of the responsibility period, and all planted shrubs shall have been in place for at least two years.
- Prohibit surface disturbing and disruptive activities within 4 miles of occupied Greater Sage-Grouse leks from March 15 to June 30 (independent of habitat suitability, restricted to within Core Population Connectivity Corridors).
- Prohibit surface disturbing and disruptive activities within Greater Sage-Grouse winter concentration areas, from December 1 to March 14.

Alternative D would apply the following to surface-disturbing activities to the extent necessary to prevent unnecessary or undue degradation within occupied Greater Sage-Grouse habitat outside of Core Population Areas and Core Population Connectivity Corridors:

- Prohibit or restrict surface-disturbing and disruptive activities within 0.25 mile of the perimeter of occupied Greater Sage-Grouse leks. Reduce surface disturbance for authorizations within 0.25 mile of occupied Greater Sage-Grouse leks.
  - Design and manage facilities to prevent WNv transmission.
  - Prohibit overhead transmission lines.
  - Bury electric distribution lines where possible; if not possible, then locate overhead lines at least 0.5 mile from the perimeter of occupied Greater Sage-Grouse leks and install raptor perch guards.
  - Restore disturbed sagebrush communities on BLM surface to meet the Wyoming DEQ community-specific full shrub density standard (Chapter 4 Rules and Regulations, option III) for all predisturbance shrub species and 5 percent minimum canopy cover of sagebrush. A 90 percent confidence interval is required to demonstrate achievement of the standard. The standard must be demonstrated the last year of the responsibility period, and all planted shrubs shall have been in place for at least two years. Recommend for all surface-disturbing activities on BLM surface adjacent to priority habitat, within or adjacent to lands involved in Greater Sage-Grouse conservation projects, or support an 85 percent Greater Sage-Grouse population density. BLM parcels less than 640 acres that only meet the population density factor may be excluded.
- Prohibit surface disturbing and disruptive activities within 2.0 miles of occupied Greater Sage-Grouse leks, from March 15 to June 30 (independent of habitat suitability) and prohibit Greater Sage-Grouse winter concentration areas, from December 1 to March 14.

Management under Alternative D for raptors, establish a year round disturbance-free zone of at least 0.5 mile for the for the Clear Creek, Crazy Woman Creek, Piney Creek, Powder River, and Tongue River riparian bald eagle corridors. This buffer could be adjusted to 1.0 mile based on topographic features, visibility, disturbance and human activity levels, and other factors. This buffer zone restriction would be based on site specific information and coordinated with the USFWS Wyoming Field Office. This management would affect less than two percent of BLM surface in the planning area, and would have a minor adverse effect on the ROW program.

- Prohibit surface-disturbing and disruptive activities to nesting raptors using USFWS spatial recommendations for an active SSS raptor nest during established time periods (Map 33).

The ROW department assumes multiple potential uses that also could affect wildlife. Therefore, lands and realty personnel considering land use proposals would consult with fish and wildlife specialists before authorizing those uses.

Alternative D would allow surface-disturbing and disruptive activities within active prairie dog colonies on BLM surface, in accordance with identified criteria, that would not adversely effect suitable habitat for SSS that depend upon prairie dog colonies (Map 35). This would affect less than one percent of BLM surface in the planning area and would have a minor adverse effect on the ROW program.

Alternative D for amphibians, reptiles and bats, require surveys for special status amphibian, reptile, and bat species prior to approving any project or activity that may impact the habitat for these species.

Overall, Alternative D special status wildlife management would have a moderate adverse effect on the ROW program.

Heritage and Visual Resources

Cultural Resources
Under Alternative D, the BLM would prohibit surface disturbance on the following sites: Pumpkin Buttes, Cantonment Reno, Dull Knife Battlefield, Crazy Woman Battle, contributing and unevaluated segments of the Bozeman Trail, rock art sites, and all rock shelters.

The BLM would apply NSO stipulations and CSU stipulations (surface disturbance and infrastructure must either not be visible or would result in a weak contrast) to protect the setting within 3 miles of the Pumpkin Buttes, Cantonment Reno, Dull Knife Battlefield, Crazy Woman Battlefield, contributing and unevaluated segments of the Bozeman Trail, rock art sites, and Native American burial sites for historic properties (Map 45).

Implementing protective measures for cultural resources would require analysis of a proposed land use to include cultural resource specialists during the scoping and analysis of a potential effects, and identify survey and monitoring activities for proposed uses. ROW proposals would be denied or rerouted to protect cultural resources, the predicted disturbance from ROW actions is 38,762 acres (4.96%) of BLM surface in the planning area, this would decrease development opportunities.

Overall, Alternative D cultural resources management would have a minor adverse effect on the ROW program.

Paleontological Resources
Under Alternative D, implementing protective measures for paleontological resources would require surveys for PFYC Class 4 and 5. The BLM would monitor them as needed. This affects 98 percent of the planning area. However, these monitoring activities would have a negligible effect on the ROW program. These measures may result in the relocation or redesign of proposed use authorizations. Because known paleontological resources occur throughout the planning area, and because it is likely that additional paleontological resources would be discovered in the future, effects could occur in varying degrees throughout the planning area. The inclusion of paleontological and resource specialists during the scoping and analysis for potential effects, as well as identifying survey and monitoring activities for proposed uses would be included with each proposed land use analysis. There would be no casual collection areas designated. Areas containing paleontological resources of high quality or importance for special management, would be designated as they are needed. Overall there would not be significant effects to the ROW program, although development opportunities would decrease from the denial or deferment of a proposal. Protecting paleontological resources would have a minor adverse effect on the ROW program.

Visual Resources
Under Alternative D, the BLM would manage VRI Class II areas (except Powder River Breaks and Fortification Creek) and special emphasis areas as VRM Class II (Map 51). This would affect 112,329 acres, or 15 percent of BLM surface in the planning area.

Under this alternative, the BLM would prepare visual simulations and design mitigation for all proposed actions in VRM Class I and II areas. Visual simulations and mitigation design could be required on a project specific basis for VRM Class III areas with high visual sensitivity. This management action would affect a total of 379,429 acres, or 48 percent of BLM surface in the planning area.

Proposed land use activities would be required to incorporate VRM requirements. Authorizations would incorporate mitigation requirements to alleviate adverse effects on visual resources in the

planning area. The ROW program would be required to incorporate plans to minimize adverse effects on visual resources. Some proposed land uses could be denied if they would cause the VRM class to change.

Overall, Alternative D management of visual resources would have a major adverse effect on the ROW program.

Land Resources

Forest Products

Under Alternative D, Forest management areas within 200 feet of surface waters would be prohibited and would affect less than one percent of the planning area. ROWs and corridors would be denied or relocated which would increase costs and decrease ROW development opportunities. The Lands and Realty staff will coordinate activities affecting forest products as necessary. This would have a negligible adverse effect on the ROW and corridor program.

Lands and Realty

Under Alternative D priority would be given to acquiring land or interests in lands in areas adjacent to large blocks of BLM-administered lands.

Alternative D, management would pursue land tenure adjustment of all identified disposal lands. These parcels would be examined for the presence of high-value resources. There are approximately 120,722 (15%) acres currently identified for disposal. Lands containing high surface values would generally be retained, including those with agricultural potential. The BFO would pursue land tenure adjustment on lands identified for disposal having no natural resource values prior to pursuing lands identified for disposal having natural resource values; generally the management action would be to retain these lands identified for disposal until after lands identified as having no natural resource value have been disposed of. Actively disposing of identified disposal lands would have a major beneficial effect on the ROW program (Map 54, Appendix L (p. 2211)), and consolidating lands would reduce the amount of trespass cases.

The BLM would pursue land adjustments related to custodial grazing allotments. Under Alternative D, disposing of these types of grazing lands would decrease the potential need for the public to request land use authorizations. It would therefore eliminate the need to monitor activities on these small, isolated parcels that are generally surrounded by private land. There are 171,749 acres identified under custodial allotments (22%) of BLM-administered land in the planning area classified as custodial allotments.

Overall, Alternative D lands and realty management actions would have a major beneficial effect on the ROW program.

Renewable Energy

Under Alternative D, renewable-energy development ROWs would be excluded in the southern Big Horn Mountains, areas closed to mineral leasing (fluid and solid), areas closed to mineral entry (locatable and salable), ROW exclusion areas, areas within 3 miles and visible from historic properties that retain an intact setting, and all other areas where surface disturbance is prohibited, approximately 352,068 acres (53%) of BLM surface in the planning area identified with wind-energy potential. Renewable-energy development would be avoided on mineral leasing (fluid and solid) NSO, and CSU areas, ROW avoidance areas, areas greater than 3 miles from historic properties that retain and intact setting, and all other areas with surface disturbance restrictions, approximately 374,518 acres on BLM surface. Exclusion and avoidance at this

scale would have a major adverse effect on the ROW and corridor program, by limiting ROW development opportunities.

Travel and Transportation Management
Alternative D TTM would allow motorized vehicle use on designated routes under a permit and within stock driveways; over-snow vehicle use would be consistent with motorized use designation when snow cover is sufficient to prevent resource damage; allow motorized vehicle use within habitat of SSS consistent with travel management designations for that area; allow travel not causing resource damage to go up to 300 feet off designated routes for dispersed camping and game retrieval. Close areas to motorized vehicle use to protect sensitive resources in Middle Fork Canyon, Cantonment Reno, Dry Creek Petrified Tree EEA, and apply a 500 foot buffer on designated non-motorized trails, 37,389 acres (4%) of BLM surface. Appropriate signs would be placed where needed to minimize or prevent inadvertent trespass.

Alternative D TTM would protect winter big game by seasonally prohibiting motorized vehicle use within big game crucial winter ranges (Map 68), and protect big game calving areas.

This would not have a significant effect on the ROW program and would potentially decrease trespass opportunities within designated routes. Overall, this management action would have a minor beneficial effect on the ROW program.

Recreation
Under Alternative D, the BLM would divide the planning area into eight ERMAs (totaling 349,663 acres) (Map 71), including Cabin Canyon ERMA (1,369 acres), Face of the Bighorns/North Fork ERMA (34,477 acres), Gardner Mountain ERMA (55,181 acres), Kaycee Stockrest ERMA (2,685 acres), North Bighorns ERMA (2,926 acres). PRB ERMA (224,483 acres), Southern Bighorns ERMA (25,535 acres), and the Walk-in Area ERMA (3,007 acres). ERMA designations emphasize recreation opportunities and do not specifically prohibit ROW authorizations.

The BLM would designates the following SRMAs under Alternative D: Burnt Hollow (17,280 acres), Dry Creek Petrified Tree (2,567 acres), Middle Fork Powder River (10,083 acres), Mosier Gulch (1,026 acres), Welch Ranch (1,748 acres), Weston Hills (9,504 acres), and Hole-in-the-Wall (11,952 acres), 7 percent of BLM surface in the planning area. The field office would consider additional lands for SRMA designation as appropriate. Surface disturbances in designated SRMAs would emphasize recreation opportunities and allow for administrative use only where consistent with other resource values. This management would have a moderate adverse effect on the ROW program.

Lands with Wilderness Characteristics
Under Alternate D the BFO would manage 6,864 acres of lands with wilderness characteristics (Map 74) to emphasize ecosystem health, natural values, and primitive recreational opportunities. The alternative prohibits surface-disturbing activities not compatible with retaining or enhancing wilderness characteristics by excluding ROW and prohibiting renewable energy development opportunity. Lands with wilderness characteristics effects approximately 0.8 percent of BLM surface in the planning area and currently have a negligible adverse effect on the ROW program.

Special Designations

Areas of Critical Environmental Concern
Under Alternative D, the BFO would designate the following proposed ACECs: Pumpkin Buttes (1,731 acres) and Welch Ranch (1,116 acres) totaling 0.3 percent of BLM surface in the planning

area. ROWs proposals, including new communication sites/locations on the Pumpkin Buttes, would be denied or have restrictive land uses under site specific management plans in the two ACEC areas, decreasing ROW development opportunities. Alternative D would have a negligible adverse effect on the ROW program.

Scenic or Back Country Byways
The BFO will evaluate roads and coordinate with the counties and other stakeholders for possible designations of National Back Country or Scenic Byways. Byway designation should not affect ROW authorization, but could adversely affect the perception of ROWs and therefore be a consideration in proposing ROWs along a designated byway, having a negligible adverse effect on the ROW program.

Wild and Scenic Rivers
If Congress denies the Middle Fork Powder River WSR nomination, management will continue to retain the free-flowing characteristics and outstanding resource values which would prohibit or restrict ROWs. Given the topography of the Middle Fork, ROW proposals are unlikely. Therefore the impact on the ROW and corridor program would be negligible adverse.

Wilderness Study Areas
Should congress act to designate or release WSAs, a plan amendment would take place. Alternative D prohibits all motorized and mechanized equipment in 28,931 acres (3%) of BLM surface. Overall, this would have a minor adverse effect on the ROW program.

4.6.4.7. Cumulative Impacts

Reasonably foreseeable development assumptions indicate oil and gas development would affect less than 39,000 acres (cumulatively), or less than five percent of the BLM-administered planning area. Therefore, cumulative impacts from oil and gas development, and associated ROWs, would have a minor effect on renewable-energy development (see Appendix G (p. 1937)). In other words, invasive species, wildlife, paleontological, transportation, recreation, and livestock grazing would have a minor effect on the renewable-energy program since these RFD identified disturbances effect less than five percent of the planning area. Oil and gas development activities would have a minor effect on the ROW and corridor program as far as authorizing ROWs in the planning area. In other words, substantial oil and gas development would not likely prohibit or preclude other ROW activities. ROWs associated with oil and gas development would be significant, considering the BFO is primarily an oil and gas office.

Cumulative effects would likely result from ongoing authorizations for multiple new surface-disturbing activities for oil and gas and renewable energy development (primarily wind towers), as well as ongoing mitigation activities for previously disturbed areas where reclamation is inadequate or has failed. Furthermore, effects to VRM may be significantly effected by increasing structures on the surface. Requiring authorized users to develop and color structures to blend in with the landscape would help alleviate these effects. The majority of the basin holds opportunities for future carbon sequestration. If this activity occurs in the area, the ROW program would be significantly affected by authorizing land use permits for surface and subsurface use, as well as ROW authorizations for linear disturbances ancillary to injection wells. This activity would benefit by utilizing those areas already affected by oil and gas development to limit new disturbances in the planning area. Current management (Alternative A) goals would likely result in adverse effects to resources across the planning area by allowing the authorized officer to waive restrictions to development activities without defining specific criteria to minimize effects

to resources. Alternative B is very restrictive, minimizing opportunities for multiple uses. Management actions related to Alternative C would likely significantly compromise, destroy, or otherwise adversely affect wildlife and rangeland resources in the planning area. Opportunities for recreation would also be effected with increased development activities.

4.6.5. Travel and Transportation Management

This section describes potential effects on the BLM's ability to acquire or develop public access to public lands and to effectively manage the transportation network in the planning area. Travel and transportation planning goes beyond allowing for motorized or OHV activities, and must address resource uses such as recreational, traditional, casual, authorized, commercial, and administrative, and accompanying modes and conditions of travel on the public lands. TTM includes management of ROWs for vehicular traffic and access to isolated parcels of public land. Acceptable modes of access and travel for each travel management area (TMA) will be determined during the RMP implementation process. Travel management is further discussed in Appendix R (p. 2519).

The transportation network in the planning area continues to expand as new roads are constructed for energy development and other land use activities. Additionally, an increase in OHV use for recreational activities has led to many user-created routes over BLM surface. Often these roads do not provide additional public access, but do provide administrative access for the BLM and authorized users under a permit. The alternatives for TTM apply to access and use of BLM-administered surface by members of the general public. Motorized travel for authorized users (i.e., under administrative permits and leases) will be analyzed under site-specific NEPA analyses and such use will be subject to the terms of the authorization in concert with other resources and resource uses.

Providing legal public access to portions of the planning area previously inaccessible to the public is considered a beneficial effect on the travel and access management program. These beneficial effects can be direct, such as when the BLM acquires access to an area for recreation purposes, or indirect, such as when a road developed for oil and gas exploration and development increases access in previously inaccessible parts of the planning area. Routine and emergency maintenance activities on roads and trails are considered inherent requirements of the TTM program and would not represent an adverse effect on the program. Certain resource management actions could adversely affect the TTM program by placing limitations on transportation development.

TTM is multi-disciplinary and affects many programs including realty, lands and minerals, wildlife, livestock management, etc. The program assists in maintaining an adequate transportation system and providing public access. The following discussion of the effects on TTM focuses on the constraints and opportunities for public access. Specifically, the analysis determines whether the implementation of management actions for other resource programs would influence or modify the locations, sizes, or designs of travel and transportation proposals or, in some cases, would preclude a proposal from being approved. Such effects would primarily occur from the implementation of management actions designed to protect natural resources and limit adverse effects on those resources from surface-disturbing activities. Therefore, the types and degrees of limitations and restrictions on travel and transportation proposals depends on the locations of sensitive or high-value resources and the potential for environmental impacts to those resources.

4.6.5.1. Methods and Assumptions

This section describes the methods and assumptions used in the impact analysis for TTM.

Impact analyses and conclusions are based on interdisciplinary team knowledge of resources in the planning area, review of existing literature, and information provided by other agencies. Spatial analysis was performed using the ESRI ArcGIS Desktop 10 computer software. Effects are quantified where possible. In the absence of quantitative data, best professional judgment was used. Effects are sometimes described using ranges of potential effects or in qualitative terms, if appropriate.

Removal of the Designation "Limited to Existing Roads and Trails"
Under the "Limited to existing roads and trails" designation, which appeared in the previous RMP, unauthorized user-created roads and trails would continue to add to the number and miles of routes already in existence on public lands. An inventory of roads was not completed with the 1985 RMP, making it difficult for the BLM to determine what roads existed at the time of the RMP decision. A new set of vehicle tracks is often confused with an "existing" road and because these tracks attract use, new roads are made. Historically, this designation allows proliferation of unauthorized roads and associated effects on soils, vegetation, and the visual quality of the landscape. This slow process would have minor short-term effects, but over the long term, areas of interest to hunters and OHV enthusiasts could be changed to the point that roads would be a dominant feature on the landscape. The decision to remove this designation from the alternatives is consistent with management of adjacent lands (USFS) and with current travel and transportation guidance (Appendix R (p. 2519)).

Impacts from the Designation "Limited to Designated Roads and Trails"
Under this designation, the incremental growth of unauthorized user-created roads and trails would be curtailed, as would unauthorized OHV use. OHV use would be limited to a specific, designated network of roads and trails and could be further limited by season. Such a limitation would be beneficial to soils and vegetation, but would have little impact on commercial or industrial uses of public lands because roads necessary to facilitate those uses are handled under permits or authorizations. This designation would not affect nonmotorized public access, nor would it diminish OHV opportunities (only specify where OHV use might occur). Furthermore, it would have little impact on other resource uses, such as mineral development, because under such a designation, roads are authorized as needed.

Lands in the "Limited" categories would be subject to a variety of impacts, depending on the terms and conditions of the designations. OHV use would be limited to a specific road and trail network established through collaboration with users, other agencies, and the general public. Unauthorized road proliferation would be curtailed, therefore extending protections to vegetation, wildlife habitat, livestock grazing, and visual resources.

Impacts from the Designation "Open to OHVs"
"Open" designations often allow for unmanaged proliferation of roads, damage to or loss of vegetation, soil erosion, or degradation of the visual quality of the landscape. Such designations are often in direct conflict with other resource values, including wildlife habitat and scenic quality. However, this designation benefits OHV users by providing an appropriate, managed place for concentrated motorized recreation considered inappropriate in most areas.

Impacts from the Designation "Closed to OHVs"
OHV access is prohibited in Closed areas, limiting access to nonmotorized means (e.g., foot or horseback). This designation would be very beneficial to physical, biological, and heritage and visual resources because lands in this category would not experience adverse effects from motor vehicle use and would retain a more natural character. All OHV activities would be excluded from such areas, making the areas unavailable to recreationists who prefer to access the public lands exclusively by motor vehicle.

Assumptions

- The analysis of the TTM resource is limited to public access and use of BLM-administered surface in the planning area.
- Demand for adequate access – the physical ability and legal right of the public, agency personnel, and authorized users to reach public lands - will remain constant or increase slightly in the foreseeable future.
- The travel network (i.e., highways, railways, and airports) in the planning area is essentially complete and no major travel infrastructure facilities are anticipated.
- Developing new roads for recreation access will be limited to providing access to large parcels of BLM-administered lands currently without adequate access.
- Consolidation of and access to public lands with prime recreational values would be pursued as opportunities arise.
- Additional roads will be developed, as needed, to support authorized uses in compliance with the multiple use concepts of FLPMA; the TTM program could adopt some of these roads for specific uses, such as recreation access.
- Use of roads will increase based on anticipated increases in oil and gas activities. ROW applications for energy-related transportation facilities (e.g., roads and pipelines) are anticipated to increase.
- Road design and construction considers other resource programs to minimize adverse effects on those resources.
- This RMP does not affect existing ROWs granted to other parties for access across the public lands.
- ROW actions are expected to generally correlate with mineral resource development, and the effects are assumed to be the same for both resources.
- Lands will be assessed by an interdisciplinary team before disposal. Lands that currently provide access to other public lands will not be disposed of without procuring alternative means of access.
- Users generally follow rules and regulations for motorized vehicle use; however, some users do not follow rules and unauthorized travel and OHV use in closed areas affects resources such as vegetation, soils, water, and wildlife and primitive recreation.
- Providing access to BLM-administered lands through the designation of routes will benefit TTM.
- Permanent or temporary road closures for unauthorized routes or those that create substantial adverse effects to other resources are considered beneficial to TTM.
- TTM planning generally improves transportation planning by limiting new roads to only those that are needed and increases the efficiency of the roadway network by directing travel to designated routes in consideration of other resource values.
- Travel management plans will be developed with full public involvement.
- Reductions in road density have beneficial effects on some resources (e.g., big game and soils), but might require additional effort for users (e.g., longer travel routes).

- Disposal of mineral materials from BLM-administered lands will continue to be needed to support road construction and maintenance.
- OHV use will increase at a faster pace than the rate of population growth because of the increasing popularity of off-road travel, improvements to OHV technology, and intensity of development and use of public lands.
- Recreational OHV use is proportionally higher in large blocks of public land with legal access, (i.e., parcels visited for hunting).
- Any seasonal closures would not apply to tasks performed in support of current permits or authorizations issued by the BLM. However, these closures could affect the decision to issue new permits in the future. In addition, other government entities that require entry to perform tasks related to management, maintenance, and control of wildlife would be exempt from the seasonal closure rule.
- It is assumed that state and major county roads would continue to be maintained to current levels and that in general, county roads would not be abandoned. BLM facilities, mainly roads, would continue to be maintained, with priority given to those most heavily used by the public.
- The analysis assumes OHV designations are to be fully implemented five years after approval of this RMP.

Significance Criteria

The scale of effects would be the same as identified in the Introduction of Chapter 4. In addition, an adverse effect on TTM as a result of project actions would be considered potentially significant if the following were to occur:

- An action would violate objectives associated with TTM, and its magnitude would be such that special mitigation would be warranted or it would persist indefinitely.

4.6.5.2. Impacts Common to All Alternatives

The travel and transportation program collaborates with other entities and agencies to acquire access, initiates realty actions to provide access, and capitalizes on developments created under other resource programs as opportunities to meet access demand. Resource uses and values would be considered through the development of Travel Management Plans in the implementation stage of this RMP. Route designations would be analyzed through subsequent NEPA documents.

Each alternative designates OHV use on BLM-administered surface in the planning area as either "Open", "Closed", or "Limited to Designated Roads and Trails"; additionally, portions of the planning area "Limited to Designated Roads and Trails" may also be "Limited Seasonally" for resource protection (see Glossary). These designations are specific to OHV use. While individual alternatives are addressed in their corresponding sections, this section describes general impacts that would result from OHV use designations.

Travel and Transportation Management
TTM is completed in response to competing demands for resource uses or protections. Travel proposals and subsequent decisions are most influenced by demands for administrative or recreational uses, to provide access for resource uses, and to mitigate wildlife management concerns. It should be noted that there would be little to no effect on legal public access from OHV designations. OHV designations in this RMP would not remove the ability to access areas currently available to the public for nonmotorized recreational activities, though it may reduce OHV recreational opportunities.

Providing access to some areas could require multiple access routes, and multiple types of access (e.g., roads, pedestrian, or equestrian trails). Managing new roads would require routine and emergency maintenance. Consideration of other resources (e.g., cultural resources and SSS) could constrain routing alternatives, require that other routing alternatives be adopted, or increase costs, or may determine that access acquisition would not be feasible.

Wildlife are expected to benefit from OHV closures because they would be subject to fewer disturbances, particularly at critical times (e.g., elk calving). Recreational experiences (including hunting) would be significantly altered in areas closed to OHV use. This could enhance these experiences or detract from them, depending on the desires and attitudes of the affected recreationists. It is expected that the visitation in areas closed to OHV use will be less than a comparable area under a different OHV use designation. This could affect the ability of the WGFD to reach wildlife population targets for certain areas.

Land tenure adjustments could benefit the overall management of the travel and transportation program. These actions would help to facilitate the location of transportation systems by providing for a more contiguous public land base and encouraging such developments near communities. Negotiating with willing landowners to obtain access across non-BLM-administered lands to isolated public land parcels is critical to meeting the goal of providing accessibility across the planning area. Acquisitions and land exchanges would help the BLM provide seamless recreational opportunities and ensure long-term public access. Access acquisition would be primarily focused on larger parcels of BLM-administered lands (larger than 2 square miles) that are currently without public access. Increased access could result in a wider diversity of recreational opportunities. Access would be acquired only from willing landowners, and the preferred method would be via land exchange; therefore, anticipated effects on private land ownership would be minor.

Improved design and maintenance on BLM roads and easements would result in safer routes that reduce adverse effects on other resources. However, the cost of improved construction and maintenance could become a significant factor in the continued maintenance of routes. Planning for routes based on site-specific objectives would improve the BLM's ability to maintain an operational transportation system. However, if the use of a route exceeds the design standards for that route, the road or trail would need to be reevaluated to ensure safety standards are met.

Establishing TMAs and designating routes would result in a comprehensive travel network that provides access across the planning area while maintaining other resource values. Signs are the most efficient means of providing information to users until the TTM planning is complete. Restricting users to existing roads and trails until travel management planning is complete would result in a short-term continuation of problems with enforcing travel designations. Travel planning would result in the protection of a wide variety of resources while maintaining access across the planning area. While some roads, particularly user-created routes, might be closed, those retained for public use would be better maintained and the overall transportation system would preserve functionality and overall access. Improved access for people with disabilities would benefit both transportation and recreation resources.

Under historic transportation planning methods, travel was restricted through signs that posted prohibited uses in an area. These signs were often vandalized or removed and were costly to maintain. Marking or numbering designated routes, rather than posting non-designated routes with prohibited uses, makes many signs obsolete, and other agencies have had success with this method. Temporary closures are designed to protect the public and land resources. The

effects would be localized and short-term, and would have a negligible adverse effect on travel and transportation program.

Implementing a designated route system is critical to protecting other resources while providing for access. Enforcement and management in areas classified as limited to existing routes is difficult, because user-created routes can legally be traveled by subsequent drivers so long as prohibited uses are not posted. Maintaining a transportation management system in cooperation with other agencies is essential to meet public and resource management needs. The effect of cooperation on the amount of accessible public lands would be beneficial.

Physical Resources

Air Quality

Air quality management common to all alternatives could affect how transportation authorizations are stipulated to alleviate adverse effects on air quality. In general, stipulations would apply to permitted uses and are not expected to affect the general public. However, stipulations could be placed on pipeline or road ROW to reduce cumulative dust emissions and in some cases may impact the BLM's ability to provide access routes to public lands. The overall impact would be negligible; the impacts to TTM from Air Quality management actions do not vary by alternative and the resource will not be discussed further.

Soil and Water Resources

Measures to protect soil and water resources could affect the placement or designation of routes on a local level, but are not expected to reduce public access to public lands. Reclamation requirements related to protecting soil resources could slightly increase the costs associated with road construction, but would ultimately increase the sustainability of transportation projects. Overall, management actions for soil and water resources would have a negligible adverse effect on TTM.

Cave & Karst Resources

The topography of areas with cave and karst resources, not specific management actions, constrain the placement of roads. Management of cave and karst resources would not affect TTM under any alternative and it will not be discussed further.

Mineral Resources

The scale of impacts from mineral resource development is expected to be relatively the same across the various mineral resources. Thus, the section will be discussed as a whole, rather than as separate resources.

Continuing to develop solid and fluid mineral resources would affect the transportation network through a continued increase in roads for mineral development. Salable mineral development is often necessary to provide material for transportation systems, but the scale of impact is dependent upon whether the materials are developed on BLM mineral estate. Mineral management actions, because they are so numerous in specific parts of the planning area, could affect the locations of subsequent transportation systems. Increased mineral actions would contribute to an increase in traffic on designated routes, with a resulting increase in the potential for litter, collisions with wildlife, and the spread of invasive plant species.

Historically, development of roads for mineral activities has not initiated a substantial change in the amount of public access to BLM-administered lands and roads constructed for oil and gas initiatives rarely provide legal public access to parcels that are currently inaccessible. However, roads created for mineral extraction purposes could be evaluated for inclusion in the designated route system, providing additional OHV access for users. Areas closed to mineral leasing, having NSO stipulations, or otherwise identified as unsuitable for surface disturbance or occupancy would likely be managed as avoidance or exclusion areas for transportation. The overall impact across all alternatives would be negligible and beneficial; the impacts to TTM from Mineral Resource management actions do not vary by alternative and the resource will not be discussed further.

Fire and Fuels Management

Fire and fuels projects are generally short term and rarely require road construction. Actions from fire and fuels projects could leave temporary evidence of motorized vehicle use on the landscape (e.g., two-tracks), but are generally reclaimed and are not expected to have any effect on the travel and transportation program and will not be discussed further.

Biological Resources

Vegetation – Forests and Woodlands, Grassland and Shrubland Communities, Riparian/Wetland Resources, Invasive Species and Pest Management
Specific alternatives related to forests and woodlands, grassland and shrubland communities, riparian/wetland resources, invasive species and pest management may affect the placement or amount of use of roads and trails on a local level; however, there are no specific alternatives related to these resources that would directly impact the transportation program. These resources will not be discussed further.

Fish and Wildlife
Similarly, while alternatives for Fish and Wildlife may affect the placement of roads on a local level, most protections for wildlife (such as timing limit stipulations) do not affect public access to or use of public lands. Seasonal closures could have negligible to minor short-term effects on transportation actions in big-game crucial winter ranges and elk calving areas. The overall impact across all alternatives would be negligible and adverse; the impacts to TTM from Fish and Wildlife management actions do not vary by alternative and the resources will not be discussed further.

Special Status Species – Plants, Fish, and Wildlife (including Greater Sage-Grouse)
Managing SSS habitat would affect uses administered by the travel and transportation program through the implementation of mitigation measures designed to protect species and wildlife habitat. Implementing species-specific protective measures for BLM sensitive plant and wildlife species and prohibiting actions that adversely affect T&E species could result in the relocation of proposed transportation systems to avoid these habitat areas. However, implementation of the "common to all alternatives" for SSS for fish, wildlife or plants would result in no effect to the travel and transportation resource; rather effects would vary by alternative.

Heritage and Visual Resources

Cultural Resources
In general, implementing protective measures for cultural resources could require avoidance and other mitigation measures for transportation systems proposed near these resources. These

measures could result in the relocation or redesign of the proposed transportation system. Because there are known cultural resources throughout the planning area, and additional resources will likely be discovered, there could be substantial effects on TTM to varying degrees throughout the planning area. In general, all effects would be at the local level. Implementation of the "common to all alternatives" for cultural would result in no effect to the travel and transportation resource, and would instead vary by alternative.

Paleontological Resources
While discovery of important paleontological resources may affect the placement of roads and trails on a local level, there are no specific alternatives related to paleontological resources that would directly impact the transportation program. The resource will not be discussed further.

Visual Resources
Managing the planning area to meet VRM objectives could affect the locations and routes of proposed transportation systems. Additional effort would be required to design projects to meet the objectives of the designated VRM class in an area in which a transportation system is proposed. Because transportation systems would generally be compatible with Class IV objectives, this classification would allow for increased opportunities for such authorizations. This is also true for VRM Class III objectives; however, some additional project planning could be necessary for VRM Class III areas to ensure that the landscape is partially retained. Areas designated as VRM Class I in the planning area are addressed under Special Designations. Any transportation systems proposed in VRM Class I or Class II areas would potentially be subject to intensive mitigation and, in some cases, could be precluded. Effects on the travel and transportation program would vary by alternative.

Land Resources

Forest Products
There is some forestry activity within the planning area each year and this activity is generally concentrated on BLM-administered lands in the southern Big Horn Mountains. Under this RMP, the BLM would identify potential commercial harvest areas and high-interest personal use (e.g., firewood cutting and Christmas tree cutting) areas. Historically, timber harvests have not exceeded approximately 500 to 1,000 thousand board feet per year, with little road construction. It is expected that a similar volume of harvest would occur in the foreseeable future. While no major road construction has occurred as a result of timber harvest, it is not inconceivable that temporary roads might be constructed to access parcels of timber in the future. Temporary roads or short access roads for small timber operations could provide new access for OHV use, although on an extremely localized scale. The implementation of any specific forest products alternative is expected to result in no effect to the travel and transportation program and the resource will not be discussed further.

Lands and Realty
Measures to avoid the potential of inadvertent trespass by people accessing public lands though the use of appropriate signage and access authorizations will also benefit the travel and transportation program by providing information related to public access.

Renewable Energy
While renewable-energy development may require additions to the transportation network to

accommodate energy projects, the alternatives related to renewable energy have no effect on public access and will not be discussed further.

Rights-of-Way and Corridors
Alternatives for ROW, particularly related to coordination with other agencies to acquire easement and to meet public and resource management needs will be beneficial to the travel and transportation program. The overall benefit will be contingent on the success of coordination and will vary by alternative.

Recreation
Development of RAMPs, recreational facilities and trails, and provision of recreation information will result in a net benefit to the travel and transportation program.

Lands With Wilderness Characteristics
Evaluation of lands for wilderness characteristics would have no effect on the transportation system. However, measures to protect any existing wilderness characteristics would generally limit motorized vehicle use in areas with wilderness characteristics. This would have no effect on legal access, but would affect motorized travel at the local level and would vary by alternative.

Livestock Grazing Management
Livestock grazing management often requires primitive road networks to access and maintain range improvements. The specific alternatives for livestock management are not expected to affect transportation management or access. Rather, roads on BLM-administered parcels without public access could be designated for administrative use, but this would have no effect on public access. Livestock management will not be discussed further in this section.

Special Designations

Potential effects from all special designations, whether existing or proposed, would usually be minor and vary by management prescriptions associated with each designated area. Intensive management of a special designation area could affect the travel and transportation program by altering the locations available for the placement of roads.

Areas of Critical Environmental Concern
Development of mitigation to protect relevant and important criteria may result in closure of access routes, or even closure to human presence. The impact to the travel and transportation program would be vary by ACEC and by alternative.

Scenic or Back Country Byways
Designation and management of scenic and BCBs would improve public access through better information but could increase the amount of traffic on any designated routes. Increased traffic could increase maintenance needs on byways, litter, and the potential for dispersion of invasive plant species or collisions with wildlife. The effect on public access would be negligible.

Wilderness Study Areas
WSAs cause restrictions on transportation management actions, because those areas would be closed to motorized travel. Transportation management is guided by Manual 6330 – Management of Wilderness Study Areas, and there would be no effect from common to all alternatives on the provision of motorized access or on legal public access.

Wild and Scenic Rivers
Designated WSRs generally include varying degrees of restrictions related to roads within a river corridor, with wild sections of rivers having the greatest restrictions and recreational sections the least. The topography of Middle Fork Canyon, not WSR-specific management actions, would constrain the placement of roads. There would be no effect on the travel and transportation program from WSR management and the resource will not be discussed further.

Socioeconomic Resources

There would be no effect on the travel and transportation program from Socioeconomic resources, Health and Safety and these resources will not be discussed further.

Table 4.59, "Estimated Acreage of OHV Designations by Alternative" (p. 1497) lists the estimated acreages of OHV use designations under each alternative.

Table 4.59. Estimated Acreage of OHV Designations by Alternative

	Alternative A	Alternative B	Alternative C	Alternative D
Open to OHV use	20,386	0	24,103	0
Closed to OHV use	3,650	625,854	28,931	37,389
Limited to Designated Routes	737,166[1]	137,126	723,497	661,726
Limited by Season	37,646	18,259	6,839	18,259

Source: BLM 2012f

[1]Includes "Limited to Existing Routes" under Alternative A.

OHV Off-highway Vehicle

4.6.5.3. Alternative A

Alternative A would continue management in accordance with the 1985 RMP as amended and maintained. Under Alternative A, effects on the travel and transportation program would be similar to those described under Impacts Common to All Alternatives, and would include the effects described in the paragraphs below.

Travel and Transportation Management
Under Alternative A, approximately 2.5 percent of the public lands in the planning area would be open to all motor vehicle use (Map 65). By continuing the Open designation for stock driveways and stock rests, the utilitarian purposes of the stock driveways would be preserved. In addition, stock driveways are often along county roads. In Open areas, vehicle travel would be permitted both on and off roads if the vehicle is operated responsibly and in a manner that would not be likely to cause significant undue damage to the environment. Even with a responsible use clause, there would be a high potential to significantly increase the number of user-created roads and trails above the number appropriate for protection of other resource values. Although this might benefit OHV enthusiasts, it would generally be detrimental to most other values and uses of the public lands except resource extraction.

At present, areas where OHV use is Closed constitute a small percentage (less than 0.5%) of the planning area. Travel in Middle Fork Canyon is largely prohibited due to the topographical constraints and would likely be prohibited under all alternatives due to steep slopes and other natural resource concerns. Dry Creek Petrified Tree and Cantonment Reno would be closed to

motorized vehicle use to protect the respective paleontological and cultural resources at the sites. The effect of these closures on travel and transportation in the planning area would be negligible.

Areas where OHV use is limited to designated routes constitute approximately 20 percent of the planning area. When coupled with areas previously limited to existing routes, the amount of the planning area limited to designated routes is 92 percent. These areas will undergo a route inventory and a formal route designation plan following the ROD. Until formal designation and implementation, travel will be limited to existing routes. In much of the planning area, land tenure is the primary factor in accessibility, rather than the travel management designation. The effect of the travel restrictions on access in the planning area would be minor. In addition, less than five percent of the planning area would be closed seasonally to protect biological resources. The effect of the travel restrictions on travel and transportation in the planning area would be minor and short-term.

Physical Resources

Soil and Water Resources

Prohibiting surface-disturbing activities includes limitations on construction of roads and could preclude motorized travel within 500 feet of certain water features, in areas of severe erosion hazard, areas with poor reclamation suitability, or on slopes equal to or greater than 25 percent. Alternative A could restrict the placement of certain roads on a local level. The effect on the travel and transportation program would be minor, but long-term. Under this alternative, restricting surface-disturbing activities, such as construction of a trail for nonmotorized travel, could still be considered if the authorized officer waives the prohibition.

Biological Resources

Special Status Species – Plants, Fish, and Wildlife (including Greater Sage-Grouse)

Mitigation measures to protect riparian areas and wetlands, fish and wildlife resources, T&E species, and critical habitats can affect the travel and transportation program through seasonal closures and placement of roads. Seasonal closures would have minor short-term effects on transportation actions in sensitive areas such as the big-game crucial winter range and Greater Sage-Grouse lek buffer areas. Year-round restrictions, including NSO and CSU stipulations (for wildlife), would affect the locations of transportation actions over the long term. Sensitive wildlife habitats such as leks would be subject to NSO stipulations, thereby limiting the placement of transportation systems and access. These protected areas are typically small and transportation systems can usually be routed around them, resulting in a minor impact to transportation and access.

Heritage and Visual Resources

Cultural Resources

Under Alternative A, transportation actions are analyzed and mitigated on a case-by-case basis. Road construction or placement could be prohibited or require special mitigation in areas of high cultural interest, which could result in the rerouting of transportation systems. The effect on travel and transportation would be negligible.

Visual Resources

Most transportation systems would be compatible with VRM Class III (10% of the planning area)

and Class IV (71% of the planning area). In VRM Class I and Class II areas (19% of the planning area), transportation actions would be limited and require mitigation to ensure that projects or surface disturbances would not attract the attention of the casual observer. The effect on the travel and transportation program would be minor.

Land Resources

Lands and Realty, Rights-of-Way and Corridors
The acquisition of lands from willing landowners would be considered on a project-specific basis. Continued authorizations of ROW and land and easement acquisitions could produce a minimal beneficial effect for travel and transportation on a localized scale given historic BLM acquisition trends.

Recreation
Alternative A for recreation may support opportunities for motorized and nonmotorized access, but the benefit would be minimal.

Lands with Wilderness Characteristics
Alternative A does not propose any special management for lands with wilderness characteristics, thus there would be no effect.

Special Designations

Areas of Critical Environmental Concern and Scenic and Back Country Byways
Alternative A does not designate ACECs or scenic or BCBs, and management is considered sufficient to protect the values of proposed ACECs. Therefore, there would be no effect on travel and transportation from management of ACECs and scenic or BCBs.

Wilderness Study Areas
BLM Manual 6330 – Management of Wilderness Study Areas directs the BLM to manage WSAs as nonmotorized use areas. Alternative A designates portions of these WSAs as "limited to designated routes." While motorized travel is currently, and would continue to be restricted in WSAs regardless of OHV designation, the Alternative A designation does not accurately reflect the management these areas. Alternatives B, C, and D clarify the closures to motorized access, but do not alter the status of legal public access. There is no effect to travel and transportation and the resource will not be discussed further in this section.

4.6.5.4. Alternative B

Alternative B would emphasize resource conservation. Alternative B effects on the travel and transportation program would be similar to those described under Impacts Common to All Alternatives, and would include the effects described in the paragraphs below.

Travel and Transportation Management
Under this alternative, there would be no open areas for OHV use. The majority of the planning area would be closed to motorized use. While this alternative would increase limitations on where motorized travel may occur, there would be little effect on legal public access; however, reasonable public access could be limited in areas where the average visitor would be unable or unwilling to walk from the nearest public road.

Under Alternative B, the acreages in the "Limited to Designated Roads and Trails" and the "Closed" categories would be increased (Map 66) compared with Alternative A. The Closed areas would include 625,854 acres (approximately 80% of the planning area). However, the closed areas in this analysis include lands with public roads. County roads, state highways, interstate highways, and roads with ROW or perpetual easements on BLM-administered lands would remain available for motorized travel. Therefore, the actual acreage of lands in the "Closed" category would be less but the overall effect on the travel and transportation program would be significant and adverse. In "Limited" areas management of motor vehicle access would be effective and the ability to enforce travel regulations would improve. Beneficial effects would include the ability to prevent the proliferation of roads and trails and protect the natural appearance of the landscape, wildlife habitat, and cultural resources. These benefits would be both short- and long-term.

In addition, the OHV designations under this alternative call for increased acreage with seasonal limitations on motorized access, whereby two percent of the planning area would have some form of seasonal OHV limitation to protect public land and resource values.

Under this alternative, travel off designated routes would be allowed only with a special use permit (e.g., grazing lessee or administrative use) in areas limited to designated routes. Special use permits would not grant the ability to travel in areas closed to motorized use (although emergency travel would be allowed with permission of the authorized officer). Travel off routes for "necessary tasks" would not be permitted. This alternative would have a beneficial effect on the ability to enforce travel regulations, while its adverse effect on the travel and transportation program would be negligible. The overall effect due to the reduced travel and transportation opportunities is major adverse.

Physical Resources

Soil and Water Resources

Under Alternative B, prohibiting surface-disturbing activities would limit construction of roads and could preclude motorized travel in areas of severe erosion hazard, areas with poor reclamation suitability, or on slopes equal to or greater than 25 percent. This alternative could restrict the placement of certain roads on a local level. The same is true for restrictions within 500 feet of water features. The effect on the travel and transportation program would be minor, but long-term. Alternative B does not include a provision for waiver by the authorized officer, which would remove the potential for discretionary approval of transportation projects in areas with sensitive physical resources.

Biological Resources

Special Status Species – Plants, Fish, and Wildlife (including Greater Sage-Grouse)

Under Alternative B, mitigation measures to protect habitats for sensitive species could affect the travel and transportation program through seasonal or permanent closures and restrictions on the placement of roads. Year-round restrictions to protect sensitive species would affect the locations of transportation actions over the long term and would affect the majority of the planning area (614,557 acres; 78.5% of the planning area).

Effects on the travel and transportation program from Alternative B wildlife and fisheries management would place an emphasis on habitat enhancement and protection and add restrictions on surface-disturbing and disruptive activities. NSO areas and seasonal restrictions would affect

the placement of transportation systems and affect the construction windows for building roads. The overall effect due to the reduced travel and transportation opportunities is moderate adverse.

Heritage and Visual Resources

Cultural Resources

Alternative B cultural resources management would prohibit surface-disturbing activities, including most travel and transportation actions, in or near historic properties. Transportation actions would be prohibited or require special mitigation measures within 5 miles or the visual horizon (whichever is closer) of historic properties, which could result in the rerouting of transportation systems. The effect on access to public lands would be moderate.

Visual Resources

Effects from VRM would be similar to those under Alternative A, except that Alternative B would designate approximately 217,021 acres as VRM Class II. This would increase the level of restrictions designed to protect visual resources and subsequently decrease opportunities for transportation authorizations. The effect on public access would be minor.

Land Resources

Lands and Realty

Under Alternative B, acquiring lands from willing landowners would be considered across the planning area. Land and easement acquisitions could have a minor beneficial effect on travel and transportation on a localized scale, given historic BLM acquisition trends.

Rights-of-Way and Corridors

The effects from ROW on transportation would be similar to the effects from alternatives to protect soil resources. Under Alternative B, prohibiting ROWs would limit construction of roads and could preclude motorized travel in areas with slopes equal to or greater than 25 percent.

Recreation

Under Alternative B, eight SRMAs (55,529 acres; 7.1% of BLM surface) would provide opportunities for intensive travel management (both motorized and nonmotorized) in defined and manageable transportation planning areas. RAMPs for each SRMA would also specifically address TTM and public access to these areas. The overall effect due to the increased travel and transportation opportunities is moderate beneficial.

Lands with Wilderness Characteristics

Effects of alternatives related to lands with wilderness characteristics would be limited to 12,237 acres (1.5% of BLM surface), an area where motorized travel is generally restricted due to topography rather than administrative prescriptions. Much of the areas under review lack legal or reasonable public access. However, it is anticipated that lands with wilderness characteristics that are managed to protect wilderness values would likely include additional restrictions to motorized travel. If these restrictions reduce legal or reasonable access to public lands, the impact to travel and transportation would be minor.

Special Designations

Areas of Critical Environmental Concern
Alternative B would designate eight ACECs (511,000 acres; 60% of BLM surface). The management emphasis for the ACECs would be to protect natural resources, which would likely restrict transportation. Resources would be further protected in ACECs through the development of implementation plans, and these areas and would be managed to meet the objectives of the specific ACECs (Appendix S (p. 2531)). In designated ACECs, future area-specific plans could further limit OHV use, including closures, limiting OHV use to designated trails, and seasonal restrictions on OHV use. The uncertainty of these future plans makes the effects on the travel and transportation program largely unknown. ACECs would likely be managed as transportation avoidance or exclusion areas, but there would be no effect on legal access. Given the retention of nonmotorized access, the overall effect due to reduced travel and transportation opportunities is moderate adverse.

Scenic and Back Country Byways
Evaluating routes and roads within the planning area for designation as BCBs could increase opportunities for vehicle touring, public access to public lands and the presence of signage to protect natural resource values, negligible beneficial effects.

4.6.5.5. Alternative C

Alternative C would emphasize resource use. Alternative C effects on the travel and transportation program would be similar to those described under Impacts Common to All Alternatives, and would include the effects described in the paragraphs below.

Travel and Transportation Management
Under this alternative, approximately three percent of the public lands in the planning area would be open to all motor vehicle use (Map 67). By continuing the Open designation for stock driveways and rests, the utilitarian purposes of the stock driveways would be preserved. In addition, stock driveways are often along county roads. In Open areas, vehicle travel would be permitted both on and off roads if the vehicle is operated responsibly and in a manner that would not be likely to cause significant undue damage to the environment. Even with a responsible use clause, there would be a high potential to significantly increase the number of user-created roads and trails above the number appropriate to protect other resource values. Although this might benefit OHV enthusiasts, it would generally be detrimental to most other values and uses of the public lands, except resource extraction.

Under Alternative C, approximately four percent of the planning area would be closed to OHV use. The effect of these closures on access in the planning area would be minor. Less than one percent of the planning area would be closed seasonally to protect biological resources. The effect of these travel restrictions on access in the planning area would be minor and short-term.

Under Alternative C, OHV use would be limited to designated routes in 92 percent of the planning area. These areas would undergo a route inventory and a formal route designation plan following the ROD. Until formal designation and RMP implementation, travel would be limited to existing routes. In much of the planning area, land tenure, not the travel management designation, is the primary factor in accessibility. The effect Alternative C travel restrictions on public access to public lands in the planning area would be negligible.

Under this alternative, travel up to 300 feet off of designated routes for necessary tasks would be permitted. This management would have a adverse effect on the ability to enforce travel

regulations. The overall effect due to the increased travel and transportation opportunities is major beneficial.

Physical Resources

Soil and Water Resources

Alternative C management of physical resources would reduce constraints on the construction or placement of many roads and trails. While measures to protect physical resources would still be in effect, the adverse effect from restrictions related to route development on the travel and transportation program from physical resources management under Alternative C would be negligible, but long-term.

Biological Resources

Special Status Species – Plants, Fish, and Wildlife (including Greater Sage-Grouse)

Very few restrictions related to fish and wildlife resources are proposed under Alternative C. For areas with habitat that supports sensitive species of plants, restrictions on development would limit the placement of transportation routes only in areas with known populations. Additional restrictions related to sensitive species of fish or wildlife will result in effects similar to Alternative A. These would either decrease opportunities for travel and transportation authorizations or increase the stipulations placed on such authorizations on a localized level.

Heritage and Visual Resources

Cultural Resources

Alternative C for cultural resources essentially removes strict restrictions on surface disturbance in areas with historic properties, however, some NSO and CSU stipulations may still exist. There will be little impact on the travel and transportation program.

Visual Resources

Alternative C effects on the travel and transportation program from management of visual resources would be similar to effects under Alternative A, except that Alternative C would not designate any areas as VRM Class II. This would lead to an overall decrease in the level of restrictions designed to protect visual resources, and subsequently increase opportunities for travel and transportation authorizations. The effect on public access would be negligible beneficial.

Land Resources

Lands and Realty

Under Alternative C, the BLM would not pursue the acquisition of lands or easements from willing landowners, eliminating the ability to consolidate land where it would benefit public access. The inability to pursue adjustments in land tenure would have a major adverse effect on the travel and transportation program.

Rights-of-Way and Corridors

ROWs would not be excluded on slopes exceeding 25 percent resulting in a negligible beneficial effect on transportation planning.

Recreation
Six SRMAs (30,570 acres) would provide opportunities for intensive travel management (both motorized and nonmotorized) in defined and manageable transportation planning areas. RAMPs for each SRMA would specifically address TTM and public access to these areas. The overall effect due to the increased travel and transportation opportunities is moderate beneficial.

Lands with Wilderness Characteristics
Alternative C does not propose any special management for lands with wilderness characteristics, thus there would be no effect.

Special Designations

Areas of Critical Environmental Concern and Scenic and Back Country Byways
Alternative C does not designate ACECs or scenic or BCBs. Therefore, there would be no effect on travel and transportation from management of ACECs and scenic or BCBs.

4.6.5.6. Alternative D

Alternative D would generally allow resource use if the activity can be conducted in a manner that conserves physical, biological, and heritage and visual resources, and would emphasize moderate constraints on resource uses to reduce adverse effects on resource values. Alternative D is the Proposed RMP. Alternative D effects on the travel and transportation program would be similar to those described under Impacts Common to All Alternatives, and would include the effects described in the paragraphs below.

Travel and Transportation Management
Under this alternative, there would be no open areas for OHV use. Instead, all areas would be limited to designated routes or closed to OHV use. While this alternative would increase limitations on where OHV travel may occur, there would be no effect on legal public access.

The acreage in the limited to designated roads and trails and the Closed categories would be increased (Map 68) under Alternative D. Approximately four percent of the planning area would be closed to motorized vehicle use. In Limited areas (79% of the planning area), management of OHV access would be effective and the ability to enforce travel regulations would improve. This management would prevent the proliferation of roads and trails and protect the natural appearance of the landscape, wildlife habitat, and cultural resources. The beneficial effects would be short-term and long-term.

In addition, the OHV designations under this alternative would increase acreage with seasonal limitations on motorized vehicle access, whereby 17 percent of the planning area would have some form of seasonal OHV limitation to protect public land and resource values.

Under this alternative, travel off designated routes would be allowed only under a special use permit (e.g., grazing lessee or administrative use) in areas limited to designated routes. Special use permits would not grant the ability to travel in areas closed to motorized vehicle use (although emergency travel would be permitted with permission of the authorized officer). Travel off routes for big game retrieval and dispersed camping would be permitted. Alternative D would have a beneficial effect on the ability to enforce travel regulations, while the adverse effect on TTM would be negligible. The overall effect due to the travel and transportation opportunities provided while protecting other resources and resource uses is major beneficial.

Physical Resources

Soils and Water Resources

Alternative D management of physical resources would include constraints on the construction or placement of roads and trails. Allowing surface-disturbing activities on slopes equal to or greater than 25 percent, in areas of severe erosion hazard, and areas with poor reclamation suitability would allow flexibility in providing nonmotorized and motorized access in certain locations. Since measures to protect physical resources would be still be in effect, the adverse effect on the travel and transportation program would be minor, long-term.

Biological Resources

Special Status Species – Plants, Fish, and Wildlife (including Greater Sage-Grouse)

Under Alternative D, mitigation measures to protect habitats for sensitive species could affect the travel and transportation program through seasonal or permanent closures and restrictions on the placement of roads. Seasonal closures would have short-term effects on transportation actions in sensitive areas. Year-round restrictions, including NSO and CSU stipulations (for SSS wildlife) would affect the locations of transportation actions over the long term. Sensitive wildlife habitats such as leks would be subject to restrictions, thereby limiting the placement of transportation systems and access. The overall effect due to the reduced travel and transportation opportunities is moderate adverse.

Heritage and Visual Resources

Cultural Resources

Alternative D cultural resources management would prohibit surface-disturbing activities, including travel and transportation actions, in or near defined historic properties. Special mitigation would apply to actions proposed on or near these historic properties, which could result in the denial or modification of future additions to the transportation system. The effect on access to public lands would be minor.

Visual Resources

Effects from management of visual resources would be similar to effects under Alternative A, except that 379,429 acres would be categorized as VRM Class III under Alternative D. The effect on public access would be negligible.

Land Resources

Lands and Realty

Under Alternative D, the BLM would consider acquiring lands from willing landowners across the planning area. Land and easement acquisitions could have a minor beneficial effect on travel and transportation on a localized scale, given historic BLM acquisition trends.

Rights-of-Way and Corridors

Alternative D management of ROWs would slightly increase constraints on issuing ROWs on slopes greater than 25 percent or highly erodible soils. Allowing some ROWs would provide flexibility in transportation planning. Measures to avoid steep slopes will produce a negligible adverse effect on the travel and transportation program.

Recreation
Under Alternative D, seven SRMAs (54,160 acres; 7.1% of BLM surface) would provide opportunities for intensive travel management (both OHV and nonmotorized) in defined and manageable transportation planning areas. RAMPs for each SRMA would specifically address travel management and public access to these areas. The overall effect due to the increased travel and transportation opportunities is moderate beneficial.

Lands with Wilderness Characteristics
Effects of alternatives related to lands with wilderness characteristics would be limited to 6,864 acres (<1% of BLM surface), an area where motorized travel is generally restricted due to topography rather than administrative prescriptions. Much of the areas under review lack legal or reasonable public access. However, it is anticipated that lands with wilderness characteristics that are managed to protect wilderness values would likely include additional restrictions to motorized travel. If these restrictions reduce legal or reasonable access to public lands, the impact to travel and transportation would be minor.

Special Designations

Areas of Critical Environmental Concern
Under Alternative D, there would be two designated ACECs (2,849 acres; <1% of BLM surface). The emphasis of the ACECs would be to protect natural resources, which would likely restrict travel and transportation. Resources would be further protected in ACECs through the development of implementation plans, and these areas and would be managed to meet the objectives of the specific ACECs (Appendix S (p. 2531)). In designated ACECs, future area-specific plans could further limit OHV, use including closures, limiting OHV use to designated trails, and seasonal restrictions on OHV use. The uncertainty of these future plans makes the effects on the travel and transportation program largely unknown. ACECs would likely be managed as transportation avoidance or exclusion areas, but there would be no effect on legal access.

Scenic and Back Country Byways
Evaluating routes and roads within the planning area for designation as BCBs could increase opportunities for vehicle touring, public access to public lands, and the presence of signage to protect natural resource values, negligible beneficial effects.

4.6.5.7. Cumulative Impacts

Most cumulative impacts to travel and transportation in the planning area would result from actions that restrict land uses. When the combined natural and cultural resource (physical resources, biological resources, heritage and visual resources, and special designations) protection measures are considered for each alternative, the severity of cumulative effects increases. Such restrictions would reduce the potential to acquire access easements and limit the locations available for road development, which would have overall adverse cumulative effects on the travel and transportation program that would vary from minor to moderate, depending on alternative. However, adverse effects would not be considered significant because opportunities to acquire access easements, develop roads, and provide reasonable public access could still be available.

If current trends persist, use of OHVs would continue and increase throughout the planning area as population and the popularity of OHVs increase. Limitations on cross-country travel on public land (which are specifically provided for under alternatives B, C, and D) could increase

cross-country OHV use on private land. As transmission lines, pipelines, and transportation routes are developed off of BLM surface, access roads to these linear facilities for operations and maintenance also could be used by the public for recreational access. If this occurs, it could trigger a proliferation of access throughout the area, including on BLM surface.

Past Actions
Since the 1985 RMP was approved, public access has been acquired in conjunction with the land acquisitions at Burnt Hollow and Welch Ranch. OHV registrations and use have increased substantially in the planning area over the past 10 years, in some cases resulting in a proliferation of routes, particularly during fall when hunters pursue big game.

Present Actions
OHV use also is a popular recreational activity, and under current management is allowed to varying degrees on BLM surface. Other public lands in the planning area provide additional areas for OHV recreation, including lands managed by the USFS Bighorn National Forest, the USFS Thunder Basin National Grassland, the State of Wyoming, and the WGFD. Often, routes that cross lands managed by other agencies provide legal public access to BLM-administered lands. Additional OHV use is expected to occur on private lands to support hunting and livestock management operations, and resource extraction activities.

Reasonably Foreseeable Future Actions
Population growth in the planning area and the surrounding region could lead to increased demand for OHV recreational opportunities. Such demand would increase both the need for designated areas and trails to recreate as well as provisions for mitigating the effects of increased OHV recreation. The ability to incentivize land exchanges or easements may be more feasible as not-for-profit organizations in northeastern Wyoming take interest in public access issues.

4.6.5.8. Conclusion

Alternative D would have the most overall beneficial effect on the travel and transportation program by balancing resource protection with legal public access and motorized vehicle access. Alternative B would impose the greatest restrictions on the program, and Alternative C the least. Alternative A would not adequately address the effects of limiting travel to existing routes. By improving trail and OHV management through land use planning, the BLM would minimize adverse effects on wildlife habitat; reduce the introduction and spread of invasive plant species; decrease conflicts among various motorized and nonmotorized recreation users; and prevent damage to cultural resources from the expansion of roads and trails on public lands. Moving toward a system of a designated network of roads and trails through TTM planning would protect, rather than inhibit, access to recreation on public lands. In support of TTM, roads, trails, byways, and other routes must be identified and/or designated to provide for public access and travel across the planning area. Actual route designation would take place after the ROD for this RMP and EIS.

4.6.6. Recreation

The BLM will ensure the continued availability of public lands for a diversity of outdoor recreation opportunities, while maintaining its commitment to manage public lands as a national resource in harmony with the principle of balanced multiple use (BLM 2007b). The Recreation and Visitor Services (R&VS) program may designated discrete units of public land in RMAs. RMAs are either a SRMA or an ERMA. SRMAs are administrative units where recognize

unique and distinctive recreation values and are managed to enhance a targeted set of activities, experiences, benefits, and recreation setting characteristics (RSC), which becomes the priority management focus of the area. Within a SRMA, R&VS management is recognized as the predominant land use plan focus, where specific recreation opportunities and RSCs are managed and protected on a long-term basis.

ERMAs recognize existing recreation use, demand, or R&VS program investments. These areas are managed to sustain availability of the principal recreation activities and associated qualities and conditions of the ERMA, commensurate with the management with other resources and resource uses. Some public lands, particularly those without legal public lands or of insufficient size to support recreational activities, may not be designated as an RMA. Recreation is not emphasized on these lands; however, recreation activities may occur unless the lands are either permanently or temporarily closed to public use to protect resource values or human health and safety. The R&VS on lands outside of RMAs are managed to allow recreation uses that are not in conflict with the other primary uses of these lands.

Table 4.60, "Proposed SRMAs by Alternative (acres)" (p. 1514) lists the acreages of SRMAs proposed under each alternative. These SRMAs represent areas in which recreation management is the predominant management focus. Recreation management matrices in Appendix T (p. 2543) identify the SRMA objectives, activities, experiences and benefits; RSC descriptions; management actions and allowable use decisions; and implementation decisions for each proposed SRMA (BLM 2011b).

4.6.6.1. Methods and Assumptions

Assumptions and methods used in this analysis might include, but are not limited to:

- Lands within the BFO are open to public recreational use unless they are closed through management alternatives in this land use plan or in accordance with guidance for Temporary Closures and Restrictions under 43 CFR Subpart 8364 (Closures and Restrictions); for Temporary Closures Mandated by 43 CFR Subpart 8341 (Conditions of Use); or for emergency actions under 40 CFR 1506.11.
- The designation of SRMAs is assumed to provide additional benefits to the recreation program compared to managing the planning area as one or more ERMAs.
- Each SRMA will be managed for the management objectives, prescribed setting character, and activity planning framework specified in Appendix T (p. 2543) and in the development of individual RAMPs following the ROD for this RMP.
- RAMP will be prepared for each SRMA and ERMA within five years of the completion of the RMP revision. A site-specific analysis will be performed on the ground as RMP decisions are implemented. RAMPs may be combined with Travel Management Plans where appropriate.
- Traditional (hunting, fishing, hiking, etc.) recreational uses of planning area lands will continue, despite any new recreational activities in the planning area originating from technologies. Both new and traditional recreational uses will be accommodated where they are determined to be appropriate to support the achievement of resource goals.
- The incidence of resource damage and conflicts between OHV users and nonmotorized recreationists will increase as OHV use increases.
- The demand for outdoor recreation opportunities is expected to increase in conjunction with population. Visitation throughout the planning area will continue to increase as resource availability and conditions allow. As the populations of neighboring states and the local area

continue to grow, the need or search for less crowded or more remote recreational opportunities will continue to bring more people to public lands in Wyoming.
- ERMA designations are largely based on the availability of legal public access for this RMP. Should additional public access be acquired, an ERMA may be created or expanded to reflect the changing conditions through an amendment to this RMP.
- For purposes of this analysis, short-term effects occur within five years of a given management action. Long-term effects continue beyond five years or take more than five years to materialize.

Beneficial effects on recreation resources would result from actions that improve the recreational setting and contribute to better recreational experience opportunities. Adverse effects would result from actions that adversely affect the recreational setting, detract from the recreational experience opportunities of users. Adverse effects in the planning area historically occur when resource development actions (e.g., mineral resources recovery and livestock grazing management) displace recreational uses from a given area.

Significance Criteria

Opportunities for recreation are generally related to access to public lands, except for activities under a special recreation permit on lands controlled by adjacent landowners. The true value of the recreation resource is qualitative and is measured in human experiences and reported levels of satisfaction, rather than in acres available for recreation. Satisfaction is directly related to the balance between expectations and actual experiences (Olshavsky and Miller 1972). Visitor surveys provide the best measure of visitor satisfaction in the planning area. The scale of potential effects is based on a variety of factors, including public access, anticipated visitor satisfaction, and the ability to provide diverse recreational opportunities based on management of other resources. In cases where quantitative information is not available, best professional judgement is used. The scale of effects would be the same as identified in the Introduction of Chapter 4. In addition, an adverse effect on R&VS management as a result of project actions would be considered potentially significant if the following were to occur:
- An action would violate objectives associated with recreation resource management, and its magnitude would be such that special mitigation would be warranted, or it would persist indefinitely.
- In a SRMA, an action would negate the ability to manage for the prescribed recreational setting.
- In ERMAs, an action would deprive the public of the ability to access a contiguous block of BLM-administered public land for which there was historic legal access.
- An action would negate the ability to manage BLM-administered public lands according to the Recreation Opportunity Spectrum.
- Long-term visitor satisfaction surveys for SRMAs show continually decreasing satisfaction levels.

4.6.6.2. Impacts Common to All Alternatives

Recreation (major beneficial)
Designating SRMAs would increase the ability to apply for funding and recreation-related construction. Designating SRMAs also would refocus attention on emerging public demands for recreation identified in recent years, and during the public scoping process for this RMP. Natural resource-dependent recreation is promoted through the allowance of casual use of public lands for dispersed recreation. Some restrictions, such as prohibiting camps within 200 feet of surface water, are consistent with outdoor ethics principles and could result in the

closure or relocation of site-specific recreational opportunities. Cooperation with other entities would ensure provision of a wide variety of recreational opportunities to meet the demands of a multitude of user groups. Such cooperation also could increase public access, opening a larger portion of the planning area to recreation use. Existing facilities would be maintained for consistency with the recreational setting, improving the visitor experience and often reducing the maintenance workload in the planning area. Minimizing noise and light pollution that would affect recreation facilities and sites would improve the visitor experience at these sites and help realize many of the beneficial outcomes intended for each recreation MZ. Timely completion of RAMP would provide clear direction for recreation management in SRMAs, while opportunities for revision would allow flexibility as unforeseen issues arise.

Imposing a stay limit on camping prevents singular use of portions of BLM-administered public lands. By ensuring that one party would not have long-term exclusive use of a campsite, opportunities for recreation would be extended on a more just and fair basis. Providing information at recreation sites would help prepare visitors for local conditions, inform users of interpretive and regulatory information, and prevent inadvertent trespass onto adjacent lands. Promoting Americans with Disabilities Act compliance at BLM-administered recreation sites would help meet national goals and provide recreational opportunities for a wider segment of the American population.

Physical Resources

Air Quality, Soil, Water Resources, and Cave and Karst Resources

Managing recreational uses to reduce adverse effects on soil or water quality could affect the placement of recreation facilities, but should have a negligible and localized adverse effect on recreation resources. Proper mitigation of the adverse effects of recreation projects would provide recreational opportunities while preserving riparian and wetland systems and the waterways they adjoin. Such management would provide quality habitat to support wildlife for recreational use, and the viewsheds that enhance the quality of recreational setting and subsequent experiences. The degree of adverse effects to the recreation program from soil and water management actions would vary by alternative. Cave Management Plans would balance resource protection with recreational use. Some caves could be closed to human presence in consideration of other resource values. The adverse effect on recreation resources from physical resources management common to all alternatives would be negligible. However, the air quality resource will not produce measurable impacts by alternative and will not be discussed further in this section.

Mineral Resources

Locatable Minerals, Leasable Minerals – Coal and Fluids, and Salable Minerals

The scale of impacts from mineral resource development is expected to be similar across the various mineral resources. Thus, the section will be discussed as a whole, rather than as separate resources. Minerals leasing operations and development would likely alter the recreational setting of any undeveloped areas. The construction of facilities and ROW for pipelines, transmission lines, communications lines, and oil and gas development generally would adversely affect recreation resources. Land clearing, grading, construction, and drilling activities would create dust and noise, and increase traffic. These activities would have an adverse effect on traditional recreational uses because they would be visibly and audibly apparent during the recreational experience. The significance of any effect on recreationists would depend on proximity to the development and compatibility with the recreation setting for a particular activity. Users would be

inconvenienced if such construction impedes access to recreational activities. The visual intrusion of these structures would be site-specific and would not affect the recreational setting outside the viewshed of each facility. Mineral development activities on BLM-administered lands in the planning area would be subject to plans of development and stipulations, which also could alter recreational settings, restrict recreation access to certain areas, and change the availability of recreation resources to the public.

Areas not withdrawn from minerals entry would continue to be susceptible to disturbances from exploration and potential development, which could affect recreational uses in any given area. Continuing to develop solid and fluid minerals resources in areas with legal public access would affect recreation resources through decreased visitor satisfaction with recreational experiences. Management actions that limit development activities (e.g., NSO stipulations and prohibitions on leasing) and minerals withdrawals could benefit recreation by protecting recreation facilities and providing long-term assurance that areas traditionally used for recreational purposes would not be affected by future development activities. Prohibiting surface-disturbing activities related to mineral resources recovery in areas with high recreational value would protect the visitor experience and prevent conflicting uses.

Fire and Fuels Management

Fire promotes vegetation and wildlife diversity, which can enhance opportunities for recreation over the long term. Opportunities for wildlife viewing or hunting could be enhanced by the growth of new vegetation and improved habitat quality. The adverse effects of fire on recreation are generally negligible and short-term, and are directly related to the effect of fires on specific resources used in recreation, such as recreation facilities. The effects on visual resources, wildlife, and vegetation from fire would create immediate and localized impacts for recreation opportunities such as camping, sightseeing, and hunting.

Biological Resources

Vegetation – Forests and Woodlands, Grassland and Shrubland Communities, and Riparian/Wetland Resources and Fish and Wildlife Resources

Measures to promote wildlife and fisheries habitat, including maintenance of sustainable forage levels, habitat improvement projects, mitigation for disruptive activities associated with wildlife habitat management, and restoration of certain species would improve opportunities for wildlife-dependent recreation. Working with stakeholders to provide public access to waters and fisheries and to promote outreach and education would increase opportunities for recreation in the planning area. Conversely, avoiding riparian habitat would have a negligible adverse effect on access to recreation, especially fishing. Proper planning and mitigation can provide opportunities for quality recreation while minimizing adverse effects on riparian areas.

Similarly, managing recreational uses to reduce adverse effects on vegetation would have a negligible effect on access to recreation. Proper mitigation of the effects of recreation projects would provide opportunities for quality recreation while preserving native vegetation. The presence of healthy vegetation benefits the recreation program because it increases the visual appeal of the setting and benefits wildlife-dependent recreation. The grassland and shrubland resource will not produce measurable impacts by alternative and will not be discussed further in this section.

Special Status Species – Plants, Fish, and Wildlife (including Greater Sage-Grouse)
Specific limits on the ability to issue special recreation permits, provide motorized use and access, or allow campsite occupancy in areas with SSS could affect recreation resources. Proposed or permitted uses would be analyzed through a NEPA document and measures implemented if SSS were encountered or known to be affected. If recreation use would affect SSS, the use often can be relocated to areas where a given species is not likely to be encountered. Land tenure will play the greatest role in determining whether recreation uses can be relocated. In the case of special recreation permits, the timing limitations for SSS such as Greater Sage-Grouse do not currently coincide with the highest-use season, autumn big-game hunting season, and any effects should be negligible. The degree of effects on recreation resources from biological resources management would vary by alternative.

Heritage and Visual Resources

Cultural Resources and Paleontological Resources
Management of cultural and paleontological resources would provide for the protection of resources of interest to the recreating public, and would provide public education and outreach designed to enhance public appreciation and respect for these resources. Adaptive re-use of historic properties, provided for under Section 110 of the NHPA, would provide opportunities for additional interpretive sites. While the presence of historic properties can affect the placement of recreation facilities or the issuance of special recreation permits, mitigation would be localized and alternative sites for recreation facilities or use would likely be found in the local area.

Visual Resources
Scenic values are consistently identified as one of the most important values for visitors to public lands. Measures to protect visual resources would generally have a beneficial effect on recreation resources.

Land Resources

Under all alternatives, surface-disturbing activities related to development or resource extraction generally result in adverse effects or the displacement of recreational opportunities and the degradation of recreational experiences for the life of those projects. Conversely, some development activities present opportunities to improve legal access to public lands, and to improve roads.

Forest Products
While most forestry actions in the planning area take place in the southern Big Horn Mountains, an area with high recreational value, the two resource uses have historically coexisted with little effect on one another. If forestry actions exceed historic limits, there could be a adverse effect on the recreation resource due to reduced scenic quality. Current levels of firewood cutting, and other permitted special uses (e.g., Christmas tree cutting) on BLM-administered lands have little effect on recreation and could even be considered recreational activities.

Lands and Realty
Considering R&PP applications can benefit the provision of recreational opportunities. Examples of R&PP leases include trail systems and shooting ranges. Additionally, avoiding potential for inadvertent trespass through signage and education will ensure that visitors have a quality and legal recreational experience.

Renewable Energy
Wind-energy development would be allowed except in areas made administratively unavailable to renewable energy. Renewable-energy projects would generally produce an adverse impact to traditional recreational opportunities within the viewshed. The scale of impacts would vary by alternative.

Rights-of-Way and Corridors and Travel and Transportation Management
Maintaining a transportation system in cooperation with other entities to meet public and resource management needs is essential to providing recreational opportunities. Acquisition of easements and ROW is largely contingent on permission from private landowners. Overlapping motorized and nonmotorized forms of recreation would likely cause the greatest amount of conflict among recreation users in the planning area. Limiting OHV use to designated trails in many areas would provide additional areas where recreation users could avoid encounters with OHV. Conversely, there could be areas recreation users have difficulty accessing due to the lack of designated trails. Those who enjoy motorized recreation could perceive limitations on motorized vehicle use in areas where it has been historically supported as an injustice. While route designations could restrict movement in an area, such restrictions would not preclude legal access to contiguous blocks of BLM-administered lands with current public access. These restrictions, coupled with closures, would lead to a more primitive type of recreational experience that certain segments of the population would enjoy. The restrictions also could affect hunter success rates because while OHV use displaces game animals, OHV access also provides the recreation user a larger geographic area in which to pursue game. Overall, these management actions would be minor beneficial.

Lands with Wilderness Characteristics
Lands with wilderness characteristics are generally managed to protect outstanding opportunities for primitive and unconfined recreation or solitude. Evaluating areas with potential wilderness characteristics does not directly affect the provision of recreational opportunities. However, subsequent identification of lands with wilderness characteristics and their impacts to the recreation resource vary by alternative.

Livestock Management
Livestock grazing sometimes temporarily displaces recreational activities from occupied pastures, especially in areas where intensive livestock grazing occurs. Back country areas could be similarly affected by intensive livestock grazing, rendering those areas undesirable for periods of time, especially those most attractive to recreationists. These effects are typically short-term, but often cyclic, depending on the grazing management system (i.e., issues return when the grazing rotation places cattle back in those locations). Conversely, the presence of commercial "dude ranch" operations also provides unique recreational opportunities in certain areas that might decrease in availability if livestock operations were not authorized in the planning area. Closing areas with developed recreation facilities or high recreational potential to livestock grazing would prevent conflicts between users and livestock, and damage to the recreation facilities by trampling, rubbing, etc. (Note: only the developed portions (e.g., picnic areas, campgrounds, potable water sources, trailheads, and parking lots) would be subject to closure). Impacts from the common to all alternatives for livestock grazing would achieve *Standards for Healthy Rangelands*, an overall benefit to the recreation resource.

Special Designations

Areas of Critical Environmental Concern
Designation of ACECs in areas with recreational value could protect the recreation setting and values associated with the relevant and important criteria. However, there is no impact to the recreation resource from common to all alternatives for the ACEC resource; rather impacts would vary by alternative.

Scenic and Back Country Byways
The designation of scenic or BCBs can identify appropriate areas for visitors to enjoy vehicle touring and sightseeing. Providing additional information along these routes would increase visitor awareness of multiple uses and land stewardship in the area, which often results in increased visitor satisfaction. Evaluating areas for designation does not directly affect the provision of recreational opportunities and subsequent designation of byways would not be anticipated to greatly effect recreation use and would result in a negligible beneficial effect.

Wild and Scenic Rivers and Wilderness Study Areas
Continued protection of the Middle Fork Powder River (eligible and suitable for WSR designation) would provide blue-ribbon fishing opportunities. Middle Fork Canyon also contains unique and abundant cultural resources and cave and karst systems.

Managing WSAs (28,931 acres) would provide unique opportunities for a primitive and unconfined type of recreation. The benefit to the recreation program would be moderate and long-term. The designation and required management of WSAs for protection of wilderness values provides some assurance of locations where primitive and semi-primitive recreational opportunities would remain available (unless Congress releases the WSAs from further consideration as wilderness). All three WSAs in the planning area have limited public access and lack developed trail systems, which limits the amount of recreational use in the core of those areas, and therefore a minor beneficial effect.

Socioeconomic Resources

Identifying and mitigating hazards to public health and safety would improve the recreational experience of the visitor by ensuring a safer environment. Mitigating the adverse effects of coal seam fires would improve the BLM's ability to provide safe recreational opportunities and reduce potentially dangerous incidents. The extent of this management is currently limited to the Welch Ranch Management Area. Though socioeconomic resource management may vary by alternative, the effects to the recreation program would not likely vary by alternative and will not be discussed further in this section.

Table 4.60, “Proposed SRMAs by Alternative (acres)” (p. 1514) lists the estimated acreages of SRMAs under each alternative.

Table 4.60. Proposed SRMAs by Alternative (acres)

SRMA	Alternative A	Alternative B	Alternative C	Alternative D
Burnt Hollow	0	17,280	17,280	17,280
Cabin Canyon	0	1,369	0	0
Dry Creek Petrified Tree	0	2,567	2,567	2,567
Hole-in-the-Wall	0	11,952	0	11,952
Middle Fork Powder River	0	10,083	1,294	10,083

SRMA	Alternative A	Alternative B	Alternative C	Alternative D
Mosier Gulch	0	1,026	868	1,026
Welch Ranch	0	1,748	1,748	1,748
Weston Hills	0	9,504	9,504	9,504
Totals	**0**	**55,529**	**30,570**	**54,160**
Source: BLM 2012f SRMA Special Recreation Management Area				

Table 4.61, "Proposed ERMAs by Alternative (acres)" (p. 1515) lists the estimated acreages of ERMAs under each alternative.

Table 4.61. Proposed ERMAs by Alternative (acres)

ERMA	Alternative A	Alternative B	Alternative C	Alternative D
Buffalo	782,102	597,812	0	0
Cabin Canyon	0	0	0	1,369
Face of the Bighorns/North Fork	0	0	0	34,477
Gardner Mountain	0	0	0	55,181
Kaycee Stockrest	0	0	0	2,685
Northern Bighorns	0	0	0	2,926
Powder River Basin	0	0	0	224,483
Southern Bighorns	0	128,761	0	25,535
Walk-In Area	0	0	0	3,007
Totals	**0**	**726,573**	**0**	**349,663**
Source: BLM 2012f ERMA Extensive Recreation Management Area				

4.6.6.3. Alternative A

Alternative A would continue management in accordance with the 1985 RMP (BLM 1985c) as amended and maintained. Alternative A effects on the recreation program would be similar to those described under Impacts Common to All Alternatives, and would include the effects described in the paragraphs below.

Recreation

Camping is limited to 14 days at any one spot to avoid resource damage and prevent exclusive use of public lands. However, Alternative A lacks clarity on how far visitors must move after the 14-day limit is reached and when they may return to an original campsite. Alternative A would not designate any lands as SRMAs. Designated SRMAs enjoy increased eligibility for construction funding, while ERMAs normally do not. Managing the entire planning area as an ERMA would place a lower priority on recreation management, management actions would be custodial in nature, and recurring needs would not be as frequently addressed. The absence of designated SRMAs could result in a decreased ability to respond to changing recreation demands for diverse recreation opportunities and prescribed settings within the planning area. Most recreation areas are currently open to mineral development, however, Mosier Gulch has been closed to leasing and an NSO is in effect for lands within 0.5 mile of Dry Creek Petrified Tree. Recreational (target) shooting is generally allowed on BLM-administered lands that have not been administratively closed. Several recreation areas, including Burnt Hollow and Welch Ranch have been closed to target shooting. Thunder Basin National Grassland has closed the USFS administered surface at Weston Hills to target shooting and the BLM issued a supportive joint

decision that resulted in a temporary closure of the area in 2008. Additionally, all developed recreation sites, including the developed facilities at Mosier Gulch and Dry Creek Petrified Tree, are closed to target shooting per 43 CFR 8365.2-5(a) to protect public health and safety.

Physical Resources

Soil

Under Alternative A, prohibiting surface-disturbing activities in areas with severe erosion hazard, on soils with poor reclamation suitability, and on slopes equal to or greater than 25 percent could affect the development of trails for nonmotorized travel in areas with steep slopes. Several proposed or existing trails in the planning area exceed 25 percent side slope. However, under this alternative, the authorized officer may waive the prohibition. Prohibiting surface-disturbing activities in areas with sensitive soil resources could affect the provision of motorized recreational opportunities in some places. The effect on the recreation program would be minor, but long-term.

Water Resources

Restrictions on surface disturbance along waterways may affect the viability or design of recreation projects in or near river corridors or reservoirs, but may be waived by the authorized officer, and therefore a negligible impact.

Cave and Karst Resources

Under Alternative A, no previous decisions have been made related to cave and karst management and Cave Management Plans would not be initiated nor special management prescribed. Thus, there would be little to no effect on recreation from cave and karst resources.

Mineral Resources

Under Alternative A, continuing to develop solid and fluid mineral resources affects the recreation program through decreased visitor satisfaction with traditional recreational activities. If development in the planning area continues as predicted (see Appendix G (p. 1937)), there would be a minor, long-term adverse effect on the recreation program, as typically less than five percent of surface acres would be impacted by mineral development.

Fire and Fuels Management

Overall, the use of unplanned and prescribed fire under Alternative A would benefit the recreation program by protecting developed recreation sites and minimizing of risk of wildfires. Suppressing wildfires in developed recreation sites would be a priority, and would benefit the recreation program. The effect is anticipated to be beneficial as fire is typically be a short-term effect and doe not influence long-term recreation use.

Biological Resources

Vegetation – Forests and Woodlands

Under Alternative A, most forest and woodland projects would be managed on a project specific basis. However, vegetation projects would be designed to protect or improve biodiversity and water quality, which would indirectly benefit recreation resources and therefore a negligible benefit.

Vegetation – Riparian/Wetland Resources
Effects from alternatives related to riparian and wetland resources would be the same as water resources. This resource will not be discussed further in this section.

Fish and Wildlife Resources – Fish and Wildlife
Under Alternative A, measures to promote wildlife and fisheries habitat, including maintenance of sustainable forage levels, habitat improvement projects, mitigation for disruptive activities associated with wildlife habitat management, and restoration of certain species would improve wildlife-dependent recreational opportunities. Wildlife and fish habitat management actions would continue to provide opportunities for recreational uses, including fishing, hunting, wildlife viewing and photography, and influence the public's preferred camping locations and travel patterns.

Special Status Species – Plants, Fish, and Wildlife (including Greater Sage-Grouse)
Under Alternative A, there are no identified areas with high recreation value that have been limited or restricted from public use due to SSS; therefore, there would be little to no effect on the recreation program under this alternative. Proposed or permitted uses would be analyzed through the NEPA process and mitigation measures implemented if SSS were encountered or were known to be affected. Effects on the recreation program would be limited to recreation areas that overlap areas with SSS timing or surface occupancy stipulations. For areas without public access, the effects would be limited to recreation in conjunction with a special recreation permit. In areas with public access, alternative routes or camping areas would be designated where possible during periods of seasonal restrictions. Areas where recreation would be affected would be small and therefore a negligible effect.

Heritage and Visual Resources

Cultural Resources
Under Alternative A, recreation sites in areas subject to Cultural Resource Management/Protection Plans could be subject to additional prohibitions related to facility development and visitor use in the area, creating an adverse effect on the recreation resource. Protection of cultural resources also benefits the recreation program by preserving the natural character of the landscape. However, because recreational opportunities may be limited the overall effect is negligible adverse.

Paleontological Resources
No management decisions have been issued in the current RMP related to paleontological resources. Projects would be considered on a case-by-case basis and there would be no measurable effect on the recreation resource.

Visual Resources (minor adverse)
Alternative A categorizes the majority of the BLM-administered surface as VRM Class IV (559,674 acres), and the minority of the acreage in the more protective VRM Class II (127,594 acres) and Class III (63,583 acres). Alternative A VRM classifications would not adequately address the protection of scenic qualities, which indirectly affects the recreation setting in areas with high recreational value. Several RMAs are currently classified as VRM Class IV (Dry Creek Petrified Tree, Hole-in-the-Wall, Burnt Hollow, Weston Hills, and portions of Mosier Gulch), which allows the greatest amount of change to the landscape. Alternative A management of visual resources would have a minor adverse effect on the recreation program.

Land Resources

Forest Products
Basing timber harvest on a desired production level could adversely affect recreation resources by producing an unsustainable level of forestry activity. The overall adverse impact on the recreation program would be limited to areas with marketable timber and would be minor. A size limitation on individual clear-cuts would benefit recreation resources by restricting the amount of vegetation removal on a local scale.

Lands and Realty
Under Alternative A, priority is given to acquisition of parcels in areas with recreational value such as the southern Big Horn Mountains and easements will be pursued for recreation purposes, a minor benefit to the recreation resource. Negotiating access across non-BLM-administered lands to isolated public land parcels from willing landowners is critical to meeting the goal of providing accessibility across the planning area. Acquisitions and land exchanges would help the BLM provide seamless recreational opportunities and ensure long-term public access to recreation. Increased access could result in a wider diversity of recreational opportunities.

Renewable Energy
Renewable energy development projects are considered on a case-by-case basis. If a renewable energy project were approved, it could affect traditional recreational values within the viewshed of the project. However since recreational opportunities probably would not be reduced the impact would be negligible.

Rights-of-Way and Corridors
Effects from alternatives related to ROWs and corridors would be the same as soil resources. This resource will not be discussed further in this section.

Travel and Transportation Management
TTM under Alternative A would designate the most surface area open for motorized vehicle use compared to any of the other alternatives. Motorized travel in other areas would be managed as limited to designated routes. It should be noted that legal public access to approximately half of BLM surface in the planning area is controlled by owners of adjacent private land. Designating such areas as available to public motorized vehicle use would, in many cases, allow only the owners of adjoining private property, and anyone with their permission, to legally travel on many of those routes. In areas previously designated as limited to existing routes (737,166 acres), the process of designating or closing routes would likely prevent the use of motor vehicles on some previously available roads. This would increase opportunities for solitude and quiet recreation in the planning area, but would reduce opportunities for motorized recreation. It also would make game retrieval more difficult by eliminating roads that might otherwise be legally traveled to recover game. Although motorized hunting access might be reduced, game animals might also return to areas no longer accessible to motorized vehicles.

Seasonal motorized vehicle restrictions (37,646 acres) under this alternative are primarily the result of wildlife management concerns, and would continue to contribute to the viability of these populations, which are important to the recreating public. Less than five percent of the planning area would be seasonally closed to motorized vehicle use. Travel limitations could limit the public's ability to access certain areas of public lands seasonally; however, seasonal closures are designed to protect the wildlife resources and indirectly benefit recreation resources.

Closing or limiting OHV use in certain areas (3,650 acres) would limit the availability of lands for motorized forms of recreation, while maintaining opportunities for traditional forms of recreation. The effect of closures on access in the planning area would be negligible because nonmotorized

access would still be provided. Limiting OHV access to designated routes in the planning area could concentrate motorized vehicle use on these routes. However, comprehensive travel management would provide adequate opportunities for motorized recreation, while preserving other resource values. The overall beneficial effect of the travel management alternatives on the diversity of recreation opportunities in the planning area would be minor.

Lands with Wilderness Characteristics
Alternative A would not propose special management related to wilderness characteristics. There would be no effect from lands with wilderness characteristics alternatives on the recreation resource under Alternative A.

Livestock Management
Opportunities in developed recreation sites and certain activities (e.g., fishing near riparian areas) sometimes conflict with livestock grazing management. Alternative A would prohibit livestock grazing on less than two percent of BLM surface in the planning area, however, there is significant overlap between the areas currently closed to livestock grazing and areas with high recreation value. At present, the limitations apply to certain areas in the southern Big Horn Mountains (approximately 4,000 acres), including Middle Fork Canyon, and several developed recreation sites, including Dry Creek Petrified Tree (22 acres exclosed), Mosier Gulch (approximately 800 acres closed or unsuitable), Outlaw Cave campground (approximately 10 acres), and the parking areas at Burnt Hollow (approximately 5 acres). These limitations benefit the recreation program, but the relative effect on the program is minor as an estimated 4,840 acres within proposed SRMAs is closed, constituting approximately 8.7 percent of high value recreation resources. Dispersed recreation in Wyoming has historically been compatible with livestock operations except in areas of intensive grazing, developed recreation sites, or in riparian areas with public stream access.

Special Designations

Areas of Critical Environmental Concern, Scenic and Back Country By-ways, and Wild and Scenic Rivers
Alternative A would not designate or prescribe special management related to ACECs, BCBs, or WSRs and would therefore produce no effect on the recreation resource.

Wilderness Study Areas
Automatically leasing WSAs if Congress releases them from designation would adversely affect the availability of primitive recreation opportunities, specifically in the Fortification Creek area.

4.6.6.4. Alternative B

Alternative B would emphasize resource conservation. Alternative B effects on the recreation program would be similar to those described under Impacts Common to All Alternatives, and would include the effects described in the paragraphs below.

Recreation
Alternative B would designate 55,529 in eight SRMAs (7.1% of the planning area). Though the RSCs within SRMAs would be recognized for the unique value and distinctiveness, protection of natural and cultural resources would be emphasized over provision of consumptive recreational opportunities where conflicts arise. Accordingly, the BLM would be able to respond to the need for more intensive management efforts in SRMAs. Recreation management activities

under this alternative would include additional emphasis on addressing crowding issues and maintaining the quality of recreational experiences on public lands. Management of the southern Big Horn Mountains, in coordination with adjacent BLM field offices (Casper and Worland), would provide additional opportunities for seamless recreation, including multiple-use trails. However, limiting development of additional recreation facilities to SRMAs and other high-use areas could reduce the opportunity to construct or designate trails in remote areas. Evaluation of fees for access to high-use areas under the Federal Lands Recreation Enhancement Act could provide additional funding for improvements in SRMAs. However, fees can exclude those unable to afford fees and could displace recreationists to non-fee sites.

Alternative B would restrict minerals resource development and other surface-disturbing activities in designated SRMAs unless the disturbance would benefits recreation resources (i.e., a campsite or trail construction) and be compatible with natural and cultural resource protection. Similarly, salable minerals development in SRMAs would be allowed only for the benefit of the recreation program (i.e., procuring gravel for access roads and parking areas) where development resulted in a net benefit to other public land resources. Restrictions on mineral development would benefit the provision of traditional recreational opportunities, particularly nonmotorized activities. However, even motorized recreation would benefit from closures through a reduction of conflicts between recreational traffic and industrial traffic.

Campers would be required to relocate 5 miles away after reaching the 14-day stay limit. Due to land tenure and topography, this would likely preclude visitors from camping within the same SRMA or general area once the stay limit is reached. All SRMAs (7% of the planning area) would be closed to recreational shooting, which would reduce noise, user conflicts between shooters and other recreationists, and would improve safety in areas without proper backdrops. Because the SRMAs and other developed recreational facilities are often the most easily accessible lands within the planning area, there would likely be a substantial reduction in opportunities for target shooting on BLM-administered lands. However, target shooting opportunities are readily available on other public lands in the planning area and at several private shooting ranges.

Designation of SRMAs (55,529 acres) would prioritize recreation resources and natural and cultural resource protection in areas experiencing high recreation use and demand. ERMA designation on the remaining 726,573 acres of BLM administered surface would ensure consideration of recreation resources and values on all BLM administered lands in the planning area. The diversity of recreation opportunities provided by Alternative B would be a major benefit to nonmotorized and non-consumptive recreational opportunities. Opportunities for motorized and/or consumptive recreation could be substantially constrained under Alternative B.

Physical Resources

Soil

Under Alternative B, prohibiting surface-disturbing activities in areas with a severe erosion hazard, on soils with poor reclamation suitability, and on slopes equal to or greater than 25 percent could affect the development of trails for nonmotorized travel use in areas with steep slopes. Several proposed or existing trails in the planning area exceed a 25 percent side slope. Prohibiting surface-disturbing activities in areas with sensitive soil resources could affect the provision of motorized recreational opportunities in some places. The overall effect of these limitations would be moderate.

Water Resources
Prohibitions on surface disturbance along waterways may affect the viability or design of recreation projects in or near river corridors or reservoirs. The effect on the recreation program would be minor as recreation facilities are typically located to protect water resources while providing for recreational opportunities.

Cave and Karst Resources
Human activity in caves with significant resources, including recreational activity, would be managed under a Cave Management Plan. Such plans may impose additional restrictions on recreationists, but would also protect the recreation setting by preserving significant resources that draw these recreationists. The effect on the recreation resource would be negligible beneficial.

Mineral Resources

Under Alternative B, increasing restrictions on minerals development would reduce adverse effects on recreation settings and available recreation opportunities by limiting the areas available for minerals resource development. SRMAs, ACECs, WSAs and WSR corridors, and lands with wilderness characteristics, areas with the highest recreational value in the planning area, would all be closed to mineral development under this alternative. This would reduce the intensity of the adverse effect on the recreation program over the long term, resulting in a negligible adverse effect overall.

Fire and Fuels Management

Under Alternative B, the use of full protection strategies and tactics in the WUI and developed recreation sites could increase the adverse effects on visual resources from fire and fuels management in these areas. Generally, the short-term adverse effects from fire and fuels management lead to long-term beneficial effects on visual resources, vegetation, wildlife, and recreation settings.

Biological Resources

Vegetation – Forests and Woodlands
Under Alternative B, management of forest and woodlands would specifically emphasize recreation, which would benefit recreation resources in forest and woodland environments, creating a beneficial effect to the recreation resource. However, allowing insect, disease and wildland fire (see *Fire and Fuels Management* section) to run their natural course would reduce scenic values and could disrupt recreational opportunities over the long term. The combination of these actions would produced a minor beneficial effect.

Fish and Wildlife Resources – Fish and Wildlife and Special Status Species – Fish and Plants
Fish habitat management under Alternative B would include more emphasis on actions to improve blue-ribbon trout fisheries and fish habitats for special status fish species. Improving fish habitats and fisheries, especially sport fisheries, would expand and diversify fishing opportunities for recreational anglers. Other wildlife management activities under this alternative would provide for enhanced opportunities for wildlife viewing and bird watching by improving habitats for all birds and sensitive wildlife species. While increased restrictions on surface disturbance may affect the ability to construct or maintain recreational facilities, the protection of suitable wildlife habitat would result in a net benefit to the recreational resource to a minor degree.

Special Status Species – Wildlife (including Greater Sage-Grouse)
Under this alternative, additional restrictions would be applied to areas that contain SSS. Effects on the recreation program limited to areas that overlap areas with SSS timing or occupancy restrictions. For areas without public access, the effects would be limited to recreation in conjunction with a commercial special recreation permits. In areas with public access, alternative routes or camping areas could be designated where possible during seasonal restrictions. Wildlife prohibitions could limit recreation facility construction within SRMAs and therefore recreational opportunities to a moderate degree.

Heritage and Visual Resources

Cultural Resources
Prohibiting surface disturbance in areas containing historic properties, or within five miles of the visual horizon, would adversely impact the ability to develop recreational facilities in all SRMAs. There would be a major adverse impact to the recreation program.

Paleontological Resources
Under Alternative B, special management for areas with high-quality paleontological specimens would likely cause a negligible adverse effect on facility development for the Dry Creek Petrified Tree SRMA. Casual collection areas would not be identified.

Visual Resources
VRM class designations under this alternative would place emphasis on maintenance of the scenic values by managing 258,866 acres as VRM Class IV, and moving most of the acreage into the more protective VRM Class II (217,021 acres) and VRM Class III (276,107 acres). Management actions, including VRM Class II designation for all SRMAs, to preserve the scenic character in PRB viewsheds would ensure long-term enjoyment for recreationists and residents in the area.

Land Resources

Forest Products
Limiting timber harvests to 5 acres per select harvest group and designing timber projects to have meandering boundaries, follow topography, and avoid natural barriers would help mitigate adverse effects on recreation resources.

Lands and Realty
Realty management activities under Alternative B would establish "acquisition criteria" for lands and public access easements that would increase opportunities for recreational use of public lands. The amount of actual change would depend on the availability of "willing parties" during the planning period. While acquisition of access and easements is provided for under Alternative B, priority would no longer be given to areas with high recreational potential. While there is a possibility that all available funding could be used to procure access in other areas, it is not likely that such an action would have a substantial effect on the recreation program. The overall impact to the recreation program from the lands and realty program would be negligible and beneficial.

Renewable Energy
Renewable energy would be excluded from SRMAs under Alternative B, a major beneficial impact on the recreation resource.

Travel and Transportation Management
Travel management under Alternative B would not designate any BLM-administered lands as open to motorized travel and would close the majority of the planning area (625,854 acres). With nearly 80 percent of the planning area closed to motorized travel (with the exception of public roads under a ROW), motorized recreational opportunities would be severely limited. Alternative B would limit motorized travel to designated routes on 137,126 acres. Approximately 18,259 acres of the planning area would be seasonally closed to motorized vehicle use. The adverse effect of the travel management alternatives on the diversity of recreation opportunities in the planning area would be major.

The 1985 RMP does not address issues related to over-snow travel. While most of the planning area currently receives very little over-snow vehicle use due to insufficient snow cover, the southern Big Horn Mountains (predominantly on USFS-administered lands) attract snowmobilers during winter. While several areas of BLM-administered lands in the planning area might be appropriate for over-snow vehicle use (consistent with travel management designations), other parcels have resource values that would be inconsistent with such use. Officially closing those areas to over-snow vehicle use would guarantee future opportunities for quiet winter recreation use, such as cross-country skiing, snowshoeing, winter camping, and wildlife-viewing, provided compliance and enforcement of the closure was effective. Because nonmotorized recreation is often displaced by the presence of motorized recreation, where the inverse is generally not true, maintaining suitable areas with official closures to motorized recreation would ensure the long-term protection of the diversity of recreation opportunities in the planning area. These management actions combine to create an overall minor beneficial effect for the recreation resource.

Lands with Wilderness Characteristics
Considering and protecting areas with wilderness characteristics would ensure the continued availability of primitive recreational opportunities. A 12,237 acre area would be managed for wilderness characteristics. This represents 1.5 percent of BLM surface within the planning area and therefore a minor beneficial effect.

Livestock Management
Limiting or prohibiting livestock grazing where it has been determined to be incompatible with other resource values, particularly in the riparian area of Welch Ranch SRMA, would beneficially affect the recreation program. Areas with developed recreation facilities and trails could selectively reduce opportunities for grazing to reduce conflicts between users and livestock. Similarly, prioritizing any permanent increases in forage allocations for wildlife habitat and watershed protection, rather than livestock grazing, would indirectly benefit wildlife-dependent recreational opportunities. Opportunities in developed recreation sites and certain activities (e.g., fishing near riparian areas) sometimes conflict with livestock grazing management. Public comments have indicated a preference for reduction of grazing opportunities in the riparian area at Welch Ranch SRMA. Alternative B would prohibit livestock grazing on 372 acres of the Welch Ranch SRMA, in addition to the developed sites already closed in Alternative A. The total acreage within SRMAs excluded from livestock management would total approximately 5,210 (9.3% of SRMAs). Excluding livestock from the riparian area at Welch would be a major benefit at the site-specific level, but the overall beneficial effect on the recreation program across the planning area would remain within the moderately beneficial threshold.

Special Designations

Areas of Critical Environmental Concern
Under Alternative B, the BLM would designate eight ACECs (511,000 acres). Resource values would be afforded additional protections, and wildlife-dependent recreational opportunities and the scenic values that comprise the recreation setting would likely increase. Four of the ACECs would also be SRMAs (Burnt Hollow, Dry Creek Petrified Tree, Hole-in-the-Wall, and Welch Ranch). Measures to protect the relevance and importance of resources in these areas also would benefit the recreation settings in these areas. In designated ACECs, future area-specific plans could further limit surface-disturbing activities, including OHV use. The uncertainty of these future plans makes the effects on recreation largely unknown and therefore a minor benefit.

Scenic and Back Country Byways
Considering routes for Scenic and BCB designation could promote opportunities for vehicle touring in the planning area. Use would not be anticipated to increase substantially and therefore the benefit would be negligible.

Wild and Scenic Rivers
If Congress releases the Middle Fork Powder River from consideration for designation as a WSR, Alternative B would retain the free-flowing conditions and outstanding resource values. Because the Middle Fork Powder River is a destination for anglers in the region, protection of WSR values would be beneficial to the recreation program.

Wilderness Study Areas
Should Congress act to designate or release WSAs, a plan amendment would take place. There would be no effect on the recreation resource for the life of this plan. Prohibiting mechanized equipment in WSAs would displace any potential opportunities (which are limited at best) within these areas, but would improve nonmechanized recreational opportunities in those areas. Overall, the decision to limit mechanized use in WSAs would have little to no effect on the ability to provide diverse recreational opportunities across the planning area.

4.6.6.5. Alternative C

Alternative C would emphasize resource use. Alternative C effects on the recreation program would be similar to those described under Impacts Common to All Alternatives, and would include the effects described in the paragraphs below.

Recreation
Alternative C would designate six SRMAs (30,570 acres). The BLM would be able to respond to the need for more intensive management efforts in these areas. Alternative C would not restrict mineral resources development and other surface-disturbing activities in designated SRMAs, which would likely result in conflicts between industrial uses and recreational opportunities. It is feasible that extractive actions would be proposed within the boundaries of SRMAs, which would have an adverse effect on the recreation settings in those areas.

Allowing recreation facilities in areas where they are supported by recreational use and are consistent with other resource values would expand the BLM ability to provide recreational opportunities outside SRMAs. Failure to evaluate areas under the Federal Lands Recreation Enhancement Act could restrict the ability to provide additional funding for improvements in SRMAs. Campers would be required to relocate 1-mile away after reaching the 14-day stay limit. Due to land tenure and topography, this could preclude some visitors from camping within the same SRMA or general area once the stay limit is reached but would generally allow them to

continue camping in the planning area. The ability to camp in the same general area would benefit recreationists, particularly during hunting season. Under Alternative C, the entire planning area would be open to target shooting. This would likely increase user conflicts between shooters and other recreationists, particularly in areas with easy access, and result in a moderate adverse effect to the recreation program.

Alternative C would not designate any ERMAs. Approximately 751,532 acres of BLM-administered lands would not be designated within an RMA. Legal public access is unavailable to approximately 296,320 acres in the field office and the effects of recreation management would likely be negligible on lands outside of RMAs. Recreational use may still occur on lands outside of RMAs that are open to public use, but the BLM would not prioritize recreation resources in these areas and recreation may or may not be considered an affected resource in subsequent site-specific analyses. For the approximately 455,212 acres outside of RMAs that do have public access, failure to designate recreation management objective would reduce the ability to protect RSCs and promote R&VS, creating a major adverse effect on recreation resources.

Physical Resources

Soil, Water Resources, and Cave and Karst Resources
Under Alternative C, surface-disturbing activities in areas with severe erosion hazard, on soils with poor reclamation suitability, steep slopes or water features would be allowed. This could benefit the development of nonmotorized vehicle trails and provision of visitor services in certain areas. However, this alternative also could adverse effect the recreation program by allowing projects for resource development in areas with recreational values that would not be allowed under other alternatives. The effect on the recreation program would be negligible, but long-term. Human activity in caves with significant resources, including recreational activity, would be managed under a Cave Management Plan. Such plans may impose additional restrictions on recreationists, but would also protect the recreation setting by preserving significant resources that draw these recreationists. The effect on the recreation resource would be negligible.

Mineral Resources

Under Alternative C, continuing to develop solid and fluid minerals resources would affect recreation resources by decreasing visitor satisfaction with traditional recreation activities. SRMAs, ACECs, and lands with wilderness characteristics would not be closed to mineral resource development. Alternative C would expand the areas available for mineral resource development would increase adverse effects on recreation settings and available recreation opportunities. If minerals development in the planning area continues as predicted (see Appendix G (p. 1937)), the adverse effect on the recreation program would be moderate and long-term.

Fire and Fuels Management

Under Alternative C, the use of full protection strategies could increase adverse effects on visual resources in affected areas. Generally, the short-term adverse effects of fire and fuels management actions lead to long-term beneficial effects for visual, vegetation, and wildlife resources and recreation settings.

Biological Resources

Vegetation – Forests and Woodlands
Under Alternative C, management of forest and woodlands would emphasize the forest resource. Utilizing intensive management tactics such as clear cuts would reduce scenic values and could disrupt recreational opportunities over the long term. The adverse impact to the recreation program would be minor.

Fish and Wildlife Resources – Fish and Wildlife
Alternative C measures to promote wildlife habitat would be less proactive than under Alternative B. While Alternative C SSS management would be is similar to management under Alternative A, but often to a lesser extent given the flexible language. The limited fish and wildlife protections result in a negligible beneficial effect for recreation opportunities.

Special Status Species – Plants, Fish, and Wildlife (including Greater Sage-Grouse)
Alternative C would incorporate restrictions in areas with SSS. Effects on the recreation program would be limited to areas that overlap with areas with SSS timing or occupancy limitations. In addition, this alternative would apply a timing restriction to Greater Sage-Grouse winter concentration areas, which might coincide with big-game hunting seasons in some areas. These restrictions would prohibit surface disturbing activities and thus prevent displacement not only of SSS but of big-game as well, a negligible benefit.

Heritage and Visual Resources

Cultural Resources
Alternative C does not propose any special provisions or restrictions on surface disturbance related to cultural resources. There would be no effect on recreation resources related to the cultural resource.

Paleontological Resources
Under Alternative C, designating casual collection areas for common invertebrate, plant, and petrified wood fossil collection could help meet public demand for such activities. However, identifying collection areas could concentrate use and reduce the presence of paleontological specimens, which are often an attraction for non-consumptive recreationists. The adverse effect would likely be negligible.

Visual Resources
VRM class designations under this alternative would place limited emphasis on maintenance of scenic values by managing 167,334 acres as Class III, and assigning most of the acreage in the planning area the less protective Class IV (584,500 acres). SRMAs would be managed as VRM Class III. The impact to the recreation resource through the reduction of scenic values would be minor and adverse.

Land Resources

Forest Products
Under Alternative C, allowing timber harvests without limits on the sizes or shapes of harvest areas could adversely affect recreation resources. The overall adverse impact on the recreation program would be limited to areas with marketable timber and therefore would be minor.

Lands and Realty
Under Alternative C, the BLM would not consider the acquisition of lands or easements from

willing landowners, which would prevent the consolidation of land where it would be beneficial for public access. This would have a major adverse effect on the recreation program.

Renewable Energy
Renewable energy would be allowed within the planning area where consistent with other resource values. Recreation resources would be considered in renewable energy project development, but protection of recreation values could not be guaranteed. The overall effect to the recreation program would be adverse and moderate.

Travel and Transportation Management
Travel management under Alternative C would designate 24,103 acres as open to motorized vehicle use. Motorized travel in other areas would be managed as limited to designated routes (718,704 acres), except where areas are closed to motorized travel. Only WSAs (28,931 acres) would be closed to OHV use under Alternative C, which would maintain opportunities for primitive forms of recreation in these areas. The effect of closures on access in the planning area would be negligible because nonmotorized access would still be provided. Approximately 6,839 acres in the southern Big Horns would be seasonally closed to motorized vehicle use to protect elk winter and calving areas. The beneficial effect of the travel management alternatives on the diversity of recreation opportunities in the planning area would be minor.

Few areas in the planning area have enough snowfall to make over-snow travel practical. However, there are parcels, particularly in the southern Big Horn Mountains, that could be appropriate for over-snow vehicle use (consistent with travel management designations). Opening such areas to over-snow vehicle use could offer a unique opportunity for over-snow travel on BLM-administered lands. This would benefit motorized recreationists, but would be detrimental to human-powered winter recreational activities.

Lands With Wilderness Characteristics
Alternative C would not propose special management related to wilderness characteristics. There would be no effect from wilderness characteristics alternatives on the recreation resource under Alternative C.

Livestock Management
Effects of livestock management on recreation under Alternative C would be largely the same as Alternative A. Authorizing permanent increases in forage allocations to livestock grazing, rather than to wildlife habitat and watershed protection, would negate any potentially beneficial effects on wildlife-dependent recreational opportunities. The overall adverse impact to the recreation resource for forage allocation would be negligible to minor. Coupled with the overall objectives for accommodating uses of public lands other than recreation, the overall benefit of livestock management alternatives in Alternative C would be minor beneficial.

Special Designations

Areas of Critical Environmental Concern, Scenic and Back Country Byways, and Wild and Scenic Rivers
Under Alternative C, the BLM would not designate any ACECs. In general, resource values would be afforded less protection and wildlife-dependent recreational opportunities and the scenic values that comprise recreation settings could decrease without the protective measures offered by these designations. Under this alternative, the BLM would not consider designating Scenic or BCBs and would not expend additional effort on promoting vehicle touring on potential routes.

Alternative C would not prescribe special management related to WSR and would therefore produce no effect on the recreation resource.

Wilderness Study Areas
Should Congress act to designate or release WSAs, a plan amendment would take place. There would be no effect on the recreation resource for the life of this plan. Mechanized equipment would not be prohibited in WSAs, which would improved any potential opportunities (which are limited at best) within these areas, but could displace nonmechanized recreational opportunities in those areas. Overall, the decision to limit mechanized use in WSAs would have little to no effect on the ability to provide diverse recreational opportunities across the planning area.

4.6.6.6. Alternative D

Alternative D would generally allow resource use if the activity can be conducted in a manner that conserves physical, biological, and heritage and visual resources, and would emphasize moderate constraints on resource uses to reduce adverse effects on resource values. Alternative D is the Proposed RMP. Alternative D effects on the recreation program would be similar to effects described under Impacts Common to All Alternatives, and would include the effects described in the paragraphs below.

Recreation
Alternative D would designate seven SRMAs comprising 54,160 acres (6.9% of the planning area). Accordingly, the BLM would be able to respond to the need for more intensive management efforts in SRMAs to protect the RSCs and recreation management objectives. Recreation management activities under this alternative would include additional emphasis on addressing crowding issues and maintaining the quality of recreational experiences on public lands. Management of the southern Big Horn Mountains, in coordination with adjacent BLM field offices (Casper and Worland), would provide additional opportunities for seamless recreation, including multiple-use trails. However, limiting development of additional recreation facilities to SRMAs and other high-use areas could reduce the opportunity to construct or designate trails in remote areas. Evaluation of fees for access to high-use areas under the Federal Lands Recreation Enhancement Act could provide additional funding for improvements in SRMAs. However, fees can exclude persons unable to afford such fees and could displace recreationists to non-fee sites.

Alternative D would apply restrictions on mineral resources development and other surface-disturbing activities in six of the SRMAs unless the disturbance would benefit recreation resources (i.e., campsite or trail construction). In the Weston Hills SRMA, limited minerals development activity would compatible with the recreation setting. Salable minerals development in all SRMAs would be allowed only for the benefit of the recreation program (i.e., procuring gravel for access roads and parking areas). Restrictions on mineral development would benefit the provision of traditional recreational opportunities, particularly nonmotorized activities. However, even motorized recreation would benefit from closures through a reduction of conflicts between recreational traffic and industrial traffic.

Campers would be required to relocate 1-mile away after reaching the 14-day stay limit. Due to land tenure and topography, this could preclude some visitors from camping within the same SRMA or general area once the stay limit is reached, but would generally allow them to continue camping in the planning area. The ability to camp in the same general area would benefit recreationists, particularly during hunting season. Welch Ranch and Burnt Hollow SRMAs

(19,028 acres, 2.4% of the planning area surface) would be permanently closed to recreational shooting, which would reduce noise, user conflicts between shooters and other recreationists, and would improve safety in areas without proper backdrops. Closures in both areas are supported by the public. A recreational shooting closure for Burnt Hollow was recommended by an interagency and public Coordinated Resource Management team; a closure was analyzed and selected as the preferred alternative in the 2005 Burnt Hollow Management Plan. A closure was analyzed and selected as the preferred alternative in the 2005 Welch Ranch Management Plan as well. Target shooting opportunities are readily available on other public lands in the planning area and at several private shooting ranges. In five other SRMAs and three ERMAs, target shooting would be addressed through education, encouragement of minimum impact skills (i.e., Respected Access campaign) and enforcement of violations of CFRs during the implementation of this RMP. If over the mid term conditions related to target shooting do not improve, such as the shooting and explosives vandalism at Weston Hills, temporary or permanent closures may be necessary. The USFS-managed portions of Weston Hills are permanently closed to recreational shooting. Any subsequent permanent closures would require a land use plan amendment.

Alternative D would designate 349,663 acres in eight distinct ERMAs. In ERMAs, recreation would be recognized as an important resource value and would likely be considered in impact analyses in subsequent site-specific analyses.

Approximately 378,275 acres of BLM administered lands would not be designated within an RMA. Legal public access is unavailable to approximately 296,320 acres in the field office, and these lands comprise the majority of the lands outside of RMAs. For the approximately 82,000 acres outside of RMAs that do have public access, the majority of the parcels are too small to manage for high quality recreational opportunities or located far enough away (3 or more miles) from public roads that reasonable public access is not available. Recreational use may still occur on lands outside of RMAs that are open to public use, but the BLM would not prioritize recreation resources in these areas and recreation may or may not be considered an affected resource in subsequent site-specific analyses. The overall effect of Alternative D recreation management alternatives will result in a major benefit to recreation resources. Appendix T (p. 2543) includes objectives for each SRMA and ERMA.

Physical Resources

Soil and Water Resources

Alternative D would slightly increase constraints on the construction or placement of recreational facilities and trails compared to Alternative A. This alternative would allowing surface-disturbing activities in areas of severe erosion hazard, on soils with poor reclamation suitability, on slopes equal to or greater than 25 percent if they adequately conserve the soil and water resource. This would allow flexibility in providing nonmotorized and motorized access in certain locations. While measures to protect physical resources would still be in effect, the adverse effect of this management on the recreation program would be negligible and long-term.

Cave and Karst Resources

Human activity in caves with significant resources, including recreational activity, would be managed under a Cave Management Plan. Such plans may impose additional restrictions on recreationists, but would also protect the recreation setting by preserving significant caves that draw these recreationists. The effect on the recreation resource would be negligible.

Mineral Resources

Under Alternative D, continuing to develop solid and fluid minerals resources would affect recreation resources by decreasing visitor satisfaction with traditional recreation activities. However, Alternative D would increase restrictions on minerals development, which would reduce adverse effects to recreation settings and available recreation opportunities by limiting the areas available for mineral resources development. Most SRMAs, ACECs and lands with wilderness characteristics would be closed to mineral development under this alternative. This would reduce the intensity of the adverse effect on the recreation program, resulting in a minor adverse effect overall.

Fire and Fuels Management

Alternative D effects from fire and fuels management will be generally the same as effects under Alternative B. Use of full protection strategies and tactics in the WUI and developed recreation sites could increase adverse effects on visual resources in these areas. Generally, the short-term adverse effects from fire and fuels management actions tend to have long-term negligible beneficial effects on visual, vegetation, and wildlife resources and recreation settings.

Biological Resources

Vegetation – Forests and Woodlands
Under Alternative D, management of forest and woodlands would emphasize multiple resource values, which would include recreation. Utilizing intensive management tactics (which may include clear cuts), which would reduce scenic values and could disrupt recreational opportunities over the long term. The adverse impact to the recreation program would be negligible.

Fish and Wildlife Resources – Fish and Wildlife
Fish habitat management under Alternative D would place more emphasis on actions to improve blue-ribbon trout fisheries and fish habitats for SSS. Improvements in fish habitats and fisheries, especially sport fisheries, would enhance recreational fishing opportunities through expanding and diversifying fishing opportunities for recreational anglers. Other wildlife management activities under this alternative would provide for enhanced opportunities for wildlife viewing and bird watching by improving habitats for all birds and sensitive wildlife species, a minor beneficial effect.

Special Status Species – Plants, Fish, and Wildlife (including Greater Sage-Grouse)
Under this alternative, restrictions would be applied in areas with SSS. Effects on the recreation program would be limited to areas recreation potential would overlap areas with SSS timing or occupancy limitations. In addition, this alternative would impose a seasonal disturbance prohibition for Greater Sage-Grouse winter concentration areas. For areas without public access, the effects would be limited to recreation in conjunction with a commercial special recreation permit. In areas with public access, alternative routes or camping areas could be designated where possible during seasonal restrictions. If the timing limitation reduced opportunities for big-game hunting, which is one of the predominant recreational activities in the planning area, that could not be mitigated through alternative means of access, the effect on the recreation program would be minor.

Heritage and Visual Resources

Cultural Resources
Prohibiting surface disturbance in certain areas containing historic properties, specifically rock art shelters/sites or Native American burial sites could adversely impact the ability to develop recreational facilities in affected areas. Some SRMAs, specifically in the southern Big Horn Mountains, may be slightly affected, but the overall adverse impact to the recreation program would be minor.

Paleontological Resources
Under Alternative D, special management for areas with high-quality paleontological specimens would likely cause a negligible adverse effect on facility development for the Dry Creek Petrified Tree SRMA. Casual collection areas would not be identified.

Visual Resources
VRM class designations under this alternative would place emphasis on maintenance of scenic values by managing 260,238 acres in VRM Class IV, and moving most of the acreage into the more protective VRM Class III (379,429 acres) and Class II (112,329 acres). Management actions, including VRM Class II designation for all SRMAs, to preserve the scenic character of these areas would ensure moderate beneficial long-term enjoyment for recreational users and local residents.

Land Resources

Forest Products
Forest products sales would remain within ecologically sustainable limits while maximizing economic return and projects would consider other resource values, including recreation. The harvest area size, which may include clear-cut areas, would not be limited, but the design would incorporate recreation resource values. The overall impact to the recreation resource from forest products is expected to be adverse, but negligible.

Lands and Realty
Realty management activities under this alternative would establish acquisition criteria for lands and public access easements that would increase opportunities for recreational use of public lands. The degree of actual change would depend on the availability of willing parties during the planning period. While Alternative B provides for acquisition of access and easements, Alternative D would not give priority to areas with high recreational potential. While there is a possibility that all available funding could be used to procure access in other areas, it is not likely that such an action would have any substantial effect on the recreation program.

Renewable Energy
Renewable energy would be excluded from the southern Big Horn Mountains and excluded or avoided in SRMAs under Alternative D, a major beneficial impact on the recreation resource.

Travel and Transportation Management
Travel management under Alternative D would not designate any BLM-administered lands as open to motorized travel and would close 37,389 acres (4% of the planning area). The combined effect on motorized recreation opportunities would be minor (661,726 acres would be limited to designated routes). Big-game crucial seasonal ranges would be seasonally closed to motorized vehicle use. Effects from over-snow travel under Alternative D would be the same as effects under Alternative B. The overall beneficial effect of travel management alternatives on the diversity of recreational opportunities in the planning area would be moderate.

Lands with Wilderness Characteristics
Under Alternative D, 6,864 acres would be managed for wilderness characteristics and would ensure the continued availability of primitive and unconfined recreational opportunities in the lands with wilderness characteristics unit. The overall impact to the recreation program would be negligible, as the resource comprises less than one percent of the BLM surface.

Livestock Management
Allowing livestock grazing except where it has been determined to be incompatible with other resource values would not be likely to have additional beneficial effects on the recreation program when compared with Alternative A. Areas with developed recreational facilities and trails could still selectively reduce opportunities for grazing to reduce conflicts between users and livestock. Allowing livestock grazing within the riparian area of Welch Ranch SRMA (372 acres), would require intense coordination between the recreation program and livestock management to minimize user conflicts within the area. The total acreage within SRMAs excluded from livestock management would be approximately 4,840 acres (8.9% of SRMAs under Alternative D). The overall beneficial effect on the recreation program across the planning area would remain within the moderately beneficial threshold.

Special Designations

Areas of Critical Environmental Concern
Alternative D would designate three ACECs (2,849 acres). Under Alternative D, the Welch Ranch would be designated as both an SRMA and an ACEC. Measures to protect the relevance and importance of resources in these areas also would benefit recreation settings in these areas. In designated ACECs, future area-specific plans could further limit surface disturbance or development.

Scenic or Back Country Byways
Considering routes for scenic or BCB designation would promote opportunities for vehicle touring in the planning area. Use is not anticipated to increase substantially, therefore a negligible benefit.

Wild and Scenic Rivers
If Congress releases the Middle Fork Powder River from consideration for designation as a WSR, Alternative D would retain the free-flowing conditions and outstanding resource values. Because the Middle Fork Powder River is a destination for anglers in the region, protection of WSR values would be beneficial to the recreation program.

Wilderness Study Areas
Should Congress act to designate or release WSAs, a plan amendment would take place. There would be no effect on the recreation resource for the life of this plan. Prohibiting mechanized equipment in WSAs would displace any potential opportunities (which are limited at best) within these areas, but would improve nonmechanized recreational opportunities in those areas. Overall, the decision to limit mechanized use in WSAs would have little to no effect on the ability to provide diverse recreational opportunities across the planning area.

4.6.6.7. Cumulative Impacts

Past Actions
According to U.S. Census Bureau data, all three counties have shown positive growth trends since 1990 (U.S. Census Bureau 2013). The BLM has developed campgrounds and other recreation

facilities in several locations throughout the planning area. OHV registrations have increased substantially in the planning area over the last 10 years, in some cases resulting in a proliferation of routes, particularly during fall and winter when hunters pursue big game.

Present Actions

Recreation opportunities in the planning area are provided on BLM-administered lands and in the Bighorn National Forest, Thunder Basin National Grassland, three game ranges managed by the WGFD, and lands managed by the State of Wyoming. Recreation activities include developed recreational sites for hunting, fishing, camping, picnicking, and other activities; OHV use areas; and primitive settings for backpacking and wildlife viewing. There is a variety of opportunities for both developed and dispersed recreation. Hunting licenses are managed by the WGFD; data available between 1990 and 2009 show an increase in hunting as a recreational use.

Walk-in areas are private lands for which the WGFD has leased rights for public hunting access. Walk-in areas provide access to public lands that otherwise have no legal public access. This reduces hunter concentrations on contiguous federal lands, which are preferred by many hunters because landowner permission is no longer a requirement. Hunters displaced by oil and gas development could increase the use of walk-in areas that have not experienced as much development. The WGFD has several projects underway that would improve wildlife habitat. These include vegetative treatments, livestock grazing management, and native fish restoration. All of these projects, when combined with similar BLM actions on federal lands, would maintain or improve the quality of habitat and visual resources, and therefore recreation settings.

Reasonably Foreseeable Future Actions

Increased tourism and population growth in the planning area and the surrounding region could lead to increased demand for recreational opportunities. Visitor satisfaction could be diminished if an area receives higher levels of visitation that are incompatible with the objectives for SRMA and ERMA management referenced in Appendix T (p. 2543). Increased demand for a variety of recreation uses also would increase the possibility of user conflicts. Actions on lands managed by other government agencies that alter travel patterns, runoff, visitation, or environmental conditions could affect the recreation settings on adjacent BLM-administered lands. Potential effects on recreation would result primarily from surface disturbance, energy development, and other industrial activities on federal and non-federal lands. Such activities would reduce the quality of most recreational experiences because of increased roads, night lighting, industrial traffic, noise, and the degradation of visual resources associated with development.

Current oil and gas development projects in the PRB have had substantial effects on recreational resources and settings. Large portions of the PRB are dominated by roads, well pads, tanks, and drill rigs that impact the natural character of the landscape, resulting in displacement of recreationists to other areas. These development areas are no longer desirable for dispersed primitive to semi-primitive recreational activities such as hiking, camping, backpacking, wildlife viewing, or hunting because of the long-term industrial setting. This is a long-term elimination of recreational use in these areas, and therefore a major effect on recreation resources. Wind-energy facilities could affect recreational settings because of the visibility of the turbines, the presence of roads, road closures, safety restrictions, and noise. Large-scale wind-energy developments would greatly detract from the typical middle- to front-country Recreation Opportunity Spectrum settings by creating obvious and dominating visual intrusions on the horizon that would displace some recreationists from the area. Forest product harvests on private or state lands are expected in the southern Big Horn Mountains and could affect recreation resources and visitor experiences with erosion, new roads, ROW, sedimentation, habitat fragmentation, noise, traffic, and dust.

4.6.6.8. Conclusion

Selection of Alternative D will have the most overall beneficial impact to recreation resources by balancing resource protection with opportunities for diverse recreational experiences. Alternative B results in similar effects to recreation resources, but increased restrictions for natural resource protection and travel management result in difficulty in providing diverse recreational opportunities. Alternative A does not designate SRMAs, resulting in one of the greatest restrictions to recreation management compared with other alternatives. Alternative C includes the least restrictions on development, which might facilitate recreation site development, but also includes the least protection for natural resources and viewsheds.

4.6.7. Lands with Wilderness Characteristics

Wilderness characteristics, which include naturalness and outstanding opportunities for solitude or primitive and unconfined recreation, are expected to remain in demand from local residents and visitors who want to experience the primitive nature of portions of the planning area. Businesses that depend on natural landscapes (e.g., ecotourism, guided hunting, and fishing) could benefit from the protection of areas that possesses wilderness characteristics. Recreationists who seek back country experiences will prefer lands with wilderness characteristics. Following the wilderness characteristics inventory for the BFO, one unit located along the spine of the southern Big Horn Mountains and totaling 12,237 acres was determined to comprise the lands with wilderness characteristics resource (Map 73). Because the presence of wilderness characteristics is defined by a lack of indicators of human presence, any surface-disturbing activities or placement of above ground structures can adversely affect the lands with wilderness characteristics resource.

4.6.7.1. Methods and Assumptions

To allow for a consistent analysis, the full wilderness characteristics unit proposed under Alternative B (12,237 acres) is used as the area of analysis for all alternatives. The BLM analyzed impacts to wilderness characteristics on the management actions listed in Chapter 2. For example, the BLM would not manage any lands for wilderness characteristics under Alternative C. However, to ensure the analysis is comparable across alternatives, Alternative C analyzes effects to wilderness characteristics for the same geographic area as the other alternatives.

Analysis assumptions may include, but are not limited to:

- The analysis in this section assesses impacts to BLM-administered surface on 12,237 acres determined to meet the criteria for lands with wilderness characteristics (Map 73).
- Parcels determined to lack wilderness characteristics are not analyzed or further considered as lands with wilderness characteristics (unless new information is presented). Lands that were analyzed but do not contain wilderness characteristics are not subject to the alternatives related to the *Lands with Wilderness Characteristics* resource.
- Lands with wilderness characteristics are not subject to BLM Manual 6330 – Management of Wilderness Study Areas (BLM 2012c) or other policies or guidance applicable to WSAs or Wilderness areas. Lands with wilderness characteristics are administrative units.

Significance Criteria

An adverse effect on wilderness characteristics as a result of project actions would be considered potentially significant if:

- An action would violate objectives associated with wilderness characteristics resource management and its magnitude would be such that it could not be mitigated.
- A parcel with wilderness characteristics would be affected to the point that the wilderness characteristics (size, naturalness or outstanding opportunities) would be removed.

Scale of Impacts

The scale of impacts has been slightly modified for the lands with wilderness characteristics resource to more accurately reflect the potential impacts under current forecasts for development. The following terms are used to define the extent of environmental consequences:

- Negligible: The effect on the resource would be barely detectable; the impact from the management actions would not directly affect the presence or absence of lands with wilderness characteristics. This level of effect is considered to be not significant.
- Minor: The impact of the management actions would not be significant and would not be likely to occur under reasonably foreseeable development forecasts.
- Moderate: The impact of the management actions would be likely to occur under reasonably foreseeable development forecasts and would not produce a significant effect or the impact of management actions would be unlikely to occur under reasonably foreseeable development forecasts but would produce a significant effect.
- Major: The impact of the management actions are likely to occur under reasonably foreseeable development forecasts and would produce a significant effect.

4.6.7.2. Impacts Common to All Alternatives

Lands with Wilderness Characteristics

The only management action common to all alternatives is to inventory acquired parcels, a component of the BLM policy to maintain the wilderness characteristics inventory. However, the inventory requirement in itself would not affect management of lands with wilderness characteristics.

Physical Resources

The lands with wilderness characteristics unit contains sensitive soils, water resources, and caves. Generally, management actions that protect physical resources without creating a need for surface disturbance (related to monitoring or reclamation) would have a beneficial effect on the wilderness characteristics resource. The impacts to the wilderness characteristics resource from Physical Resource management actions would have no or indiscernible effects that do not vary across the alternatives; therefore, Physical Resources are not further discussed in this section.

Mineral Resources

Leasable-Coal and Leasable-Other

There is no coal potential or identified Leasable-other resources within the lands with wilderness characteristics unit, therefore no effect is anticipated from these resources and they will not be discussed further in this section.

Locatable, Leasable-Fluids and Salable Minerals
Construction and operation of mines or oil and gas wells and associated infrastructure, including roads, pipelines, and powerlines would disturb soil and vegetation, and would introduce structures that would degrade the naturalness of lands with wilderness characteristics. Noise from construction and operation of producing wells or mines, including the presence of work crews, vehicles, and equipment, would degrade opportunities for solitude and conflict with primitive recreational opportunities near industrial development. Mineral extraction could affect areas with wilderness characteristics that are not withdrawn from mineral entry, closed to oil and gas leasing or subject to a NSO. Effects from mineral extraction would also vary depending on the methods used and size of operations. The slopes within the unit would likely make extraction of mineral resources difficult and less than economically feasible.

The potential for CBNG is very low and there is no potential for conventional oil and gas. No locatable minerals are known to occur in this area in currently commercially viable quantities. Sand and gravel are present within the unit, but the steep slopes within the lands with wilderness characteristics make development of these resources unlikely as other nearby areas may offer more economically viable options for salable mineral development. Should mineral development activity occur within the unit, the impacts to wilderness characteristics would likely be significant and adverse. However, under current development forecasts, the impacts from management actions are considered moderate using the defined scale of impacts for this resource.

Fire and Fuels Management

Firefighting activities and prescribed fire may affect wilderness characteristics. Lightning-caused wildland fire is a naturally occurring phenomenon and considered a part of the natural ecosystem. Prescribed fire may potentially affect the naturalness of the landscape. When persons are physically present during fire and fuels management activities, or when persons leave evidence of their presence (skid roads, burn piles, etc.), there may be an effect on solitude, and to a lessor degree, on primitive and unconfined recreation. Such effects on solitude and primitive and unconfined recreation would likely be short-term. However, hazardous fuels reduction projects and environmental restoration efforts involving fire often benefit wilderness characteristics by restoring the landscape to desired condition classes. The degree of beneficial or adverse effects to lands with wilderness characteristics from fire and fuels management would depend heavily on the methods and mitigation measures implemented at the project level. The fire and fuels management actions common to all alternatives encourage stabilization of burned areas and consideration of affected natural resources and produce a negligible benefit to the lands with wilderness characteristics resource.

Biological Resources

Vegetation – Forests and Woodlands
While managing healthy forests and woodlands and restoring native vegetative communities would benefit the natural character of lands with wilderness characteristics, use of mechanical equipment to accomplish the objective could diminish naturalness. Also, over the short term, the presence and noise of people and equipment could eliminate opportunities for solitude and primitive forms of recreation near treatment areas. The degree of beneficial or adverse effects to lands with wilderness characteristics from vegetation manipulation associated with forest and woodland resource management would depend heavily on the methods and mitigation measures implemented at the project level. There are no management actions common to all alternatives for

the Forest and Woodland Resources; however, management actions do vary by alternative for this resource and are discussed below.

Vegetation – Grassland and Shrubland Communities, Vegetation – Riparian/Wetland Resources, Invasive Species and Pest Management, Fish, Wildlife and Special Status Species (including Greater Sage-Grouse)

Controlling or prohibiting the introduction of non-native species within an lands with wilderness characteristics unit generally benefits the naturalness of an area over the long term. However, the impacts from grassland and shrubland communities and invasive species and pest management actions to the wilderness characteristics resource would have no or indiscernible effects that do not vary across the alternatives; therefore, these resources are not further discussed in this section. The impacts from riparian/wetland resources are negligible under all alternatives as they produce indirect impacts on a small portion of the lands with wilderness characteristics unit and are not discussed further in the text.

The lands with wilderness characteristics area contains a diversity of vegetation, fish, wildlife, and SSS resources. Management alternatives that improve habitat for endemic wildlife populations would enhance the natural character of lands with wilderness characteristics. Furthermore, sustainable and healthy wildlife populations could expand opportunities for primitive and unconfined recreational opportunities, including wildlife viewing, hunting, and natural history study. The biological resources management actions when considered together have a minor beneficial effect on wilderness characteristics. Prohibitions on development for protection of biological resources (such as near fish-bearing streams, within elk security habitat and special status plant habitat) and an emphasis on provision of quality wildlife habitat would affect the entire lands with wilderness characteristics unit and produce a benefit to the wilderness characteristics resource. However, the impacts from fish, wildlife and SSS management actions to the lands with wilderness characteristics resource do not directly affect the naturalness or outstanding opportunities and the impacts do not substantially vary across alternatives. Therefore, these resources are not further discussed in this section.

Heritage and Visual Resources

Cultural Resources and Paleontological Resources

Generally, management actions that protect heritage resources would have a beneficial effect on the wilderness characteristics resource. The BLM may provide for legitimate field research by qualified scientists and institutions. These activities could involve temporary surface-disturbing activities like digging and excavation. If these activities occurred in areas with wilderness characteristics, they would create a loss of naturalness and temporarily disturb opportunities for solitude and primitive recreation in the immediate area. Over the long term, however, gaining knowledge about the cultural and paleontological resources of an area, interpreting the resource appropriately, and viewing cultural or paleontological resource sites in the lands with wilderness characteristics would add to the enjoyment of these areas for primitive recreational purposes. Protecting heritage resources also adds to the character of settings that support these recreational opportunities.

Paleontological management alternatives focus on protecting resources of high quality or importance; as none are presently identified within the lands with wilderness characteristics unit, paleontological resources will not be discussed further in this section. The impacts from cultural resource management actions to the lands with wilderness characteristics resource do not directly

affect the naturalness or outstanding opportunities and the impacts do not substantially vary across alternatives. Therefore, cultural resources are not further discussed in this section.

Visual Resources

Land use planning decisions to designate and manage areas under VRM Class I or II objectives would preserve the characteristic landscape. At present, only WSAs and WSR are managed under VRM Class I. VRM Class II objectives would retain the characteristic landscape, allowing for minor changes to the landform and vegetation. This objective would generally protect the natural condition of lands with wilderness characteristics. The objective of VRM Class III is to partially retain the existing character of the landscape, allowing for moderate changes to land and vegetation. This objective is not compatible with preserving the natural character of lands with wilderness characteristics. VRM Class IV objectives allow major modification of the landscape, and is clearly incompatible with preservation of the natural character of lands with wilderness characteristics. In keeping with VRM Class I and II objectives, preserving the natural character of the non-WSA lands with wilderness characteristics also would preserve the undeveloped settings needed to support opportunities for solitude and primitive forms of recreation. Because VRM Class III and IV objectives would not preserve undeveloped settings, naturalness and opportunities for solitude and primitive recreation would be diminished. The visual resources management actions when considered together have a moderate beneficial effect on wilderness characteristics.

Land Resources

Forest Products, Renewable Energy, Rights-of-Way and Corridors, Travel and Transportation Management

Commercial timber operations can adversely affect the presence of naturalness through the creation of logging roads and the presence of heavy machinery. Effects of timber operations on solitude and primitive and unconfined recreation would likely be short-term. Often, environmental restoration efforts or disease control are cost-prohibitive if the project is not part of a commercial timber sale. Thus, timber sales can assist in protection of the natural ecosystem over the long-term. However, the degree of beneficial or adverse long-term effects to lands with wilderness characteristics from forest product management would depend heavily on the method of recovery and mitigation implemented at the project level.

Land use authorizations to approve renewable energy development or to issue ROW such as pipelines and utilities and communication sites would adversely affect wilderness characteristics. Aboveground structures would diminish the naturalness of the immediate area, and in the surrounding areas solitude and primitive and unconfined recreation would be reduced. Burying lines would temporarily affect the naturalness of an area on a localized scale, and through maintenance actions for below-ground facilities. The steep slopes would generally preclude Renewable Energy and ROW development; however, should the construction of wind turbines, roads or transmission lines occur within the unit, the impacts to wilderness characteristics would be significant and adverse. Given the steep slopes and difficulty in accessing the area, and in the context of the scale of impacts described in this section, the impact has been assessed as moderate and adverse.

Allowing cross-country motorized travel in lands with wilderness characteristics would disturb soils and vegetation, which would alter the landscape and diminish the natural character of such lands. Designations that permanently or seasonally close areas to motorized travel would have a beneficial effect on the wilderness characteristics resource. Additionally, portions of the lands with wilderness characteristics unit where motorized travel was previously limited to

existing routes would now limit motorized travel to designated routes, which would have a beneficial effects on the wilderness characteristics resource. The travel management actions, when considered together, have a moderate adverse effect on wilderness characteristics.

Lands and Realty, Recreation, Livestock Grazing Management
No lands within the lands with wilderness characteristics have been identified for disposal under any alternative. Recreation management actions that encourage the development of recreational facilities or motorized vehicle use could affect the naturalness, solitude, and recreation setting in presently undeveloped areas containing wilderness characteristics. However, some facilities (e.g., trailheads and parking lots) might be necessary on the periphery of an area with wilderness characteristics to provide adequate access and opportunities for recreational use of such areas. Proper design and construction techniques can reduce adverse effects from adjacent recreation facilities and help maintain a more natural viewshed. The unit does not overlap any SRMAs under any alternative. The unit overlaps with an ERMA in alternatives A, B and D, but the management of ERMAs does not contain specific land use allocations and is not expected to produce a discernible impact across the alternatives.

Livestock grazing is guided by livestock objectives set in the *Wyoming Standards for Health Rangelands*. Proper levels of livestock use are guided by these standards; therefore, it is not anticipated that livestock grazing would affect lands with wilderness characteristics under any alternative because meeting these standards would promote healthy rangelands. For some visitors, the presence of livestock would be an adverse effect on the desired experience (connection with the natural world and experiences of solitude). However, this effect would be seasonal. At other times of the year, livestock would not be present, and soils and vegetation would recover, decreasing effects on the visitor experience. Much of the lands with wilderness characteristics unit is considered unsuitable for grazing due to steep slopes.

There are no or indiscernible effects to the lands with wilderness characteristics resource across alternatives from the lands and realty, recreation, and livestock grazing management actions, and therefore, these resources will not be discussed further in this section.

Special Designations

Designation of an ACEC or WSR in an area with wilderness characteristics benefits the resource. However, there are no proposed ACECs in the lands with wilderness characteristics unit and the area is not contiguous to a WSA or WSR. Therefore, there would be no effect from ACECs, WSAs or WSR. Designating scenic or BCBs in an area with wilderness characteristics could be detrimental to the resource due to the increased motorized use vehicle use associated with such a designation and the subsequent effect on naturalness and opportunities for solitude. Currently, no roads within the lands with wilderness characteristics unit are being considered for BCB designation, therefore there would be no effect to the lands with wilderness characteristics resource. Special designations will not be considered further in this section.

Socioeconomic Resources

There are no discernible effects from socioeconomic or health and safety management actions common to all alternatives or across the alternatives; therefore, these resources will not be discussed further in this section.

4.6.7.3. Alternative A

Alternative A would continue management in accordance with the 1985 RMP (BLM 1985c) as amended and maintained. Alternative A effects on the wilderness characteristics resource would be similar to those described under Impacts Common to All Alternatives, and would include the effects described in the paragraphs below.

Lands with Wilderness Characteristics
Alternative A does not provide any previous decision for the lands with wilderness characteristics unit, thus, protection of this resource would not be provided. The overall management under Alternative A would generally allow for some development within the lands with wilderness characteristics unit, which could significantly impact wilderness characteristics. The resources or management actions with impacts to lands with wilderness characteristics that vary by alternative include locatable, leasable-fluid mineral and salable mineral development, fire and fuels management, forest and woodlands management, forest products, visual resources management, ROWs, renewable energy development, travel management. The discussion of the environmental consequences for the lands with wilderness characteristics resource is limited to these resources for brevity.

Mineral Resources

Locatable Leasable – Fluids and Salable Minerals
The potential for fluid or locatable mineral development is very low and would be unlikely to occur under reasonably foreseeable development forecasts; however the unit would not be recommended for withdrawal from mineral entry, would not be closed to leasing nor subject to an NSO, and would not be closed to salable mineral development under Alternative C. Mineral development could potentially occur and any development would produce a significant effect. Thus, the impact to the lands with wilderness characteristics resource from Locatable, Leasable-Fluids and Salable Minerals under Alternative A is defined as moderately adverse.

Fire and Fuels Management

Under Alternative A, priority is given to suppressing fires in or threatening higher value resources, which would generally include the northern portion of the lands with wilderness characteristics unit as it contains a developed recreation site and WUI. Alternative A also encourages rehabilitation of fire-damaged lands to meet resource objectives, which could benefit lands with wilderness characteristics. The degree of beneficial or adverse effects to Lands with Wilderness Characteristics from fire and fuels management would depend heavily on the methods and mitigation measures implemented.

Biological Resources

Vegetation – Forests and Woodlands
Under Alternative A, many action alternatives had no previous decision or management was determined on a project specific basis. However, designing vegetation projects to protect or improve biodiversity and water quality would benefit the lands with wilderness characteristics resource. The overall benefit to the wilderness characteristics resource is negligible and beneficial.

Heritage and Visual Resources

Visual Resources
Under Alternative A, the lands with wilderness characteristics unit would be classified as VRM Class II on the western portion of the unit and VRM Class IV on the eastern side of the unit. Areas with wilderness characteristics that overlap VRM Class II areas would receive an appropriate level of protection for visual resources in an area with wilderness characteristics, while the portion of the lands with wilderness characteristics unit in VRM Class IV could receive inadequate protection, resulting in a minor adverse impact to the lands with wilderness characteristics resource.

Land Resources

Forest Products
Under Alternative A, allowing sale of minor forest products could encourage surface disturbance and impact naturalness. Conversely, encouraging regeneration within 5 years within a forest management area could benefit naturalness over the long term. Additionally, individual clear-cuts were limited to 20 acres. The degree of beneficial or adverse effects to lands with wilderness characteristics from forest product management would depend heavily on the methods and mitigation measures implemented at the project level. When the management actions for Alternative A are considered in context historic forest product sales, the overall impact to the lands with wilderness characteristics resource from forest and woodland resource alternatives is minor and adverse.

Renewable Energy
Under Alternative A, renewable energy action alternatives had no previous decision. As there are no management actions to analyze for the renewable energy program under Alternative A, there is no effect to the lands with wilderness characteristics resource. However, management actions do vary by alternative for this resource and are discussed below.

Rights-of-Way and Corridors
Alternative A prohibits authorizing ROW on slopes that exceed 25 percent, which includes the majority of the lands with wilderness characteristics unit. Given the steep topography, extensive development of the lands with wilderness characteristics unit is not reasonably foreseeable. The benefit to the lands with wilderness characteristics resource is moderate and beneficial.

Travel and Transportation Management
Alternative A classifies the area as limited to existing routes; under current guidance this area would now be managed as limited to designated routes once travel management has been completed. Motorized travel within the unit would reduce outstanding opportunities for solitude and primitive and unconfined recreation and could impact naturalness. There are no existing routes identified within the unit, thus, the adverse effect on wilderness characteristics is negligible.

4.6.7.4. Alternative B

Alternative B would emphasize resource conservation. Alternative B effects on the wilderness characteristics resource would be similar to those described under Impacts Common to All Alternatives, and would include the effects described in the paragraphs below.

Lands with Wilderness Characteristics
Under Alternative B, managing lands with wilderness characteristics (Map 73) to emphasize

ecosystem health, natural values, and primitive recreational opportunities would benefit the wilderness characteristics resource. All 12,237 acres of the lands with wilderness characteristics unit will be managed to protect wilderness characteristics. Management of the lands with wilderness characteristics unit would include closing the area to motorized use; managing the area as VRM Class II; closing the area to mineral leasing (fluid and solid); recommending withdrawal to locatable mineral entry; closing the area to salable mineral development; excluding ROW development; prohibiting commercial woodcutting unless it is a by product of an environmental restoration effort, and prohibiting all other surface-disturbing activities not compatible with retaining or enhancing the area's natural values. The protection of an additional 12,237 acres of lands with wilderness characteristics would be a major beneficial impact to the lands with wilderness characteristics resource.

Mineral Resources

Locatable, Leasable-Fluids and Salable Minerals

Under Alternative B, the lands with wilderness characteristics unit would be recommended for withdrawal from mineral entry, closed to the leasing of solid and fluid minerals and closed to salable mineral development. The preclusion of mineral development is a substantial benefit to the wilderness characteristics resource; given the low development forecast, the benefit is classified as moderate.

Fire and Fuels Management

Under Alternative B, fire could be managed for multiple resource objectives, including allowing fire for resource benefit. Limiting heavy equipment usage to areas near existing roads and trails would also decrease the impacts to naturalness within the unit.

Biological Resources

Vegetation – Forests and Woodlands

Keeping silvicultural treatments to a minimum and encouraging natural processes to run their course without intervention would directly benefit the naturalness criteria within the lands with wilderness characteristics unit. Managing forests/woodlands to emphasize recreation and wildlife could also encourage outstanding opportunities for primitive and unconfined recreation and habitat for sensitive plant and wildlife species.

Heritage and Visual Resources

Visual Resources

Under Alternative B, the lands with wilderness characteristics unit would be managed as VRM Class II management. This would benefit wilderness characteristics by maintaining the natural values of the landscape.

Land Resources

Forest Products, Renewable Energy, Rights-of-Way and Corridors, Travel and Transportation Management

Under Alternative B, the lands with wilderness characteristics unit would be closed commercial

woodcutting unless the project was for environmental restoration, excluded from authorization of ROW grants, closed to renewable-energy development, closed to motorized use, and any other related surface-disturbing activities would be prohibited. Selection of Alternative B would be a major benefit to wilderness characteristics as impacts from forest products, renewable energy, ROWs and corridors or TTM activities would be precluded within the lands with wilderness characteristics unit.

4.6.7.5. Alternative C

Alternative C would emphasize resource use. Alternative C effects on the wilderness characteristics resource would be similar to those described under Impacts Common to All Alternatives, and would include the effects described in the paragraphs below.

Lands with Wilderness Characteristics
There would be no special provisions related to protection of wilderness characteristics would not be imposed on lands with wilderness characteristics unit resulting in a major adverse impact to the wilderness characteristics resource.

Mineral Resources

Locatable, Leasable – Fluids and Salable Minerals
The potential for fluid or locatable mineral development is very low would be unlikely to occur under reasonably foreseeable development forecasts; however the unit would not be recommended for withdrawal from mineral entry, would not be closed to leasing nor subject to an NSO, and would not be closed to salable mineral development under Alternative C. Mineral development could potentially occur and any development would produce a significant effect. Thus, the impact to the lands with wilderness characteristics resource from Locatable, Leasable-Fluids and Salable Minerals under Alternative C is defined as moderately adverse.

Fire and Fuels Management

Under Alternative C, full suppression strategies and use of heavy equipment would be encouraged, which could impact naturalness over the long term.

Biological Resources

Vegetation – Forest and Woodland Resources
Using intensive management tactics, such as large clear-cuts, to manage forest and woodland resources could impact the naturalness criteria within the lands with wilderness characteristics unit. Considering the presence of steep slopes and limited historic project proposals in the area, the likelihood of large-scale vegetation manipulation within the lands with wilderness characteristics unit is limited. Thus the benefit is classified as moderate and adverse.

Heritage and Visual Resources

Visual Resources
Under Alternative C, the lands with wilderness characteristics unit would be managed under VRM Class III. This would reduce protections for scenic values in the lands with wilderness

characteristics area. The effect on the wilderness characteristics resource would be minor and adverse.

Land Resources

Forest Products, Renewable Energy, Rights-of-Way and Corridors
Under Alternative C, forest product sales would be managed for maximized economic return, which could encourage surface disturbance and impact naturalness. There would be no limit on the size of individual clear-cuts and forest management would be maintained to minimum stocking levels. The degree of beneficial or adverse effects to lands with wilderness characteristics from forest product management would depend heavily on the methods and mitigation measures implemented at the project level. When the management actions for Alternative C are considered in context with reasonably foreseeable development forecasts and the other selected management actions for Alternative C, the overall impact to the lands with wilderness characteristics resource from mineral resource alternatives is moderate and adverse.

Under Alternative C, renewable energy would be avoided but not excluded. Wind energy projects within the lands with wilderness characteristics unit are not expected as more economically viable options exist in nearby areas. Thus, the impact is expected to be moderate and adverse.

Alternative C allows ROW on slopes that exceed 25 percent, and categorizes the lands with wilderness characteristics unit as open to ROW authorizations. ROW within the majority of the lands with wilderness characteristics unit are not expected as more economically viable options exist in nearby areas. The impact to the lands with wilderness characteristics resource is moderate and adverse.

Travel and Transportation Management
Alternative C classifies the area as limited to designated routes. There are no existing routes identified within the unit, and it is not reasonably foreseeable that any would be designated for motorized use, thus, the adverse effect on wilderness characteristics is negligible.

4.6.7.6. Alternative D

Alternative D may allow resource use if the activity can be conducted in a manner that conserves physical, biological, and heritage and visual resources, and would emphasize moderate constraints on resource uses to reduce adverse effects on resource values. Alternative D is the Proposed RMP.

Lands with Wilderness Characteristics
Under Alternative D, managing a portion (6,864 acres) of the lands with wilderness characteristics resource (Map 74) to emphasize ecosystem health, natural values, and primitive recreational opportunities would benefit the wilderness characteristics resource.

Several factors affect potential manageability of lands with wilderness characteristics, including the configuration of the unit and the interspersion of summer homes at the northern tip of the unit. The narrowness of the unit (0.25 mile in some areas) presents difficulty in managing the southern and western portion of the unit as BLM-administered lands essentially subdivide private lands and lands owned by the State of Wyoming. In this area, the BLM must consider the needs for potential access or services by adjacent landowners. The practicality of managing a narrow strip of land for protection of wilderness characteristics is tenuous. Additionally, lands along the Billy Creek Access road are located within the WUI and forest management activities are desirable to

decrease fuel loads in this region. Additionally, defining the boundaries by section and township lines creates a clear legal description of the unit that is easily identifiable and manageable. The portions of the lands with wilderness characteristics unit meeting manageability criteria (6,864 acres) will be managed to protect lands with wilderness characteristics.

Management of the unit would include closing portion of the area (6,864 acres) to motorized use; managing the area as VRM Class II; applying an NSO for fluid mineral development; recommending withdrawal to locatable mineral entry; closing the area to salable mineral development; excluding ROW development; prohibiting commercial woodcutting unless it is a by product of an environmental restoration effort;, and prohibiting all other surface-disturbing activities not compatible with retaining or enhancing the area's natural values. The remaining acres (5,373 acres) within the unit will be managed for multiple use pursuant to the management actions identified for other resources under Alternative D and no special management related to protect the lands with wilderness characteristics resource will be applied. Overall, these management actions will produce a moderate beneficial effect on the wilderness characteristics resource.

Mineral Resources

Locatable, Leasable-Fluids and Salable Minerals

Under Alternative D, a portion of the lands with wilderness characteristics unit (6,864 acres) would be recommended for withdrawal from mineral entry and closed to salable mineral development. Additionally, the portion of the lands with wilderness characteristics unit selected for special management would be available to leasing, but subject to a NSO which would preclude any surface disturbance or above-ground structures in the unit. This would allow for horizontal drilling from outside of the unit while still offering protection of the wilderness characteristics resource. The preclusion of mineral development is a substantial benefit to the wilderness characteristics resource; given the low development forecast, the benefit is classified as moderate.

The remaining portion of the lands with wilderness characteristics unit (5,373 acres) would be open to oil and gas development with moderate constraints and there would be a moderate adverse effect to the wilderness characteristics on this portion. When the management actions for Alternative D are considered in context with reasonably foreseeable development forecasts and the other selected management actions for Alternative D, the overall impact to the lands with wilderness characteristics resource from mineral resource alternatives is minor and beneficial.

Fire and Fuels Management

Under Alternative D, fire could be managed for multiple resource objectives, including allowing fire for resource benefit. Alternative D specifically prohibits heavy equipment usage in lands with wilderness characteristics, which would affect 6,864 acres. In the remaining portion of the lands with wilderness characteristics unit (5,373 acres), heavy equipment usage would be limited to areas near existing roads and trails, decreasing the impacts to naturalness within the unit.

Biological Resources

Vegetation – Forests and Woodlands

Designing and implementing silvicultural treatments for forest health could benefit the naturalness criteria within the lands with wilderness characteristics unit, but to a lesser extent than in

Alternative B. However, encouraging more intensive management of forest and woodland resources could impact naturalness. Similarly, managing forests/woodlands for multiple resources, including recreation, could encourage outstanding opportunities for primitive and unconfined recreation but to a lesser extent than in Alternative B. The degree of beneficial or adverse effects to lands with wilderness characteristics from forest and woodland management would depend heavily on the methods and mitigation measures implemented at the project level. When the management actions for Alternative D are considered in context historic vegetation manipulation and the other selected management actions for Alternative D, the overall impact to the lands with wilderness characteristics resource from forest and woodland resource alternatives is minor and beneficial.

Heritage and Visual Resources

Under Alternative D for VRM management, the entire lands with wilderness characteristics unit (12,237 acres) is proposed for management as VRM Class II. This would benefit wilderness characteristics by maintaining the natural values of the landscape.

Land Resources

Forest Products, Renewable Energy, Rights-of-Way and Corridors, Travel and Transportation Management

Under Alternative D, a portion (6,864 acres) of the lands with wilderness characteristics unit would be closed commercial woodcutting unless the project was for environmental restoration, excluded from authorization of ROW grants, closed to renewable-energy development, closed to motorized use, and any other related surface-disturbing activities would be prohibited. Selection of Alternative D would be a major benefit to the portion managed to protect wilderness characteristics as impacts from forest products, renewable energy, ROWs and corridors or TTM activities would be precluded within the lands with wilderness characteristics unit.

The remaining portion of the lands with wilderness characteristics unit (5,373 acres) would be managed as limited to designated routes or seasonally closed. This portion would also not have specific prohibitions on production of forest products, but project design would encourage protection of natural and aesthetic values. The portion of the lands with wilderness characteristics not managed under Alternative D for LWC-6002 would still be excluded from renewable energy development or granting of ROW. When the management actions for Alternative D are considered in context with reasonably foreseeable development forecasts and the other selected management actions for Alternative D, the overall impact to the lands with wilderness characteristics resource from land resource alternatives is moderate and beneficial.

4.6.7.7. Cumulative Impacts

The lands with wilderness characteristics unit is a located in a remote area with steep topography. The majority of the LWC unit is unsuitable for grazing due to steep slopes and the area has very low development potential for minerals. While timber blowdown events have occurred in the past, harvesting of commercially valuable timber has been limited to the periphery of the lands with wilderness characteristics unit, adjacent to the existing road network. Currently, no other projects in the vicinity have been identified.

4.6.7.8. Conclusion

Selection of Alternative D will result in a balanced approach to management of lands with wilderness characteristics resources by focusing protection of wilderness characteristics in areas where such management is most feasible and allowing for flexible management in areas near existing roads and allowing for protection of residences in the WUI. Alternative B results in the most protection of lands with wilderness characteristics resources, but increased restrictions for natural resource protection and travel management result in difficulty in providing quality forest management. Alternative A does not address lands with wilderness characteristics. Alternative C includes the least restrictions on development, which would produce adverse effects on the lands with wilderness characteristics resource.

4.6.8. Livestock Grazing Management

This section describes potential effects on livestock grazing from management actions for other resource programs. Existing conditions concerning livestock grazing management are described in Chapter 3. Management actions and allowable uses that prohibit, limit, or reduce livestock grazing or reduce AUMs in the planning area are would have an adverse effect on livestock resources. Deterioration in rangeland health also would be adverse to livestock grazing. Restrictions on livestock grazing or AUM to protect resource values would have an adverse effect. Conversely, beneficial effects on livestock grazing include allowable uses or actions that would improve land health, increase AUM, or decrease restrictions on and costs for livestock grazing operations. For purposes of this analysis, short-term effects on livestock grazing would result from activities that change the AUM allocations or land health within five years of when the activity occurs. Long-term effects remain or occur after five years. Livestock grazing can have beneficial and adverse effects on the health and productivity of vegetative communities in rangelands. Native grasslands evolved with grazers and many grass species respond positively to leaf removal by propagating, which increases vegetative cover. Other beneficial effects of grazing include reduced competition by removing encroaching woody plant cover; hoof action that keeps topsoil loose, increases litter and precipitation penetration, and incorporates seeds into soil; nutrient recycling; removal of wildfire fuels; and control of invasive plant and weed species with properly timed grazing rotations and species (e.g., goats). Adverse effects include direct mortality of native plants through trampling or herbivory, soil compaction and erosion, changes in plant community composition and structure, and increased invasive species spread. Prolonged grazing during the growing season or summer could result in reduced vigor of desired species, changes in species richness, and increased potential for invasion by annual grasses and invasive plant species. Areas where land health is most likely to be adversely affected are areas where livestock congregate. These include areas with water, shade, and more palatable forage. Therefore, rangeland management often is geared toward improving the overall distribution of livestock within an allotment. This is accomplished through implementing BMPs, and developing AMPs or coordinated RMPs, changing grazing systems, and implementing range improvement projects (i.e., fencing, water-development projects, and salt and mineral licks). A recurring effect on livestock grazing is surface-disturbing activities as they relate to energy development. Where allowed, these disturbances would have an direct adverse effect on livestock grazing through vegetative forage removal for the duration of the project or permit, usually over the long term (10 or more years). Reclamation could require short-term (2 to 5 years) removal of livestock on all or a portion of project areas to help achieve reclamation objectives.

4.6.8.1. Methods and Assumptions

Land use activities in the planning area affect livestock grazing management. Effects on livestock grazing are generally the result of activities that affect management of forage levels for individual grazing allotments. This impact analysis and its conclusions are based on interdisciplinary team knowledge of resources and the planning area, review of existing literature, and information provided by specialists within the BLM or other agencies. Effects are quantified where possible. In the absence of quantifiable data, best professional judgment was used.

Assumptions

To determine potential effects on livestock grazing management, certain assumptions were made concerning the level of land use activities, resource conditions, and resource responses, as follows:

- Livestock grazing will continue on public lands in the planning area. Allotments will be managed to improve ecological site condition in coordination and cooperation with other resource uses, including but not limited to, SSS, crucial wildlife habitats, and riparian and wetland systems.
- The Wyoming Standards for Healthy Rangelands (Appendix P (p. 2501)) provide standards and guidelines designed to maintain or improve land health. The BLM will continue to use these standards and guidelines to assess land health and determine appropriate management actions.
- Lands currently designated for stock driveways will remain as designated for that purpose.
- Reserve common allotments will serve as a tool in the management of timber sales, unplanned and prescribed fires, and drought.
- Range improvement projects would continue to be used to achieve management goals.
- Disposal of Category custodial (C) allotments is a priority to reduce administrative requirements. Disposing of these parcels of public land should not substantially affect the overall available AUM.
- The BLM works with grazing lessees to identify and accomplish management objectives.
- Management of invasive plants and pests will continue on the rangelands.
- Minerals development, and its associated surface-disturbing activities, SSS habitats, and the continued expansion of annual bromes will have the greatest future effects on rangelands.
- Allowable uses and management actions that could impact livestock grazing include surface-disturbing activities, fire and fuels management, recreational opportunities, restrictions to protect resource values, restoration and reclamation projects and success, invasive plant and pest management, specials status species management, and proactive livestock grazing management. These uses and actions are anticipated to result in short- or long-term changes to land health and AUM allocation.

Significance Criteria

Adverse effects on livestock grazing would be considered potentially significant if the following were to occur:

- Resource management actions substantially reduce or eliminate the availability of public land for grazing.

4.6.8.2. Impacts Common to All Alternatives

Livestock Grazing Management
Livestock grazing would continue in most of the planning area under all alternatives. While livestock grazing management is designed to prevent overgrazing, localized and short-term over utilization is possible. Riparian and wetland systems, in particular, are vulnerable to overgrazing by livestock and wildlife. Grazing strategies, including implementing the Wyoming Standards for Healthy Rangelands, AMP and grazing agreement implementation, proper livestock management, and installation of range improvement projects, are designed to help achieve appropriate levels of forage consumption by livestock and wildlife. AMP and grazing agreements include defined rotations, deferments, periods of rest from grazing, manipulation of season of use, and grazing intensity. These have the ability to alter the amounts and types of vegetation present on the landscape; therefore, they can be used as tools to directly and indirectly manipulate and improve plant community composition, plant structure, plant cover, and vigor of vegetation for over the short and long terms. Designated stock driveways will continue to be used and managed as they currently are. Any changes to stock driveway designations will be evaluated on a project-specific basis and analyzed through an environmental assessment. Areas of concentrated livestock use within stock rests are usually small and isolated. Each year the numbers and types of livestock using the trails vary.

Range improvements would result in localized short-term disturbances, including the flattening or loss of vegetative cover due to construction activities. Placement of water, salt or other supplements results in trampling and small bare areas of vegetation around these livestock concentration sites. In locations where containers are not used, there would be changes in soil chemistry that would delay long-term recovery of vegetation. Construction of reservoirs, wells, troughs and pipelines to provide water will assist in dispersing grazing use. The grazing lessee or other cooperator will be required to maintain water in some troughs located on public land during the frost-free period (April through October) for wildlife. Long-term loss of vegetation would occur near water troughs, pits, and reservoirs, and along fence lines where there are roads or animal trails. However, overall plant composition and vigor would potentially be improved as a result of newly available water sources, fences, and grazing management.

Physical Resources

Air Quality
There are no air quality management actions common to all alternatives or that would vary by alternative that would have an effect on livestock grazing management. Therefore, this section does not further address air quality.

Soil
Using soil surveys and onsite investigations would ensure proper use of soil resources. Soils management actions common to all alternatives would have a major beneficial effect on livestock grazing.

Water Resources
Water management actions common to all alternatives include managing surface-disturbing activities to prevent degradation of water quality, including reducing channel and bank erosion, providing “off-source” water supply in locations where the source is fenced out, and managing water to meet Wyoming Standards for Healthy Rangelands. These actions are designed to reduce

or prevent soil erosion and improve water quality across the entire planning area, and therefore would have a moderate beneficial effect on livestock grazing management.

Cave and Karst Resources
Inventorying, mapping and determining significance of caves and karsts will have no effect on livestock grazing management.

Mineral Resources

Locatable Minerals, Leasable Minerals – Coal and Fluids, and Salable Minerals
Rangeland health and forage production can be directly and indirectly affected by surface disturbance by all four types of mineral development through the loss of forage, spread of invasive plant species, and soil erosion.

Even though few areas are withdrawn from development of locatable minerals, the acres that would be realistically affected is minor (less than 5% of the acres open to livestock grazing). Coal and oil and gas development are anticipated to cause the most long-term surface disturbance and, therefore, the greatest adverse effect on livestock grazing in the planning area. The degree of effect would depend on the rate of development, production success, and how quickly disturbed areas are reclaimed. The effect on AUM allocations could be substantial for individual allotments, but the overall effect of disturbance from oil and gas development on AUMs in the planning area should be moderate. In some cases, oil and gas development can benefit livestock and wildlife by increasing the number of water wells available for livestock watering, thereby improving livestock distribution in an allotment. As with locatable mineral development, the majority of the planning area is open to salable mineral developments. However, it is anticipated that development will only occur on less than 5 percent of the acres available for livestock grazing. Therefore, the effects would be minor adverse. Given the extent of the coal, oil and gas development the overall the effects of mineral resources development on livestock grazing management will be moderate adverse. Overall, the management actions requiring treatment and the use of certified weed seed-free products will have a moderate beneficial effect on livestock grazing.

Fire and Fuels Management

Fire can have beneficial and adverse effects on livestock grazing management. Over the short term, fire and fuels management actions reduce canopy and forage that livestock depend on and can damage facilities such as fences. This damage can have a substantial adverse economic effect on grazing operations by requiring leasing of additional pasture, supplemental feeding of livestock for longer periods, building or repairing fences, and reducing herd size. Long-term, direct, and adverse effects include “livestock grazing strategies on vegetative areas generally include rest the first year following treatments and deferment of livestock grazing the second year” (BLM 2001a). Another long-term and direct effect is that fire could improve the quality and quantity of forage, thereby improving flexibility in managing livestock. This would have a beneficial effect.

Prescribed fire can benefit livestock grazing by improving the quality, quantity, and availability of forage for livestock. Prescribed fire also can help meet specific management objectives, such as improving livestock distribution or removing dense stands of brush. Both wildland and prescribed fire can increase the likelihood of invasive species establishment and spread on the site(s), including cheatgrass. This effect would be long-term, direct, and adverse. The long-term effect of continuous fire suppression is the buildup of hazardous fuels and the increased risk of

severe or catastrophic wildland fires. Overall, the effect of fire and fuels management on livestock grazing management would be minor adverse.

Biological Resources

Vegetation – Forests and Woodlands
There are no forest and woodlands management effects on livestock grazing common to all alternatives or that would vary by alternative. Therefore, forest and woodlands management is not further addressed in the *Livestock Grazing Management* section.

Vegetation – Grassland and Shrubland Communities
Management of vegetative communities, includes determining land health in accordance with the Wyoming Standards for Healthy Rangelands and applying an integrated management approach (e.g., mechanical, chemical, and biological treatments, prescribed fire, and grazing management techniques) to maintain, restore, and enhance the health and diversity of plant communities to achieve resource or multi-resource objectives. These applications to maintain or improve vegetative health would have indirect, beneficial, and long-term effects on livestock grazing. Managing to protect, preserve, or enhance plant communities, including habitat for SSS, could have long-term, indirect, adverse and beneficial effects on livestock grazing because these areas could be protected from surface-disturbing activities. This could benefit livestock grazing management, or could have an adverse effect if these areas become no longer available for grazing.

Managing the siting of facilities and related infrastructure to reduce the number of disturbed sites and acres would result in less disturbance. This would have a direct beneficial effect on livestock grazing management over the long term.

Developing a contingency plan to address catastrophic natural events such as drought, wildfires, and large-scale pest infestations by incorporating strategies that best protect vegetative resources would have a direct adverse effect on livestock grazing over the short term of the events, and an indirect beneficial effect over the long term once sustainable levels of vegetation were reestablished.

Overall, the management actions that are common to all alternatives for grassland and shrubland vegetation communities would have a major beneficial effect because they would maintain or improve the health, vigor and diversity of the vegetation community.

Vegetation – Riparian/Wetland Resources
Developing and implementing activity plans to manage riparian systems to be at or above, or continue to be improving toward, PFC while achieving the Wyoming Standards for Healthy Rangelands would benefit livestock grazing. Managing riparian and wetland systems to enhance forage conditions and improve water quality, and to prevent degradation, loss, or destruction of riparian/wetland habitat also would indirectly benefit livestock grazing over the long term. Riparian areas are more susceptible to the effects of grazing during the hot season (July and early August). Livestock are naturally attracted to areas with water and thermal cover, which requires intensive management to reduce the potential for overgrazing. The use of livestock exclosures to protect seeps and springs would preclude livestock grazing, but would not necessarily stop other animals from grazing in these areas. Developed water sources on uplands would be used to improve distribution of livestock in riparian/wetland areas. This would help to improve species composition, plant densities, and plant vigor in riparian/wetland habitat.

Overall, the management actions that are common to all alternatives for riparian/wetland vegetation communities would have a minor beneficial effect.

Invasive Species and Pest Management
One of the primary indirect and adverse effects on land health and productivity from surface disturbances is the spread of invasive plant species. Surface-disturbing activities typically include mechanical disturbance, mining, and vegetative treatments. Invasive species can out compete native vegetation for water, space, and soil nutrients. These invasive plants can lessen the amount and quality of native forage. They usually are less palatable and less nutritious thereby reducing livestock weight and condition. Managing invasive species and pests to minimize their adverse effects on native plants is a direct benefit to livestock management.

Pest species such as grasshoppers can be have an adverse effect on native forage species. Pest directly consume native plants for nutrition and when pest populations exceed their natural threshold, natural and economic injury can occur. This has an indirect adverse effect on livestock grazing by reducing the quantity of forage, and the nutrient content and palatability of the native plants over the short term of the infestation or that year's growing season. Managing invasive species and pests to minimize their adverse effects on native plants can keep forage healthy and available for grazing by livestock and wildlife. This is a direct benefit to livestock management.

Fish and Wildlife Resources – Fish
Improving fish habitat and the health of associated riparian and wetland systems could have a direct adverse effect on livestock grazing over the long term by limiting or excluding livestock grazing in those areas to meet management objectives. However, the acres of fish habitat in grazing allotments within the planning area is less than one percent, therefore a negligible adverse effect.

Fish and Wildlife Resources – Wildlife
Mitigation for surface-disturbing and disruptive activities associated with wildlife habitat management could have an indirect beneficial or adverse effect livestock grazing over the long term, depending on the types, degrees, and locations of the mitigation.

Maintaining or improving important wildlife habitats through vegetative manipulations, habitat improvement projects, and livestock grazing strategies would directly affect livestock. Effects could be adverse or beneficial depending on the type of project, the rest prescription following the treatment, and the types and extents of livestock strategies implemented; effects would be long-term. Exclusions or rest from grazing would be adverse; rotational or deferred grazing could be beneficial. Providing, to the extent possible, suitable habitat and forage to support wildlife population objectives as defined by the WGFD could be adverse if forage demands to support wildlife population objectives and habitat requirements would make less forage available for livestock grazing. Overall, the management actions that are common to all alternatives for wildlife resources would have a minor adverse effect because of the greater limitations to livestock grazing.

Special Status Species – Plants, Fish, and Wildlife (including Greater Sage-Grouse)
Livestock grazing could maintain or create habitat for sensitive plants by reducing vegetation competition. However, livestock grazing could reduce the occurrence of some species through trampling, consumption, and general site degradation. Implementing actions in recovery plans, conservation measures, terms and conditions, and appropriate BMPs and reasonable and prudent measures in biological opinions for T&E plant species could be adverse or beneficial to livestock grazing. Adverse effects from implemented actions would include, but not be limited to, limiting,

restricting, or excluding livestock grazing, and decreased stocking rates. Beneficial effects could include, but not be limited to, improving forage quality and quantity.

Special considerations for the management of SSS as they are discovered, or if critical habitat is designated, could affect livestock grazing. Limiting the placement or timing of constructing range improvement projects would have a direct adverse effect on livestock grazing by encumbering management flexibility over the long term. Permanent water sources may have to be treated to reduce carriers of WNv; this could increase costs and management. Overall, the effects of SSS management on livestock grazing would be minor adverse.

Heritage and Visual Resources

Cultural

Avoiding cultural resource sites eligible for listing or listed on the National Register, or applying protection provisions to areas adjacent to historic trails could limit the ability to construct rangeland improvement projects that would facilitate improved management of livestock. In addition, cultural resources management could delay construction of range improvement projects by requiring additional surveys and design changes for projects to avoid important cultural sites. These constitute minor adverse effects.

Paleontological Resources

Retaining lands with significant paleontological resources will have no effect on livestock management.

Visual Resources

Management actions common to all alternatives for visual resources will have no effect on livestock management. Grazing livestock and range improvements typically do not attract the attention of casual observers, and therefore are compatible with VRM. The differences in visual resources management by alternative will have no discernible effects on livestock grazing management, and therefore, will not be discussed further in this section.

Land Resources

Forest Products

Forest products harvesting and sales could affect available forage for grazing. Harvesting crews, machinery, and transports associated with permitted commercial or private harvesting of forest products in active grazing allotments likely would have direct, adverse and short-term effects on livestock grazing by displacing or disturbing livestock, increasing the potential for vehicle collisions with animals, and reducing available forage through trampling. However, post-harvest conditions would have a short-term, indirect beneficial effect by opening the canopy, which could then support a greater abundance of available forage in the form of early seral grasses and forbs. The overall effect from forest product management on livestock grazing is anticipated to be negligible adverse.

Lands and Realty

Land disposal acreage has been identified throughout the planning area. Most of the lands identified for consideration for disposal are isolated and generally surrounded by private land. Most land disposed of likely will continue to be grazed under different (e.g., private) ownership. However, the BLM would no longer collect grazing fees. Frequently, land disposal is tied to land exchanges, resulting in no net change in AUMs or only a slight increase or decrease in

AUMs. If lands are only disposed of, this would have a direct adverse effect over the long term because grazing fees from public land grazing would decrease. Land acquisitions would have a direct beneficial effect over the long term because available AUM and associated grazing fees would increase slightly. Overall management actions for lands and realty would have a minor beneficial effect on livestock grazing.

Renewable Energy
The management actions common to all alternatives for renewable energy will have no effect on livestock grazing management.

Rights-of-Way and Corridors
Construction that would result from ROW grants and land use authorizations could create noise that would disturb livestock, limit the area available for livestock distribution, and reduce available forage near project sites. However, the development of access and maintenance roads associated with ROW and other land use authorizations could indirectly affect rangeland management by providing better access to allotments and range projects (e.g., water sites, fences, and corrals) and could be used by lessees to guide or retrieve livestock. The preferred location for new ROW would be in or adjacent to existing disturbed areas associated with existing ROW, constructed roads, or highways, therefore minimizing the amount of surface-disturbing activities that would require reclamation. Minimizing the amount of disturbance would directly benefit livestock grazing over the long term. However, the construction of ROW would have a direct adverse effect on livestock grazing over the long term. The overall effect from ROW and corridor management on livestock grazing is anticipated to be minor adverse.

Travel and Transportation Management
Under all alternatives, the BLM would design, construct, and maintain roads or trails based on the specific objectives for each trail or road in consideration of other resources. Management actions that reduce erosion of soil that in turn affects vegetation would indirectly benefit forage. Minimizing surface disturbance, minimizing surface water runoff to reduce erosion, and restricting travel to posted/designated roads would directly benefit livestock grazing over the long term by minimizing forage loss and reclamation projects. Limiting access or closing roads could affect grazing lessees and management of livestock; this effect would be indirect and long-term. The beneficial effects would outweigh the adverse effect.

Recreation
Closing developed recreation sites such as picnic areas, campgrounds, and EEAs to livestock grazing would have a direct adverse effect on livestock grazing over the long term. However, development of recreation sites is expected to remove only small acreages in various locations.

Lands with Wilderness Characteristics
Evaluating newly acquired lands for wilderness characteristics will have no effect on livestock grazing management.

Special Designations

Areas of Critical Environmental Concern, Scenic or Back Country Byways, Wild and Scenic Rivers, and Wilderness Study Areas
Special designations would directly and adversely affect livestock grazing if they removed livestock grazing from designated areas for the long term. Limitations or restrictions associated with roads could inconvenience grazing lessees in the performance of general ranch maintenance,

including checking fences and water sources. Physical interaction between recreationists and livestock could stress animals; this would have a direct and adverse, but short-term, effect.

Socioeconomic Resources

Social and Economic Conditions
Social and economic resources management actions could affect livestock in a way that could increase or decrease grazing activities. The levels of livestock grazing are integrally linked to supply and demand for livestock, which involves local, national, and international economics and politics, and is therefore difficult to predict on the scale of the planning area. The BLM will refer to socioeconomic monitoring plans for, and remain sensitive to, the economic and social health of affected areas, quantify socioeconomic effects associate with BLM actions to the extent possible, and manage in consideration of these resources.

4.6.8.3. Alternative A

Alternative A would continue management in accordance with the 1985 RMP (BLM 1985c) as amended and maintained. The effects described under Impacts Common to All Alternatives would be in addition to the effects described below for management actions under Alternative A.

Livestock Grazing Management
Under Alternative A, livestock grazing would not be authorized on approximately 4,000 acres of public land in the canyons and slopes of the southern Big Horn Mountains because of the rough terrain and steep slopes. Livestock grazing would be allowed on all public lands in the planning area except on approximately 6,000 acres (1%) where it has been determined to be incompatible with other resource uses or values. Most of these areas produce little vegetation and have fragile soil surfaces and steep slopes. Any permanent increases in the amount of forage produced would be considered for wildlife and watershed protection before additional livestock use is authorized. Providing increases in forage toward habitat and watershed protection before making it available for livestock consumption helps maintain healthy ecological conditions for these resources, but would have a direct adverse effect on livestock grazing over the long term. To benefit livestock grazing, increases in forage produced would be allocated to livestock as the first priority. Alternative A addresses rest periods from livestock grazing following prescribed fire and other vegetative treatments, including rest the first year following treatment and deferment the second year.

Estimations of surface disturbance over the planning area in the next 20 years for range improvement projects consist of spring developments, pipeline developments, fence construction, and well developments. Spring developments are estimated to disturb approximately 4 acres, with successful reclamation on 2 acres and 2 acres of long-term disturbance. Pipelines are estimated to disturb 40 acres, with successful reclamation on 35 acres and 5 acres of long-term disturbance. Fences would disturb approximately 70 acres (80 miles), with successful reclamation on approximately 50 acres (57 miles) and approximately 30 acres disturbed over the long term. Wells are estimated to disturb one acre, with successful reclamation (Appendix G (p. 1937)).

Physical Resources

Soil
Alternative A soils management actions limit surface-disturbing activities on slopes, badlands,

rock outcrops, and slopes susceptible to mass movement; on soils with poor reclamation suitability; and in areas of severe erosional hazard with timing season restrictions. Actions also include reclaiming roads and trails if they are heavily eroded or washed out, or if other access roads in better condition are available. Surface disturbance on public lands can result in the direct removal of forage available to livestock. Projected surface disturbance under Alternative A is anticipated to result in short- and long-term removal of forage. Surface disturbances can have major direct and indirect adverse effects on land health and forage production through the loss of forage, the spread of invasive plant species, and soil erosion.

Water Resources
Alternative A does not include water management actions that would affect livestock grazing.

Cave and Karst Resources
Alternative A does not include cave and karst management actions.

Mineral Resources

Locatable Minerals
Alternative A locatable minerals entry would be available on all but 43,089 acres of BLM surface. For the planning area overall it is estimated that BLM actions would disturb less than one percent of public land over the next 20 years. This is a negligible adverse effect on livestock grazing management.

Leasable Minerals – Coal and Fluids
Coal development would occur only on a small portion of this acreage, but where it does occur, livestock grazing would be excluded. For oil and gas development, only the WSAs (28,931 acres) would be closed for leasing. Out of approximately 480 allotments, there are 198 allotments in areas considered as having a very high to moderate potential for conventional oil and gas development, and 43 allotments in high-potential areas for coal development, and 198 allotments in areas with very high to moderate potential for CBNG development. Therefore, all or portions of these allotments would likely be affected by coal and oil and gas development under Alternative A. It is estimated that surface disturbance associated with conventional oil development (vertical and horizontal wells) will have a major adverse impact (10.6%) in the short term. However in the long term due to reclamation it will be a minor adverse impact (3.5%). Minerals development that removes the vegetative layer to extract the minerals, and the possible removal of livestock to achieve successful reclamation, would directly and adversely affect livestock grazing over the long term. Short-term, indirect, adverse effects on the livestock animals include, but are not limited to, respiratory ailments from road dust, vehicle collisions with animals, separation of mothers from calves, noise, and movement of livestock from gates left open. These are short-term events, but they occur over the long term of the leases or permits.

Salable Minerals
Alternative A would exclude salable minerals entry on 28,873 acres. For the planning area overall it is estimated that BLM actions would disturb less than 1 percent of public land over the next 20 years. This is a negligible adverse effect on livestock grazing management.

Fire and Fuels Management

Alternative A fire and fuels management actions include suppressing wildfires in high-value areas, rehabilitating fire and suppression damage, and conducting prescribed fires to improve

vegetative health and wildfire habitat. Wildfires affect livestock primarily by direct removal of forage until the next growing season, and displacement of livestock in the burn areas for the short term of the fires (days to weeks). Rehabilitation after wildfires also can displace cattle for up to two years. This would have a direct adverse effect on livestock grazing. Rehabilitation also would have a long-term, indirect beneficial effect because it would help replace dead or damaged forage with new seedlings. Prescribed fire would have an indirect beneficial effect by improving the ecological state of vegetation. However, prescribed fire would have an indirect adverse effect, because treated areas would be rested from livestock grazing for a minimum of two years. Long-term estimates for the application of prescribed fire to support grassland and shrubland communities and wildlife habitat objectives include approximately 14,000 acres from BLM actions. All acres would be successfully reclaimed (Appendix G (p. 1937)).

Biological Resources

Vegetation – Grassland and Shrubland Communities
Alternative A does not include management decisions for grassland and shrublands. Not having management actions guiding these resources has a direct and adverse effect on the vegetation which directly and adversely effects livestock management.

Vegetation – Riparian/Wetland Resources
Under Alternative A, prohibiting surface disturbance within 500 feet of springs and perennial streams, if the authorized officer waives the prohibition it would still allow actions in those areas. This management would allow disturbance on approximately 23,831 acres of public land (approximately 3.0% of BLM-administered lands in the planning area). The loss of forage, the need for reclamation, the potential to remove livestock, and the opportunity for invasive species to establish and spread, that might occur from surface-disturbing activity all would have a direct moderate adverse effect on livestock grazing.

Invasive Species and Pest Management
Under Alternative A, controlling invasive plant species on public lands in cooperation with county weed and pest control districts would have an indirect beneficial effect on livestock grazing by removing invasive species and improving the ecological state of vegetation, thereby improving the quality and quantity of forage for livestock and wildlife over the long term. Current management has not addressed the invasion of cheatgrass. This annual grass has a direct, adverse, and long-term effect on vegetative communities and is found in all land-type associations. Exact acreages are not known due to a lack of vegetative inventory, but BLM specialists' professional judgment estimates the cheatgrass canopy cover to be 20 to 25 percent of the planning area, making it a major problem. Control treatments have not been pursued because the plant is not listed on the Wyoming Weed and Pest Control Act Designated List and a lack of funding. Livestock grazing is indirectly and adversely affected because cheatgrass is so competitive with native species, repeatedly outcompeting natives for soil nutrients and available water. It has spread and overtaken thousands of acres. Other than in early spring and late fall, cheatgrass is nutrient deficient and increases grazing pressure on adjacent plant communities from livestock and wildlife.

Fish and Wildlife Resources – Fish and Wildlife
Under Alternative A, designating areas where surface-disturbing and disruptive activities are not allowed would have a direct beneficial effect on livestock grazing because these areas would be protected from removal of vegetative forage.

Special Status Species – Plants, Fish, and Wildlife (including Greater Sage-Grouse)
Providing and managing habitat for T&E and special status plant, animal and fish species on all public lands in compliance with the ESA, approved recovery plans, and BLM policy associated with management of habitat would have direct adverse effects on livestock grazing. Actions that would close areas to grazing, limit control efforts for invasive species, and restrict vegetative treatments would have direct adverse effects on livestock grazing over the long term. Protecting SSS habitat would have a direct effect on livestock grazing, beneficial or adverse depending on the species. If management actions and the species habitat requirements favor habitat protection over livestock grazing, protective measures would have a direct adverse effect on livestock grazing. If protecting SSS habitat improves ecological conditions, effects would be indirect and beneficial over the long term. The overall effect from SSS management on livestock grazing is anticipated to be minor adverse.

Heritage and Visual Resources

Under Alternative A, there would be no effects from cultural and visual resources on livestock grazing management.

Land Resources

Forest Products
Alternative A management includes considering fencing regeneration areas to prevent livestock from damaging seedlings. Livestock could graze young saplings to the degree where fencing or some type of protective device might be needed. Fences would have a direct adverse effect on livestock over the short term, and would be constructed on a project-specific basis. The percentage of acres impacted would be less than one, therefore a negligible effect.

Lands and Realty
Under Alternative A, approximately 108,243 acres of BLM-administered land are identified for disposal. Most are isolated and generally surrounded by private land, and have no access; many of these parcels would be associated with a category C allotment. Land disposals have a direct adverse effect on livestock grazing because such actions would reduce the number of public land acres available for grazing over the long term. Land exchanges would have a direct beneficial effect on livestock grazing. However, public land acreages would likely decline because more acres of public lands would be exchanged for fewer acres. Net loss of public lands would be less under land exchanges than land disposals. Land tenure adjustments on Category C allotments would have a direct beneficial effect on the overall grazing program over the long term because there would be less administration for these small isolated parcels.

Renewable Energy
There is no previous decision so there will be no effect on livestock grazing management.

Rights-of-Way and Corridors
ROW grants and land use authorizations are anticipated to disturb 38,562 acres (14,000 acres of pipelines, 18,550 acres of roads, 4,916 acres of powerlines, 56 acres of communication sites, and 1,040 acres of other disturbances) of BLM surface (4.9%). Prompt reclamation will encourage forage recovery. The effect of ROWs and corridors on livestock grazing would be minor adverse.

Travel and Transportation Management
Alternative A limits motorized vehicle use to existing roads and vehicle routes. Prohibiting vehicular travel in certain areas (approximately 3,650 acres), limiting vehicular travel to designated roads and trails (737,166 acres) in other areas, and seasonally closing areas to vehicular travel (approximately 37,646 acres) would have a direct, minor, beneficial effect on livestock management over the long term. Over 10 percent of the acres open to grazing would benefit from limiting motorized vehicles, therefore a major beneficial effect.

Recreation
Livestock could be disturbed by recreational activity and trampling or soil compaction could reduce available forage and promote noxious and invasive plants establishment. Most of the impacts from dispersed recreation would be direct, adverse, site-specific and short-term. Recreational site development is anticipated to disturb about 5 acres with 100 percent successful reclamation.

Lands with Wilderness Characteristics
There are no public lands, outside of WSAs, presently be managed for wilderness characteristics, so there will be no effect on livestock grazing management.

Special Designations

Areas of Critical Environmental Concern and Scenic or Back Country Byways, Wild and Scenic Rivers and Wilderness Study Areas
Under Alternative A, special designations, including ACECs, BCBs, WSRs or WSAs, generally would not result in adverse impacts to livestock grazing. All areas historically open to grazing are open under this alternative. However, special designations adversely impact livestock grazing by limiting or closing roads and trails. These closures could have a direct adverse effect on the grazing lessee for access to perform maintenance activities. Special designation areas under Alternative A affect less than one percent of the planning area, and include one recommended WSR and three WSAs, but no ACEC or BCB.

Socioeconomic Resources

There are no anticipated effects from socioeconomic resource management actions.

4.6.8.4. Alternative B

This section describes management actions under Alternative B, which would emphasize resource conservation, and the likely effects on livestock grazing due to their implementation. The impacts described above under Impacts Common to All Alternatives would be in addition to the effects described below for management actions under Alternative B.

Livestock Grazing Management
Alternative B livestock grazing management actions include: (1) prohibiting increases in livestock stocking rates as a result of vegetative treatments; (2) providing a minimum of 2 years rest following prescribed fire, wildfire (in lieu of an approved plan), and other vegetative treatments, with additional rest where necessary; (3) limiting or prohibiting livestock grazing where it has been determined to be incompatible with other resource values; (4) locating livestock salt or mineral supplements a minimum of 0.5 mile from water sources, riparian areas, and aspen stands; (5) designating and managing future reserve common allotments as needed and developing

management criteria for the reserve common allotments at the time of designation; (6) authorizing permanent increases in forage allocations to wildlife habitat and watershed protection as the first priority, and livestock grazing as a second priority; (7) reducing or eliminating the potential effects of grazing to meet timber harvest regeneration objectives; and (8) Category M allotments would be managed to achieve multiple resource objectives, Category I allotments would have AMP goals/objectives based on multiple resource and livestock grazing, and Category C allotments would continue with minimal input of resource planning and improvements. These allotments are given consideration for land realty sales or exchanges to reduce overall management of small acreage adjacent to private and State of Wyoming lands. Management actions for Category C allotments are common to all alternatives. Prohibiting increases in livestock stocking rates would ensure that benefits to vegetative treatments would not be lost to increased grazing pressure. This would also reduce the incentive of grazing lessees to support vegetative treatments, and treatments would likely be limited to just the public lands. Locating salt or mineral supplements away from water sources would alleviate grazing pressure and entice livestock to move away from accessible water sources. On specific allotments, the number of riparian systems and location of aspen stands could make the 0.5 mile salt and mineral buffer difficult to administer reserve common allotments would allow other pastures and allotments to be rested from natural disasters or vegetative treatments if needed. Additional rest allows vegetation to complete two life-cycles, or more if needed, before resuming livestock grazing. This would complicate grazing management since treated locations and pastures would be rested and unavailable for grazing for a minimum of two years. Deferment instead of rest would allow these area to be grazed outside the growing system. Increases in forage would be allocated to watershed protection and wildlife habitat to meet rangeland health standards before making it available to livestock. This could serve as a disincentive for grazing lessees to apply good rangeland management since their livestock would not be the priority to benefit from increases in forage. Protecting new generations of timber species from livestock and wildlife would improve seedling establishment and growth. Other than designating resource reserve common allotments, all these actions would put other resource needs as a higher priority than livestock grazing management and they would have an adverse effect over the long term.

Estimations for surface disturbance over the planning area in the next 20 years for range improvement projects consist of spring developments, pipeline developments, fence construction, and well developments. Spring developments are estimated to disturb approximately 4 acres, with successful reclamation on 2 acres and 2 acres of long-term disturbance. Pipelines are estimated to disturb 40 acres, with successful reclamation on 35 acres and 5 acres of long-term disturbances. Fences would disturb approximately 100 acres (120 miles), with successful reclamation on approximately 70 acres (84 miles) and approximately 30 acres of long-term disturbance. Wells are estimated to disturb one acre, with successful reclamation (Appendix G (p. 1937)).

Physical Resources

Soil

Soils management actions under Alternative B would prohibit surface-disturbing activities on sensitive soils. This would have an indirect beneficial effect on livestock grazing over the long term, because there would be no loss of forage, no reclamation, and no increased opportunities for invasive species to establish and spread.

Water Resources

All Alternative B water management actions would directly benefit livestock management over

the long term. Maintaining water supplies to meet needs includes having adequate water for livestock. Powering water sources with alternative energy could allow water sources to be established in remote locations or in areas without a nearby power source, which would open areas to livestock that are seldom grazed. Prohibiting surface-disturbing activities would prevent disturbance of vegetative forage. Not converting abandoned oil and gas wells to water supply wells for livestock use would have direct adverse effect over for the long term; conversion of wells could help with livestock management and use existing water.

Cave and Karst Resources

Alternative B cave and karst management actions include restricting livestock from entrances to significant caves. This would keep livestock from going into caves and rock shelters, where they could rub on cave and shelter and possibly affect historical pictographs and other significant rock art. Keeping livestock out of these areas would have a direct adverse effect over the long term. However, the restriction would cover a minimal amount of acreage because it would apply only the entrances. Because there has been no completed cave inventory, the number of caves requiring restrictive actions is not known.

Mineral Resources

Locatable Minerals , **Leasable Minerals – Coal and Fluids**, **and Salable Minerals**

Any surface-disturbing activity associated with minerals development, including well pads, coal exploration and leasing, areas of extraction, roads, pipelines, and utility corridors, would require removal of vegetation. These disturbances would have a direct adverse effect on livestock until successful reclamation is achieved. The reclamation process itself also would have a direct adverse effect if livestock were removed from reclamation projects to achieve objectives. Alternative B management would reduce the acreage available for exploration and development by 65 percent compared to Alternative A. For locatable, salable, and other leasable minerals, the disturbance level and subsequent effects on livestock grazing would be negligible to minor. For leasable fluid minerals and coal, the disturbance level and associated effects would be moderate.

Fire and Fuels Management

Unplanned fire management actions have an indirect and adverse effect on livestock grazing. Vegetative communities infested with cheatgrass will respond with more cheatgrass due to the additional nitrogen put into the soil by the fire. Suppression efforts would directly benefit livestock grazing by limiting the sizes and locations of the unplanned fires. Allowing unplanned fires to burn in areas where fire can be used as a management tool would have a direct adverse effect over the short term due to the loss of the forage. Over the long term, unplanned and prescribed fire could help improve the vegetative ecological condition, which would translate to improved forage quality and increased quantity. This would have an indirect beneficial effect on livestock grazing. Management actions to rehabilitate all fire-related damage would have a direct, short-term adverse effect if livestock were removed to achieve reclamation objectives. Rehabilitation would have a direct, long-term beneficial effect if the ecological state of the rehabilitated sites was improved and there was an improvement in forage quality and quantity. Overall, the effects from fire and fuels management would have a minor adverse effect on managing livestock grazing.

Biological Resources

Vegetation – Grassland and Shrubland Communities
Under Alternative B, authorizing only native plant species for all reclamation activities would promote native species and eliminate or reduce opportunities for non-native species to be introduced. Use of non-native species could have an indirect beneficial effect on livestock grazing by establishing vegetation on sites quickly and reducing opportunities for erosion and invasive plant establishment.

Vegetation – Riparian/Wetland Resources
Alternative B management actions to prohibit surface-disturbing and disruptive activities within 500 feet of riparian/wetland systems, aquatic habitats, and floodplains would affect approximately 23,831 acres BLM-administered lands in the planning area, and does not include the provision for the authorized officer to waive the prohibitions. This would have a direct beneficial effect on livestock grazing over the long term.

Invasive Species and Pest Management
Alternative B management actions that do not limit aerial application of pesticides and would treat annual brome species throughout the planning area would indirectly benefit livestock grazing. Aerial application of herbicide allows treatment of large areas and in remote areas. Large-scale treatments of invasive plant species would allow native species to prosper in treated areas. Treating cheatgrass also would reduce or eliminate this nutrient-deficient and less palatable invasive species that has affected thousands of federal, state, and private lands. These effects would be minor for noxious weeds and major for cheatgrass, and the effects would be long term for both.

Fish and Wildlife Resources – Fish
Alternative B management actions would consider fish and fish habitat in reservoirs, riparian and wetland systems. Alternative B would apply constraints on surface disturbing and disruptive activities on one percent of acres open to grazing would provide protection of vegetation, soils and forage. If livestock were excluded from these areas, there would be an adverse effect on grazing. Overall, there would be a negligible adverse effect on livestock grazing management.

Fish and Wildlife Resources – Wildlife
Alternative B management actions include not allowing surface disturbance and disruptive activity in crucial elk winter range (50,586 acres) between November 15 and April 30, and in elk calving areas (37,549 acres) from May 1 to June 30 (Map 29). Also no surface disturbance and occupancy within 0.25 mile of all sharp-tailed grouse leks at any time has a negligible effect on livestock grazing. Prohibiting surface disturbance and disruptive activities within 0.5 mile of a big game migration corridor affects 9,587 acres. Traditional migration and travel corridors would be maintained for big game species. Alternative B avoids constrictions of big game corridors and restricting facility development and occupancy within elk crucial winter range and calving areas. Migration and travel corridors would be maintained for big game; this would be have to be done in cooperation with adjacent private land owners due to the mixed land status in these areas. Management of these areas primarily for wildlife could impact the management of livestock by limiting or restricting activities in these areas during stated time periods. Excluding surface-disturbing activities would have a direct benefit to livestock management since forage plants would be available for grazing and opportunities for invasive plants to establish would be limited. The actions that promote wildlife management would have direct adverse effects on livestock management over the long term.

Special Status Species – Plants
Alternative B would restrict livestock grazing to prevent trampling by livestock, and would not allow water developments or mineral, salt, or forage supplements in special status plant species habitat or in other sensitive areas. These restrictions would have a direct adverse effect on livestock grazing over the long term. The allotments where there are special status plant species are a mixture of federal, State of Wyoming, and private ownerships. Protecting special status plant habitat on public lands would likely require the construction of fences to keep livestock out. Protecting potential habitat could require special management or no presence of livestock on hundreds of acres based on the possibility that one plant could be present. SSS plant management would likely have a moderate adverse effect on managing livestock grazing.

Special Status Species – Fish
Alternative B would apply constraints on surface-disturbing and disruptive activities on one percent of acres open to grazing would provide protection of vegetation, soils and forage. If livestock were excluded from these areas, there would be an adverse effect on grazing. Overall, there would be a negligible adverse effect on livestock grazing management.

Special Status Species – Wildlife (including Greater Sage-Grouse)
Increasing the visibility of existing fences to avoid collision from upland game birds would slightly increase costs of range improvement fences. Requiring anti-perching devices in Greater Sage-Grouse habitat would protect young livestock, especially lambs, from raptor predation. Protecting special status wildlife species could conflict with livestock grazing if habitat requirements are contrary to typical habitat requirements, such as those of prairie dogs and mountain plover (approximately 6,156 acres). These habitats are associated with short-grass prairie dominated by blue grama, and these species require an early seral vegetation state to thrive. Prohibiting surface disturbance would have a direct beneficial effect on livestock grazing; however, maintaining current levels of prairie dog populations and not encouraging improvement of the ecological state would have a direct adverse effect on livestock grazing. Prohibiting surface-disturbing activities and disruptive activities could alter locations and timing of installation of range improvements and general ranch management of livestock (e.g., livestock roundups, timing and ability of maintenance/repair of range improvements). Inventories to determine the presence or absence of species could increase costs and affect timeframes of project planning and completion.

Closing grazing within 4.0 miles of Greater Sage-Grouse leks or winter concentration areas would have a major adverse impact on livestock grazing (approximately 467,897 acres of the total 782,102 acres (60%) would be affected. There are no fences or natural barriers separating BLM and non-BLM-administered lands. If the public lands are not leased, the operator must keep livestock off public lands through herding or fencing, or else be in violation of federal grazing regulations. The mixed ownership pattern in the BFO resource area makes herding difficult, in addition to the fact that herding does not ensure that public lands are not grazed. Fences will likely be constructed on private land, fragmenting the area and making BLM unable to stipulate wire spacing to facilitate wildlife movement. In the absence of fences, the BLM must constantly supervise the public lands to assure they are not being grazed.

Restoration of disturbed sagebrush communities due to range improvement projects such as stock water pipelines within nesting, brood-rearing and winter habitat would have a minor adverse impact.

Prohibiting surface disturbance and disruptive activities, and the establishment of disturbance-free zones for Greater Sage-Grouse, raptors, amphibians and reptiles would adversely affect livestock management since these only apply (unless it is associated with mineral leasing) to public land parcels which are usually small in acreage and locations are scattered among private lands. Maintaining the integrity of traditional wildlife migration and travel corridors could also impact management of livestock; these also would comprise a mixture of land statuses. Overall these management actions would have a major adverse impact on livestock management for the long term.

Overall these management actions would have a major adverse impact on livestock management for the long term.

Heritage and Visual Resources

Cultural Resources and Paleontological Resources

Alternative B cultural resources management actions that restrict or prohibit surface-disturbing activities related to energy development (approximately 330,592 acres, or 42% of the BLM surface in the planning area) would have a direct beneficial effect on livestock grazing. Management actions that require paleontological field surveys on all PFYC Class 3, 4, and 5 formations (approximately 754,668 acres, or 96% of BLM surface in the planning area) would have an indirect adverse effect on livestock grazing. Those surveys and the identification of cultural or paleontological resources could prohibit the placement of a range improvement project, or cause the project to be moved such that it would greatly increase the cost of or cancel the project.

Land Resources

Forest Products

Alternative B management actions would address conflicts between livestock grazing and forest species regeneration. Livestock can graze young saplings, so fencing or other types of barriers would be required. This would have a direct adverse effect on livestock grazing over the short term until regeneration objectives were met.

Lands and Realty

Alternative B management actions to pursue land tenure adjustments or sales on lands with custodial grazing allotments to improve management of the public lands would directly benefit livestock grazing over the long term. Land disposal would have a direct adverse effect on livestock grazing because it would reduce the amount of public land acres available for grazing. Land exchanges would directly benefit livestock grazing. However, public land acreages would likely decline because more acres of public lands would be exchanged for fewer acres. Net loss of public lands would be less under land exchanges than land disposals. Land tenure adjustment on Category C allotments could affect up to 202,012 acres of federal land. This would directly benefit the overall grazing program over the long term by reducing the administration effort necessary to manage 293 custodial allotments that encompass these small isolated parcels of federal lands.

Renewable Energy

Under Alternative B, development of renewable energy would be excluded on approximately 730,530 acres of public land and avoided on an additional 45,441 acres of public land. Less than two percent of BLM-administered lands within grazing allotments could possibly be affected by renewable energy development. Under this alternative, there could be renewable-energy development in areas not presently disturbed by other energy development. With the reduction in

available forage either through surface-disturbance or fencing, this management action has a minor adverse effect on livestock grazing management.

Travel and Transportation Management
Alternative B management actions would limit motorized vehicle use to designated routes within stock driveways. This would reduce adverse effects on forage and potential interactions between livestock and human activities. Closing areas to motorized travel in SSS habitat would adversely affect grazing lessees. Prohibiting vehicular travel and implementing seasonal closures or limitations would reduce disturbance from livestock and adverse effects on forage from trampling or soil compaction. This management would directly benefit livestock grazing over the long term. Administratively closing areas to motorized travel would preclude permitted access for grazing purposes unless such access is determined to be necessary. This would have a direct and adverse impact to management of livestock for the long term. The benefits of protecting forage vegetation outweigh the inconvenience of reduced motor vehicle access, resulting in an overall minor beneficial effect.

Recreation
Alternative B designates seven SRMAs (55,529 acres; 7%) of the BLM-administered land within the planning area and eight ERMAs (726,573 acres). Only small portions of a few of the SRMAs have areas that livestock grazing is currently excluded. Prohibiting surface disturbance in designated SRMAs, unless the disturbance is for administrative purposes, would generally help protect, maintain, and enhance vegetative resources. However, promoting visitor use and access in the SRMAs, would increase the areas' popularity and visitation. This would increase vegetation disturbance from trampling, increase the potential for invasive species introduction and spread, and could result in conflicts between recreationists and livestock. Designation of the ERMAs will not have any effects on livestock grazing.

Alternative B also proposed to close 372 acres along the Tongue Rive of the Welch Ranch Recreation Area to grazing. This would result in a reduction of approximately 144 AUMs of the total 476 authorized AUMs. This closure would have an overall negligible (<1%) adverse effect on livestock grazing management. However, to the individual grazing allotment on the Welch Ranch it would be a major adverse effect. Management actions would have an overall minor adverse effect on livestock grazing management.

Lands with Wilderness Characteristics
Alternative B actions would include managing the full lands with wilderness characteristics area to emphasize vegetative health, natural values, and primitive recreational opportunities on 12,237 acres. With limited surface-disturbing activities, this area would conserve vegetation on the acres open to grazing in the planning area. Managing for wilderness characteristics generally does not preclude livestock grazing. Managing these lands to those standards would have an indirect, negligible, beneficial effect over the long term.

Special Designations

Special designations could affect livestock grazing by limiting or closing roads and trails. This would indirectly benefit livestock, but could have a direct adverse effect on the grazing lessee for access to perform ranch maintenance activities. Effects would be long-term, but negligible. Special designation areas under Alternative B include eight ACECs, six potential byways, one recommended WSR, and three WSAs.

Socioeconomic Resources

There are no anticipated effects from socioeconomic resource management actions.

4.6.8.5. Alternative C

This section describes management actions under Alternative C, which emphasizes resource utilization, and the likely resulting effects on livestock grazing due to its implementation. The effects described above under Impacts Common to All Alternatives would be in addition to the effects described below for management actions under Alternative C.

Livestock Grazing Management
Alternative C management actions include taking no action to reduce or eliminate the effects of livestock grazing impacts on timber regeneration following timber harvests. Alternative C management actions would support increases in livestock stocking rates as a result of vegetative treatments. This Alternative would provide a maximum two years of rest following vegetative treatments or wildfire (if no rehab plan of its own). Under Alternative C, growing-season rest would allow vegetation to complete two life-cycles, but pastures or allotments would be available for late summer, fall, and winter grazing. Alternative C limits or prohibitions on livestock grazing in certain areas would be the same as Alternative A; closing areas to livestock grazing would reduce conflicts with other uses. These areas would generally be small, ranging from two to 20 acres, and likely would not affect permitted use on the grazing lease. Locating livestock mineral or salt supplements a minimum of 500 feet away from water sources, riparian areas, and aspen stands, would directly benefit livestock grazing by ensuring livestock would not be stressed in obtaining these dietary requirements, but could promote overgrazing and potential trampling of vegetation on these sensitive sites, including habitat for special status plant species. Under Alternative C, not establishing reserve common allotments would prevent flexibility in planning vegetative treatments and addressing droughts and pest invasions. If reserve common allotments were not available, adjustments in livestock numbers, season of use, and grazing periods would be necessary. Alternative C would authorize permanent increases in forage allocations to livestock grazing as the first priority and wildlife habitat and watershed protection as a second priority. Authorizing increases in forage to livestock would be an incentive for grazing lessees to enhance grazing practices. Category M allotments would be managed to achieve livestock management objectives only. Category I allotments would have AMP goals/objectives based livestock management only.

Estimations for surface disturbance over the planning area in the next 20 years for range improvement projects consist of spring developments, pipeline developments, fence construction, and well developments. Spring developments are estimated to disturb approximately 4 acres, with successful reclamation on 2 acres and 2 acres of long-term disturbance. Pipelines are estimated to disturb 40 acres, with successful reclamation on 35 acres and 5 acres of long-term disturbances. Fences would disturb approximately 100 acres (120 miles), with successful reclamation on approximately 70 acres (84 miles) and approximately 30 acres of long-term disturbance. Wells are estimated to disturb one acre, with successful reclamation (Appendix G (p. 1937)).

Physical Resources

Soil
Alternative C soil management actions would not constrain surface-disturbing activities.

Allowing surface-disturbing activities on more than 50 percent of BLM-administered lands available for grazing would decrease available forage and increase opportunities for invasive species to establish and spread throughout the planning area. This would have direct, major adverse effect on livestock grazing.

Water Resources
Alternative C management actions include allowing on-channel reservoirs in the most productive forage sites. Surface discharge would be authorized when permitted by the State of Wyoming, which would allow upland sites to convert to hydric and invasive species. Allowing surface disturbance within 500 feet of springs, perennial streams, and riparian habitat would have a direct adverse effect on livestock grazing by removing or decreasing the quality and quantity of forage.

Cave and Karst Resources
Alternative C cave and karst management would not constrain livestock grazing in those areas.

Mineral Resources

Locatable Minerals, **Leasable Minerals – Coal and Fluids**, **and Salable Minerals**
Alternative C mineral resources management would not include new withdrawal from minerals entry. All coal lands would be open to coal exploration and leasing (approximately 195,700 acres of predicted disturbance). Although all acres would available for coal exploration, leasing history shows only a small portion would actually be developed. Alternative C would make approximately 3,356,010 acres of federal mineral estate available for fluid minerals leasing. It is estimated that surface disturbance associated with conventional oil development (vertical and horizontal wells) will have a major adverse impact (11.6%) in the short term. However in the long term due to reclamation it will be a minor adverse impact (3.8%). Exploration would disturb soils, which would result in lost forage. Removing vegetation would have a direct adverse effect on livestock grazing until disturbed areas were successfully reclaimed. The reclamation process itself also would have a direct and adverse effect if livestock were removed from reclamation projects to achieve reclamation objectives.

Fire and Fuels Management

Full protection of resources would limit size of wildfires, not allowing historical fire patterns to return and would not limit heavy equipment impacts on forage. Management actions to rehabilitate all fire related damage is a direct and adverse impact for the short term if livestock are removed to achieve reclamation objectives. Rehabilitation is a direct benefit long-term if the ecological state of the rehab sites is enhanced and there is an improvement in forage quality and quantity. Use wildfire and other vegetative treatments (prescribed fire) to enhance forage for commodity production is a direct benefit for the long term. Overall the effect of the management action for fire and fuels would have a minor adverse effect on livestock grazing.

Biological Resources

Vegetation – Grassland and Shrubland Communities
Under Alternative C, allowing non-native plant species for initial reclamation could introduce species that out compete native plants; such plant species also could be less palatable and less

nutritious for livestock. This would have a direct adverse effect on livestock grazing over the long term.

Vegetation – Riparian/Wetland Resources
Alternative C management actions would allow surface-disturbing and disruptive activities within 500 feet of riparian/wetland systems, which would remove any protective buffer from these vegetative systems. This would have a direct adverse effect on livestock grazing over the long term. Managing riparian/wetland systems to achieve DFC could affect livestock grazing because the priority management actions would focus on the health and functioning of the systems. Overall, this management would likely have a direct adverse effect on livestock grazing.

Invasive Species and Pest Management
Alternative C management would limit aerial application to insecticides only, which would eliminate the opportunity to treat invasive plant species in large areas, remote locations, and on topography difficult to traverse. The most effective method of herbicide application on cheatgrass and leafy spurge would be eliminated. This would have an indirect adverse effect on livestock grazing. Effects would be minor for most invasive plant species, moderate for leafy spurge in the PRB, and major for cheatgrass throughout the planning area; all effects would be long-term. Over the next 20 years, BLM actions are predicted to treat approximately 10,000 acres.

Fish and Wildlife Resources – Fish
Alternative C would not apply constraints on surface-disturbing and disruptive activities on 1 percent of acres open to grazing and would not provide protection of vegetation, soils and forage. Since livestock will not excluded from these areas, there would be a negligible beneficial effect on grazing. Overall, there would be a negligible beneficial effect on livestock grazing management.

Fish and Wildlife Resources – Wildlife
Alternative C wildlife management actions, including upland game birds, amphibians and reptiles, migratory birds, special status fish, and special status amphibians and reptiles would not be implemented on a project-specific basis. There would be no prohibitions or limitations on surface-disturbing and disruptive activities except in areas with known populations of species, in designated areas, and during designated periods. Migration and travel corridors composed of mixed land status would be managed consistent with other resource values rather than primarily for big game. Management actions for special status fish would prohibit surface-disturbing and disruptive activities if adverse effects could not be mitigated. Prohibiting or limiting surface-disturbing activities would have a beneficial effect on livestock grazing. Management actions that are consistent with other resource values have an indirect and direct, moderate, beneficial effect on livestock management for the long term.

Special Status Species – Plants
Under Alternative C, the BLM would manage livestock grazing to protect known populations of special status plant species. Possible tools to accomplish this include exclosures, barriers, and timing of grazing. This would have a direct, negligible adverse effect on grazing, but protected areas would incorporate small acreages overall. Over time, as populations of listed species are identified, protected areas would increase.

Special Status Species – Fish
Alternative C management actions would prohibit surface-disturbing activities in less than one percent of the acres open for livestock grazing, this would improve the amount of forage available in those areas. If livestock was eliminated in the areas where stream segments area restored for special status fish species, there would be a negligible adverse effect.

Special Status Species – Wildlife (including Greater Sage-Grouse)
Alternative C management would maintain current levels of prairie dog populations and not encourage improvement of the ecological condition. This would have a direct adverse effect on livestock grazing. Allowing surface-disturbing and disruptive activities in all prairie dog colonies would affect 6,156 acres. Such activities could displace the prairie dogs to another location, where they likely would affect the vegetation to a lower ecological state. This would increase the area of vegetative disturbance and would have a direct, negligible adverse effect on livestock grazing over the long term.

There would be no emphasis to increase visibility of fences to avoid collision from upland game birds. Anti-perching devices in Greater Sage-Grouse habitat would only be required for new powerlines and would protect young livestock, especially lambs, from raptor predators. Prohibiting surface-disturbing activities and disruptive activities could alter locations and timing of installation of range improvements and general ranch management of livestock (e.g., livestock roundups, timing and ability of maintenance/repair of range improvements). Inventories to determine the presence or absence of species could increase costs and affect timeframes of project planning and completion. Prohibiting surface disturbance, disruptive activities, and the establishment of disturbance-free zones would exist for Greater Sage-Grouse and raptors, not amphibians and reptiles; these limitations are smaller in acreage and time span. This would adversely affect livestock management since these only apply to public land parcels (unless it is associated with mineral leasing) which are usually small in acreage and locations are scattered among private lands. Managing traditional wildlife migration and travel corridors consistent with other resources could also impact timing, numbers, and presence or absence of livestock; managing livestock in these localized areas would also be difficult because of the mixture of land status. These management actions would have a minor adverse impact on livestock management for the long term.

Heritage and Visual Resources

Cultural Resources and Paleontological Resources
Alternative C management actions would not restrict or prohibit surface-disturbing activities related to energy development and would have a direct, minor adverse effect on livestock grazing. Management actions would require field surveys for paleontological resources. This could have a direct adverse effect on livestock grazing if identifying resources prohibited range improvement projects or caused projects to be moved or cancelled.

Land Resources

Forest Products
Alternative C management would not address conflicts between livestock grazing and forest species regeneration. Livestock could graze young saplings, and fencing or other type of barriers would not be required. This would directly benefit livestock grazing over the long term.

Lands and Realty
Alternative C management would not pursue land tenure adjustments and sales for lands with custodial grazing allotments to improve management of the public lands. This would have a direct, major adverse effect on the administration of livestock grazing on public land over the long term. This would have a direct adverse effect on the overall grazing program over the long

term by not reducing the administrative effort necessary to manage 293 custodial allotments that encompass these small isolated federal parcels.

Renewable Energy
Under Alternative C, renewable energy could affect all but 28,551 acres (less than 10%) of BLM surface. If large tracts of public land were disturbed and vegetation removed or fenced out long term, this management would have a direct, major adverse effect on livestock grazing over the long term. Renewable energy could be developed in areas not presently disturbed by other energy development.

Travel and Transportation Management

Alternative C management actions would allow motorized vehicles within the stock driveways, on saturated soils and on slopes greater than 25 percent, and in special species habitat. Management actions would close or limit travel to designated routes to motorized vehicle use and would implement winter closures (November 15 to April 30) on designated big game ranges. These actions would have a direct, long-term, minor, adverse effect by not protecting the protecting the soil or vegetation resources.

Recreation
Alternative C management actions include designation of six areas as SRMAs with no consideration to additional lands for SRMA designation, leasing minerals in accordance with management for areas surrounding SRMAs, and allowing surface disturbance and salable minerals development in the six designated SRMAs. This would have a direct, minor adverse effect.

Lands with Wilderness Characteristics
There are no special restrictions related to lands with wilderness characteristics so there will be no effect on livestock grazing management.

Special Designations

Areas of Critical Environmental Concern and Scenic or Back Country Byways, and Wild and Scenic Rivers and Wilderness Study Areas
Special designations under Alternative C could affect livestock grazing by limiting or closing roads and trails. This would indirectly benefit livestock, but could have a direct adverse effect on the grazing lessee for access to perform ranch maintenance activities. Effects would be long-term, but negligible. Special designation areas under Alternative C include one recommended WSR and three WSAs. There would be no effect from ACECs or byways.

Socioeconomic Resources

There are no anticipated effects from socioeconomic resource management actions.

4.6.8.6. Alternative D

Alternative D would generally allow resource use if the activity can be conducted in a manner that conserves physical, biological, and heritage and visual resources, and would emphasize moderate constraints on resource uses to reduce adverse effects on resource values. Alternative D is the Proposed RMP.

This section describes management actions under Alternative D and the likely resulting effects on livestock grazing due to their implementation. The effects described above under Impacts Common to All Alternatives would be in addition to the effects described below for management actions under Alternative D.

Livestock Grazing Management

Alternative D management actions include timber restoration treatments as described under Alternative B; reducing or eliminating potential grazing impacts on timber restoration treatments until regeneration objectives are met, rather than suspending or adjusting livestock grazing use in areas where timber harvest have occurred. Alternative D management of Category M allotments would be the same as under Alternative B. Any permanent increases in forage allocations are considered for watershed protection, livestock grazing, wildlife habitat, and other resource values; allocation would be dependent upon resource goals and objectives of management plans or resource needs. Alternative D would continue to not authorize livestock grazing on approximately 4,000 acres of public land in the canyons and slopes of the southern Big Horn Mountains because of the rough terrain and steep slopes. Livestock grazing would be allowed on all public lands in the planning area except on approximately 6,000 acres (1%) where it has been determined to be incompatible with other resource uses or values. Most of these areas produce little vegetation and have fragile soil surfaces and steep slopes. Preferred management actions would allow livestock grazing on all public lands except where an evaluation has determined it would be incompatible with other resource uses or values, e.g., established campgrounds, entrances of caves. These authorized livestock grazing restrictions are limited to small acreages, estimated to be between 1 and 20 acres. Mineral and salt placement would be managed as described under Alternative C. Reserve common allotments will be managed as described under Alternative B. Rest and deferment following prescribed fires or other vegetative treatments would continue until resource objectives were met. Livestock stocking rates would be allowed to increase based on these vegetative treatments. Management actions have a direct moderate beneficial effect on livestock grazing for the long term.

Physical Resources

Soil

Alternative D soils management actions would allow surface-disturbing activities on sensitive soils when resource objectives can be met. This would have an adverse effect on livestock grazing because areas of disturbance would have to be reclaimed and surface-disturbing activities would promote the establishment and spread of invasive species. These adverse effects would be indirect and long-term.

Alternative D would restrict development on more than 50 percent of BLM surface. Alternative D would work toward ensuring that projects are capable of being reclaimed before the BLM would approve them. Alternative D soils management would have a moderate adverse effect on livestock grazing.

Water Resources

Alternative D water management actions would allow abandoned oil and gas wells to be converted to water supply wells if a beneficial use can be demonstrated. Existing water supply sources would be maintained where possible, and the development of new water supply sources would be allowed to meet demand, consistent with management of other resources. Alternative D would encourage the use of alternative sources of energy (e.g., solar and wind) rather than overhead power or petroleum-based power to power new water resource developments. Actions

to make water available would directly benefit livestock grazing over the long term. Alternative D water management actions would have a minor beneficial effect on livestock grazing.

Cave and Karst Resources
Alternative D management actions would restrict livestock from entrances to significant caves. This would have a direct, long-term, but negligible adverse effect on livestock grazing because it would incorporate minimal total acreage.

Mineral Resources

Locatable Minerals
Alternative D would open 4,720,586 acres of mineral estate to locatable minerals entry (greater than 80% of lands with a grazing lease). It is doubtful that mineral development would occur on all of those acres. For the planning area overall it is estimated that BLM actions would disturb approximately 1,252 acres of public land over the next 20 years. This is a negligible adverse effect (less than 1%) on livestock grazing management.

Leasable Minerals – Coal
All coal lands would be open to coal exploration and leasing (approximately 195,700 acres of predicted disturbance). Although all acres would available for coal exploration, leasing history shows only a small portion would actually be developed.

Leasable Minerals – Fluids
Under this alternative, there would be 3,314,254 acres of federal mineral estate open for exploration, and 72,276 acres federal mineral estate closed to fluid minerals leasing. This management would have a direct adverse effect on livestock grazing. Specifically, it is estimated that surface disturbance associated with conventional oil development (vertical and horizontal wells) will have a moderate adverse impact (9.4%) in the short term. However in the long term due to reclamation it will be a minor adverse impact (3.1%). There is no anticipated disturbance from geothermal related activity.

Salable Minerals
Alternative D would open 2,725,060 of federal mineral estate to salable minerals exploration and development and close 623,061 acres. For salable minerals development over the next 20 years, the estimated areas of surface disturbance would total 1,193 acres; 224 acres would be reclaimed, leaving 969 acres long-term disturbance (0.1%). Therefore there would be a negligible adverse effect by reducing available forage for livestock grazing.

Fire and Fuels Management

Alternative D response to wildland fires would be the same as described under Alternative B. Alternative D would prohibit heavy equipment use in specified areas except when human safety would be at risk or if the expected effects of the fire would cause more resource damage than the use of heavy equipment. Prohibiting heavy equipment would directly benefit vegetation over the short and long terms. Full protection strategies and tactics would be used in designated areas on approximately 38,760 acres; all protective measures would directly benefit vegetation over the long term, unless allowing a fire to burn would improve vegetative health. Alternative D would use wildfire and other vegetative treatments to meet fire and fuels management objectives. These actions would have an indirect minor beneficial effect on livestock grazing over the long term.

Biological Resources

Vegetation – Grassland and Shrubland Communities
Alternative D would allow the use of non-native species for initial reclamation, as incorporated in an approved reclamation plan. Achieving successful reclamation would remove possible restrictions on livestock grazing and help control invasive species. This would indirectly benefit livestock grazing over the long term.

Vegetation – Riparian/Wetland Resources
Alternative D would allow surface-disturbing activities in riparian/wetland areas when resource objectives can be met and vegetation in CBNG-supported wetland/riparian systems is restored to ecological site potential. In the short term, surface-disturbing activities on 23,831 acres (less than 3% of the acres open to grazing) will cause a minor adverse effect due to the loss of forage. In the long term, with the restoration of most of the riparian vegetation, this would have an indirect negligible adverse effect on livestock grazing.

Invasive Species and Pest Management
Alternative D would authorize aerial applications of pesticides in areas where topography, extent of infestation, target species, and timing limit other application methods. Annual brome areas would be designated and prioritized for treatment. Both these actions would directly benefit vegetative communities in the planning area over the long term, and would have a direct moderate benefit effect on livestock grazing.

Fish and Wildlife Resources – Fish
Alternative D management actions would consider fish and fish habitat in reservoirs, riparian and wetland systems. Alternative D would apply constraints on surface-disturbing and disruptive activities on 6 percent of acres open to grazing would provide protection of vegetation, soils and forage. If livestock were excluded from these areas, there would be an adverse effect on grazing. Overall, there would be a negligible adverse effect on livestock grazing management.

Fish and Wildlife Resources – Wildlife
Alternative D wildlife management would include prohibiting disruptive activity in crucial big game winter range (81,437 acres) during WGFD specified dates, and in elk calving areas (37,549 acres) during WGFD specified dates (Map 29). Historic uses, including livestock grazing, would be exempted. Management actions also include maintaining and reestablishing identified traditional priority travel corridors for big game species and include prohibiting construction of new travel barriers within 0.5 mile of identified big game priority travel corridors (9,587 acres), reducing barriers with cooperation of other agencies, and avoiding constrictions of big game corridors. Allowing above ground facility development within elk crucial winter range and calving areas in when resource objectives can be met. Management actions that exempt historic uses such as livestock grazing are beneficial, other management actions would have direct and indirect minor adverse effects on management of livestock over the long term.

Special Status Species – Plants
Alternative D management actions for special status plant species include allowing the placement of water developments and mineral or salt supplements in SSS habitat, but not in areas with known populations these species. This would have a direct, negligible adverse effect on livestock grazing over the long term by slightly limiting the areas where water developments and supplements can be placed.

Special Status Species – Fish
Alternative D would apply constraints on surface-disturbing and disruptive activities on less than one percent of acres open to grazing and would provide protection of vegetation, soils and forage. If livestock were excluded from these areas, there would be an adverse effect on grazing. Overall, there would be a negligible adverse effect on livestock grazing management.

Special Status Species – Wildlife (including Greater Sage-Grouse)
Alternative D would allow surface-disturbing and disruptive activities in active prairie dog colonies on BLM surface in accordance with identified criteria, if those activities would not adversely affect suitable habitat for SSS that depend on prairie dog colonies. Both the surface disturbance and the protection of the black tailed prairie dog towns would have a direct and adverse effect on livestock grazing for the long term. Existing fences will be prioritized for modification and new fences will meet visibility requirements. Anti-perching devices would be required on new powerline in occupied Greater Sage-Grouse habitat; these also would protect young livestock, especially lambs, from raptor predation.

Prohibiting surface-disturbing activities and disruptive activities in Greater Sage-Grouse Core Population Areas and Core Population Connectivity Corridor, and certain areas outside of them could alter locations and timing of installation of range improvements and general ranch management of livestock. The extent of the effects would vary slightly between the different areas, but all would be moderately adverse. Prohibiting surface disturbance and disruptive activities, and the establishment of disturbance-free zones would exist for Greater Sage-Grouse and raptors. These activities would be avoided for amphibians, reptiles, and bats and their habitats. Prohibitions and avoidances would adversely affect livestock management since these only apply to public land parcels (unless it is associated with mineral leasing) and could be difficult to administer due to land status. Traditional wildlife corridors will be maintained or enhanced, travel corridors will be managed consistent with other resource values. These could affect location and timing of grazing by livestock, livestock numbers, and increase the complexity of grazing livestock in these localized areas of mixed land status. Managing for SSS habitat objectives would have mixed effects depending on species; mountain plover habitat objectives could allow for increased forage utilization while Greater Sage-Grouse habitat objectives might decrease grazing opportunities in localized situations such as nesting habitat to maintain residual cover. Overall, Alternative D management actions would have a moderate adverse impact on livestock management for the long term.

Heritage and Visual Resources

Alternative D management action would prohibit surface disturbances on identified cultural resources sites and would allow disturbance and infrastructure on other identified sites if they would result in a weak visual contrast with the surrounding area. This would have a direct adverse effect on livestock grazing. Alternative D management actions would require paleontological field surveys, which could have an indirect adverse effect if those surveys and identified locations of paleontological resources would prohibit the placement of range improvement projects or cause projects to be cancelled. Overall, Alternative D management of cultural, paleontological, and visual resources would have a minor adverse effect on livestock grazing.

Land Resources

Forest Products
Alternative D management actions include protecting forest regeneration areas, but would not require fencing. Protective measures would include keeping livestock out of these areas. This would have a direct, negligible adverse effect on livestock grazing over the long term.

Lands and Realty
Alternative D management actions to address land tenure adjustments on lands with custodial grazing allotments would be the same minor beneficial effect as management under Alternative B.

Renewable Energy
Alternative D management actions would exclude renewable-energy development in the southern Big Horn Mountains, areas closed to mineral leasing for fluids and solids, locatable minerals, salable minerals, ROW exclosures areas, and other areas where surface disturbance is prohibited for a total exclusion acreage of 352,068 public land acres. Renewable energy development would also be avoided on 374,518 public land acres, leaving less than 6 percent of public land available for development. Overall it is estimated that BLM actions would disturb approximately 75,240 acres over the next 20 years. Reclamation would occur on 50,240 acres of BLM, leaving 25,000 acres (approximately 3% of the public land) of long-term disturbance (Appendix G (p. 1937)). Development where it is allowed would have a direct and minor adverse effect on the vegetation and on livestock grazing over the long term.

Travel and Transportation Management
Alternative D would close special designation areas to motorized vehicle use. Motorized vehicle use in stock driveways would be allowed on designated routes. Motorized vehicle use would be allowed with travel management designations in SSS habitat and on saturated soils or on slopes 25 percent or greater. Alternative D would limit motorized vehicle travel to designated roads and trails, consistent with management of other resources and would seasonally prohibit travel in game ranges. Alternative D management actions would have a direct, minor beneficial effect over the long term.

Recreation
Alternative D designates seven areas as SRMAs (54,160 acres) and eight ERMAs (349,663 acres). Prohibiting surface disturbance in designated SRMAs unless for administrative use would generally help protect, maintain, and enhance vegetative resources. Alternative D allows additional recreation facilities consistent with other resource values which would have a direct adverse effect on vegetation in and around the facilities and could possibly prohibit livestock grazing in these facilities, the effect would be long term. Only small portions of a few of the SRMAs have areas that livestock grazing is currently excluded. Visitor use and access is promoted in SRMAs which would increase popularity and visitation. Increased human activity could promote vegetation disturbance from trampling, increase livestock animal and human interactions, and increase the potential for introduction and spread of invasive plant species; these would have an adverse effect. However, designated SRMAs would also provide increased education opportunities to reduce conflicts. Designation of the ERMAs will not have any effects on livestock grazing. Overall, these management actions would have a minor adverse effect on livestock grazing over the long term.

Lands with Wilderness Characteristics
Alternative D actions would include managing to emphasize vegetative health, natural values, and primitive recreational opportunities on about 6,864 acres in the lands with wilderness characteristics unit. With limited surface-disturbing activities, this area would conserve

vegetation on less than one percent of the acres open to grazing in the planning area. Managing for wilderness characteristics generally does not preclude livestock grazing. Managing these lands to those standards would have an indirect, negligible, beneficial effect over the long term.

Special Designations

Areas of Critical Environmental Concern, Scenic or Back Country Byways, Wild and Scenic Rivers, and Wilderness Study Areas

Special designation areas under Alternative D include two ACECs, six potential byways, one recommended WSR, and three WSAs. These special designations generally would not result in adverse impacts to livestock grazing. All areas historically open to grazing are open under this alternative. However, special designations adversely impact livestock grazing by limiting or closing roads and trails. These closures could have a direct adverse effect on the grazing lessee for access to perform ranch maintenance activities. This management would affect less than one percent of the planning area resulting in a negligible adverse effect on the livestock grazing program.

Socioeconomic Resources

There are no anticipated effects from socioeconomic resource management actions.

4.6.8.7. Cumulative Impacts

Chapter 4 describes effects to livestock grazing management from past and present actions, federal and non-federal as part of the affected environment. Non-federal actions will affect livestock grazing management similar to federal actions but mitigation for effects to vegetation resources would differ between federal and non-federal actions. Current management of livestock, vegetation, and wildlife is intended to facilitate achievement of the standards for public land health. Guidelines for livestock grazing management set the parameters for mitigation, restoration, or other measures needed to improve land health. Changing levels of livestock use on public lands could cause changes in grazing practices on private land. A reduction of the time or numbers of livestock allowed on public lands could lead to increased or longer duration of use on private lands which could lead to a decline in the ecological state of these lands and reduce wildlife habitat quality provided by them. The need for land development associated with energy development is expected to increase in the future. As the amount of land required for these types of development or uses increase, impacts on vegetation and other resources from land development, including expanded transportation corridors, utility corridors, and others also are likely to increase. Based on the emphasis for Special Designations and recreational opportunities and the availability of maintained roads, there is a high probability that recreation use would continue to increase in the future. The increased public use in and around the area could lead to more human-caused wildfires, augmented dispersal of invasive plant and noxious weed species, and increased degradation of native plant communities, which could potentially reduce access to and the amount of available forage. As these types of resource uses increase and public perceptions or needs shift, conflicts between new uses and historic livestock grazing could occur. Limitation and prohibitions of surface disturbing activities will facilitate rangelands remaining intact for the benefit of all forage and habitat users.

4.6.8.8. Conclusion

In general, Alternative B management actions would be more conservative than Alternative A management actions for the following resources: soils, water, riparian/wetland communities, SSS, fish, wildlife, cultural and paleontological resources, ROW, livestock grazing, recreation, and special designations. This is primarily because Alternative B would not allow the authorized officer to waive prohibitions on surface-disturbing and disruptive activities for multiple conservation management actions as under Alternative A. In addition, Alternative B would include a number of restrictions (e.g., timing and location).

Treatment of invasive plant species including cheatgrass and other annual grasses, as stated under alternatives B and D, would benefit vegetation systems and improve the habitat and forage for wildlife and livestock species that inhabit these plant communities.

Livestock management would emphasize the allocation of additional forage to habitat and watershed protection before livestock grazing as compared to Alternative C which emphasized livestock grazing. Periods of deferment and rest following wildfires or planned vegetation treatments would allow sufficient rest to achieve the desired ecological condition. Placement of salt or mineral supplements would be a minimum of 500 feet from water sources, riparian areas, and aspen stands under alternatives C and D and a minimum of 0.5 mile under Alternative B.

Livestock management would emphasize the allocation of additional forage to habitat and watershed protection before livestock grazing as compared to Alternative C which emphasized livestock grazing. Periods of deferment and rest following wildfires or planned vegetation treatments would allow sufficient rest to achieve the desired ecological condition. Placement of salt or mineral supplements would be a minimum of 500 feet from water sources, riparian areas, and aspen stands under alternatives C and D and a minimum of 0.5 mile under Alternative B.

SRMAs and other special designation areas would in most cases protect and enhance vegetative resources. More restrictive management under Alternative B and Alternative D with qualifiers, would reduce surface disturbance, which would reduce the opportunity for invasive species to be introduced or spread. Under Alternative C, these areas would be available for minerals leasing and permitting thus subverting invasive species and pest management. The greater the number of recreational facilities and opportunities, the higher the probability of livestock and recreationist confrontation.

Although Alternative B management would result in the fewest acres of surface disturbance and would reduce AUMs the least of all alternatives, it would be the most restrictive on livestock grazing and would have the greatest adverse effects on livestock grazing management compared to the other alternatives. Alternative C management would result in the most long-term acres of surface disturbance and would be the least restrictive on livestock grazing. Alternative D management would result in the second highest acreage of surface disturbance and would be less restrictive on livestock grazing compared to Alternative B. Alternative D's relatively higher surface disturbance is associated with fisheries and wildlife enhancements and range management improvements; these enhancements and the greater management flexibility associated with Alternative D would have the most beneficial effects on livestock grazing compared to the other alternatives.

4.7. Special Designations

4.7.1. Areas of Critical Environmental Concern

This section describes impacts to proposed ACECs in the planning area. ACECs are designated to provide special management for relevant and important values, resources, natural systems, and natural hazards (referred to herein as values of concern). The discussion of ACECs focuses on the values of concern and impacts to those values from other programs. Many of the values of concern in ACECs are also resources with management independent of ACEC designation; this non-ACEC management is addressed under the relevant sections of this chapter. For example, impacts to wildlife values in the proposed Fortification Creek Elk ACEC are discussed below, while the overall impacts to wildlife from management under the alternatives appear in the *Biological Resources* section. The ACECs that would be designated in each alternative are identified in Table 4.62, "Proposed ACEC BLM Surface Acres" (p. 1578).

Table 4.62. Proposed ACEC BLM Surface Acres

Name	Alternative A	Alternative B	Alternative C	Alternative D
Cantonment Reno	0	523	0	0
Burnt Hollow	0	17,280	0	0
Dry Creek Petrified Tree	0	2,567	0	0
Fortification Creek Elk Area	0	32,602	0	0
Hole in the Wall	0	11,952	0	0
Pumpkin Buttes	0	1,731	0	1,731
Sagebrush Ecosystem	0	467,897	0	0
Welch Ranch	0	1,748	0	1,116

Source: BLM 2012f

ACEC Area of Critical Environmental Concern
BLM Bureau of Land Management

4.7.1.1. Methods and Assumptions

Generally, an ACEC designation will result in additional prescriptions for other land use activities in the ACEC to protect the associated relevant and important features. Degradation of relevant and important values would primarily occur from surface-disturbing activities. Other activities, such as vegetation manipulation and OHV use, could affect relevant and important values by removing soil and vegetation. Protecting relevant and important values in proposed ACECs would result from the implementation of management actions designed to protect physical, biological, and heritage resources. Management actions for soils, water, vegetation, and fish and wildlife usually limit the extent of surface-disturbing activities and associated vegetation removal. This is generally achieved through the designation of protective buffers, area closures, restrictions on surface use, and other measures.

Scale of impacts:

- Negligible – Less than 1 percent of proposed ACECs would be affected; only a small portion of a single evaluated ACEC would be affected.
- Minor – 1 percent to 5 percent of proposed ACECs would be affected; a moderate portion of a single evaluated ACEC or small portions of two to three evaluated ACECs would be affected.

- Moderate – 5 percent to 10 percent of proposed ACECs would be affected; the majority of a single evaluated ACEC or moderate portions of two to four evaluated ACECs would be affected.
- Major – 10 percent of proposed ACECs would be affected; the majority of several evaluated ACECs or moderate portions of most evaluated ACECs would be affected.

To protect the values for which each ACEC is designated, the BLM will formulate specific management decisions and mitigation measures for each ACEC (Appendix S (p. 2531)). While non-BLM-administered lands may appear within ACEC administrative boundaries, management prescriptions will only apply to BLM actions. ACEC designation would not affect valid existing rights.

To allow for a consistent analysis, the ACEC boundaries proposed under Alternative B are used as the area of analysis for all alternatives. Using Alternative B boundaries, the analysis compares the impacts of management actions to ACEC values in these areas. The BLM based the determination of impacts to ACEC values on the management actions listed in Chapter 2. For example, the BLM would not designate any ACECs under Alternative C. However, to ensure the analysis is comparable across alternatives, Alternative C analyzes effects to ACEC values for the same geographic area as the other alternatives. The adverse and beneficial impacts to ACEC values are discussed under Alternative C just as they are under the other alternatives.

Significance Criteria

An adverse effect on ACECs as a result of project actions would be considered potentially significant if the following were to occur:

- Management actions would result in long-term elimination or reduction of the "relevant and important values" for which the ACEC was proposed.
- The intensity of development would not be compatible with the stated objectives of an ACEC.

4.7.1.2. Impacts Common to All Alternatives

Areas of Critical Environmental Concern

Common to all alternatives, BLM activities would be mitigated to protect the integrity and characteristics of designated ACECs. There are presently no ACECs within the planning area (Alternative A), Alternative B would designate eight ACECs, no ACECs would be designated under Alternative C, and three ACECs would be designated with Alternative D.

Physical Resources

Air Quality

Managing prescribed burns, and implementing mitigation measures to reduce emissions would beneficially affect ACECs by protecting the air quality and visibility within and surrounding ACECs. These management actions would be applied throughout the planning area and could affect all ACECs, therefore the level of effect is major beneficial.

Soil

Soil management actions common to all alternatives include mitigating surface-disturbing activities and requiring reclamation plans. Soil typically is one of, or supports, ACEC resource

values. These actions would be applied to BLM actions across the entire planning area, which could have a major beneficial effect on ACECs.

Water Resources
Water management actions common to all alternatives include providing alternative or "off-source" water, installing flow-control devices, managing surface-disturbing activities to prevent degradation of water quality, minimizing impacts to groundwater, reducing channel and bank erosion, and managing water to meet Wyoming Standards for Healthy Rangelands. Water typically is one of, or supports, ACEC resource values. These actions would be applied to BLM actions across the entire planning area, which could have a major beneficial effect on ACECs.

Cave and Karst Resources
The cave and karst program does not have any management actions common to all alternatives that would effect ACEC management. Common to all management actions relate to inventories and not cave protection.

Mineral Resources

Under management actions common to all alternatives, almost the entire planning area would be available for exploration and development of locatable, leasable fluid, and salable minerals.

Locatable Minerals
There is likely to be minimal overlap between locatable minerals activities and potential ACECs. There are no active or proposed mines within or adjacent to potential ACECs. The maximum foreseeable locatable minerals development is 1,455 acres of BLM surface (0.2%) in the planning area. Therefore, the potential for locatable minerals development to affect ACEC resource values would be negligible.

Leasable Minerals - Coal
Areas identified as acceptable for further coal leasing consideration occur in central Campbell County and northern Sheridan County, which would include the Welch Ranch and western edge of the Burnt Hollow evaluation areas. There are currently no active coal mines within Sheridan County. Coal has been leased for mining within 3.5 miles of the proposed Burnt Hollow ACEC. There is not an existing lease or a lease application that includes or is adjacent to Burnt Hollow. Coal mining within or adjacent to proposed ACECs is not foreseeable during the planning period, therefore effects to ACEC resources would be negligible across all alternatives. Therefore, the impacts to ACECs will not be discussed further.

Leasable Minerals - Fluids
The federal oil and gas mineral estate within the planning area is available for leasing, including for geothermal activity, unless administratively closed. Lessees would be required to minimize adverse resource impacts. Cantonment Reno, Dry Creek Petrified Tree, Fortification Creek, and Pumpkin Buttes have high potential for CBNG development; Fortification Creek has moderate potential for conventional development. Fluid mineral surface-disturbing activities and production operations within ACECs could have major adverse impacts on ACEC values.

Salable Minerals
BLM-authorized salable mineral development is taking place adjacent to the Dry Creek Petrified Tree and Welch Ranch proposed ACECs. In addition to these two proposed ACECs, sand and gravel deposits occur within three additional proposed ACECs: Burnt Hollow, Cantonment Reno, and Fortification Creek. Salable mineral operations are generally localized and confined;

occurring in discrete locations, not widespread such as oil and gas wells. Salable mineral activities within ACECs could have moderate adverse impacts on ACEC values.

Fire and Fuels Management

Unplanned Fire (Wildfire)
Common to all alternatives, a resource advisor would be consulted or assigned to any wildland fires potentially affecting ACECs, fire retardant would be restricted or prohibited to protect rock art or surface water, and fire lines would be rehabilitated to prevent or control erosion. These actions would be applied to across the entire planning area, which could have a major beneficial effect on ACECs.

Planned Fire (Prescribed Fire)
Management actions common to all alternatives include: reducing hazardous fuels within WUIs, and ensuring prescribed burning activities comply with air quality and smoke management rules. These management actions would benefit ACECs by reducing the potential for catastrophic wildfire and by protecting the air quality and visibility within the ACECs. Planned fire has occurred historically only within the proposed Fortification Creek ACEC. There are no foreseeable planned fire activities within any of the proposed ACECs, therefore the level of beneficial effect is negligible.

Biological Resources

Management actions for biological resources are designed to protect those resources typically by limiting surface-disturbing activities which would likely benefit ACEC values.

Vegetation – Forests and Woodlands
There are no management actions common to all alternatives for forest and woodland resources that would affect ACEC values.

Vegetation – Grassland and Shrubland Communities
Grass and shrub communities are the predominant vegetation types within the planning area. Relevant management actions include managing vegetation communities for healthy rangelands; using an integrated management approach to enhance the health and diversity of plant communities; managing the location of facilities, routes, and uses to reduce impacts to vegetation; and cooperatively managing plant communities to maintain healthy rangelands. These actions would be applied across the entire planning area, which would have a major beneficial effect on potential ACECs.

Vegetation – Riparian/Wetland Resources
Management actions common to all alternatives that could affect ACECs include managing riparian and wetland habitats to improve water quality, to manage towards properly functioning condition, to cooperatively enhance riparian/wetland systems, and to prevent the loss or degradation of riparian/wetland habitat. All potential ACECs except Pumpkin Buttes, contain riparian and/or wetland communities. Riparian/wetland management actions could have a major beneficial effect on ACEC values.

Invasive Species and Pest Management
Management actions common to all alternatives that could affect ACECs include an integrated approach to pest management, limiting surface disturbance, use of certified weed seed-free

products, and requiring invasive species treatment. These actions would benefit native vegetative communities, an ACEC value. These actions would be applied to across the entire planning area, which would have a major beneficial effect on potential ACECs.

Fish and Wildlife Resources – Fish and Special Status Species – Fish
There are several fisheries management actions that could affect ACECs including developing mitigation for surface-disturbing and disruptive activities, managing barriers to fish passage, providing public access to fish-bearing waters, managing non-native vegetation, and providing cooperative fisheries education. These management actions would benefit fish, an ACEC value. All potential ACECs except Pumpkin Buttes, contain streams capable of supporting fish. Fisheries management actions could have a major beneficial effect on ACEC values. Welch Ranch is the only potential ACEC capable of supporting current special status fish species (Yellowstone cutthroat trout), therefore the beneficial effect of special status fish management actions on ACEC values is negligible.

Fish and Wildlife Resources – Wildlife and Special Status Species – Wildlife (including Greater Sage-Grouse)
Wildlife and SSS management actions common to all alternatives include mitigation for surface-disturbing activities; maintaining or improving wildlife habitats; protecting crucial wildlife habitats; managing, maintaining, and restoring Greater Sage-Grouse habitat; and a permanent disturbance-free buffer for bald eagle nests. Collectively, these actions could have a major beneficial effect on ACECs by promoting habitat protection while causing the relocation, modification, or redesign of surface disturbing activities. These actions would be applied across the entire planning area, where the appropriate wildlife resources are present, which would have a major beneficial effect on potential ACECs.

Special Status Species – Plants
SSS plant management actions common to all alternatives include implementing conservation measures and BMPs, and allowing vegetation treatments that would benefit the species. These actions would benefit ACECs by protecting special status plant habitat and native vegetation communities. However, Hole in the Wall is the only potential ACEC containing special status plant habitat (11,952 acres), therefore the level of beneficial effect on potential ACECs would be minor.

Heritage and Visual Resources

Cultural Resources and Paleontological Resources
Public lands containing areas important to Native Americans or significant paleontological resources would be retained. Pumpkin Buttes is a proposed ACEC important to Native Americans and Dry Creek Petrified Tree is a potential ACEC containing significant paleontological resources. These management actions would have a moderate beneficial effect on ACECs as they would be limited to two of the eight potential ACECs.

Visual Resources
A management action common to all alternatives is the requirement for permanent facilities to blend with the surrounding landscape. This requirement is secondary to managing within the VRM class, meaning that although facilities might be visible within VRM Class II through IV areas, mitigation for adverse effects on visual resources should be included wherever possible. Blending permanent facilities would help mitigate visual impacts, however development activities

would likely still be readily visible and therefore the beneficial effect of the management action on ACEC values is likely to be negligible.

Land Resources

Forest Products

Forests and woodlands of the planning area would be available for the collection and harvest of forest products, except within 200 feet of surface waters. The harvest of forest products could adversely affect ACEC resource values such as fragile soils and watersheds, and visual resources. Burnt Hollow, Fortification Creek, Hole in the Wall, Pumpkin Buttes, and Welch Ranch potential ACECs all contain forest or woodland vegetation that could be available for forest product use. However, the commercial timber areas where forest product use would be most foreseeable does not overlap any proposed ACEC, therefore the anticipated level of adverse effect on ACEC values would be negligible.

Lands and Realty

Management actions common to all alternatives affecting ACEC values include the consideration of land withdrawal or disposal and signage to aid access and avoid trespass. Withdrawal of surface-disturbing activities such as mineral development and reducing trespass would benefit ACEC values. Disposal of public lands containing ACEC values would be an adverse effect. Increased access could also be an adverse effect if the ACEC values are not protected from the increased use. It is unlikely that public lands containing ACEC values would be disposed of. ACEC specific management plans would reduce the potential for adverse effects from facilitated access to the ACECs. Overall, the level of effect from lands and realty actions on ACEC values is expected to be minor adverse.

Renewable Energy

The renewable-energy program does not have any management actions common to all alternatives that would affect ACEC management. Effects will vary by alternative.

Rights-of-Way and Corridors

Management actions common to all alternatives affecting ACEC values include designating ROW corridors to minimize impacts to other resources, with the preferred ROW location being within or adjacent to existing disturbance; providing access to public lands; and maintaining a transportation system. ROW within ACECs would adversely affect ACEC values. However, the management actions common to all alternatives are designed to minimize impacts to other resources including ACECs, therefore the level of anticipated effect is minor adverse.

Travel and Transportation Management

Management actions common to all alternatives relate to standards for the location, design, and maintenance of roads. Roads within ACECs would adversely affect ACEC values. However, the management actions common to all alternatives are designed to provide a safe transportation network while minimizing impacts to other resources including ACECs, therefore the level of anticipated effect is minor adverse.

Recreation

Management actions common to all alternatives encourage and provide for the recreational use of public lands. Management actions are included for the protection of riparian areas and surface water. Most potential ACECs are also desirable for recreation opportunities; however access to Cantonment Reno, Fortification Creek, and Pumpkin Buttes is limited. ACEC-specific

management plans would reduce the potential for adverse effects from recreation use. Overall, the level of effect of recreation management actions on ACEC values is expected to be minor adverse.

Lands With Wilderness Characteristics
Management actions common to all alternatives would not affect ACEC values as they pertain to inventory rather than direct physical land management. Additionally, wilderness characteristic inventories identified one area with wilderness characteristics, which is not contiguous with or adjacent to any proposed ACECs. Therefore, lands with wilderness characteristics will not be discussed further in the ACEC section.

Livestock Grazing Management
Livestock grazing would be managed to achieve healthy rangelands and special habitats. Poorly managed grazing can impair ACEC values by over utilizing native vegetation, increasing erosion and stream sedimentation. Properly managed grazing can avoid these impacts and be beneficial to some resources. Overall, the level of anticipated effect is negligible adverse, as not all adverse effects can be avoided or mitigated such as inadvertent trampling of cultural artifacts or temporary over utilization.

Special Designations

Scenic or Back Country Byways
Presently there are no byways within the planning area. The potential Tipperary/Thompson Creek Roads byway access the potential Dry Creek Petrified Tree ACEC. If the Tipperary/Thompson Creek Roads byway were to be designated, it would be managed to encourage responsible use while protecting resource values. Increased byway use could lead to increased use of the potential Dry Creek Petrified Tree ACEC. An ACEC specific management plan would reduce the potential for adverse effects from recreation use. Overall the level of effect on ACEC values is expected to be negligible adverse, as only one potential ACEC would be affected and the site-specific management plan would reduce adverse effects.

Wild and Scenic Rivers
There are no management actions for WSRs that would affect ACEC values as the Middle Fork Powder River suitable WSR segment is not contained within a potential ACEC. WSRs will not be discussed further in this section.

Wilderness Study Areas
The Fortification Creek evaluation area is the only evaluation area to contain a WSA. Common to all alternatives, WSAs would be managed to preserve natural conditions and processes. WSA management would benefit ACEC values. Since Fortification Creek is the only evaluation area containing a WSA, the level of beneficial effect would be negligible. The effects of WSA management actions on ACECs do not vary by alternative and the resources will not be discussed further.

Socioeconomic Resources

Social and Economic Conditions
There are no social or economic management actions common to all alternatives or by alternative that would have a measurable effect on ACEC values. Therefore, these topics are not addressed further in this section.

Health and Safety
Management actions common to all alternatives control, manage, and mitigate health and safety hazards. Environmental hazards such as the coal fire at Welch Ranch can benefit ACEC values. While these management actions are primarily designed for the protection of human health and safety they often protect other resources such as soil, vegetation, and wildlife. The application of these actions is generally limited in time and space, therefore the level of beneficial effect is minor.

Health and safety does not have any management actions that vary by alternative, therefore there is no effect to ACECs and will not be discussed further in this section.

4.7.1.3. Alternative A

Areas of Critical Environmental Concern
There are presently no ACECs within the planning area and no additional ACECs would be designated. The PRB Final EIS (BLM 2003c) analyzed all of the ACECs that would be designated under Alternative B with the exception of the Welch Ranch. The PRB Final EIS concluded that present management was sufficient to protect the relevant and important ACEC values. The PRB Final EIS was an oil and gas project and therefore did not analyze all potential land use activities affecting ACEC values. Land uses such as renewable-energy development, ROWs, and other mineral development could adversely affect ACEC values. However, since oil and gas development is one of the primary land uses within the planning area and other land uses are often correlated with oil and gas (such as ROW) the level of adverse effect is anticipated to be minor.

Physical Resources

Air Quality
Alternative A would analyze the effects of activities on air quality and may include modeling. Data analysis and modeling do not directly relate to ACEC management, therefore there would be no effect to ACEC values.

Soil and Water Resources
Management actions regulate surface disturbing activities on sensitive soils and near water resources while allowing for exceptions. The intent of the management actions are to allow for resource use while protecting sensitive soils and water. However management has been applied inconsistently, adversely affecting soil and water resources and therefore ACEC values in many situations. Sensitive soils and water resources are present within all the areas being evaluated resulting in an overall moderate adverse effect.

Cave and Karst Resources
Cave and karst resources are associated with the Big Horn Mountains. Only the Hole-in-the-Wall evaluation area contains karst-bearing formations. There are no cave and karst management actions in the 1985 RMP, therefore management in cave and karst areas are considered on a project-specific basis; which has led to inconsistent management of surface-disturbing activities. The potential for surface-disturbing activities in cave and karst areas is relatively low, related both to the difficult topography and limited potential for mineral resources. Because of the limited foreseeable activity, the lack of previous management actions to consistently protect cave and karst resources, and only one evaluation area being affected, overall there would be a negligible adverse effect on ACEC values.

Mineral Resources

Under management actions common to all alternatives, almost the entire planning area would be available for exploration and development of locatable, leasable fluid, and salable minerals.

Locatable Minerals
Locatable minerals have been withdrawn from three WHMAs and locatable mineral activities are restricted within the three WSAs. The only ACEC evaluation area to benefit from these withdrawals and restrictions is Fortification Creek. There is potential for locatable mineral activity within the other evaluation areas and within Fortification Creek outside the WSA. However, there are no active or proposed mines within or adjacent to ACEC evaluation areas. The maximum foreseeable locatable minerals development is 1,455 acres (0.2%) of BLM surface in the planning area. Therefore, the potential for locatable minerals development to affect ACEC resource values would be negligible.

Leasable Minerals - Fluids
Nearly the entire federal oil and gas mineral estate within the planning area is available for leasing, including for geothermal activity. Lessees would be required to minimize adverse resource impacts. Cantonment Reno, Dry Creek Petrified Tree, Fortification Creek, and Pumpkin Buttes have high potential for CBNG development; Fortification Creek has moderate potential for conventional development. Fluid mineral surface-disturbing activities and production operations within ACECs would have major adverse impacts on ACEC values.

Salable Minerals
Mineral material activity is prohibited within WSAs, which would benefit a portion of the proposed Fortification Creek ACEC. BLM-authorized salable mineral development is taking place adjacent to the Dry Creek Petrified Tree and Welch Ranch evaluation areas. In addition to these two areas, sand and gravel deposits occur within three additional evaluation areas: Burnt Hollow, Cantonment Reno, and Fortification Creek. Salable mineral operations are generally localized and confined; occurring in discrete locations, not widespread such as oil and gas wells. Salable mineral activities within ACECs would have moderate adverse impacts on ACEC values.

Fire and Fuels Management

Unplanned Fire (Wildfire)
Present management of unplanned fires takes resource values into consideration during suppression activities. There are no existing ACECs, therefore ACECs would not be considered as an independent resource value but the relevant and important resource values (physical, biological, cultural, etc.) would be. Designation could heighten the awareness and therefore the protection of ACEC values, the lack of designation could result in resource values being overlooked. However, since all resource values should be considered during suppression, the adverse effect would be negligible.

Planned Fire (Prescribed Fire)
Prescribed fire would be used to support vegetation and wildlife habitat objectives. These management actions could benefit ACEC evaluation areas as vegetation and wildlife are often the relevant and important ACEC values. There are no foreseeable planned fire activities within any of the evaluation areas, therefore the level of beneficial effect is negligible.

Biological Resources

Management actions for biological resources are designed to protect those resources typically by limiting surface-disturbing activities which would likely benefit ACEC values.

Vegetation – Forests and Woodlands
Forest and woodland treatments would be designed to improve forest health, biodiversity, and water quality. Five evaluation areas (Burnt Hollow, Fortification Creek, Hole-in-the-Wall, Pumpkin Buttes, and Welch Ranch) contain forest and woodland communities. The evaluation areas should benefit from these management actions. Designation would heighten the awareness and therefore the protection of ACEC values, the lack of designation could result in resource values being overlooked. However, since all resource values should be considered, ACEC values should benefit, but to a minor degree.

Vegetation – Grassland and Shrubland Communities
The only management action which varies by alternative relates to the use of non-native plant species for reclamation. The present RMP did not address the issue, therefore non-native plants are used in accordance with the BLM reclamation policy and are considered on a project-specific basis. There is development potential within all evaluation areas particularly without ACEC-specific management, which would regulate development activities. The presence of non-native species would detract from naturalness values for knowledgeable public land users. However, since reclamation areas would be limited in scale and duration, the adverse effect would be negligible.

Vegetation – Riparian/Wetland Resources
Current management prohibits surface-disturbing activities within 500 feet of surface water unless the prohibition is waived. All evaluation areas except Pumpkin Buttes contain riparian and/or wetland communities. Management has been applied inconsistently, adversely effecting riparian and wetland resources and therefore ACEC values in many situations. The inconsistent management results in a moderate adverse effect to ACEC values.

Invasive Species and Pest Management
Invasive species are currently managed in cooperation with the county weed and pest districts. ACEC evaluation areas and ACEC values benefit from invasive species management. Invasive species decrease biodiversity, ecosystem health, and visual naturalness. The evaluation areas would be more likely to receive treatment through ACEC designation as designation would be an additional factor considered in determining treatment areas. The benefit to ACEC values would likely be minor, as without designation few evaluation areas would likely be targeted for invasive species management.

Fish and Wildlife Resources – Fish and Special Status Species – Fish
Hole-in-the-Wall and Welch Ranch are the evaluation areas most likely to benefit from current fisheries management. However, the other evaluation areas could also benefit if reservoirs were to be constructed as enhancing fisheries would be encouraged. There are no current management decisions for special status fish species. Welch Ranch is the only evaluation area capable of supporting Yellowstone cutthroat trout. Fisheries has not been a management priority or forecasted to become one. The beneficial effect of fish and SSS fish management actions on ACEC values is negligible.

Fish and Wildlife Resources – Wildlife and Special Status Species – Wildlife (including Greater Sage-Grouse)
Current management provides seasonal and in some cases year-round spatial buffers from surface-disturbing activities for raptor nests, big game calving areas and crucial winter range, and

sharp-tailed grouse leks. Similar buffers are provided for SSS such as bald eagles and Greater Sage-Grouse. Exceptions to these protections are allowed. Exception criteria was not defined in the current RMP and therefore exceptions have not been consistently applied which has lead to localized adverse effects to wildlife and therefore ACEC values. In the case of Greater Sage-Grouse, the best available science clearly indicates that current management has not been sufficient to sustain the Greater Sage-Grouse populations within the planning area (Doherty et al. 2010). All ACEC evaluation areas contain Greater Sage-Grouse habitat. Alternative A SSS management would not sustain Greater Sage-Grouse populations within the evaluation areas or the planning area as a whole, and therefore have a major adverse effect on ACEC values.

Special Status Species – Plants
The current RMP does not address special status plants, therefore they are managed on a project-specific basis. The absence of direction can lead to inconsistent management and adverse effects to the plants and therefore ACEC values. Hole-in-the-Wall is the only evaluation area containing mapped special status plant habitat. Since special status plants are unlikely in the remaining evaluation areas, the level of adverse effect on ACEC values would be negligible.

Heritage and Visual Resources

Cultural Resources
Current management includes a NSO stipulation on fluid mineral leases associated with the Bozeman Trail, which includes the Cantonment Reno evaluation area. Otherwise cultural resources would be considered on a project-specific basis. The absence of management direction can lead to inconsistent management and adverse effects to the cultural resources and therefore ACEC values. The anticipated level of effect is moderate adverse as all ACECs outside of Cantonment Reno would not be guaranteed protection.

Paleontological Resources
There are no paleontological resources management decisions in the current RMP, paleontological resources are considered on a project-specific basis. The Dry Creek Petrified Tree evaluation area is an area containing paleontological resources of high quality or importance. The Hole-in-the-Wall evaluation area contains areas of PFYC 5 and likely contains paleontological resources. Paleontological resources are likely not present or rare within the other evaluation areas. The absence of management direction can lead to inconsistent management and adverse effects to the paleontological resources and therefore ACEC values. The resources at Dry Creek Petrified Tree are well known and therefore not likely to be affected as surface-disturbing activities would be avoided. The opportunity for adverse effects within the other evaluation areas is greater as their paleontological resources are unknown. But since Hole-in-the-Wall is the only other evaluation area likely to contain high quality paleontological resources, the anticipated level of effect is minor adverse.

Visual Resources
The Welch Ranch and western half of the Hole-in-the-Wall evaluation areas are currently managed as VRM Class II where management activities may be seen but should not attract attention. All of Pumpkin Buttes and portions of the Burnt Hollow and Fortification Creek evaluation areas are managed as VRM Class III, where management activities may attract attention but should not dominate the view. The remainder of the evaluation areas are managed as VRM Class IV where management activities may dominate the view. Scenic quality is an ACEC value. With the potential for development activities to dominate throughout all or large portions of five evaluation areas, the anticipated effect to ACEC values would be major adverse.

Land Resources

Forest Products

Forests and woodlands of the planning area would be available for the collection and commercial harvest of minor forest products. The harvest of forest products could adversely affect ACEC resource values such as fragile soils and watersheds, and visual resources. Burnt Hollow, Fortification Creek, Hole-in-the-Wall, Pumpkin Buttes, and Welch Ranch evaluation areas all contain forest or woodland vegetation that could be available for forest product use. However, the commercial timber areas where forest product use would be most foreseeable does not overlap any proposed ACEC, therefore the anticipated level of adverse effect on ACEC values would be negligible.

Lands and Realty

Current management actions for the lands and realty program mostly relate to the acquisition and disposal of public lands. Lands with resource values are generally not disposed of and are desirable for acquisition. The absence of designated ACECs would be one less resource value assessed during land and realty actions. It is unlikely any of the evaluation areas would be disposed of as their resource values are known. Acquisition within or adjacent to the evaluation areas would be beneficial. Acquisition must be from, and is typically initiated by, a willing land owner. There has been recent interest in exchanges by private land owners within the Welch Ranch, Burnt Hollow, and Hole-in-the-Wall evaluation areas. Burnt Hollow and Welch Ranch are both products of recent land exchanges. The effects of current management on ACEC values are moderate beneficial.

Renewable Energy

The 1985 RMP does not contain any management decisions for renewable energy, projects are considered on an individual basis. Pumpkin Buttes is the only evaluation area with wind-power potential of good or better. It is not foreseeable for any of the six other evaluation areas to be affected by renewable energy. Wind-power development near Pumpkin Buttes would impair the scenic qualities of the evaluation area. As adverse impacts would likely be limited to one evaluation area, the level of effect is minor.

Rights-of-Way and Corridors

ROW are analyzed and authorized on a project-specific basis under the present RMP. Pumpkin Buttes contains communication sites on the South Middle Butte with provisions for expansion to North Middle Butte, if absolutely necessary. Communication sites and surface-disturbance from ROW within evaluation areas adversely affects ACEC values. Cantonment Reno, Dry Creek Petrified Tree, Fortification Creek, Pumpkin Buttes, and Welch Ranch are within the CBNG development area and given the mixed ownership pattern of both surface and mineral estate ROW applications are likely. The level of anticipated effect to ACEC values is major adverse.

Travel and Transportation Management

TTM actions define where, when, and how motorized vehicles can be used within the planning area. Current management prohibits motorized use within portions of the Burnt Hollow, Cantonment Reno and Dry Creek Petrified Tree evaluation areas. There are seasonal vehicle restrictions within portions of the Fortification Creek evaluation area. Where open to motorized vehicles, including seasonally, motorists are limited to existing or designated routes. Limiting vehicle use to defined routes limits impacts to soil, water, vegetation, and other resources including ACEC values. The level of anticipated effect is minor adverse.

Recreation
Current management recognizes all of the evaluation areas, with the exception of Pumpkin Buttes, as important recreation areas. Proposals for surface-disturbing or disruptive activities are mitigated to protect the recreation and related resources such as soil, water, vegetation, wildlife habitat, and therefore ACEC values. Recreation use itself can have adverse effects, although typically localized, from compacting soil and vegetation which increases vegetation, wildlife displacement, and the development of recreation facilities. Overall, the level of effect recreation management actions on ACEC values is expected to be minor adverse.

Livestock Grazing Management
Livestock grazing would be allowed within the evaluation areas and managed to achieve healthy rangelands and special habitats. Properly managed grazing can avoid adverse impacts and be beneficial to some resources. Overall, the level of anticipated effect is minor adverse as not all adverse effects can be avoided or mitigated, such as inadvertent trampling of cultural artifacts or temporary over utilization. ACEC designation could also have provided heightened awareness and further minimized the adverse effects.

Special Designations

Scenic or Back Country Byways
Presently there are no byways within the planning area. The potential Tipperary/Thompson Creek Roads byway accesses the Dry Creek Petrified Tree evaluation area. If the Tipperary/Thompson Creek Roads byway were to be designated it would be managed to encourage responsible use while protecting resource values. Without designation this beneficial effect would not occur. Increased use of Tipperary/Thompson Creek Roads and the Dry Creek Petrified Tree area would also likely not occur. Alternative A would likely have no effect on ACEC values.

4.7.1.4. Alternative B

Areas of Critical Environmental Concern
Alternative B emphasizes resource conservation and would designate eight ACECs totalling 511,000 acres (65%) of BLM surface. Appendix S (p. 2531) lists the objectives and management prescriptions for each ACEC. ACEC-specific prescriptions would protect the integrity of the characteristics for which each ACEC was designated. Management prescriptions could vary dependent on the relevant and important values present at each site.

Designation of ACECs would establish these areas as priority areas and management efforts would focus such that problems and issues could be addressed more effectively, thereby serving to better protect the relevant and important resources. Management actions common to all ACECs would include: closing or limiting motorized vehicle use; managing visual resources as VRM Class II; restricting mineral development; ROW; and other surface-disturbing activities. It is important to note that an ACEC designation would not affect present leases or valid existing rights. However, when current leases expire, they would become closed to future leasing.

Physical Resources

Air Quality
Alternative B would analyze the effects of activities on air quality and would include modeling to identify mitigation strategies. Air quality mitigation would beneficially effect ACEC

values. Burnt Hollow is the most likely ACEC to benefit as it is the eastern most ACEC and the closest to the coal mines which is a primary emissions source within the planning area. ACECs within the center of the planning area are influenced by oil and gas emissions including Cantonment Reno, Fortification Creek, and Pumpkin Buttes. Air quality mitigation would have a major beneficial effect on ACEC values.

Soil and Water Resources
Alternative B management actions prohibit surface-disturbing activities on sensitive soils and near water resources which protects ACEC values. Sensitive soils and water resources are present within all the areas being evaluated resulting in a major beneficial effect for ACEC values.

Cave and Karst Resources
Surface-disturbing activities and forest product sales would be prohibited within karst areas benefitting ACEC values. The Hole-in-the-Wall evaluation area contains bands of karst-bearing formations. Because limited portions of one evaluation area would be affected, overall there would be a negligible beneficial effect on ACEC values.

Mineral Resources

Locatable Minerals
In addition to the present mineral withdrawals, another 618,256 acres would be recommended for withdrawal from mineral entry including the ACECs. This management action would have a major beneficial effect on ACEC values by preventing locatable mineral development.

Leasable Minerals - Fluids
The ACECs would be unavailable for additional leasing. Seventy-five percent (2,544,512 acres leased, 3,386,530 acres federal estate) of the federal fluid mineral estate has already been leased, including within the ACECs. Existing leases would be honored. There has been fluid mineral development within all ACECs except Cantonment Reno. Dry Creek Petrified Tree, Hole-in-the-Wall, and Welch Ranch each contain one plugged and abandoned well, abandoned between 1962 (Welch) and 1978 (Hole-in-the-Wall). Fortification Creek and Pumpkin Buttes leases are currently producing. Applications (APDs) are pending within Fortification Creek, Pumpkin Buttes, and Sagebrush Ecosystem ACECs. Cantonment Reno, Dry Creek Petrified Tree, Fortification Creek, and Pumpkin Buttes have high potential for CBNG development; Fortification Creek also has moderate potential for conventional development. Development of the existing leases during the planning period is likely and is considered under Impacts Common to All Alternatives. ACECs would be closed to leasing under Alternative B, which would have a major beneficial impact on ACEC values.

Salable Minerals
Mineral material activity would be prohibited within the ACECs. BLM-authorized salable mineral development is taking place adjacent to the Dry Creek Petrified Tree and Welch Ranch ACECs. Existing rights would be honored, expansion of permit areas into the ACECs would not be authorized. Sand and gravel deposits occur within three additional ACECs: Burnt Hollow, Cantonment Reno, and Fortification Creek. Salable mineral operations are generally localized and confined; occurring in discrete locations, not widespread such as oil and gas wells. The prohibition of salable mineral activities within ACECs is beneficial to ACEC values, however the existing activities adjacent to two ACECs would temper the beneficial effects to minor.

Fire and Fuels Management

Unplanned Fire (Wildfire) and Planned Fire (Prescribed Fire)
Unplanned fire management would be cognizant of resource goals, including ACECs, and respond accordingly including limiting heavy equipment use. Wildland and planned fire would be used to restore fire-adapted ecosystems. ACEC designation would heighten the awareness and therefore the protection and management of ACEC values. These management actions would be a major benefit to the ACECs.

Biological Resources

Vegetation – Forests and Woodlands
Alternative B would emphasize natural processes and keep silviculture treatments to a minimum. The lack of intensive management would benefit ACEC values as the ACECs would visually be more natural. Aspen and limber pine communities would likely continue to decline. Insect and disease outbreaks would be allowed to run their course. Hole-in-the-Wall contains limber pine and potentially aspen, otherwise these species and threat of disease are not widespread in the other four ACECs containing forest and woodland vegetation. Because four of the eight ACECs would benefit from these management actions and only one would likely be adversely affected, the overall level of effect to ACEC values would likely be moderate beneficial.

Vegetation – Grassland and Shrubland Communities
Native plant species would be required for all reclamation activities. ACEC management which would regulate development activities and keep surface-disturbing activities to a minimum. The presence of only native species would increase naturalness values for knowledgeable public land users. Since reclamation areas would be limited in scale and duration, the beneficial effect would be negligible.

Vegetation – Riparian/Wetland Resources
Alternative B prohibits surface-disturbing activities within 500 feet of surface water. All evaluation areas except Pumpkin Buttes, contain riparian and/or wetland communities. The prohibition of surface-disturbing activities is a major benefit to ACEC values.

Invasive Species and Pest Management
ACEC designation would likely factor into determining treatment areas. The highest priority would be given to BLM-administered lands threatened by invasion from adjacent lands. Few ACECs are likely to be the highest priority for treatment. Therefore benefit to ACEC values would likely be minor.

Fish and Wildlife Resources – Fish and Special Status Species – Fish
Surface-disturbing activities would be prohibited within 0.25 mile of fish-bearing water bodies. This management action would be a major benefit as all ACECs except Pumpkin Buttes, contain fish-bearing waters. Welch Ranch is the only ACEC capable of supporting Yellowstone cutthroat trout, therefore the benefits of special status fish species management actions on ACEC values is negligible.

Fish and Wildlife Resources – Wildlife and Special Status Species – Wildlife (including Greater Sage-Grouse)
Alternative B would provide seasonal and permanent spatial buffers where surface-disturbing and disruptive activities are prohibited for the protection of raptor nests, big-game calving areas and

crucial winter range, and sharp-tailed grouse leks. These management actions would be applied across the planning area where applicable and therefore be a major benefit to ACEC values. Similar buffers are provided for SSS such as bald eagles. Surface-disturbing and disruptive activities would be prohibited within prairie dog colonies. Greater Sage-Grouse management would apply prohibitions on surface-disturbing and disruptive activities within four miles of lek sites and winter concentration areas and therefore be a major benefit to ACEC values.

Special Status Species – Plants
Surface-disturbing and disruptive activities would be prohibited within special status plant habitat under Alternative B. Hole in the Wall is the only evaluation area containing mapped special status plant habitat. Since special status plants are unlikely in the remaining evaluation areas the level of beneficial effect on ACEC values would be minor.

Heritage and Visual Resources

Cultural Resources
Mineral development and other surface-disturbing activities would be prohibited near historic properties that retain their historic setting and ares that contain sensitive cultural sites. These management actions would protect cultural resources, and therefore ACEC values, within the Cantonment Reno, Hole in the Wall, Pumpkin Buttes, and Welch Ranch ACECs. The anticipated level of effect is major beneficial.

Paleontological Resources
Mineral development and other surface-disturbing activities would be prohibited in areas containing paleontological resources of high quality or importance such as the Dry Creek Petrified Tree ACEC. Paleontological surveys would be required prior to surface-disturbing activities in all PFYC Class 3, 4, and 5 formations; this management action would include all eight ACECs. Monitoring of surface-disturbing activities would be required in PFYC Class 4 and 5 areas. The Hole in the Wall ACEC contains areas of PFYC 5. Surface-disturbing activities within PFYC Class 3 areas would be monitored on a project specific basis, this would include the six remaining ACECs and remainder of the Hole in the Wall ACEC. Surveying provides the opportunity to identify paleontological resources but would not be expected to discover all paleontological resources, and therefore monitoring could be required or recommended. Likewise, monitoring reduces adverse effects to paleontological resources, by identifying the resources as they are uncovered, but does not prevent all adverse effects. However, through the survey and monitoring requirements adverse effects should be negligible.

Visual Resources
The eight ACECs would be managed as VRM Class II where management activities may be seen but should not attract attention. This management would be a major benefit to visual resources and ACEC values.

Land Resources

Forest Products
Commercial timber activities would be limited to specified forest areas that do not overlap any ACEC. Vegetation, soil, water, and visual resources would be protected from surface-disturbing activities a major benefit to ACEC values.

Lands and Realty
Alternative B would include an active land acquisition program. Acquisitions, from willing land owners, within or adjacent to the ACECs could be actively sought. There has been recent interest in exchanges by private land owners within the Welch Ranch, Burnt Hollow, and Hole in the Wall ACEC areas. Under Alternative B these exchanges would be pursued. An active acquisition program would be a major benefit to ACEC values.

Renewable Energy
ACECs would be designated as renewable energy exclusion areas under Alternative B. Pumpkin Buttes and portions of the Sagebrush Ecosystem ACECs are the only evaluation area with wind power potential of good or better. It is not foreseeable for any of the six other ACECs to be affected by renewable energy. As renewable energy development would likely be proposed within the Pumpkin Buttes ACEC, and therefore only one ACEC truly benefits from the exclusion area, the beneficial effect is minor.

Rights-of-Way and Corridors
New ROW, including new communication sites on the Pumpkin Buttes, would be prohibited within ACECs under Alternative B. The absence of new surface disturbance and visual intrusion would be a major benefit to ACEC values.

Travel and Transportation Management
Alternative B would prohibit motorized use within the Burnt Hollow, Cantonment Reno, and Dry Creek Petrified Tree ACECs. There are seasonal vehicle restrictions within the elk crucial seasonal ranges within the Fortification Creek ACEC. Where open to motorized vehicles, including seasonally, motorists would be limited to designated routes. Limiting vehicle use to defined routes limits impacts to soil, water, vegetation and other resources including ACEC values. The level of anticipated effect is minor adverse.

Recreation
Alternative B would designate four of the ACECs as SRMAs including Burnt Hollow, Dry Creek Petrified Tree, Hole in the Wall, and Welch Ranch. Surface-disturbing activities, except for administrative use, would be prohibited within the SRMAs. Proposals for surface-disturbing activities would consider relevant and important values in the other ACECs and would be mitigated to protect such values. Recreation use can have adverse effects, although typically localized, from compacting soil and vegetation which increases vegetation, wildlife displacement, and the development of recreation facilities. Overall the level of effect recreation management actions on ACEC values is expected to be negligible adverse as non-recreation related surface-disturbing activities would be minimized.

Livestock Grazing Management
Livestock grazing would be allowed within the ACECs where compatible with other resource values and managed to achieve healthy rangelands and special habitats. Properly managed grazing can avoid adverse impacts and be beneficial to some resources. ACEC designation would provide a heightened awareness and further minimize the adverse effects of grazing on other resources including ACEC values. Overall the level of anticipated effect is negligible adverse as not all adverse effects can be avoided or mitigated such as inadvertent trampling of cultural artifacts or temporary over utilization.

Special Designations

Scenic or Back Country Byways
Alternative B would evaluate six routes for national byway status. The potential Tipperary/Thompson Creek Roads byway accesses the Dry Creek Petrified Tree ACEC. If the Tipperary/Thompson Creek Roads byway were to be designated it would be managed to encourage responsible use while protecting resource values. Increased byway use could lead to increased use of the Dry Creek Petrified Tree ACEC. Educational efforts would reduce the level of adverse effects on ACEC values from increased use to negligible.

4.7.1.5. Alternative C

Areas of Critical Environmental Concern
Alternative C would emphasize resource use and would not designate any ACECs. Management decisions would be applied on a project-specific basis to protect relevant and important values when activities are proposed. This could result in additional restrictions or design requirements for certain uses or activities, thereby mitigating impacts to ACEC values, however adverse effects to ACEC values are likely to occur. Overall, Alternative C would likely have minor adverse effects on ACEC values.

Physical Resources

Air Quality
Alternative C would not model air quality effects or identify mitigation strategies. The absence of air quality mitigation would have a major adverse effect on ACEC values.

Soil and Water Resources
Management actions allow surface-disturbing activities on sensitive soils and near water resources where consistent with other resource values. The intent of the management actions are to allow for resource use without permanently impairing sensitive resources including soil, water, and other resources. Sensitive soils and water resources are present within all the areas being evaluated resulting in a major adverse effect.

Cave and Karst Resources
Surface-disturbing activities and forest product sales would be restricted near significant caves benefitting ACEC values. The Hole-in-the-Wall evaluation area contains bands of karst-bearing formations. Because limited portions of one evaluation area would be affected, overall there would be a negligible beneficial effect on ACEC values.

Mineral Resources

Locatable Minerals
No additional mineral withdrawals would be recommended. There is potential for locatable mineral activity within all evaluation areas including Fortification Creek outside the WSA. However, there are no active or proposed mines within or adjacent to ACEC evaluation areas. The maximum foreseeable locatable minerals development is 1,455 acres (0.2%) of BLM surface in the planning area. Therefore, the potential for locatable minerals development to affect ACEC resource values would be negligible.

Leasable Minerals - Fluids
The entire federal oil and gas mineral estate within the planning area would be available for leasing, including for geothermal activity. Lessees would be required to mitigate

adverse resource impacts. There has been fluid mineral development within all ACECs except Cantonment Reno. Leases within Fortification Creek and Pumpkin Buttes are currently producing. Cantonment Reno, Dry Creek Petrified Tree, Fortification Creek, and Pumpkin Buttes have high potential for CBNG development; Fortification Creek has moderate potential for conventional development. Fluid mineral surface-disturbing activities and production operations within ACECs would have major adverse impacts on ACEC values.

Salable Minerals
Mineral material activity would be allowed where compatible with other resources. Alternative C does not designate any ACECs, therefore ACEC values would not be a resource taken into consideration. BLM-authorized salable mineral development is taking place adjacent to the Dry Creek Petrified Tree and Welch Ranch evaluation areas. In addition to these two areas, sand and gravel deposits occur within three additional evaluation areas: Burnt Hollow, Cantonment Reno, and Fortification Creek. Salable mineral operations are generally localized and confined; occurring in discrete locations, not widespread such as oil and gas wells. Salable mineral activities within ACECs would have moderate adverse impacts on ACEC values.

Fire and Fuels Management

Unplanned Fire (Wildfire)
Full protection strategies, with few constraints on heavy equipment use, would be used during suppression activities. There would not be any ACECs, therefore ACECs would not be considered as an independent resource value. Designation could heighten the awareness and therefore the protection of ACEC values. Given the aggressive nature of suppression activities and no ACEC designation, the effects to ACEC values would be major adverse.

Planned Fire (Prescribed Fire)
Prescribed fire would be used to restore fire-adapted ecosystems for commodity production. These management actions could benefit ACEC evaluation areas as vegetation is often a relevant and important ACEC value. However, the additional vegetation would likely be used for livestock forage or other commodities thereby negating the ecosystem restoration. The end result is a negligible adverse effect.

Biological Resources

Vegetation – Forests and Woodlands
Forest and woodland treatments would be designed to maximize forest health and resource use. Intensive management would detract from the naturalness of the evaluation areas and reduce their biodiversity. Alternative C management would have major adverse effects on ACEC values.

Vegetation – Grassland and Shrubland Communities
Non-native plants could be used for interim reclamation activities in accordance with the BLM reclamation policy. There is development potential within all evaluation areas particularly without ACEC-specific management which would regulate development activities. The presence of non-native species would detract from naturalness values for knowledgeable public land users. However, since reclamation areas would be limited in scale and duration, the adverse effect would be negligible.

Vegetation – Riparian/Wetland Resources
Surface-disturbing activities would be allowed within 500 feet of surface water where consistent

with other resource values. All evaluation areas except Pumpkin Buttes contain riparian and/or wetland communities. There would not be any ACECs, therefore ACECs would not be considered as an independent resource value. Designation could heighten the awareness and therefore limit surface-disturbing activities. Development would be likely within the evaluation areas and result in a moderate adverse effect to ACEC values.

Invasive Species and Pest Management
Fewer species would be treated under Alternative C and priority would be given to infestations on public lands which threaten adjacent private lands. Few if any evaluation areas are likely to be the highest priority for treatment. Therefore benefits to ACEC values would likely be negligible.

Fish and Wildlife Resources – Fish and Special Status Species – Fish
Surface-disturbing activities would be allowed within 0.25 mile of fish-bearing water bodies where consistent with other resource values. There would not be any ACECs therefore ACECs would not be considered as an independent resource value. Designation could heighten the awareness and therefore limit surface-disturbing activities. Development would be likely within the evaluation areas and result in a major adverse effect to ACEC values as all ACECs except Pumpkin Buttes contain fish-bearing waters. Welch Ranch is the only ACEC capable of supporting Yellowstone cutthroat trout therefore the impacts of special status fish species management actions on ACEC values is negligible.

Fish and Wildlife Resources – Wildlife and Special Status Species – Wildlife (including Greater Sage-Grouse)
Alternative C would apply a seasonal spatial buffer from surface disturbing activities for raptor nests but otherwise allow surface-disturbing and disruptive activities within, big-game calving areas and crucial winter range, and near sharp-tailed grouse leks. These management actions would result in major adverse effects to wildlife and therefore ACEC values.

Seasonal and permanent buffers prohibiting surface-disturbing activities are provided for SSS such as bald eagles and Greater Sage-Grouse. Raptors are a seasonal buffer only. Surface-disturbing and disruptive activities could be authorized within prairie dog colonies. These management actions would be unlikely to sustain black-tailed prairie dog, Greater Sage-Grouse, and raptor populations within the evaluation areas. Alternative C SSS management would have a major adverse effect on ACEC values.

Special Status Species – Plants
Alternative C would allow surface-disturbing and disruptive activities within special status plant habitat but not within known populations. While this management would protect known populations there are likely undocumented populations that would not be protected as surveys that could identify additional populations would not be required. Hole in the Wall is the only evaluation area containing mapped special status plant habitat. Since special status plants are unlikely in the remaining evaluation areas the level of beneficial effect on ACEC values would be negligible.

Heritage and Visual Resources

Cultural Resources
Surface-disturbing activities would be allowed near historic properties and other sensitive sites when appropriate mitigation is accomplished. Four evaluation areas (Cantonment Reno, Hole in the Wall, Pumpkin Buttes, and Welch Ranch) are known to contain sensitive cultural resources

and they are likely present in the other evaluation areas as well. The absence of management direction can lead to inconsistent management and adverse effects to the cultural resources and therefore ACEC values. The anticipated level of effect is moderate adverse.

Paleontological Resources
Mineral development and other surface-disturbing activities would not be prohibited in areas containing paleontological resources of high quality or importance such as the Dry Creek Petrified Tree evaluation area. Paleontological surveys would be required prior to surface-disturbing activities in all PFYC Class 4, and 5 formations; this management action would include a portion of the Hole in the Wall evaluation area. Surface-disturbing activities would be monitored on a project specific basis. Surveying provides the opportunity to identify paleontological resources but would not be expected to discover all paleontological resources, and therefore monitoring could be required or recommended. Likewise, monitoring reduces adverse effects to paleontological resources, by identifying the resources as they are uncovered, but does not prevent all adverse effects. Since only PFYC Class 4 and 5 area would be surveyed and therefore likely to be monitored it is likely some paleontological resources would be impacted therefore the level of adverse effects would be minor.

Visual Resources
All of Pumpkin Buttes and most of the Hole in the Wall evaluation areas as well as smaller portions of the Fortification Creek and Welch Ranch evaluation areas would be managed as VRM Class III. The remainder of the evaluation areas are managed as VRM Class IV. With the potential for development activities to dominate throughout all or large portions of five evaluation areas the anticipated effect to ACEC values would be major adverse.

Land Resources

Forest Products
Forests and woodlands of the planning area would be available for the collection and commercial harvest of forest products. Forest products would be managed to maximize economic return which includes no limitations on the size or shape of harvest areas. The harvest of forest products could adversely affect ACEC resource values such as fragile soils and watersheds, and visual resources. Burnt Hollow, Fortification Creek, Hole in the Wall, Pumpkin Buttes, and Welch Ranch evaluation areas all contain forest or woodland vegetation that could be available for available for forest product use. Commercial timber areas do not overlap any evaluation area. With the focus on economic return forest product activities are foreseeable within the evaluation areas and could be a major adverse effect to ACEC values.

Lands and Realty
Alternative C would focus on the disposal of public lands and would not acquire any additional lands. Lands with resource values including ACEC values would be candidates for disposal. The inability to acquire additional lands and the emphasis on public land disposal would have a major adverse effect on ACEC values.

Renewable Energy
The ACEC evaluation areas would be available for renewable energy development under Alternative C. Pumpkin Buttes is the only evaluation area with wind power potential of good or better. It is not foreseeable for any of the six other evaluation areas to be affected by renewable energy. Wind power development near the Buttes would impair the scenic qualities

of the evaluation area. As adverse impacts would likely be limited to one evaluation area the level of effect is minor.

Rights-of-Way and Corridors
ROW would be considered within the ACEC evaluation areas, including additional communication sites on the South Middle Butte. Communication sites and surface-disturbance from ROW within evaluation areas adversely effects ACEC values. Cantonment Reno, Dry Creek Petrified Tree, Fortification Creek, Pumpkin Buttes, and Welch Ranch are within the CBNG development area and given the mixed ownership pattern of both surface and mineral estate ROW applications area likely. The level of anticipated effect to ACEC values is major adverse.

Travel and Transportation Management
Alternative C, without ACEC designation, could allow motorized use within Burnt Hollow, Cantonment Reno and Dry Creek Petrified Tree evaluation areas. There would continue to be seasonal vehicle restrictions within the elk crucial winter range of the Fortification Creek evaluation area. Where open to motorized vehicles, including seasonally, motorists are limited to existing or designated routes. Limiting vehicle use to defined routes limits impacts to soil, water, vegetation and other resources including ACEC values. However, since motor vehicle use would be present within all eight evaluation areas the level of anticipated effect is moderate adverse.

Recreation
Alternative C would designate three of the ACEC evaluation areas as SRMAs including Burnt Hollow, Dry Creek Petrified Tree, and Welch Ranch. Surface-disturbing activities would be allowed within the SRMAs when consistent with resource values. Proposals for surface-disturbing or disruptive activities within the SRMAs and four remaining evaluation areas could be mitigated to protect the recreation and related resources such as soil, water, vegetation, wildlife habitat, and therefore ACEC values. Recreation use can have adverse effects, although typically localized, from compacting soil and vegetation which increases vegetation, wildlife displacement, and the development of recreation facilities. Considering Alternative C's emphasis on resource use, the overall level of effect recreation management actions would have on ACEC values is moderate adverse as surface-disturbing activities within the evaluation areas would be likely.

Livestock Grazing Management
Livestock grazing would be allowed within all evaluation areas. Increases in livestock stocking rates could be allowed with any increases in forage production allocated to livestock as the first priority. With the overall emphasis of Alternative C on resource uses the level of anticipated effect is moderate as there could be increased stocking rates and therefore grazing pressure within the ACEC evaluation areas.

Special Designations

Scenic or Back Country Byways
Alternative C would not designate any byways within the planning area. Increased use of Tipperary/Thompson Creek Roads and the Dry Creek Petrified Tree area would likely not occur. Alternative C would likely have no effect on ACEC values.

4.7.1.6. Alternative D

Areas of Critical Environmental Concern
Alternative D would designate two ACECs: Pumpkin Buttes (1,731 acres) and a portion of

Welch Ranch (1,116 acres) for a total of 2,849 acres. The other six evaluation areas would not be designated. Appendix S (p. 2531) lists the objectives and management prescriptions for each ACEC. Designation of ACECs would establish these areas as priority areas and management efforts would focus such that problems and issues could be addressed more effectively, thereby serving to better protect the relevant and important resources. Prescriptions specific to the relevant and important criteria at each ACEC would protect the integrity of the characteristics for which each ACEC was designated. Management prescriptions would vary dependent on the relevant and important values present at each site.

ACEC designation would not affect present leases or valid existing rights. However, when current leases expire, they could become closed to future leasing.

Physical Resources

Air Quality

Alternative D would involve stakeholders to model air quality effects and identify mitigation strategies. Air quality mitigation would beneficially affect ACEC values. Pumpkin Buttes ACEC and the Fortification Creek evaluation area are located within the center of the planning area and are substantially influenced by oil and gas emissions. Air quality mitigation would have a minor beneficial effect on ACEC values as only two ACECs totaling 2,849 acres would benefit.

Soil and Water Resources

Alternative D management actions allow surface-disturbing activities on sensitive soils and near water resources where resource management objectives can be met through project design or mitigation. The intent of the management actions are to allow for resource use while protecting soil, water, and other resources. Soil and water resource action alternatives would have a minor beneficial effect on all evaluation areas.

Cave and Karst Resources

Surface-disturbing activities and forest product sales would be restricted near significant caves benefitting ACEC values. The Hole-in-the-Wall evaluation area contains bands of karst-bearing formations. Because limited portions of one evaluation area would be affected, overall there would be a negligible beneficial effect on ACEC values.

Mineral Resources

Locatable Minerals

In addition to the present mineral withdrawals, another 82,691 acres would be recommended for withdrawal from mineral entry, including within designated ACECs. This management action would have a minor beneficial effect on ACEC values as locatable mineral development would be prohibited on less than 5 percent of the acreage being evaluated.

Leasable Minerals - Fluids

Additional leasing would be contingent on ACEC specific management plans. Pumpkin Buttes leases would be subject to NSO, and the portion of Welch Ranch containing federal fluid mineral estate would be closed to leasing under Recreation management alternatives. All other ACEC evaluation areas would be available for leasing and development. Existing leases would be honored, which could adversely affect the relevant and important criteria in ACECs that are not designated. Fortification Creek and Pumpkin Buttes leases are currently producing. Applications (APDs) are pending within Fortification Creek, Pumpkin Buttes, and Sagebrush

Ecosystem. Cantonment Reno, Dry Creek Petrified Tree, Fortification Creek, and Pumpkin Buttes have high potential for CBNG development; Fortification Creek also has moderate potential for conventional development. Development of the existing leases during the planning period is likely.

Salable Minerals
Mineral material activity would be prohibited within the two ACECs. Salable mineral development would be allowed only for administrative use in Burnt Hollow, Dry Creek Petrified Tree, and Hole-in-the-Wall SRMAs under recreation management alternatives and precluded at Cantonment Reno under cultural resource alternatives. Salable mineral development would be available within the Fortification Creek and Sagebrush Ecosystem evaluation areas. BLM-authorized salable mineral development is taking place adjacent to the Dry Creek Petrified Tree evaluation area and the Welch Ranch ACEC. Existing rights would be honored, expansion of permit areas into Welch Ranch would not be authorized. Salable mineral operations are generally localized and confined; occurring in discrete locations, not widespread such as oil and gas wells. The prohibition of salable mineral activities within ACECs is beneficial to ACEC values and affects six of the eight ACECs.

Fire and Fuels Management

Unplanned Fire (Wildfire) and Planned Fire (Prescribed Fire)
Unplanned fire management would be cognizant of resource goals, including ACECs, and respond accordingly including limiting heavy equipment use. Wildland and planned fire would be used to restore fire-adapted ecosystems. ACEC designation would heighten the awareness and therefore the protection and management of ACEC values in the three designated ACECs. The lack of designation within the other four evaluation areas could result in ACEC resource values being overlooked. These management actions would be a moderate benefit to the ACECs.

Biological Resources

Vegetation – Forests and Woodlands
Alternative D would use silvicultural treatments to maximize forest health. Management of old growth, aspen, and limber pine communities would be emphasized. These species are not widespread in Fortification Creek or Welch Ranch. Pumpkin Buttes does not contain forest or woodland vegetation. Other ACEC evaluation areas, most notably Hole-in-the-Wall may benefit from these management actions, but without designation the relevant and important ACEC values may be overlooked. The overall level of effect to ACEC values would likely be negligible beneficial.

Vegetation – Grassland and Shrubland Communities
Non-native plants could be used for short-term reclamation activities in accordance with the BLM reclamation policy. There is development potential within the three ACECs and four evaluation areas. ACEC-specific management which would regulate development activities within the two ACECs, but not the five evaluation areas. The presence of non-native species would detract from naturalness values for knowledgeable public land users. However, since reclamation areas would be limited in scale and duration the adverse effect would be negligible.

Vegetation – Riparian/Wetland Resources
Alternative D allows surface-disturbing activities within 500 feet of surface water where resources can be adequately protected. ACEC designation and management would further regulate

development activities within the two ACECs containing riparian or wetland communities, but not within the four non-designated evaluation areas. Since surface-disturbing activities would be minimal in the ACECs and regulated within the evaluation areas, the result would be a moderate benefit to ACEC values.

Invasive Species and Pest Management
ACEC designation would likely factor into determining treatment areas. The highest priority would be given to BLM-administered lands threatened by invasion from adjacent lands. Few ACECs or evaluation areas are likely to be the highest priority for treatment. Therefore, the benefit to ACEC values would likely be minor.

Fish and Wildlife Resources – Fish and Special Status Species – Fish
Surface-disturbing activities would be allowed within 0.25 mile of fish-bearing water bodies where impacts are determined to be acceptable. Other management actions include incorporating fisheries enhancement into reservoir design, maintaining or enhancing fish habitat, and designing water crossings to support fish passage. These management actions would be a moderate benefit as although they allow for development, the adverse impacts would be mitigated to maintain a sustainable fisheries. Welch Ranch is the only ACEC capable of supporting Yellowstone cutthroat trout, therefore the benefits of special status fish species management actions on ACEC values is negligible.

Fish and Wildlife Resources – Wildlife
Alternative D would provide seasonal and permanent-spatial buffers where surface-disturbing and disruptive activities would be allowed with adequate protection of raptor nests, big game calving areas and crucial winter range, and sharp-tailed grouse leks. The allowance for development and disruptive activities would result in localized impacts but overall should be moderately beneficial to wildlife, and therefore ACEC values.

Special Status Species – Wildlife (including Greater Sage-Grouse)
Similar buffers are provided for SSS such as bald eagles and Greater Sage-Grouse. Greater Sage-Grouse management would be based on the Wyoming BLM Policy (WY-2012-019) and Wyoming EO (2011-05). Pumpkin Buttes and Welch Ranch ACECs and the Fortification Creek evaluation area are outside of Priority Habitat Area. Four evaluation areas are wholly (Cantonment Reno, Dry Creek Petrified Tree, and Hole-in-the-Wall) or partially (Burnt Hollow) within Priority Habitat Area. The BLM and Wyoming Greater Sage-Grouse strategies are statewide strategies. While associated prescriptions will conserve Greater Sage-Grouse populations within Wyoming as a whole, they may not be sufficient to sustain the Greater Sage-Grouse population within the planning area, and therefore have a significant adverse effect on ACEC values for the Sagebrush Ecosystem evaluation area (467,897 acres). However, other ACECs would receive a negligible beneficial impact from SSS alternatives. Overall, the impact from SSS alternatives to ACECs are considered moderate adverse.

Special Status Species – Plants
Alternative D would allow surface-disturbing and disruptive activities within special status plant habitat but not within known populations. Surveys would be required that could identify and therefore protect additional populations. Hole-in-the-Wall is the only evaluation area containing mapped special status plant habitat. Since special status plants are unlikely in the remaining evaluation areas, the level of beneficial effect on ACEC values would be minor.

Heritage and Visual Resources

Cultural Resources
Mineral development and other surface-disturbing activities would be prohibited or restricted near specific historic properties and sensitive cultural sites. These management actions would protect cultural resources, and therefore ACEC values, within the Pumpkin Buttes, and Welch Ranch ACECs and the Cantonment Reno and Hole-in-the-Wall evaluation areas. The anticipated level of effect is major beneficial.

Paleontological Resources
Mineral development and other surface-disturbing activities would avoid areas containing paleontological resources of high quality or importance such as the Dry Creek Petrified Tree evaluation area. Paleontological surveys would be required prior to surface-disturbing activities in all PFYC Class 4, and 5 formations and Class 3 formations as needed. This management action would include all two ACECs and the five evaluation areas. Monitoring of surface-disturbing activities would be required based on survey results. The Hole-in-the-Wall ACEC contains areas of PFYC 5. Surveying provides the opportunity to identify paleontological resources, but would not be expected to discover all paleontological resources, and therefore monitoring could be required or recommended. Likewise, monitoring reduces adverse effects to paleontological resources, by identifying the resources as they are uncovered, but does not prevent all adverse effects. However, through the survey and monitoring requirements adverse effects should be negligible.

Visual Resources
Under Alternative D, Pumpkin Buttes and Welch Ranch ACECs, Dry Creek Petrified Tree and Hole-in-the-Wall SRMAs, and Cantonment Reno would be managed as VRM Class II. The Fortification Creek evaluation area outside of the WSA would be managed as VRM Class III. The Sagebrush Ecosystem would be managed as VRM Class III and IV. Management activities should not attract attention within six of the eight areas evaluated, therefore visual resources and ACEC should only be impaired to a minor degree.

Land Resources

Forest Products
Forests and woodlands of the planning area would be available for the collection and commercial harvest of forest products. Forest products would be managed to remain within ecologically sustainable limits and could include limitations on the size or shape of harvest areas. The harvest of forest products could adversely affect ACEC resource values such as fragile soils and watersheds, and visual resources. Burnt Hollow, Fortification Creek, Hole-in-the-Wall, Pumpkin Buttes, and Welch Ranch evaluation areas all contain forest or woodland vegetation that could for available for forest product use. Commercial timber areas do not overlap any evaluation area. Forest product activities are foreseeable within the evaluation areas and could be a moderate adverse effect to ACEC values.

Lands and Realty
Alternative D would allow land acquisition from willing land owners and actively seek to dispose of public lands which are difficult to manage and do not contain resource values. Acquisitions, from willing land owners, within or adjacent to the two ACECs and five evaluation areas would be desirable. There has been recent interest in exchanges by private land owners within the Burnt Hollow, and Hole-in-the-Wall evaluation areas and near the Welch Ranch ACEC. Under Alternative D, these exchanges would be pursued. The allowance for acquisitions would be a major benefit to ACEC values.

Renewable Energy
ACECs would be designated as renewable-energy exclusion areas under Alternative D. Pumpkin Buttes is the only ACEC with wind-power potential of good or better. It is not foreseeable for any of the six other evaluation areas to be affected by renewable energy. As renewable-energy development would likely be proposed within one ACEC, and therefore only one ACEC truly benefits from the exclusion area, the beneficial effect is minor.

Rights-of-Way and Corridors
New ROW, including new communication sites on the Pumpkin Buttes, would be prohibited within the two ACECs under Alternative D. ROWs would also be excluded within Dry Creek Petrified Tree and Hole-in-the-Wall SRMAs and Cantonment Reno under recreation or cultural alternatives. Within the Fortification Creek and Sagebrush Ecosystem evaluation areas, ROW would be considered but subject to stipulations to protect wildlife and sensitive species. Given the likelihood of new surface disturbance and visual intrusion within the evaluation areas, impacts from ROW alternatives would have a minor adverse effect on ACEC values.

Travel and Transportation Management
Alternative D would prohibit motorized use within Cantonment Reno, the EEA at Dry Creek Petrified Tree and the WSA portion of Fortification Creek evaluation areas. There would be seasonal vehicle restrictions within the elk crucial seasonal ranges within the Fortification Creek area, which would limit impacts to the relevance criteria. In all other evaluation areas and both designated ACECs, motorists would be limited to designated routes. Limiting vehicle use to defined routes limits impacts to soil, water, vegetation, and other resources including ACEC values. The level of anticipated effect is minor beneficial.

Recreation
Alternative D would designate the Welch Ranch ACEC as aSRMA. In addition, three of the ACEC evaluation areas would be designated as SRMAs including Burnt Hollow, Dry Creek Petrified Tree and Hole-in-the-Wall. Surface-disturbing activities, except for administrative use, would be prohibited within the SRMAs. Some protection of relevant and important values would be afforded in SRMAs that were not designated as ACECs in Alternative D due to the surface use restrictions. Recreation use itself can have adverse effects, although typically localized, from compacting soil and vegetation which increases vegetation and wildlife displacement, and the development of recreation facilities. Recreational use within ACECs may be mitigated to protect the ACEC values. Overall, the level of effect of recreation management actions on ACEC values is expected to be minor adverse as non-recreation-related surface-disturbing activities would be minimized within the four ACEC evaluation areas (including one designated ACEC) designated as SRMAs and reduced in the remaining evaluation areas.

Livestock Grazing Management
Livestock grazing would be allowed within the two ACECs and five evaluation areas where compatible with other resource values. Properly managed grazing can avoid adverse impacts and be beneficial to some resources. ACEC designation would provide a heightened awareness and further minimize the adverse effects of grazing on other resources including ACEC values. Overall, the level of anticipated effect is negligible adverse, as not all adverse effects can be avoided or mitigated such as inadvertent trampling of cultural artifacts or temporary over utilization, and not all evaluation areas would be designated.

Special Designations

Scenic or Back Country Byways
Alternative D would evaluate six routes for byway status. The potential Tipperary/Thompson Creek Roads byway accesses the Dry Creek Petrified Tree ACEC. If the Tipperary/Thompson Creek Roads byway were to be designated, it would be managed to encourage responsible use while protecting resource values. Increased byway use could lead to increased use of the Dry Creek Petrified Tree ACEC. Educational efforts would reduce the level of adverse effects on ACEC values from increased use to negligible.

4.7.1.7. Cumulative Impacts

The Proposed RMP designates Pumpkin Buttes and Welch Ranch as ACECs, a total of 2,849 acres (0.3% of the planning area). In these two areas, the ACEC will overlap with other designations, such as a TCP and SRMA. ACEC designation and management applies only to BLM actions. Actions on adjacent parcels such as CBNG development may affect the ability to manage for wildlife, visual resources, and other ACEC values.

4.7.1.8. Conclusion

Alternative B has the most beneficial effect on ACECs as eight ACECs would be designated and they would be managed to protect their relevant and important resource values. Alternative D is the second most beneficial alternative as two ACECs would be designated. Neither alternatives A or C would designate any ACECs. Alternative C emphasizes resource use and would therefore be the most adverse to ACEC values.

4.7.2. Scenic or Back Country Byways

This section describes the impacts of each alternative to National Byways, which are an important recreational resource on BLM-administered lands. Byways enhance motorized recreation, wildlife viewing, and heritage tourism.

4.7.2.1. Methods and Assumptions

Six potential byways, totalling 205 miles, are evaluated in alternatives B and D. There are no designated National Byways within the planning area (Alternative A) and none are proposed in Alternative C. The resource evaluated is the 9,765 acres of BLM surface within 0.25 mile of the evaluated byways. Adverse impacts to National Byways result from management actions that substantially limit or prevent public use of byways. Beneficial impacts result from actions that enhance the use of the byways. Assumptions used in this analysis, include, but are not limited to, the following:

- Designating a byway will increase use of the road and increase human presence in the area.
- Byways will be designated in cooperation with the affected counties, adjacent landowners, and other stakeholders.
- No formal land use constraints, land-use closures, are associated with the designation of byways. Any regulations or restrictions related to byway designation will affect BLM-administered lands only.
- Management prescribed for designated byways would provide opportunities for motor touring while enhancing understanding of the multiple uses of public lands.

Scale of impacts:

- Negligible: Less than 1 percent of proposed BCBs would be affected; only a small portion of a single evaluated BCB would be affected.
- Minor: 1-5 percent of proposed BCB would be affected; a moderate portion of a single evaluated BCB or small portions of 2-3 evaluated BCB would be affected.
- Moderate: 5-10 percent of proposed BCB would be affected; the majority of a single evaluated BCB or moderate portions of 2-4 evaluated BCB would be affected.
- Major: 10 percent of proposed BCB would be affected; the majority of several evaluated BCB or moderate portions of most evaluated BCB would be affected.

Significance Criteria

An adverse effect on Scenic or BCBs as a result of project actions would be considered potentially significant if the action would violate objectives associated with byway resource management and could not be mitigated.

4.7.2.2. Impacts Common to All Alternatives

Scenic or Back Country Byways
Managing byways to encourage responsible motorized recreational use while protecting other resource values would preserve the natural features for which the byway was designated. Allowing for multiple use along byways would increase local support for byway designation. Coordination with local residents is critical for successful designation and maintenance of any designated byway.

Physical Resources

The **Air Quality, Soil, and Cave and Karst Resources** programs do not have any management actions common to all alternatives that would affect byway use or management. There are also no air management actions by alternative that would affect byway use or management; air quality will not be addressed further in this section.

Water Resources
Water management actions common to all alternatives include managing surface-disturbing activities to prevent degradation of water quality, and managing water to meet Wyoming Standards for Healthy Rangelands. These actions would be applied to federal actions across the entire planning area, which could have a major beneficial effect on byway use by protecting the water quality and water based recreational opportunities along the byways.

Mineral Resources

Under management actions common to all alternatives, almost the entire planning area would be available for exploration and development of locatable, leasable fluid, and salable minerals.

Locatable Minerals
There is likely to be minimal overlap between locatable minerals activities and potential byways. The maximum foreseeable locatable minerals development is 1,455 acres (0.2%) of BLM surface in the planning area. Therefore, the potential for locatable minerals development to effect byway use would be negligible.

Leasable Minerals – Coal
Coal leasing would be limited to the high development potential areas of central Campbell County and northern Sheridan County, which are not traversed by any of the evaluated byways. Coal activity in the planning area would have no effect on byway management and is not further addressed in this section.

Leasable Minerals – Fluids
The foreseeable development predicts moderate to high CBNG development and moderate conventional development along the Lower Powder River Road. There are 2,659 acres (27%) of BLM surface (9,765 acres) within 0.25 mile of the evaluated byways along the Lower Powder River Road. Fluid mineral activities could have a major adverse effect on byway use.

Salable Minerals
The foreseeable development scenarios for all alternatives predict that salable minerals development would disturb less than one percent of BLM surface in the planning area. Overall, salable minerals development would likely have a negligible adverse effect on byway use.

Fire and Fuels Management

Fire and fuels management does not have any management actions common to all alternatives or by alternative that would affect byway management or use. There are also no fire and fuels management actions by alternative that would effect byway use or management; fire and fuels management will not be addressed further in the *Scenic or BCBs* section.

Biological Resources

Management actions for biological resources are designed to protect those resources typically by limiting surface-disturbing activities which would likely increase byway use.

Vegetation – Forests and Woodlands
The forests and woodland resource does not include any management actions common to all alternatives that would affect use of the evaluated byways. The effects from the forests and woodlands program on scenic or BCBs will vary by alternative.

Vegetation – Grassland and Shrubland Communities
Grass and shrub communities are the predominant vegetation types within the planning area. Relevant management actions include protecting plant communities, and cooperatively managing plant communities to maintain healthy rangelands. Surface-disturbing activities would be sited to reduce adverse effects to vegetation. These management actions would have a major beneficial effect on potential byway use.

Vegetation – Riparian/Wetland Resources
The primary byway that would be affected by riparian and wetland management is the Lower Powder River Road which parallels the Powder River; the Hazelton Road crosses multiple riparian areas. Management actions common to all alternatives that could affect byway management and use include managing riparian and wetland habitats to improve water quality, to manage towards properly functioning condition, to cooperatively enhance riparian/wetland systems, and to prevent the loss or degradation of riparian/wetland habitat. The Lower Powder River Road byway includes 2,659 acres (27%) of BLM surface (9,765 acres) within 0.25 mile of the evaluated byways. Riparian/wetland management actions could have a major beneficial effect on byway use.

Invasive Species and Pest Management
Invasive species and pest management does not have any management actions common to all alternatives or by alternative that would affect byway management or use. Invasive species and pest management will not be addressed further in the *Scenic or BCBs* section.

Fish and Wildlife Resources – Fish
There are several fisheries management actions that could potentially increase use along the Lower Powder River and Hazelton Roads including developing mitigation for surface-disturbing and disruptive activities, managing barriers to fish passage, providing public access to fish-bearing waters, and providing cooperative fisheries education. These management actions would likely have a major beneficial effect on byway use by increasing opportunities for water-based recreation.

Fish and Wildlife Resources – Wildlife and Special Status Species – Wildlife (including Greater Sage-Grouse)
Wildlife and SSS management actions common to all alternatives include mitigation for surface-disturbing activities; maintaining or improving wildlife habitats; protecting crucial wildlife habitats; managing, maintaining, and restoring Greater Sage-Grouse habitat; and a permanent disturbance-free buffer for bald eagle nests. Collectively, these actions could have a major beneficial effect on byway use by promoting habitat protection while causing the relocation, modification, or redesign of surface-disturbing activities.

Special Status Species – Plant
SSS plant management does not include any management actions common to all alternatives that would affect use of the evaluated byways. The effects from the SSS plant management program on scenic or BCBs will vary by alternative.

Special Status Species – Fish
Evaluated byways do not intersect with potential or occupied SSS fish habitat, therefore special status fish management would have no effect on byways and are not further addressed in this section.

Heritage and Visual Resources

There are no management actions common to all alternatives for cultural or paleontological resources that would affect byway management or use.

Visual Resources
A management action common to all alternatives is the requirement for permanent facilities to blend with the surrounding landscape. This requirement is secondary to managing within the VRM class, meaning that although facilities might be visible within VRM Class II through IV areas, mitigation for adverse effects on visual resources should be included wherever possible. Blending permanent facilities would help mitigate visual impacts however development activities would likely still be readily visible, therefore the beneficial effect of the management action on byway use is likely to be negligible.

Land Resources

Forest Products
Forest product management does not include any management actions common to all alternatives

that would affect use of the evaluated byways. The effects from the forest product program on scenic or BCBs will vary by alternative.

Lands and Realty
The lands and realty management actions common to all alternatives and which vary by alternative do not effect byway management or use and will not be addressed further in the *Scenic or BCBs* section.

Renewable Energy
Renewable-energy development does not include any management actions common to all alternatives that would affect use of the evaluated byways. The effects from the renewable-energy program on scenic or BCBs will vary by alternative.

Rights-of-Way and Corridors
The designation of ROW corridors adjacent to roads and other disturbance corridors could have a major adverse effect on byway use.

Travel and Transportation Management
Management actions common to all alternatives relate to standards for the location, design, and maintenance of roads and would have a major beneficial effect on byway use by providing a safe transportation network.

Recreation
Management actions common to all alternatives that would benefit byway use include providing diverse recreational opportunities, cooperatively developing recreational facilities and trails, and pursing access to public lands for recreational purposes. These management actions would likely have a major beneficial effect.

Lands With Wilderness Characteristics
None of the evaluated byways traverse areas containing wilderness characteristics; this resource will not be addressed further in this section.

Livestock Grazing Management
Livestock are seen by some recreational motorists as an integral component of the rural pastoral setting while to others they are a detriment. Livestock grazing would be managed to achieve healthy rangelands and special habitats, a benefit to byway users. Overall, these management effects are likely to have a minor beneficial effect.

Special Designations

Area of Critical Environmental Concern
There are no management actions common to all alternatives for ACECs that affect scenic or BCBs, the effects of ACEC management on the scenic or BCB resource will vary by alternative.

Wild and Scenic Rivers and Wilderness Study Areas
Management of WSRs or WSAs would not affect byway use. None of the evaluated routes directly access WSAs or the proposed Middle Fork suitable WSR segment; they will not be addressed further in the *Scenic or BCBs* section.

Socioeconomic Resources

There are no social, economic, or health and safety management actions common to all alternatives or by alternative that would have a measurable effect on byway management or use. Therefore, these topics are not addressed further in this section.

4.7.2.3. Alternative A

Scenic or Back Country Byways
Alternative A would continue management in accordance with the 1985 RMP as amended and maintained. Under Alternative A, there are no designated Scenic or BCBs. Mineral and other land use activities could occur along the potential byways reducing user satisfaction and safety. Development is likely along the Powder River Road, Trabing/Sussex Roads, an Tipperary/Thompson Roads; a major adverse effect.

Physical Resources

Soil
Soil management actions for Alternative A prohibit surface-disturbing activities on steep slopes and fragile soils with exception provisions. These actions would be applied to federal actions across the entire planning area, which could have a major beneficial effect on byway use by limiting development activities thereby enhancing recreational opportunities along the byways. However, inconsistent application of exceptions reduces the benefit to moderate.

Water Resources
Water management actions prohibit surface-disturbing activities within 500 feet of perennial streams and reservoirs with exception provisions. These actions would be applied to federal actions across the entire planning area, which could have a major beneficial effect on byway use by protecting the water quality and water based recreational opportunities along the byways. However, inconsistent application of exceptions reduces the benefit to moderate.

Cave and Karst Resources
While the 1985 does not contain any cave management decisions, surface-disturbing activities would likely be prohibited near significant caves. Much of the southern Big Horn Mountains is comprised of cave-bearing karst formation. Surface-disturbing activities could be prohibited near any significant caves along the Hazelton, Rome Hill, and Slip Roads proposed byways. This would likely include only a few caves and therefore a limited area of the byway evaluation area, a minor beneficial effect.

Mineral Resources

Locatable Minerals
There is likely to be minimal overlap between locatable minerals activities and potential byways. The potential for locatable minerals development to effect use within the byway evaluation areas would be negligible.

Leasable Minerals – Fluids
The foreseeable development predicts moderate to high CBNG development and moderate conventional development along the Lower Powder River Road. 2,659 acres (27%) of BLM surface (9,765 acres) within 0.25 mile of the evaluated byways are along the Lower Powder river Road. Fluid mineral activities could have a major adverse effect on byway use.

Salable Minerals
The foreseeable development scenario predicts that salable minerals development would disturb less than one percent of BLM surface in the planning area. There is likely to be minimal overlap between salable minerals activities and potential byways. Overall, salable minerals development would likely have a negligible adverse effect on byway use.

Biological Resources

Vegetation – Forests and Woodlands
The Hazelton and Slip Roads potential byways provide access to commercial forest management areas. Alternative A management actions are designed to promote biodiversity and healthy forests. These management actions would provide for management activities in the Hazelton and Slip Road evaluation areas which could cause short term reduction in users but overall diverse healthy forests and woodlands should promote byway use. Therefore, forest and woodland management actions would have a moderate beneficial effect.

Vegetation – Grassland and Shrubland Communities
The present RMP does not have any grass and shrub community management actions. Non-native species could be used in reclamation activities, which may have an adverse effect on knowledgeable byway users. However, most users would not notice therefore the impact would be negligible.

Vegetation – Riparian/Wetland Resources
The primary byway that would be affected by riparian and wetland management is the Lower Powder River Road which parallels the Powder River; the Hazelton Road crosses multiple riparian areas. The Lower Powder River Road byway includes 2,659 acres (27%) of BLM surface (9,765 acres) within 0.25 mile of the evaluated byways. Surface-disturbing activities would be prohibited within 500 feet of riparian and wetland areas with exception provisions. Inconsistent application of exceptions and only one evaluation area being affected reduces the benefit to minor.

Fish and Wildlife Resources – Fish
The BLM cooperatively works with the WGFD to manage fish habitat. Fish habitat is present along the Lower Powder River and Hazelton Roads. Cooperative management would likely have a moderate beneficial effect on byway use by increasing opportunities for water-based recreation along these two routes.

Fish and Wildlife Resources – Wildlife and Special Status Species – Wildlife (including Greater Sage-Grouse)
Wildlife and SSS management actions include mitigation for surface-disturbing activities; maintaining or improving wildlife habitats; protecting crucial wildlife habitats; managing Greater Sage-Grouse habitat; and a seasonal disturbance-free buffer for bald eagle nests. These management actions all include provisions for exceptions that have been inconsistently applied in the past. Collectively, these actions could have a moderate beneficial effect on byway use by promoting habitat protection while providing exceptions for surface-disturbing activities.

Special Status Species – Plants
There are presently no management actions for special status plant species. The potential byways are all existing roads and therefore would likely not be affected by any special status plant management actions.

Heritage and Visual Resources

Cultural Resources

Alternative A would prohibit surface-disturbing activities near certain historic sites including the Bozeman Trail and Crazy Woman Battle Site. This management action would affect nearly all of the Trabing/Sussex byway which follows the Bozeman Trail. Small portions of the Hazelton, Powder River, and Slip Road byways would also be affected. This management action could have a moderate beneficial effect on byway use by limiting development activities thereby enhancing recreational opportunities along the byways.

Paleontological Resources

The 1985 RMP prohibited mineral activities within the Dry Creek Petrified Tree EEA. The Tipperary/Thompson Creek Roads byway provides access to Dry Creek. This management action would have a negligible beneficial effect on byway as it effects a limited portion of one potential byway.

Visual Resources

Alternative A manages the Big Horn Mountains as VRM Class II which includes the Hazelton, Slip, and Rome Hill byway evaluation areas. VRM Class II management would restrict development so that activities should not attract the attention of the casual observer. The remainder of the evaluation areas are primarily within VRM Class IV, with small sections within VRM Class II or III. VRM Class IV allows management activities to dominate the view. The effect is moderate beneficial as approximately one-third of the evaluation area is within VRM Class II, which restricts but does not prohibit development which detracts from byway user satisfaction.

Land Resources

Forest Products

The Hazelton and Slip Roads evaluation areas provide access to the commercial forest areas. Current management forecasts 6,000 acres of development during the planning period, clear cuts are limited to 20 acres in size. Commercial forestry activities would reduce user safety and detract from user enjoyment of the potential byways. The effect is moderate adverse as only two evaluation areas would be affected.

Renewable Energy

Renewable energy development would be possible along the Hazelton and Slip Roads evaluation areas. Renewable energy activities would reduce user safety and detract from user enjoyment of the potential byways. The effect is moderate adverse as only two evaluation areas would be affected.

Rights-of-Way and Corridors

The designation of ROW corridors adjacent to roads and other disturbance corridors could have a major adverse effect on byway use.

Travel and Transportation Management

The byway evaluation areas are all public roads which would not be affected by the Alternative A management actions.

Recreation
The Dry Creek Petrified Tree EEA, along the Tipperary/Thompson Creek byway evaluation area is an established recreation site which is likely to not have any additional effect on byway use.

Livestock Grazing Management
Livestock are seen by some recreational motorists as an integral component of the rural pastoral setting while to others they are a detriment. Livestock grazing would be managed to achieve healthy rangelands and special habitats a benefit to byway users. Overall these management effects are likely to have a minor beneficial effect.

Special Designations

Areas of Critical Environmental Concern
Presently, there are no ACECs within the planning area, therefore they have no effect on potential byway use.

4.7.2.4. Alternative B

Scenic or Back Country Byways
Alternative B would emphasize resource conservation. Under this alternative, the BLM would evaluate six routes in the planning area for Scenic or BCB designation. This would help provide opportunities for the public to learn about the multiple uses of public lands, which would have a major benefit on any designated byway.

Physical Resources

Soil
Soil management actions for Alternative B prohibit surface-disturbing activities on steep slopes and fragile soils. These actions would be applied to federal actions across the entire planning area, which could have a major beneficial effect on byway use by limiting development activities, thereby enhancing recreational opportunities along the byways.

Water Resources
Water management actions would prohibit surface-disturbing activities within 500 feet of perennial streams and reservoirs, and manage riparian areas to restore perennial flows. These actions would be applied to federal actions across the entire planning area, which could have a major beneficial effect on byway use by protecting the water quality and water based recreational opportunities along the byways.

Cave and Karst Resources
Surface-disturbing activities would be prohibited within the karst formation. Much of the southern Big Horn Mountains is comprised of karst formation. Surface-disturbing activities would be prohibited along the Hazelton, Rome Hill, and Slip Roads proposed byways. This could have a moderate beneficial effect on byway use by limiting development activities, thereby enhancing recreational opportunities along the three byways.

Mineral Resources

Locatable Minerals
There is likely to be minimal overlap between locatable minerals activities and potential byways. The maximum foreseeable locatable minerals development is 1,455 acres (0.2%) of BLM surface in the planning area. Therefore, the potential for locatable minerals development to affect byway use would be negligible.

Leasable Minerals - Fluids
The foreseeable development predicts moderate to high CBNG development and moderate conventional development along the Lower Powder River Road. There are 2,659 acres (27%) of BLM surface (9,765 acres) within 0.25 mile of the evaluated byways along the Lower Powder River Road. There is also moderate to high CBNG potential along the Tipperary/Thompson Creek proposed byway. Fluid mineral activities could have a major adverse effect on byway use.

Salable Minerals
The foreseeable development scenarios for all alternatives predict that salable minerals development would disturb less than one percent of BLM surface in the planning area. Overall, salable minerals development would likely have a negligible adverse effect on byway use.

Biological Resources

Vegetation – Forests and Woodlands
The Hazelton and Slip Roads potential byways provide access to commercial forest management areas. Alternative B management actions are designed to promote natural processes and minimize silvicultural treatments. These management actions would be have a major beneficial effect on potential byway use by maintaining the natural ecosystems which the byways traverse.

Vegetation – Grassland and Shrubland Communities
Native plant species would be required for all reclamation activities. This may have a beneficial effect on byway users sensitive to non-native species.

Vegetation – Riparian/Wetland Resources
Riparian management actions would prohibit surface-disturbing activities within 500 feet of perennial streams and manage riparian areas to achieve DFC. These actions would be applied to federal actions across the entire planning area, which could have a major beneficial effect on byway use by protecting the water quality and water based recreational opportunities along the byways.

Fish and Wildlife Resources – Fish
There are several fisheries management actions that could potentially increase use along the Lower Powder River and Hazelton Roads including enhancing fisheries potential by prohibiting surface-disturbing and disruptive activities near fish-bearing water bodies, cooperating with the WGFD in stocking operations, designing and managing reservoirs for fisheries, and designing crossings to support fish passage. These management actions would likely have a major beneficial effect on byway use by increasing opportunities for water-based recreation.

Fish and Wildlife Resources – Wildlife and Special Status Species – Wildlife (including Greater Sage-Grouse)
Wildlife and SSS management actions under Alternative B prohibit surface-disturbing and disruptive activities within important habitat for many species including big game, raptors, upland game birds, herptiles, and bats. Collectively, these actions could have a major beneficial effect

on byway use by promoting habitat protection while causing the relocation, modification, or redesign of surface-disturbing activities.

Special Status Species – Plants
Surface-disturbing activities that could adversely impact special status plant habitat would be prohibited under Alternative B. Much of the Hazelton, Slip, and Rome Hill potential byways traverse special status plant habitat. These management actions would be have a major beneficial effect on potential byway use by providing undisturbed SSS plant habitat that would be attractive to byway users.

Heritage and Visual Resources

Cultural Resources
Alternative B would prohibit surface-disturbing activities within 5 miles of historic properties. This management action would affect nearly all of the Trabing/Sussex byway which follows the Bozeman Trail. Small portions of the Hazelton, Powder River, and Slip Roads byways would also be affected. This management action could have a major beneficial effect on byway use by limiting development activities, thereby enhancing recreational opportunities along the byways.

Paleontological Resources
Alternative B would prohibit mineral development in areas containing paleontological resources of high quality or importance. The Tipperary/Thompson Creek Roads byway provides access to the Dry Creek Petrified Tree EEA. Mineral activities are already precluded within the education area. This management action would have a negligible beneficial effect on byway as it effects a limited portion of one potential byway.

Visual Resources
Approximately one-third of the Powder River Road and 2 miles of the Hazelton Road traverse areas that would be managed as VRM Class II under Alternative B. There are 1,784 acres of BLM surface within 0.25 mile of the evaluated byways; 18 percent of the 9,765 acres of BLM surface in total within 0.25 mile of the evaluated byways. In VRM Class II areas, management activities would be regulated to not attract the attention of byway users. VRM could have a major beneficial effect on byway use by limiting development activities thereby enhancing recreational opportunities along the byways.

Land Resources

Forest Products
The Hazelton and Slip Roads potential byways provide access to commercial forest management areas. Alternative B management actions limit the area from which and the amount of commercial saw timber sold, to remain within ecologically sustainable limits. Commercial timber sales discourage byway use due to the truck traffic and vegetation disturbance along the byways. Limiting the size of treatment areas, designing treatment areas to have meandering boundaries, and limiting the available sales quantity would keep the impacts to byway use at a negligible level.

Renewable Energy
Renewable-energy development would be discouraged within the southern Big Horn Mountains reducing potential development along the Hazelton and Slip Roads. Renewable-energy activities could reduce user safety and detract from user enjoyment of the potential byways. The effect is moderate adverse, as development is possible along the byways.

Rights-of-Way and Corridors
Under Alternative B, ROW would be excluded from nearly all of BLM surface along the byways evaluated. The exclusion areas are for the protection of physical, biological, and heritage resources. Excluding ROW would have a major beneficial effect on byways by protecting resources important to byway users and enhancing recreational opportunities along the byways.

Travel and Transportation Management
Alternative B would prohibit motorized travel within big game crucial winter range and calving areas during the appropriate periods. These management actions would only affect the Slip Road which is not maintained for winter travel anyway; therefore these management actions would have a negligible impact on byway use as the amount of time during the seasonal closures when the Slip Road would be clear of snow and available for use is short. Travel off designated routes would be prohibited without a special use permit, this would likely affect some byway users but since few byway users are likely to be off-road recreationists, the effect is likely minor.

Recreation
The Dry Creek Petrified Tree EEA, along the Tipperary/Thompson Creek byway would be designated a SRMA under Alternative B. This is the only SRMA that would be accessed by an evaluated byway. As the Dry Creek Petrified Tree EEA is already an established site the additional SRMA designation is likely to have no effect on byway use.

Livestock Grazing Management
Livestock are seen by some recreational motorists as an integral component of the rural pastoral setting while to others they are a detriment. Livestock grazing would be managed to achieve healthy rangelands and special habitats, a benefit to byway users. Overall, these management effects are likely to have a minor beneficial effect.

Special Designations

Areas of Critical Environmental Concern
Cantonment Reno, along the Trabing/Sussex byway would be designated an ACEC under Alternative B. This is the only ACEC that would be accessed by an evaluated byway. Although Cantonment Reno is an established site with interpretive signs, the additional ACEC designation could bring additional attention to the historic fort and increase use of the byway. As only one byway would be affected, the effect would likely be negligible.

4.7.2.5. Alternative C

Scenic or Back Country Byways
Alternative C would not designate any Scenic or BCBs. Mineral and other land use activities could occur along the potential byways reducing user satisfaction and safety. Development is likely along the Powder River Road, Trabing/Sussex Roads, an Tipperary/Thompson Roads; a major adverse effect.

Physical Resources

Soil and Water Resources
Soil management actions for Alternative C allow surface-disturbing activities on steep slopes, fragile soils, and within 500 feet of perennial streams and reservoirs. These actions

would have a major adverse effect on byway use by enabling development activities thereby reducing recreational opportunities along the byways.

Cave and Karst Resources
Surface-disturbing activities would be prohibited near any significant caves along the Hazelton, Rome Hill, and Slip Roads. This would likely include only a few caves and therefore a limited area of the byway evaluation area, a minor beneficial effect.

Mineral Resources

Locatable Minerals
There is likely to be minimal overlap between locatable minerals activities and potential byways. The potential for locatable minerals development to effect use within the byway evaluation areas would be negligible.

Leasable Minerals - Fluids
The foreseeable development predicts moderate to high CBNG development and moderate conventional development along the Lower Powder River Road. 2,659 acres (27%) of BLM surface (9,765 acres) within 0.25 mile of the evaluated byways are along the Lower Powder river Road. Fluid mineral activities could have a major adverse effect on byway use.

Salable Minerals
The foreseeable development scenario predicts that salable minerals development would disturb less than one percent of BLM surface in the planning area. There is likely to be minimal overlap between salable minerals activities and potential byways. Overall, salable minerals development would likely have a negligible adverse effect on byway use.

Biological Resources

Vegetation – Forests and Woodlands
The Hazelton and Slip Roads potential byways provide access to commercial forest management areas. Alternative C management actions are designed to maximize forest health through intensive management. Commercial activity would decrease user safety and satisfaction within these two byway evaluation areas, a moderate adverse effect.

Vegetation – Grassland and Shrubland Communities
Non-native species could be used in reclamation activities, which may have an adverse effect on knowledgeable byway users. However, most users would not notice therefore the impact would be negligible.

Vegetation – Riparian/Wetland Resources
The primary byway that would be affected by riparian and wetland management is the Lower Powder River Road which parallels the Powder River; the Hazelton Road crosses multiple riparian areas. The Lower Powder River Road byway includes 2,659 acres (27%) of BLM surface (9,765 acres) within 0.25 mile of the evaluated byways. Surface-disturbing activities would be allowed within 500 feet of riparian and wetland areas. Development activity would reduce byway user safety and satisfaction, a minor adverse effect as a portion of two evaluation areas would be affected.

Fish and Wildlife Resources – Fish
Development activities would be allowed within fish habitat where resource objectives could be met. Fish habitat is present along the Lower Powder River and Hazelton Roads. Alternative C management would likely have a minor beneficial effect on byway use as although development could detract from user satisfaction opportunities for water-based recreation along these two routes would be maintained.

Fish and Wildlife Resources – Wildlife and Special Status Species – Wildlife (including Greater Sage-Grouse)
Wildlife and SSS management actions include mitigation for surface-disturbing activities; maintaining or improving wildlife habitats; protecting crucial wildlife habitats; managing Greater Sage-Grouse habitat; and a seasonal disturbance-free buffer for bald eagle nests. Collectively, these actions could have a moderate beneficial effect on byway use by promoting habitat protection.

Special Status Species – Plants
Surface-disturbing activities that could adversely impact special status plant populations would be prohibited under Alternative C. While much of the Hazelton, Slip, and Rome Hill Roads traverse special status plant habitat there are few documented populations and populations are typically of limited size. These management actions would be have a minor beneficial effect on potential byway use as there are few documented sensitive species plant populations along the routes that might attract byway users.

Heritage and Visual Resources

Cultural Resources
Alternative C would allow surface-disturbing activities near historic and sites with mitigation. This management action could affect nearly all of the Trabing/Sussex byway which follows the Bozeman Trail. Small portions of the Hazelton, Powder River, and Slip Road byways could also be affected. This management action would have a minor beneficial effect on byway use by mitigating development activities within the evaluation areas thereby enhancing recreational opportunities.

Paleontological Resources
High-quality paleontological resource sites would not be designated. This could potentially allow development activities within the Dry Creek Petrified Tree EEA. The Tipperary/Thompson Creek Roads byway provides access to Dry Creek. This management action would have a negligible adverse effect on byway use as it effects a limited portion of one potential byway.

Visual Resources
The byway evaluation areas are mostly within VRM Class IV, with some VRM. Class III. VRM Class IV allows management activities to dominate the view. The effect is major adverse as the amount of development that could be authorized would detract from byway user satisfaction.

Land Resources

Forest Products
The Hazelton and Slip Roads evaluation areas provide access to the commercial forest areas; management would maximize economic return. Commercial forestry activities would reduce user

safety and detract from user enjoyment of the potential byways. The effect is moderate adverse as only two evaluation areas would be affected.

Renewable Energy
Renewable energy development would be possible along the Hazelton and Slip Roads evaluation areas. Renewable energy activities would reduce user safety and detract from user enjoyment of the potential byways. The effect is moderate adverse as only two evaluation areas would be affected.

Rights-of-Way and Corridors
The designation of ROW corridors adjacent to roads and other disturbance corridors could have a major adverse effect on byway use.

Travel and Transportation Management
The byway evaluation areas are all public roads which would not be affected by the Alternative C management actions.

Recreation
No SRMAs would be designated. The Dry Creek Petrified Tree EEA, along the Tipperary/Thompson Creek byway evaluation area is an established recreation site which is likely to not have any additional effect on byway use.

Livestock Grazing Management
Livestock are seen by some recreational motorists as an integral component of the rural pastoral setting while to others they are a detriment. Livestock grazing would be managed to achieve healthy rangelands and special habitats a benefit to byway users. Overall these management effects are likely to have a minor beneficial effect.

Special Designations

Areas of Critical Environmental Concern
Presently, there are no ACECs within the planning area, therefore they have no effect on potential byway use.

4.7.2.6. Alternative D

Scenic or Back Country Byways
Alternative D promotes resource use while conserving physical, biological, and heritage resources. Under this alternative, the BLM would evaluate six routes in the planning area for scenic or BCB designation. This would help provide opportunities for the public to learn about the multiple uses of public lands, which would have a major benefit on any designated byway.

Physical Resources

Soil
Soil management actions for Alternative D would allow surface-disturbing activities on steep slopes and fragile soils where the BLM determines the soil resource could be adequately protected. These actions while providing for development along the byways also conserve areas with fragile soils that would be attractive to byway users. Overall, there would likely be a moderate beneficial effect on byway use.

Water Resources
Water management actions would allow surface-disturbing activities within 500 feet of perennial streams and reservoirs where the water resource could be adequately protected. These actions while providing for development along the byways also conserve water quality and water-based recreational opportunities that would be attractive to byway users. Overall, there would likely be a moderate beneficial effect on byway use.

Cave and Karst Resources
Much of the southern Big Horn Mountains, accessed by the Hazelton, Rome Hill, and Slip Roads proposed byways, is comprised of cave-bearing karst formations. Surface-disturbing activities would be prohibited in the vicinity of significant caves. While Hazelton and Rome Hill Roads help provide access to cave areas, only the Slip Road has identified significant caves in close proximity to the potential byway, therefore the effect of cave and karst management on byway use is likely to be minor.

Mineral Resources

Locatable Minerals
There is likely to be minimal overlap between locatable minerals activities and potential byways. The maximum foreseeable locatable minerals development is 1,455 acres (0.2%) of BLM surface in the planning area. Therefore, the potential for locatable minerals development to affect byway use would be negligible.

Leasable Minerals - Fluids
The foreseeable development predicts moderate to high CBNG development and moderate conventional development along the Lower Powder River Road. The 2,659 acres (27%) of BLM surface (9,765 acres) within 0.25 mile of the evaluated byways are along the Lower Powder River Road. There is also moderate to high CBNG potential along the Tipperary/Thompson Creek proposed byway. Fluid mineral activities could have a major adverse effect on byway use.

Salable Minerals
The foreseeable development scenarios for all alternatives predict that salable minerals development would disturb less than one percent of BLM surface in the planning area. Overall, salable minerals development would likely have a negligible adverse effect on byway use.

Biological Resources

Vegetation – Forests and Woodlands
The Hazelton and Slip Roads potential byways provide access to commercial forest management areas. Alternative D management actions are designed to promote forest and woodland health; particularly aspen communities and old growth forest stands. While these management actions provide for intensive management they also support healthy ecosystems attractive to byway users. These management actions would be have a moderate beneficial effect on potential byway use.

Vegetation – Grassland and Shrubland Communities
Non-native plant species would be allowed only for short-term reclamation activities. This should not effect byway users sensitive to non-native species as their presence would be short duration.

Vegetation – Riparian/Wetland Resources
Riparian management actions would allow surface-disturbing activities within 500 feet of riparian and wetland areas where they could be adequately protected. These actions while providing for development along the byways also conserve riparian/wetland resources and water based recreational opportunities that would be attractive to byway users. Overall, there would likely be a moderate beneficial effect on byway use.

Fish and Wildlife Resources – Fish
There are several fisheries management actions that could potentially increase use along the Lower Powder River and Hazelton Roads including enhancing fisheries potential by limiting surface-disturbing and disruptive activities near fish-bearing water bodies, considering fish when designing and managing reservoirs, and designing crossings to support fish passage. These management actions would likely have a moderate beneficial effect on byway use by increasing opportunities for water-based recreation.

Fish and Wildlife Resources – Wildlife and Special Status Species – Wildlife (including Greater Sage-Grouse)
Wildlife and SSS management actions under Alternative D regulate surface-disturbing and disruptive activities within important habitat for many species including big game, raptors, upland game birds, reptiles, and bats. Collectively, these actions could have a moderate beneficial effect on byway use by promoting habitat conservation attractive to byway users while allowing development protective of the wildlife resource.

Special Status Species – Plants
Surface-disturbing activities that could adversely impact special status plant populations would be prohibited under Alternative D. While much of the Hazelton, Slip, and Rome Hill potential byways traverse special status plant habitat where there are few documented populations and populations are typically of limited size. These management actions would have a minor beneficial effect on potential byway use as there are few documented sensitive species plant populations along the routes that might attract byway users.

Heritage and Visual Resources

Cultural Resources
Alternative D would prohibit surface-disturbing activities near identified historic properties. This management action would affect portions of the Trabing/Sussex byway which follows the Bozeman Trail and individual sites along the Hazelton, Powder River, and Slip Road byways. This management action could have a moderate beneficial effect on byway use by limiting development activities, thereby enhancing recreational opportunities along the byways.

Paleontological Resources
Mineral development under Alternative D would avoid areas containing paleontological resources of high quality or importance. The Tipperary/Thompson Creek Roads byway provides access to the Dry Creek Petrified Tree EEA. Mineral activities are already precluded within the education area. This management action would have a negligible beneficial effect on byway as it affects a limited portion of one potential byway.

Visual Resources
Short stretches of Tipperary/Thompson Creek and Hazelton byways traverse areas that would be managed as VRM Class II under Alternative D. In VRM Class II areas management

activities would be regulated to not attract the attention of byway users. Most of the remaining BLM surface traversed by the byways evaluated would be managed as VRM Class III where management activities may attract attention but should not dominate the view of byway users. VRM would likely have a minor beneficial effect on byway use as development activities could be readily visible along much of the byways, while in limited areas development activities would not attract the attention of byway users.

Land Resources

Forest Products

Alternative D management actions limit the amount of commercial saw timber sold to remain within ecologically sustainable limits. Commercial timber sales discourage byway use due to the truck traffic and vegetation disturbance along the byways. Designing treatment areas to have meandering boundaries, and limiting the available sales quantity would keep the impacts to byway use at a negligible level.

Renewable Energy

Renewable-energy development would be prohibited within the southern Big Horn Mountains preventing potential development along the Hazelton and Slip Roads. Renewable-energy activities could reduce user safety and detract from user enjoyment of the potential byways. The effect is moderate beneficial as only two evaluation areas are protected from development.

Rights-of-Way and Corridors

Alternative D excludes or regulates ROW on much of BLM surface along the byways evaluated. The avoidance and exclusion areas are for the protection of physical, biological, and heritage resources. Avoiding and excluding ROW would have a major beneficial effect on byways by protecting resources important to byway users and enhancing recreational opportunities along the byways.

Travel and Transportation Management

Alternative D would prohibit motorized travel within big game crucial winter range and calving areas during the appropriate periods. These management actions would only affect the Slip Road which is not maintained for winter travel anyway; therefore these management actions would have a negligible impact on byway use as the amount of time during the seasonal closures when the Slip Road would be clear of snow and available for use is short. Limited travel off designated routes would be allowed without a special use permit, this would likely have a minor beneficial effect on byway users. As the allowance for limited off-road use effects all of the byways whereas the big game timing limitations only affect the Slip Road, the overall effect of these management actions on byway use is likely to be minor beneficial.

Recreation

The Dry Creek Petrified Tree EEA, along the Tipperary/Thompson Creek byway would be designated a SRMA under Alternative D. This is the only SRMA that would be accessed by an evaluated byway. As the Dry Creek Petrified Tree EEA is already an established site the additional SRMA designation is likely to have no effect on byway use.

Livestock Grazing Management

Livestock are seen by some recreational motorists as an integral component of the rural pastoral setting while to others they are a detriment. Livestock grazing would be managed to achieve

healthy rangelands and special habitats a benefit to byway users. Overall these management effects are likely to have a minor beneficial effect.

Special Designations

Areas of Critical Environmental Concern
There are no ACECs under Alternative D that would be accessed from an evaluated byway; therefore there would be no effect from ACEC management on byway use.

4.7.2.7. Cumulative Impacts

Public use of any designated Scenic or BCBs could affect landowners and residents adjacent to the routes. In particular, increased traffic in fairly remote areas could result in requests for assistance, especially in times of bad weather. All evaluated Scenic or BCBs are county roads. The roads may require additional maintenance above the current level of county maintenance.

4.7.2.8. Conclusion

Alternatives B and D evaluate six potential byways. Alternative B would be the most protective of the scenic values for which byways are proposed. Alternative D provides for more land use activities and development than Alternative B which could be visible from designated byways. No byways are proposed in alternatives A or C.

4.7.3. Wild and Scenic Rivers

Protecting and enhancing scenic qualities, fisheries, recreation, wildlife values, and the relatively unmodified character of the area in a near-natural setting are the primary objectives for managing waterway segments eligible and suitable for inclusion in the WSR system. Because Manual 6400 - Wild and Scenic Rivers provides clear guidance on prohibited versus allowable uses in WSR corridors, the range of alternatives or discretionary actions regarding WSRs is limited. There would be no or undetectable effects on WSRs from the proposed management of the following: **Physical Resources, Mineral Resources, Biological Resources, Lands and Realty, Renewable Energy, Rights-of-Way and Corridors, Travel and Transportation Management, Livestock Grazing Management, Scenic or Back Country Byways, or Wilderness Study Areas.** Management of several other resources or resource uses, including recreation, could have effects on recreational uses of public lands and waters. Water, fire and fuels, and vegetation management activities could influence the distribution of fish and wildlife and cause variations in the function and appearance of the landscape and river corridor. Other activities (including development of historic mining claims) that could affect ORVs in WSRs would be due to grandfathered or valid existing rights. Manual 6400 - Wild and Scenic Rivers provides guidance on the level of activity allowed, and adverse effects on ORVs are minimized as much as possible. In addition, there are no identified proposed actions contrary to managing the river to protect the ORVs and free-flowing condition.

4.7.3.1. Methods and Assumptions

The methods and assumptions used in the WSR analysis include, but are not limited to, the following:

- The management of suitable and eligible WSRs is guided by policy that supersedes the administrative flexibility and management alternatives in this document.
- Recreational use of river corridors eligible and suitable for WSR designation will increase. If the proposed corridors are designated, prescribed management will protect the ORVs for which the rivers were designated, requiring a mix of education and regulatory measures.
- Actions approved by the BLM will not affect the eligibility or suitability status of the subject waterways.
- Because the Middle Fork Powder River is currently the only waterway in the planning area that meets the requirements for eligibility and suitability, the extent of environmental consequences is limited to the area adjacent to that waterway. (Note: Corridor boundaries for the Middle Fork of the Powder River suitable segment are delineated by the canyon rims, except in cases where "rim-to-rim" exceeds an average of a half mile).
- The analysis will discuss the ability to protect the outstanding remarkable values, eligibility or suitability of the waterway, and to manage the river in a free-flowing condition.
- If Congress designates the Middle Fork Powder River as a WSR, the BLM will manage it in accordance with the National Wild and Scenic Rivers Act of 1968 and BLM Manual 6400–Wild and Scenic Rivers.
- Management prescribed for rivers found suitable for designation in the National Wild and Scenic Rivers System would protect the identified ORVs, tentative classification, and free-flowing condition of those segments.

Significance Criteria

An adverse effect on an WSR as a result of federal actions would be considered potentially significant if the following were to occur:

- Any action that would impact the identified ORVs for the Middle Fork Powder River suitable segment or lead to a determination of nonsuitability for WSR designation.
- An action that changes the tentative classification of the segment from "wild" to either "scenic" or "recreation."

4.7.3.2. Impacts Common to All Alternatives

Interim management requires protection and/or enhancement of the ORVs, free-flowing condition, and water quality of the river corridor and maintenance of the tentative classification until Congress designates the river or releases it for other uses. The adverse effects of proposed actions would be mitigated to protect the existing values upon which suitability is based. The Middle Fork Powder River will be managed in cooperation with stakeholders to meet the requirements specified in Manual 6400 and will maintain the tentative "wild" classification of the suitable segment. Management action VRM-5005 specifies that Congressional designation of the Middle Fork Powder River WSR would designate the corridor as VRM Class I, it would not be necessary to amend the RMP. The alternative prescriptions below indicate the VRM Class that would be assigned if Congress releases the suitable segment to other uses.

4.7.3.3. Alternative A

No previous decision has been made regarding continued management of the Middle Fork Powder River should Congress choose to release the river from further consideration. Alternative A would continue management in accordance with the 1985 RMP (BLM 1985c) as amended and maintained. The Middle Fork Powder River canyon is currently managed as a VRM Class II,

offering adequate protection of scenic values in the canyon to maintain eligibility for designation as a WSR. Middle Fork Canyon is currently closed to motorized use and livestock grazing. Given the topographical restraints in Middle Fork Canyon and the relatively low mineral potential, land uses, including minerals extraction and ROW, would be unlikely. Under Alternative A, project proposals for resource development (e.g., mineral resources, ROW, road construction) or extraction would be managed on a case-by-case basis pursuant to Manual 6400. The protection of the free-flowing condition and outstanding remarkable values could not be guaranteed.

4.7.3.4. Alternative B

Alternative B would emphasize resource conservation. If Congress releases the Middle Fork Powder River suitable segment to other uses, management under Alternative B would protect and enhance the free-flowing condition and identified ORVs of the river. Alternative B provides for continued protections of the river corridor even if Congress does not designate the Middle Fork Powder River as a WSR. The area would continue to be managed as VRMClass II, rather than VRM Class I, if released from consideration. Middle Fork Canyon would be included in the SRMA designation, which would increase protections from the effects of overuse or damage from recreationists. In addition, the SRMA would be unavailable for leasing and withdrawn from minerals entry, further protecting the WSR resource. Other land use activities would be managed on a case-by-case basis.

4.7.3.5. Alternative C

Alternative C would emphasize resource use. Under this alternative, if Congress releases the Middle Fork Powder River suitable segment to other uses, special provisions or restrictions would not be imposed on the river corridor. Project proposals for resource development or extraction would be managed on a case-by-case basis. The canyon of the Middle Fork Powder River would be managed as a VRM Class III area, which would reduce protections for scenic values. The Middle Fork Powder River would be included in the SRMA designation, which would increase protections from the effects of overuse or damage from recreationists. However, the area would not be closed to minerals leasing. Due to the low mineral potential in the area coupled with the rough topography and distance to market, the anticipated demand for mineral development is low. Thus, the adverse effect of allowing minerals leasing may not affect the river corridor's ORVs, as development is not reasonably foreseeable. Alternative C could conceivably allow for future dams along the river should the river be released from consideration, which would damage the river's free-flowing condition.

4.7.3.6. Alternative D

Alternative D would allow resource use if the activity can be conducted in a manner that conserves physical, biological, and heritage and visual resources, and would emphasize moderate constraints on resource uses to reduce adverse effects on resource values. Alternative D is the Proposed RMP. If Congress releases the Middle Fork Powder River suitable segment to other uses, management under Alternative D would retain the free-flowing condition and identified ORVs of the river. This alternative would provide for continued protection of the river corridor. The area would be managed as VRM Class II. Middle Fork Powder River would be included in the SRMA designation, which would increase protections from the effects of overuse or damage from recreationists. In addition, the SRMA would be unavailable for leasing and withdrawn

from minerals entry, which would further protect the WSR resource. Other land use activities would be managed on a case-by-case basis.

4.7.3.7. Cumulative Impacts

The section of Middle Fork Powder River that is suitable for WSR designation is surrounded by BLM-administered public lands with no private inholdings. Private land intersects the river both upstream and downstream of suitable segments recommended for WSR designation. The river corridor does briefly cross through a corner of land managed by the WGFD in the Ed O. Taylor Winter Game Range. The placement of a dam on private lands in the vicinity of Middle Fork Powder River has been proposed in the past; a dam would affect the river's free flowing condition. Such an action would require a permit through the State of Wyoming. There are currently no RFAs in the WSR corridor that would impact identified ORVs, change the tentative classification, result in a determination of nonsuitability, and/or disqualify the river from potential designation.

4.7.3.8. Conclusion

The impacts from each alternative will be contingent on whether or not Congress acts to release the Middle Fork Powder River from consideration or to designate as a WSR. Table 4.63, "Summary of Ability to Protect Characteristics of Wild and Scenic Rivers" (p. 1626) summarizes the ability of each alternative to protect the free-flowing condition and outstanding remarkable values of WSRs.

Table 4.63. Summary of Ability to Protect Characteristics of Wild and Scenic Rivers

	Alternative A	Alternative B	Alternative C	Alternative D
Free-flowing Characteristic	Insufficient protection	Sufficient protection	Insufficient protection	Sufficient protection
Outstanding Remarkable Values	Insufficient protection	Sufficient protection	Insufficient protection	Sufficient protection

4.7.4. Wilderness Study Areas

Because BLM Manual 6330 - Management of Wilderness Study Areas provides clear guidance on prohibited versus allowable uses in WSAs, the range of alternatives or discretionary actions regarding WSAs is limited. There would be no effects on WSAs from the proposed management of the following: physical resources, mineral resources, fish and wildlife resources, lands and realty, renewable energy, ROW and corridors, Scenic or BCBs, or WSRs. Management of several other resources or resource uses, including recreation and livestock grazing, could have indirect, often minor, effects. Water, fire and fuels, and vegetation management activities could influence the distribution of fish and wildlife and cause variations in the function and appearance of the landscape. This could influence recreational use patterns and preferences in the planning area, but would not substantially alter the demand for or distribution of activities in the planning area as a whole, and are not further discussed in this section. Other activities (including range improvements and development of historic mining claims) that could affect wilderness values in WSAs would be due to grandfathered or valid existing rights. The WSA Manual provides guidance on the level of activity allowed, and adverse effects on wilderness values are minimized as much as possible.

4.7.4.1. Methods and Assumptions

The methods and assumptions used in the impact analysis for WSAs include but are not limited to the following:

- The extent of environmental consequences is limited to the BLM-administered lands in the North Fork, Gardner Mountain, and Fortification Creek WSAs.
- All WSAs in the planning area will continue to be managed under the BLM Manual 6330 - Management of Wilderness Study Areas until such time as Congress either designates all or portions of the WSAs as wilderness or releases the WSAs or portions of the WSAs from further consideration for wilderness.
- Should Congress release a WSA from further consideration for designation as wilderness, the lands within the WSA will be subject to consideration as lands with wilderness characteristics.
- Any resource-dependent activity approved in a WSA will be rigorously managed to ensure that it would not impair the area's wilderness characteristics or its suitability for designation as wilderness.
- Wilderness interim management is subject to Valid Existing Rights and the Grandfather Clause (see Manual 6330) under all of the alternatives.
- WSA designation helps protect air quality and watersheds, soil and water quality, ecological stability, plant and animal gene pools, archeological and historical sites, habitats for wildlife, and quality of forage.
- Although areas considered or proposed for withdrawal from mineral entry would require approval by Congress, this analysis assumes the area would be approved and withdrawn.
- The analysis will focus on the ability of the BLM to protect the wilderness characteristics (naturalness; opportunities for outstanding primitive and unconfined recreation and solitude; and identified supplemental values).

4.7.4.2. Impacts Common to All Alternatives

Restrictions on solid and fluid minerals development and motorized vehicle use in WSAs would be consistent with BLM Manual 6330 - Management of Wilderness Study Areas and protect the pristine character of these areas. Managing WSAs under VRM Class I objectives is mandated through WO-IM-2000-096 (BLM 2000b) and helps to meeting BLM Manual 6330 - Management of Wilderness Study Areas goals and objectives.

Under BLM Manual 6330 - Management of Wilderness Study Areas, the wilderness characteristics of WSAs and the areas' opportunities for solitude and primitive, unconfined recreation, as well as any special features that further qualify them for consideration as wilderness, would be preserved. At the same time, activities that would adversely affect the wilderness character of the areas would be prohibited.

4.7.4.3. Alternative A

Alternative A would continue management in accordance with the 1985 RMP (BLM 1985c) as amended and maintained. Under Alternative A, if Congress does not designate the WSAs as wilderness, automatically leasing these areas for oil and gas development would not protect the wilderness characteristics in each of the WSAs. An estimated 150 CBNG wells could be developed in the Fortification Creek WSA. Mineral potential in Gardner Mountain and North Fork WSAs is low; therefore, it is not likely that these WSAs would be developed. Under Alternative A, the WSAs are designated as "limited to designated routes" and most of the WSAs

are seasonally closed to motorized use. While no routes have been designated within any WSA, the possibility for route designation exists and clarification is necessary to meet the objectives set forth in BLM Manual 6330 - Management of Wilderness Study Areas. Mechanized vehicle use is often considered inconsistent with wilderness values, however, no specific decisions related to mechanized use have been made within the planning area. The protection of the wilderness characteristics from motorized or mechanized uses could not be guaranteed.

4.7.4.4. Alternative B

Alternative B would emphasize resource conservation. Should Congress release a WSA from further consideration, a plan amendment would be necessary. Designating an ACEC for the Fortification Creek elk herd would provide additional protections for the fauna that inhabit the Fortification Creek WSA, but may not specifically protect wilderness characteristics. The protection of the wilderness characteristics from other resource uses would be subject to policy regarding lands with wilderness characteristics and dependent on a future RMP amendment. Current policy (Secretarial Order 3310) directs the BLM to protect the naturalness of Lands with Wilderness Characteristics. Should policy change during the life of the plan, protection of wilderness characteristics in released WSAs could not be guaranteed. Prohibiting motorized and mechanized vehicle use would be consistent with management of designated wilderness areas and would be appropriate in WSAs.

4.7.4.5. Alternative C

Alternative C would emphasize resource use. Should Congress release a WSA from further consideration, a plan amendment would be necessary. The protection of the wilderness characteristics from other resource uses would be subject to policy regarding lands with wilderness characteristics and dependent on a future RMP amendment. Current policy (Secretarial Order 3310) directs the BLM to protect the naturalness of lands with wilderness characteristics. Should policy change during the life of the plan, protection of wilderness characteristics in released WSAs could not be guaranteed. Prohibiting motorized use would be consistent with BLM Manual 6330 - Management of Wilderness Study Areas. This alternative would not prohibit mechanized use in WSAs, which could result in reduced opportunities for primitive and unconfined recreation or solitude from the perspective of “traditional” back country visitors.

4.7.4.6. Alternative D

Alternative D would generally allow resource use if the activity can be conducted in a manner that conserves physical, biological, and heritage and visual resources, and would emphasize moderate constraints on resource uses to reduce adverse effects on resource values. Alternative D is the Proposed RMP. The impacts to WSAs of implementing Alternative D would be the same as Alternative B.

4.7.4.7. Cumulative Impacts

There is a 640-acre section owned by the State of Wyoming in the Fortification Creek WSA, while not presently leased for mineral development, it has been leased (but not developed) in the past and could be leased and potentially developed. However, adverse effects on the WSA resource are not anticipated from RFAs. There are no other inholdings within the boundaries of any of the WSAs; therefore, there would be no non-BLM actions in the Gardner Mountain or North Fork

WSA. There are private and state parcels adjacent to each of the WSAs, but activities outside of WSA boundaries would not affect the eligibility of a WSA for Wilderness designation.

4.7.4.8. Conclusion

The impacts from each alternative will be contingent on whether or not Congress acts to release the WSAs from consideration or to designate as Wilderness.

4.8. Socioeconomic Resources

4.8.1. Social Conditions

This section addresses the potential for the alternatives to affect social conditions in the planning area, including direct, indirect, short-term, and long-term effects. Appendix A (p. 1771) identifies the laws, regulations, policies, and guidance considered in this analysis of effects on social conditions.

Potential effects on social conditions include changes in population, such as fluctuations caused by economic boom and bust cycles; changes in the demand for housing and community services, along with community fiscal conditions, which can affect the ability of state, regional, and local governments to supply community services such as education; and changes in community character, culture, and social trends. The BLM does not directly manage social conditions in the planning area. However, BLM management actions have the potential to indirectly affect social conditions. For example, a decision to prohibit future oil and gas exploration or leasing on BLM-administered mineral estate could adversely affect the availability of job opportunities in the planning area, which could lead to reductions in populations in parts of the planning area as residents move away to find jobs elsewhere (or as fewer people move to the planning area for jobs).

4.8.1.1. Methods and Assumptions

Effects on social conditions associated with each of the alternatives were compared to existing conditions and trends in the planning area to establish a context for comparison. Effects on social conditions were broadly classified into three categories: effects on population; effects on housing and community services; and effects on customs, culture, and social trends. This section also describes each alternative's consistency with local land use plans.

Assumptions used in this analysis include:

- Economic conditions, especially jobs, labor earnings, and economic output, will continue to drive population growth in the planning area.
- Any population change that could reasonably be associated with the alternatives will likely be due to changes in employment opportunities.
- Federal, state, and local taxes will continue to be collected on minerals produced in the planning area.
- While BLM management actions will have some influence on the pace and timing of economic development in the planning area, the pace and timing of development also depends and will continue to depend on many factors, most notably the price of coal, oil, gas, and mineral

products on regional, national, and international markets, and national and world economic conditions (e.g., business cycles).

4.8.1.2. Impacts Common to All Alternatives

Any population change that could reasonably be associated with the alternatives would likely be due to changes in employment opportunities. Employment opportunities related to activities on BLM surface and federal mineral estate include jobs in exploration, development, and production of minerals, including oil and gas, coal, and locatable and salable minerals; jobs in livestock production; jobs related to various recreation activities and OHV use; and other types of jobs that rely on BLM-administered lands, such as management of wildlife and plant species that use BLM-administered lands. The economic analysis provides quantitative estimates of employment in the planning area due to oil and gas, grazing, and recreation activities on BLM surface and federal mineral estate. These quantitative estimates are used to aid in the analysis of effects on population.

The analysis that follows focuses on the effects of BLM actions. It is important to note that many other events outside BLM control could alter economic and social trends. For example, oil and gas prices could change as a result of an expansion or contraction of world or national economic activity, and that could affect the pace of development or the quantity of development. Similarly, state and local laws regulating the subdivision of land could alter land ownership and development patterns, which could affect open space and physical landscapes. Where the analysis finds that BLM actions would result in minimal or no change in social conditions, it does not necessarily mean there would be no change. Other forces frequently result in changes to complex economic and social trends.

The economic and social analysis incorporates variations in pace of development over time, where that information can be predicted with reasonable certainty. However, under all alternatives, the pace of development could differ from the rate assumed in the analysis. The BLM has limited control over the pace of development because it only authorizes economic activities such as oil and gas drilling, and does not perform these activities. An abrupt shift in the pace of development could result in short-term effects (beneficial or adverse) on demand for housing and community services, and on the supply of tax revenues from residences or businesses to support community services, due to short-term changes in job opportunities and the resulting change in inmigration or outmigration trends. Any such effects would likely be more severe for smaller communities, which are less likely to be able to absorb a sudden influx of new residents, or to continue to support existing infrastructure if outmigration suddenly increased.

Under all alternatives, the BLM would continue to consider effects on socioeconomics from site-specific actions, and incorporate socioeconomic issues into the analyses of environmental, social, and economic effects, such as the NEPA analyses required for certain future site-specific actions.

4.8.1.3. Alternative A

Effects on Population

Under Alternative A, activities on BLM surface and federal mineral estate related to oil and gas development, livestock grazing, and recreation would support an average of 3,478 full-time and part-time jobs per year, which represents approximately 6.0 percent of total employment in the

planning area as of 2011. It is important to note that this does not constitute an increase of 3,478 jobs per year over current employment; it more closely represents an estimate of the contribution of certain activities on BLM surface and federal mineral estate to overall employment in the planning area. In addition, as noted in the *Economic Conditions* section, this does not include activities not modeled in Impact Analysis for Planning Model (IMPLAN), including coal, renewable-energy, and locatable and salable minerals exploration and production.

The economic analysis is performed at a regional level and integrates across all producing sectors; thus, these job opportunities would occur throughout the planning area. This is also true because oil and gas developers, livestock producers, and recreation providers operate throughout the planning area. However, job opportunities would concentrate in population centers. This would not represent a shift in the current distribution of employment opportunities. Indeed, because Alternative A would continue current management actions, it would not alter the overall trend of development in the planning area, nor would it alter current trends in population growth and decline.

Effects on Housing and Community Services

Changes in population have the potential to change the demand for housing and community services, such as roads, schools, and police and fire protection. County-wide vacancy rates in 2010 were 9.4 percent in Campbell County, 16.9 percent in Johnson County, and 11.3 percent in Sheridan County. These percentages, which include rental units as well as units for purchase, represent approximately 1,800 vacant units in Campbell County, 770 vacant units in Johnson County, and 1,600 in Sheridan County (U.S. Census Bureau 2011a). Vacancy rates for rental properties have been on the order of 7 to 8 percent in recent years according to the data from the Wyoming Housing Database Partnership presented in Chapter 3. However, because Alternative A would not result in a change in BLM management actions, management under this alternative should not result in a change in either the total demand for housing and community services or its geographic distribution.

If development is slower or faster than the relatively steady pace assumed in this analysis, there could be short-term effects on the demand for housing and community services and on the supply of tax revenues from residences or businesses to support community services. It would likely be more difficult for smaller communities to absorb sudden changes of this nature. If national and international energy prices, operator business strategies, or other factors lead to a rapid pace of development, there could be sudden short-term increases in demand for community services as a result of new jobs and increased population. However, local and state tax revenues collected from energy production could help mitigate short-term increases in demand for services, because tax revenues help pay for community services.

Consistency with Adopted County Land Use Plans

As noted in Chapter 3, BLM RMPs must be consistent with adopted local land use plans, and the BLM must take practical steps to resolve any identified conflicts between federal and local plans. The *Social Conditions* section in Chapter 3 summarizes adopted land use plans for each of the counties in the planning area. Alternative A would maintain existing policies for BLM-administered land management and therefore would not result in any inconsistencies or conflicts with existing county land use plans.

Land use plans for the three counties in the planning area emphasize the importance of coordinating with the BLM and other federal land management agencies. Under Alternative A,

the BLM would continue current policies of coordinating with county and municipal land use planners. Alternative A also would continue current policies related to livestock grazing, which would be consistent with the adopted Johnson County land use plan. That plan identifies three key concerns related to BLM-administered lands and resources, all related to the continued availability of public lands for livestock grazing, the policies that affect the management of federal grazing allotments, and the continued financial viability of livestock grazing operators (Johnson County 2005).

Effects on Quality of Life and Local Culture

Historically, the communities in the planning area developed around a combination of resource-based industries, including resource extraction, ranching, trade and commerce, and providing supplies and services to visitors. Quality of life for the people who live in the planning area depends on continued economic opportunities and features of the natural landscape. Alternative A would maintain existing BLM policies. Historically, these policies have contributed – along with other government policies and the actions of private firms and residents – to economic viability and resilience. But it should be noted that under Alternative A there could be other forces at play that would drive changes in the economic, physical, and social conditions in the planning area.

Although there are specific groups with particular interests regarding specific land uses (e.g., oil and gas, recreation interests), based on current land use plans, there is local support for both conservation of natural resources and the economic viability of resource-based industries. This is consistent with multiple uses of BLM-administered lands, including the development of mineral and energy resources, livestock grazing authorizations, continued access to BLM-administered lands for recreation, and conservation of wildlife and native vegetation. Alternative A would continue the current BLM practice of allowing multiple uses. The BLM also would continue to incorporate socioeconomic considerations into the planning process and perform socioeconomic analyses as required for site-specific actions.

4.8.1.4. Alternative B

Effects on Population

Under Alternative B, activities on BLM-administered lands and mineral estate related to oil and gas development, livestock grazing, and recreation would support an average of 109 full-time and part-time jobs per year, which represents approximately 0.2 percent of total employment in the planning area as of 2011. Compared to Alternative A, which represents the continuation of current trends, this represents a decrease of 3,373 jobs, or approximately 5.8 percent of employment in 2011. Most of these job losses would be related to restrictions on development of oil and gas from federal surface. The BLM predicts that oil and gas development on nearby state or fee surface land would partially compensate for the projected employment decrease (see the analysis of cumulative impacts for more information).

A decrease in employment opportunities could result in a decrease in population in the planning area because people might leave the area to seek employment elsewhere. The expected magnitude of any such decrease would be similar to the magnitude of employment loss, but would be lower because some people (e.g., those who are retired) live on unearned income and therefore do not depend directly on employment for their economic wellbeing. In other words, if 5.8 percent of employed people and their families leave the planning area, the population would decrease by

less than 5.8 percent because some residents in the planning area are in retired or otherwise nonworking families.

There would be job opportunities related to BLM actions throughout the planning area. Oil and gas developers, livestock producers, and recreation providers operate throughout the planning area. However, job opportunities would concentrate in population centers. This would likely produce a shift in the current geographic distribution of employment opportunities within the planning area depending on the communities' dependence on oil and gas development. Based on the county distribution of oil and gas production and employment (described in the *Socioeconomic Resources* section of Chapter 3), the reduced direct employment supported by oil and gas activities on BLM-administered lands would be more likely felt in Johnson and Campbell counties, than in Sheridan County, although indirect employment impacts could be more broadly distributed. Moreover, Alternative B would result in employment moving away from jobs related to oil and gas development and into other sectors. One result would be lower average wages because jobs related to oil and gas tend to have relatively higher average earnings per job than jobs related to services and agriculture. As a result, the implementation of Alternative B would likely produce a decline in population that would be noticeable in regional statistics.

Under Alternative B, job opportunities, and therefore job losses, would concentrate in population centers. Because the job losses under Alternative B would be primarily related to oil and gas development, any population changes would concentrate in areas that service oil and gas companies, such as Gillette.

Effects on Housing and Community Services

Alternative B management could result in decreased population and therefore would result in decreased demand for housing and community services. Alternative B management also would result in a reduced tax base for providing these services. Areas that service oil and gas production companies, such as Gillette, would experience the greatest reductions in reduced tax base.

If the decline in the oil and gas sector occurs slower or faster than the relatively steady pace assumed in this analysis, there could be short-term effects on demand for housing and community services, and on the supply of tax revenues from residences or businesses to support community services. It would likely be more difficult for smaller communities to absorb sudden changes of this nature.

Consistency with Adopted County Land Use Plans

BLM RMPs must be consistent with adopted local land use plans, and the BLM must take practical steps to resolve any identified conflicts between federal and local plans. The *Social Conditions* section in Chapter 3 summarizes adopted land use plans for each of the counties in the planning area. Alternative B would result in a measurable reduction in employment opportunities, amounting to about 5.8 percent of current employment, with the reduction attributable to direct, indirect, and induced effects related to oil and gas exploration and production (see "Effects on Population" above, and "Effects on Employment" in the *Economic Conditions* section). Accordingly, it could be argued that Alternative B would result in a conflict with the adopted land use plan of Campbell County, which indicates that the social stability of the county is based on "high-paying direct and indirect jobs related to mineral extraction in the county and depends on these industries being stable and viable." BLM management actions in Alternative B would not affect the long-term viability of mineral extraction activities on state and private land, but it would decrease the number of job opportunities available related to oil and gas over the life of the RMP.

Land use plans for the three counties in the planning area emphasize the importance of coordinating with the BLM and other federal land management agencies. Under this alternative, the BLM would continue current policies of coordinating with county and municipal land use planners. The adopted Johnson County land use plan identifies three key concerns related to BLM-administered land and resources, all related to the continued availability of public lands for livestock grazing, the policies that affect the management of federal grazing allotments, and the continued financial viability of livestock grazing operators (Johnson County 2005). In this context, it is notable that Alternative B would result in less available acres for livestock grazing.

Effects on Quality of Life and Local Culture

Historically, the communities in the planning area developed around a combination of resource-based industries, including resource extraction, ranching, trade and commerce, and providing supplies and services to tourists. Quality of life for the people who live in the planning area depends on continued economic opportunities and features of the natural landscape. Alternative B would reduce economic opportunities overall, but also would result in lower air pollution and other adverse environmental effects associated with oil and gas development.

Although there are specific groups with particular interests regarding specific land uses (e.g., oil and gas, recreation interests), based on current land use plans, there is local support for both conservation of natural resources and the economic viability of resource-based industries. This is consistent with multiple uses of BLM-administered lands, including the development of mineral and energy resources, livestock grazing authorizations, continued access to BLM-administered lands for recreation, and conservation of wildlife and native vegetation. Alternative B would continue the current BLM practice of allowing multiple uses, but would prioritize other uses over oil and gas development and livestock grazing. This would be inconsistent with the culture advocated by others (e.g., oil and gas developers) and would promote the culture advocated by others (e.g., wilderness advocates). Based on the analysis of impacts to recreation in the Chapter 4 *Recreation* section, Alternative B would favor groups associated with nonmotorized and non-consumptive recreational opportunities, as opposed to groups associated with motorized and consumptive recreation.

4.8.1.5. Alternative C

Effects on Population

Under Alternative C, activities on BLM-administered land and mineral estate related to oil and gas development, livestock grazing, and recreation would support an average of 4,201 full-time and part-time jobs per year, which represents approximately 7.2 percent of total employment in the planning area as of 2011. This total figure is somewhat higher than that for Alternative A. The IMPLAN model predicts a very small decrease in jobs related to livestock grazing, and more jobs related to oil and gas exploration, development, and production.

Because the economic analysis is performed at a regional level and integrates across all producing sectors, the job opportunities under Alternative C would occur throughout the planning area. Although this alternative would result in a slight shift away from jobs related to livestock grazing and toward jobs related to oil and gas development, this shift would not likely be noticeable in regional statistics for agriculture given the magnitude of the figures involved (i.e., three fewer jobs related to livestock grazing, but approximately 700 more related to oil and gas development). However, it is important to note that these figures reflect not just the sectors directly affected,

but also indirectly related sectors such as product wholesalers and distributors. The geographic distribution of job opportunities would not change substantially from current conditions, and jobs would continue to concentrate in population centers.

An increase in employment opportunities could result in an increase in population in the planning area as people are drawn to the new jobs. The expected magnitude of any such increase would be similar to the magnitude of employment gained, as new employees move to the area with their families. Because this alternative would not result in a measurable increase in employment overall, it would not result in a change in population.

Effects on Housing and Community Services

Alternative C may result in a small increase in population and therefore could result in higher demand for housing and/or community services. The current vacancy rates for housing units in the three counties (reported in the analysis for Alternative A) indicate that housing would likely be available for people migrating into the community, if that were to happen as a result of BLM actions in Alternative C. Alternative C would also result in a slightly greater tax base for providing these services than is presently available (see the *Economic Conditions* section). This would likely be perceived as a beneficial effect on community governments.

As noted under Impacts Common to All Alternatives, if development occurs slower or faster than the relatively steady pace assumed in this analysis, there could be short-term effects on demand for housing and community services, and on the supply of tax revenues from residences or businesses to support community services. It would likely be more difficult for smaller communities to absorb sudden changes of this nature.

Consistency with Adopted County Land Use Plans

BLM RMPs must be consistent with adopted local land use plans, and the BLM must take practical steps to resolve any identified conflicts between federal and local plans. The *Social Conditions* section in Chapter 3 summarizes adopted land use plans for each of the counties in the planning area. Alternative C would not result in any inconsistencies or conflicts with existing county land use plans.

Land use plans for the three counties in the planning area emphasize the importance of coordinating with the BLM and other federal land management agencies. Under Alternative C, the BLM would continue current policies of coordinating with county and municipal land use planners. The adopted Johnson County land use plan identifies three key concerns related to BLM-administered land and resources, all related to the continued availability of public lands for livestock grazing, the policies that affect the management of federal grazing allotments, and the continued financial viability of livestock grazing operators (Johnson County 2005). In this context, it is notable that Alternative C would result in slightly more surface disturbance that could adversely affect livestock grazing operators (approximately 1.3 times as much as under Alternative A). Although the reduction in available AUMs for grazing operators could adversely affect their financial viability, there is a potential that some operators would benefit from offsetting financial benefits from surface agreements and leasing their mineral development rights to oil and gas producers. However, it is unclear on balance whether or not the financial gain would fully compensate for all the oil and gas related impacts.

Effects on Quality of Life and Local Culture

Historically, the communities in the planning area developed around a combination of resource-based industries, including resource extraction, ranching, trade and commerce, and providing supplies and services to tourists. Quality of life for the people who live in the planning area depends on continued economic opportunities and features of the natural landscape. Alternative C would increase economic opportunities, but also would result in more air pollution and other adverse environmental effects associated with oil and gas development.

Although there are specific groups with particular interests regarding specific land uses (e.g., oil and gas, recreation interests), based on current land use plans, there is local support for both conservation of natural and the economic viability of resource-based industries. This would be consistent with multiple uses of BLM-administered lands, including the development of mineral and energy resources, livestock grazing authorizations, continued access to BLM-administered lands for recreation, and conservation of wildlife and native vegetation. Alternative C would continue the current BLM practice of allowing multiple uses, but would prioritize oil and gas development over other uses. This would be consistent with the culture advocated by some interest groups (e.g., oil and gas interests) and would be inconsistent with the culture advocated by others (e.g., wilderness advocates). Based on the analysis of impacts to recreation in the Chapter 4 *Recreation* section, Alternative C would be less favorable to nonmotorized and non-consumptive recreational users.

4.8.1.6. Alternative D

Effects on Population

Under Alternative D, activities on BLM surface and federal mineral estate related to oil and gas development, livestock grazing, and recreation would support an average of 3,557 full-time and part-time jobs per year, which represents approximately 6.1 percent of total employment in the planning area as of 2011. This total is a slight increase over Alternative A, with about 82 more jobs. The distribution of jobs under Alternative D would be essentially the same as Alternative A.

Because the economic analysis is performed at a regional level and integrates across all producing sectors, the job opportunities under Alternative D would occur throughout the planning area. The geographic distribution of job opportunities would not change substantially from current conditions, and jobs would continue to concentrate in population centers.

An increase in employment opportunities could result in an increase in population in the planning area as people are drawn to the new jobs. The expected magnitude of any such increase would be similar to the magnitude of employment gained as new employees move to the area with their families. Because this alternative would result in a barely measurable increase in employment overall, it would not result in a change in population.

Effects on Housing and Community Services

Alternative D would not likely result in a measurable increase in population and therefore would not result in higher demand for housing or community services. To the extent that there would be in-migration, recent housing vacancy rates suggest that the current housing stock could accommodate newcomers. Alternative D would also result in a slightly greater tax base for providing community services than is presently available (see the *Economic Conditions* section). This would likely be perceived as a beneficial effect on community governments.

As noted under Impacts Common to All Alternatives, if development occurs slower or faster than the relatively steady pace assumed in the analysis, there could be short-term effects on demand for housing and community services, and on the supply of tax revenues from residences or businesses to support community services. It would likely be more difficult for smaller communities to absorb sudden changes of this nature.

Consistency with Adopted County Land Use Plans

BLM RMPs must be consistent with adopted local land use plans, and the BLM must take practical steps to resolve any identified conflicts between federal and local plans. The *Social Conditions* section in Chapter 3 summarizes adopted land use plans for each of the counties in the planning area. Alternative D would not result in any inconsistencies or conflicts with existing county land use plans.

Land use plans for the three counties in the planning area emphasize the importance of coordinating with the BLM and other federal land management agencies. Under this alternative, the BLM would continue current policies of coordinating with county and municipal land use planners. The adopted Johnson County land use plan identifies three key concerns related to BLM-administered land and resources, all related to the continued availability of public lands for livestock grazing, the policies that affect the management of federal grazing allotments, and the continued financial viability of livestock grazing operators (Johnson County 2005). In this context, it is notable that Alternative D would result in slightly more surface disturbance that could adversely affect livestock grazing operators (approximately 1.3 times as much as under Alternative A). Although the reduction in available AUMs for grazing operators could adversely affect their financial viability, there is a potential that some operators would benefit from offsetting financial benefits from surface agreements and leasing their mineral development rights to oil and gas producers. However, it is unclear on balance whether or not the financial gain would fully compensate for all the oil and gas related impacts.

Effects on Quality of Life and Local Culture

Historically, the communities in the planning area developed around a combination of resource-based industries, including resource extraction, ranching, trade and commerce, and providing supplies and services to tourists. Quality of life for the people who live in the planning area depends on continued economic opportunities and features of the natural landscape. Alternative D would increase economic opportunities, but also would result in more air pollution and other adverse environmental effects associated with oil and gas development.

Although there are specific groups with particular interests regarding specific land uses (e.g., oil and gas, recreation interests), based on current land use plans, there is local support for both conservation of natural resources and the economic viability of resource-based industries. This would be consistent with multiple uses of BLM-administered lands, including the development of mineral and energy resources, livestock grazing authorizations, continued access to BLM-administered lands for recreation, and conservation of wildlife and native vegetation. Alternative D would continue the current BLM practice of allowing multiple uses, but would prioritize oil and gas development over other uses. This would be consistent with the culture advocated by some interest groups (e.g., oil and gas interests) and would be inconsistent with the culture advocated by others (e.g., wilderness advocates). Based on the analysis of impacts to recreation in Chapter 4 *Recreation* section, Alternative D would manage resources to also benefit recreation users, both of nonmotorized and motorized recreation.

4.8.1.7. Cumulative Impacts

See the *Cumulative Impacts* section in the *Economic Conditions* section for a discussion of cumulative impacts to social conditions.

4.8.1.8. Conclusion

Social conditions relate primarily to economic conditions that can influence the growth or development of employment and income. The economic sectors in the planning area most likely to be directly affected by BLM management actions are related to the service sector and resource development activities (e.g., oil and gas). That is not to imply that grazing, ranching, and other agricultural activities are unaffected or unimportant. However, based on their economic contribution to the overall economy, changes in this sector would be expected to produce relatively minor economic effects on the overall economy. Nevertheless, the agricultural sector in this area is quite influential in terms of community character and identity. Therefore, land management decisions affecting the agricultural sector have the potential to have far-reaching effects on the social structure in the planning area, even though the economic effect is not expected to be substantial. Adverse effects on the agricultural sector are expected primarily under Alternative B.

Table 4.64, "Overall Impacts on Social Conditions by Alternative" (p. 1638) summarizes effects on social conditions as described in this section for alternatives B, C, and D compared to Alternative A. Although the table attempts to summarize effects and characterize them as low, medium, or high, it does not classify these impacts as beneficial or adverse. Effects on social conditions seen as beneficial by some interest groups could be seen as adverse by other interest groups. For example, increased emphasis on resource conservation under Alternative B would result in a change from the current balance of uses, which wilderness advocates would likely see as a beneficial effect, but oil and gas development interests would see as an adverse effect. In the table, high impacts are those that would result in substantial changes to an existing condition in a way that would affect a large number of people and/or endure for a long period; low impacts are those that would be felt by a limited number of people and for a limited period; and medium impacts are intermediate.

Table 4.64. Overall Impacts on Social Conditions by Alternative

Impact	Alternative A	Alternative B	Alternative C	Alternative D
Impact on Population	Low Impact	Medium Impact (likely reductions focused in oil/gas service areas, which generally correspond to population centers)	Low Impact	Low Impact
Impact on Housing and Community Services	Low Impact	Medium Impact (due to likely population reductions)	Low Impact	Low Impact
Consistency with Adopted County Land Use Plans	No effect	Medium impact (due to loss of employment opportunities from oil and gas and loss of grazing land)	No effect	No effect

Impact	Alternative A	Alternative B	Alternative C	Alternative D
Impacts on Quality of Life and Local Culture	Low Impact (continued policy of balanced use; no change from current conditions)	Low to Medium Impact (change from recent trends would constitute greater emphasis on resource conservation)	Low Impact (change from recent trends would constitute greater emphasis on resource development)	Low Impact (continued policy of balanced use, with some change from current conditions)
Source: Based on the analysis of impacts to social conditions, as described in the text.				

4.8.2. Economic Conditions

This section addresses the potential for the alternatives to affect economic conditions in the planning area, including direct, indirect, induced, short-term, and long-term effects. Appendix A (p. 1771) identifies the laws, EOs, regulations, policies, and guidance considered in the analysis of economic conditions.

Potential effects include changes in regional economic output, employment and earnings, and tax revenues for local, state, and federal governments. In terms of economic modeling analysis, direct and indirect effects are assumed to occur simultaneously, even though in reality these effects could take time to work their way through the economic sectors in the analysis area. For example, an action to permit gas exploration and production could result in the direct infusion of money into several economic sectors and indirect infusions into related sectors. In economic modeling, these effects would be assumed to occur instantaneously. Moreover, continued direct infusion of money into the planning area's economy created by the decision to lease oil and gas would be analyzed over the life of the project, which in this case is likely to represent a multi-year period of production. Therefore, the analysis is designed to account for the economic activity produced by planning decisions over time. The effects are estimated on an annual basis from 2009 through 2028, based on the estimated annual direct effect of the alternatives.

4.8.2.1. Methods and Assumptions

The BLM used the IMPLAN model to estimate the economic effects of BLM management actions under the alternatives. IMPLAN is a regional economic model that provides a mathematical accounting of the flow of money, goods, and services through a region's economy. The model provides estimates of how a specific economic activity translates into jobs and income for the region. It includes the "ripple effect" (or "multiplier effect") of changes in sectors that might not be directly affected by management actions, but are linked to industries that are directly affected. In IMPLAN, these ripple effects are called indirect impacts (for changes in industries that sell inputs to the industries that are directly affected) and induced impacts (for changes in household spending as household income increases or decreases due to the changes in production).

For example, an increase in oil and gas production implies more money would be spent on the maintenance of existing oil and gas equipment or new oil and gas equipment; this implies more money would be spent in sectors that provide inputs to oil and gas support services or equipment sectors. These production and consumption, or input-output, relationships allow IMPLAN to estimate the indirect and induced effects based on changes in production that might result from implementing an alternative. Appendix U (p. 2589) provides technical assumptions and additional information about the IMPLAN model.

Assumptions used in this analysis include:

- Employment, earnings, and output continue to be drivers of economic and population growth in the planning area.
- Economic benefits to the planning area accrue from BLM-influenced activities, such as oil and natural gas development, livestock grazing, and recreation. Economic benefits to the analysis area also accrue from wildlife grazing, to the extent that wildlife grazing contributes to the availability of and demand for recreational activities.
- The IMPLAN model can reasonably estimate indirect and induced benefits due to minerals, livestock grazing, and recreation. (The IMPLAN production coefficients were modified to reflect the interaction of producing sectors in the planning area.)
- Recreation-related expenditures by residents occur in the region, but do not represent new money coming into the study area; therefore, analysis of the economic effects of recreation considers only recreation expenditures of nonresidents in the three-county planning area. In other words, there is a multiplier affect associated with nonresident recreation-related spending because it results in an input of new money into the study region.
- The analysis of direct and indirect effects associated with oil and gas activities considers only activities on BLM surface and federal mineral estate, whereas the cumulative impacts analysis considers activities on state and fee land and mineral estate.
- For livestock grazing, the analysis reflects a "worst-case" assumption that all acres affected by surface-disturbing activities (from all the sources listed in Appendix G (p. 1937)) are lands currently authorized for grazing. Therefore, the number of acres available for grazing in 2028 is the number of acres currently available, minus acres that are affected long term by surface-disturbing activities. In addition, the analysis of grazing reflects the assumption that surface-disturbing activities occur at a constant rate over time.

While BLM management actions influence the pace and timing of economic development in the planning area, the pace and timing of development also depends and will continue to depend on many factors. These include national and international energy demand, supply, and prices; operator business strategies; production conditions in the planning area; and demand and supply for agricultural products. Because the pace of development in the planning area is not known, this analysis assumes a relatively constant rate of development. Therefore, actual effects could differ (e.g., there could be boom and bust type short-term effects that would differ from long-term effects) if the rate of development changes substantially.

The IMPLAN production coefficients were modified to reflect the interaction of producing sectors in the planning area. As a result, the calibrated model does a better job of generating multipliers and the subsequent effects that reflect the interaction between and among the sectors in the planning area compared to a model using unadjusted national coefficients. Specifically, worker productivity in oil and gas production is higher in Wyoming than nationally, and more of the hay used for livestock feed is produced in the region, compared with national averages. Key variables used in the IMPLAN model were filled in using data specific to Wyoming, including employment estimates, labor earnings, and total industry output.

Changes in economic activity have an effect on federal, state, and local tax revenues. While all sectors of the economy contribute to tax revenues, the analysis of tax revenue effects focuses on oil and gas production because almost all of the measurable variation in economic activity among alternatives is in oil and gas. Tax revenues assessed include those from federal royalties, state severance taxes and from local ad valorem taxes. Counties would also receive revenues from the distribution of lease rents and bonus payments for oil and gas leases. These were not included in the calculations but would represent a relatively small amount of additional revenues to the state and counties.

The focus of the analysis is on regional earnings and output, employment, and tax revenue, with the region defined as the three-county planning area. Because the regional economic model relies on interlinkages among sectors that are aggregated over the entire planning area, it is not possible to predict total (direct, indirect, and induced) economic effects for individual communities in the three-county area. However, to the extent possible, geographical areas of likely concentration of impacts are discussed.

4.8.2.2. Impacts Common to All Alternatives

The focus of this analysis is on the resource activities most likely to be affected by land management decisions and that have an economic value to the study area, including oil and gas development, livestock grazing, and recreation. Actions from resource programs or constraints (as described for each alternative) that affect oil and gas development, livestock grazing, and recreation (e.g., surface-disturbing activities that affect the amount of land available for grazing) are included by implication. Also included by implication are restrictions on ROW and corridors, because the BLM RFD Scenario for oil and gas, which provides estimated numbers of oil and gas wells and production, incorporates the restrictions on ROW and corridors. Restrictions on new ROW would tend to be a negligible factor in the decision to develop additional oil and gas wells in fields that are already producing, but could be a more important factor in a decision to develop a new field. Seasonal closures would not apply to existing oil and gas permits, although scheduled activities would be expected to be performed outside of restriction period when possible. Seasonal closures could add costs to future leases and permits, if these were to be displaced to nearby areas to circumvent the seasonal closures.

Economic effects related to other resources, such as coal, locatable and salable minerals, and renewable energy, are addressed outside the framework of the IMPLAN model. Running the IMPLAN model requires extensive quantitative data on each sector, such as unit costs of production broken into categories that can be assigned to individual economic sectors, and these data are not available for all types of economic activities. In addition, the BLM focused its use of IMPLAN on those resources for which economic impacts would be substantively different across the alternatives in the RMP. Economic activity related to coal, renewable energy, locatable minerals, and salable minerals, would be similar across all the alternatives, at least in the first 5 to 10 years of the planning period. In latter half of the planning period, economic activity from renewable energy could be somewhat higher under alternatives A, C, and D compared to Alternative B, but there are many uncertainties. Therefore, the discussions for each alternative do not include quantitative estimates of earnings, jobs, or output related to coal, locatable and salable minerals, and renewable energy. However, the discussions do identify differences in expected levels of economic activity associated with these resources.

Payments in Lieu of Taxes to counties would likely not be impacted by the choice of management alternative, although Alternative C could be conducive to lower payments over time, if the amount of federal lands in each county is reduced.

4.8.2.3. Alternative A

Effects on Regional Earnings and Output

Based on the IMPLAN model, regional earnings under Alternative A for the modeled sectors (oil and gas, grazing, and recreation) would average approximately $202.8 million per year between 2009 and 2028, and regional output would average approximately $909.9 million per

year, due to activities on BLM surface and federal mineral estate. The net present value of the stream of regional output, discounted at a 7 percent real discount rate (Office of Management and Budget 2002), would be approximately $8.6 billion over 20 years. Table 4.65, "Average Annual Impacts on Earnings and Output, by Sector and Alternative for the Planning Area" (p. 1643) lists sector-level breakouts for earnings and output.

As noted above, data are insufficient to develop quantitative estimates of direct, indirect, and induced effects associated with the production of locatable and salable minerals in the planning area. Uranium and bentonite are the only locatable minerals currently being developed in the planning area, although gypsum also is present in commercial quantities. The primary salable minerals mined in the planning area are scoria and sand and gravel, both primarily used to support road building for oil, gas, and coal development, county road maintenance, and general construction. Under Alternative A, lands not formally withdrawn or segregated from locatable minerals entry would be open for the exploration and development of locatable minerals. Among the alternatives, Alternative A would withdraw from locatable minerals development and restrict minerals development activities on the fewest number of acres.

Locatable and salable minerals would continue to contribute to economic activity in the planning area. The U.S. Census Bureau estimated employment for mining and support activities, for minerals other than oil, gas, and coal, at between 20 and approximately 180 people in the three-county study area (Bureau of Labor Statistics 2012b). Earnings information was not provided, and the range of employment reflects restrictions on release of confidential business information. The BLM expects to respond to plans of operation to develop locatable minerals and applications for disposals [contract sales and free use permits] for salable minerals in the planning area in a way that the operations would continue to meet market demand. Therefore, production of these minerals would not vary across the alternatives (with the possible exception of Alternative B as indicated in that section), and with this possible exception the BLM does not expect differences in the economic activity associated with each alternative. Variations in employment and earnings would likely be driven more by market fluctuations than by BLM management decisions.

Among renewable-energy sources, wind and solar energy are the most promising resources in the planning area. There have not been any formal inquiries associated with renewable-energy development in the planning area, nor has the area experienced any development of renewable energy other than some solar panels that provide supplemental electricity to some individual oil and gas development sites. The planning area is considered to have a moderate potential for wind-energy development and a low potential for solar-energy development. Alternative A would not restrict renewable-energy development in any areas based on existing resource conditions or management designations, but would consider renewable-energy development on a project-specific basis. Given that renewable-energy development in the planning area is in its infancy, it is not possible to estimate the level of economic activity, jobs, or labor earnings that could be associated with renewable energy development under this alternative.

Regarding coal, Alternative A would allow exploration on all federal coal lands, subject to license restrictions necessary to protect other resource values, and the BLM predicts 65 new exploration licenses would be issued during the planning period. Sixty of these licenses would be issued for areas with high potential for coal development, and five would be for other areas. Under Alternative A, the BLM could allow new development technologies, such as in situ gasification and CH_4 farming on federal coal lands. Economic activity from coal exploration and development under Alternative A would likely be similar to the current level of activity, based on the BLM forecast for leasing rate and production. According to this forecast, leasing would continue at a

rate necessary to replace depleted reserves at the rates predicted in the PRB coal review study through 2020; from 2020 to 2030, the rate of production increase is conservatively predicted to be one percent per year (see the *Leasable Minerals – Coal* section for more information).

Effects on Employment

Employment is a function of the level of economic activity (sales and purchases) among and between economic sectors. Therefore, effects on employment are closely related to effects on economic output. An increase in output implies an increase in employment, and vice versa.

Based on the IMPLAN model, regional employment under Alternative A for the modeled sectors would average approximately 3,482 jobs per year between 2009 and 2028 due to activities on BLM surface and federal mineral estate. Note that the number of jobs is expressed as "annual job equivalents," where one annual job equivalent represents 12 months of employment. For example, one annual job equivalent could represent 2 jobs for 6 months each, or one job for 12 months. Annual job equivalents can represent full-time or part-time jobs. Table 4.66, "Average Annual Impacts on Employment, by Sector and Alternative for the Planning Area" (p. 1644) provides information on how these jobs break out by sector.

Table 4.65. Average Annual Impacts on Earnings and Output, by Sector and Alternative for the Planning Area

Sector	Alternative A	Alternative B	Alternative C	Alternative D
Impacts on Annual Average Earnings (millions of 2011 $)				
Oil and Gas	$199.2	$1.3	$239.5	$202.9
Livestock Grazing Management	$3.4	$2.4	$3.3	$3.3
Recreation	$0.2	$0.2	$0.2	$0.2
Total	$202.8	$3.9	$243.0	$206.4
Impacts on Annual Average Output (millions of 2011 $)				
Oil and Gas	$899.6	$11.0	$1,306.0	$1,012.6
Livestock Grazing Management	$9.7	$7.0	$9.5	$9.5
Recreation	$0.6	$0.6	$0.6	$0.6
Total	$909.9	$18.7	$1,316.1	$1,022.7
Impacts on Net Present Value of Output Over 20 Years (millions of 2011 $)[1]				
Oil and Gas	$8,477.5	$98.2	$12,059.8	$9,436.6
Livestock Grazing Management	$103.3	$81.0	$101.9	$101.6
Recreation	$6.7	$6.7	$6.7	$6.7
Total	$8,587.4	$185.9	$12,168.4	$9,544.8

Source: Calculated using the IMPLAN model, as described in the text.

[1]Net present value from 2009 to 2028, discounted at 7% (rate from Office of Management and Budget 2002).

$ U.S. dollar
IMPLAN Impact Analysis for Planning model

Table 4.66. Average Annual Impacts on Employment, by Sector and Alternative for the Planning Area

Sector	Number of Jobs[1]			
	Alternative A	Alternative B	Alternative C	Alternative D
Oil and Gas	3,366	23	4,092	3,448
Livestock Grazing Management	110	79	108	107
Recreation	7	7	7	7
Total	3,482	109	4,206	3,562

Source: Calculated using the IMPLAN model, as described in the text.

[1]Number of jobs is in annual job equivalents, where one annual job equivalent represents 12 months of employment. For example, one annual job equivalent could represent 1 job for 12 months, or 2 jobs for 6 months.

IMPLAN Impact Analysis for Planning model

Average annual earnings per job would differ for each of these sectors. Based on the IMPLAN model, earnings per job (expressed in year 2011 dollars) would average:

- Between $52,000 and $65,000 for jobs in oil and gas well drilling and completion
- Approximately $67,000 for jobs in oil and gas production
- Approximately $31,000 for jobs associated with cattle and sheep grazing
- Between $23,000 and $26,000 for recreation-related jobs

Effects on Tax Revenue

Projected tax revenues under Alternative A due to oil and gas production on federal mineral estate would average $47.6 million per year for federal royalties, $22.9 million per year for state severance taxes, and $24.9 million per year for local ad valorem taxes. Because specific well locations are not known at this time, data are not sufficient to apportion the local tax receipts to individual counties; however, project-specific analyses will be able to provide this information. Table 4.67, "Estimated Oil and Gas Tax Revenues by Alternative for the Planning Area (millions of 2011 $)" (p. 1644) summarizes tax revenues from oil and gas production under the alternatives.

Table 4.67. Estimated Oil and Gas Tax Revenues by Alternative for the Planning Area (millions of 2011 $)

Tax Type	Alternative A	Alternative B	Alternative C	Alternative D
Federal mineral royalties	$47.6	$0.9	$82.4	$59.3
State severance taxes	$22.9	$0.4	$39.6	$28.5
Local ad valorem production taxes	$24.9	$0.5	$43.2	$31.1
Total	$95.4	$1.8	$165.2	$118.8

Source: Calculated based on the IMPLAN model and state, federal, and local tax rates, as described in the text.

$ U.S. dollars
IMPLAN Impact Analysis for Planning model

Tax revenues due to recreation and livestock grazing activities would be nearly identical across the alternatives, as is the case for earnings and employment for those activities. In the context of overall tax collections, the differences in tax revenues from oil and gas development and production are relatively small, between alternatives A, C, and D. For instance, total state severance tax collections were $877 billion in Fiscal Year 2012 (see Chapter 3). This is in part

because of the importance of tax revenues from other minerals, most notably coal, for which the alternatives would not result in a difference in production. The PRB Coal Review (ENSR 2005c) indicated that, from 2011 through 2015, severance tax revenues in Campbell, Johnson, Sheridan, and Converse Counties are expected to be over $400 million annually, and ad valorem tax revenues about $355 million annually, from coal mining, CBNG, and conventional oil and gas.

Effects on Non-Market Values

Alternative A would maintain BLM's current balance between multiple uses of BLM-administered lands. This means that current management affecting non-market values associated with recreation uses, environmental protection, or other benefits provided to local communities and occupational and interest groups would continue.

4.8.2.4. Alternative B

Effects on Regional Earnings and Output

Based on the IMPLAN model, regional earnings under Alternative B for the modeled sectors (oil and gas, grazing, and recreation) would average approximately $3.9 million per year between 2009 and 2028, and regional output would average approximately $18.7 million per year, due to activities on BLM surface and federal mineral estate. The net present value of the stream of regional output, discounted at a seven percent real discount rate (Office of Management and Budget 2002), would be approximately $0.2 billion over 20 years.

Table 4.65, "Average Annual Impacts on Earnings and Output, by Sector and Alternative for the Planning Area" (p. 1643) shows sector-level breakouts for earnings and output. These dramatic reductions compared to Alternative A primarily reflect the BLM's prediction of lower oil and gas development on BLM-administered lands. Based on the county distribution of oil and gas production and employment (described in the *Socioeconomic Resources* section of Chapter 3), the reduced direct employment supported by oil and gas activities on BLM-administered lands would be more likely felt in Johnson and Campbell counties, than in Sheridan County, although indirect employment impacts could be more broadly distributed. Alternative B would see a lower amount of earnings, output, and employment from livestock grazing.

Under Alternative B, the BLM would withdraw or apply restrictions on locatable and salable minerals development on more acres than Alternative A. However, locatable and salable minerals would continue to contribute to economic activity in the planning area. In general, the BLM would attempt to respond to plans of operation to develop locatable minerals and applications for disposals [contract sales and free use permits] for salable minerals in the planning area in a way that the operations would continue to meet market demand. However, given the planned restrictions on mineral entry in Alternative B, the BLM may not be able to meet this objective. If production of these minerals would be lower in Alternative B compared to Alternative A, then there could be some differences in employment and earnings associated with locatable and salable minerals. Even so, variations in employment and earnings would also be driven somewhat by market fluctuations, and the variation from those fluctuations could also be a substantial driver.

Under Alternative B, renewable-energy development projects would be excluded in areas closed to minerals leasing, closed to locatable and salable minerals, excluded from ROW development, and all other areas where surface disturbance would be prohibited. Alternative B would exclude more areas from renewable-energy development than Alternative A. However, given that renewable-energy development in the planning area is in its infancy, it is not possible to

estimate the level of economic activity, jobs, or labor earnings that could be associated with renewable-energy development in this alternative. The data are not sufficient to determine how the overall economic activity associated with renewable-energy development and production would compare to Alternative A.

Regarding coal, under Alternative B, the BLM would allow coal exploration only on federal coal lands in the two areas with high development potential, subject to license stipulations necessary to protect other resource values. The BLM predicts 60 new exploration licenses would be issued during the planning period, all in areas with high potential for coal development. Non-conventional technologies such as in situ gasification and CH_4 farming would not be permitted on federal coal lands. However, the BLM does not predict substantive production from these non-conventional production technologies over the life of the RMP. Thus, economic activity from coal exploration and development under Alternative B would likely be similar to that under Alternative A, based on the BLM forecast for leasing rate and production. According to this forecast, leasing would continue at a rate necessary to replace depleted reserves at the rates predicted in the PRB coal review study through 2020; from 2020 to 2030, the rate of production increase is conservatively predicted to be one percent per year (see Leasable Minerals – Coal for more information).

Effects on Employment

Employment is a function of the level of economic activity (sales and purchases) among and between economic sectors. Therefore, effects on employment are closely related to effects on economic output. An increase in output implies an increase in employment, and vice versa.

Based on the IMPLAN model, regional employment under Alternative B for the modeled sectors would average approximately 109 jobs per year between 2009 and 2028 due to activities on BLM surface and federal mineral estate. Table 4.66, "Average Annual Impacts on Employment, by Sector and Alternative for the Planning Area" (p. 1644) provides information on how these jobs break out by sector. Average annual earnings per job would be the same under Alternative B as under Alternative A, and are described above.

Effects on Tax Revenue

Projected tax revenues under Alternative B due to oil and gas production on federal mineral estate would average $0.9 million per year for federal royalties, $0.4 million per year for state severance taxes, and $0.5 million per year for local ad valorem taxes. Because specific well locations are not known at this time, there are not sufficient data to apportion the local tax receipts to individual counties; however, project-specific analyses will be able to provide this information. Table 4.67, "Estimated Oil and Gas Tax Revenues by Alternative for the Planning Area (millions of 2011 $)" (p. 1644) summarizes tax revenues from oil and gas production under the alternatives.

Tax revenues due to recreation and livestock grazing activities would be nearly identical across the alternatives, as is the case for earnings and employment for those activities. For instance, total state severance tax collections were $877 million in Fiscal Year 2012 (see Chapter 3). This is in part because of the importance of tax revenues from other minerals, most notably coal, for which the alternatives would not result in a difference in production. According to the PRB Coal Review (ENSR 2005c), from 2011 through 2015 severance tax revenues in Campbell, Johnson, Sheridan, and Converse Counties are expected to be over $400 million annually, and ad valorem tax revenues about $355 million annually, from coal mining, CBNG, and conventional oil and

gas. For Alternative B, the effect of reduced state, local and federal tax collections is more substantial in the context of overall revenue collections.

Effects on Non-Market Values

Alternative B would give lesser priority to oil and gas development on BLM-administered lands when compared to Alternative A. This would tend to protect non-market values associated with other uses or protection of natural resources. Non-market values associated with nonmotorized and non-consumptive activities would be enhanced relative to those associated with motorized and consumptive recreation.

4.8.2.5. Alternative C

Effects on Regional Earnings and Output

Based on the IMPLAN model, regional earnings under Alternative C for the modeled sectors (oil and gas, grazing, and recreation) would average approximately $243.0 million per year between 2009 and 2028, and regional output would average approximately $1,316.1 million per year, due to activities on BLM-administered lands and mineral estate. The net present value of the stream of regional output, discounted at a seven percent real discount rate (Office of Management and Budget 2002), would be approximately $12.2 billion over 20 years. Table 4.65, "Average Annual Impacts on Earnings and Output, by Sector and Alternative for the Planning Area" (p. 1643) shows sector-level breakouts for earnings and output.

Under Alternative C, the BLM would recommend no withdrawals from locatable mineral entry, and would apply slightly more restrictions on areas open to salable minerals development without restrictions. In both cases, the BLM expects to respond to plans of operation to develop locatable minerals and applications for disposals [contract sales and free use permits] for salable minerals in the planning area in a way that the operations would continue to meet market demand. Therefore, production of these minerals would not vary across the alternatives (with the possible exception of Alternative B as indicated in that section), and with this possible exception, the BLM does not expect differences in economic activity associated with each alternative. Variations in employment and earnings would be driven more by market fluctuations than BLM management decisions.

Under Alternative C, renewable-energy development projects would be allowed anywhere in the planning area as long as development would be consistent with other resource values. In addition, unlike alternatives A and B, Alternative C would not require transmission lines to be located within identified ROW corridor areas, which could result in decreased development times for projects and, ultimately, more development of renewable-energy resources. However, given that renewable-energy development in the planning area is in its infancy, it is not possible to estimate the level of economic activity, jobs, or labor earnings that could be associated with renewable energy development under this alternative. The data are not sufficient to determine how the overall economic activity associated with renewable-energy development and production would compare to Alternative A.

Alternative C could lead to greater disposition of federal lands and less acquisition of private and state lands by BLM. This would be expected to favor output and earnings generation, through greater utilization of lands with agricultural potential or water. With time, this could also have adverse effects on Payments in Lieu of Taxes made to counties, because Payments in Lieu of Taxes calculation considers the amount of federal lands within each county.

Regarding coal, exploration would be allowed on all federal coal lands under Alternative C, and the BLM predicts 65 new exploration licenses would be issued during the planning period. Sixty of these licenses would be issued for areas with high potential for coal development, and five would be for other areas. Under Alternative C, the BLM would allow new development technologies, such as in situ gasification and CH_4 farming, on federal coal lands. However, the BLM does not predict substantive production from these non-conventional production technologies over the life of the RMP. Thus, although this alternative would remove some restrictions included under Alternative A, the economic activity from coal exploration and development under Alternative C would likely be similar to that under Alternative A, based on the BLM forecast for leasing rate and production. According to the BLM forecast, leasing would continue at a rate necessary to replace depleted reserves at the rates predicted in the PRB coal review study through 2020; from 2020 to 2030, the rate of production increase is conservatively predicted to be one percent per year (see Leasable Minerals – Coal for more information).

Effects on Employment

Employment is a function of the level of economic activity (sales and purchases) among and between economic sectors. Therefore, effects on employment are closely related to effects on economic output. An increase in output implies an increase in employment, and vice versa.

Based on the IMPLAN model, regional employment under Alternative C for the modeled sectors would average approximately 4,206 jobs per year between 2009 and 2028 due to activities on BLM surface and federal mineral estate. Table 4.66, "Average Annual Impacts on Employment, by Sector and Alternative for the Planning Area" (p. 1644) provides information on how these jobs break out by sector. Average annual earnings per job under Alternative C are the same as under Alternative A.

Effects on Tax Revenue

Projected tax revenues under Alternative C due to oil and gas production on federal mineral estate would average $82.4 million per year for federal royalties, $39.6 million per year for state severance taxes, and $43.2 million per year for local ad valorem taxes. Because specific well locations are not known at this time, data are not sufficient to apportion the local tax receipts to individual counties. Table 4.67, "Estimated Oil and Gas Tax Revenues by Alternative for the Planning Area (millions of 2011 $)" (p. 1644) summarizes tax revenues from oil and gas production under each alternatives.

Tax revenues due to recreation and livestock grazing activities would be nearly identical across the alternatives, as is the case for earnings and employment for those activities. In the context of overall tax collections, the differences in tax revenues from oil and gas development and production are relatively small, between alternatives A, C, and D. For instance, total state severance tax collections were $877 million in Fiscal Year 2012 (see Chapter 3). This is in part because of the importance of tax revenues from other minerals, most notably coal, for which the alternatives would not result in a difference in production. According to the PRB Coal Review (ENSR 2005c), from 2011 through 2015 severance tax revenues in Campbell, Johnson, Sheridan, and Converse Counties are expected to be over $400 million annually, and ad valorem tax revenues about $355 million annually, from coal mining, CBNG, and conventional oil and gas.

Effects on Non-Market Values

Alternative C would give greater priority to oil and gas development on BLM-administered lands when compared to Alternative A. This would tend to reduce non-market values associated with other uses (e.g., recreation) or protection of natural resources. Recreational non-market values associated with nonmotorized and non-consumptive activities would be reduced relative to those associated with motorized and consumptive recreation.

4.8.2.6. Alternative D

Effects on Regional Earnings and Output

Based on the IMPLAN model, regional earnings under Alternative D for the modeled sectors (oil and gas, grazing, and recreation) would average approximately $206.4 million per year between 2009 and 2028, and regional output would average approximately $1,022.7 million per year, due to activities on BLM surface and federal mineral estate. The net present value of the stream of regional output, discounted at a 7 percent real discount rate (Office of Management and Budget 2002), would be approximately $9.5 billion over 20 years. Table 4.65, "Average Annual Impacts on Earnings and Output, by Sector and Alternative for the Planning Area" (p. 1643) shows sector-level breakouts for earnings and output.

Under Alternative D, the BLM would recommend or apply more withdrawals and restrictions on locatable and salable minerals development than under Alternative A. However, the BLM expects to respond to plans of operation to develop locatable minerals and applications for disposals [contract sales and free use permits] for salable minerals in the planning area in a way that the operations would continue to meet market demand. Therefore, production of these minerals would not vary across the alternatives (with the exception of Alternative B as indicated in that section), and with this possible exception, the BLM does not expect differences in the economic activity associated with each alternative. Variations in employment and earnings would be driven more by market fluctuations than by BLM management decisions.

Compared to the other alternatives, Alternative D would exclude renewable energy development across more area than Alternative A or C. However, given that renewable-energy development in the planning area is in its infancy, it is not possible to estimate the level of economic activity, jobs, or labor earnings that could be associated with renewable energy development under this alternative. The data are not sufficient to determine the overall economic activity associated with renewable-energy development and production compared to Alternative A.

Regarding coal, exploration would be allowed on all federal coal lands under Alternative D, subject to multiple use constraints, and the BLM predicts 65 new exploration licenses would be issued during the planning period. Sixty of these licenses would be issued for areas with high potential for coal development, and five would be for other areas. Under Alternative D, the BLM would implement existing coal leasing authority when federal coal lands are requested for in situ gasification. The BLM would develop an appropriate coal use authorization that provides public compensation for the reduction in coal value resulting from methanogenesis. However, the BLM does not predict substantive production from these non-conventional production technologies over the life of the RMP. Thus, although this alternative would increase some restrictions compared to Alternative A, the economic activity from coal exploration and development under Alternative D would likely be similar to that under Alternative A, based on the BLM forecast for leasing rate and production. According to the BLM forecast, leasing would continue at a rate necessary to replace depleted reserves at the rates predicted in the PRB coal review study through 2020; from

2020 to 2030, the rate of production increase is conservatively predicted to be one percent per year (see Leasable Minerals – Coal for more information).

Effects on Employment

Employment is a function of the level of economic activity (sales and purchases) among and between economic sectors. Therefore, effects on employment are closely related to effects on economic output. An increase in output implies an increase in employment, and vice versa.

Based on the IMPLAN model, regional employment under Alternative D for the modeled sectors would average approximately 3,562 jobs per year between 2009 and 2028 due to activities on BLM surface and federal mineral estate. Table 4.66, "Average Annual Impacts on Employment, by Sector and Alternative for the Planning Area" (p. 1644) provides information on how these jobs break out by sector. Average annual earnings per job would be the same under Alternative D as under Alternative A.

Effects on Tax Revenue

Projected tax revenues under Alternative D due to oil and gas production on federal mineral estate would average $59.3 million per year for federal royalties, $28.5 million per year for state severance taxes, and $31.1 million per year for local ad valorem taxes. Because specific well locations are not known at this time, data are not sufficient to apportion the local tax receipts to individual counties. Table 4.67, "Estimated Oil and Gas Tax Revenues by Alternative for the Planning Area (millions of 2011 $)" (p. 1644) summarizes tax revenues from oil and gas production under the alternatives.

Tax revenues due to recreation and livestock grazing activities would be nearly identical across the alternatives, as is the case for earnings and employment for those activities. In the context of overall tax collections, the differences in tax revenues from oil and gas development and production are relatively small, between alternatives A, C, and D. For instance, total state severance tax collections were $877 million in Fiscal Year 2012 (see Chapter 3). This is in part because of the importance of tax revenues from other minerals, most notably coal, for which the alternatives would not result in a difference in production. According to the PRB Coal Review (ENSR 2005c), from 2011 through 2015 severance tax revenues in Campbell, Johnson, Sheridan, and Converse Counties are expected to be over $400 million annually, and ad valorem tax revenues about $400 million annually, from coal mining, CBNG, and conventional oil and gas.

Effects on Non-Market Values

Alternative D would give greater priority to oil and gas development on BLM-administered lands when compared to Alternative A. This would tend to reduce non-market values associated with other uses (e.g., recreation) or protection of natural resources. Alternative D would however, provide some increased opportunities for recreation uses of BLM-administered lands, favoring non-market values associated both with nonmotorized and motorized and with non-consumptive and consumptive recreational activities.

4.8.2.7. Cumulative Impacts

This section discusses the cumulative impact of management actions and projected development on the economic and social conditions of local communities.

The assessment area for cumulative social and economic conditions consists of the three counties that overlap the planning area.

Analysis in this section primarily focuses on cumulative impacts related to oil and gas activity, ranching and livestock grazing, and quality of life, including non-market values.

Past, present, and reasonably foreseeable future actions in the planning area and surrounding geographic areas would affect both traditional economic measures (earnings, jobs, output) and non-market values in the planning area. For example, the BLM Bighorn Basin RMP, which is being updated concurrent with the present RMP, would update BLM's direction and management plans in the Cody and Worland Field Offices, which include land and resources in several counties that neighbor the BFO. Thus, the choice of alternatives in the Bighorn Basin RMP could directly affect social and economic conditions in the planning area for this RMP. However, the Preferred Alternative in the Bighorn Basin RMP revision, as identified in the Bighorn Basin Draft RMP and EIS, would continue the BLM's balanced management of land and resources, and if that is the selected alternative for the Cody and Worland planning areas, then the effects of BLM management actions in those areas would not be expected to have a significant effect on social or economic conditions in the Buffalo planning area.

Appendix G (p. 1937) lists RFAs within the planning area. BLM expects non-BLM actions in the planning area to include the development of coal, locatable and salable minerals, oil and gas, wind energy, powerlines, pipelines and communication sites, among other developments, These developments would likely constitute sources of employment and earnings, would contribute to the attraction or retention of population in the study area and would contribute to the change or maintenance of social characteristics of communities, in addition to the impacts of BLM actions under each alternative. Because of the relative importance of oil and gas in driving economic and social trends in the planning area, the remainder of this analysis adds the impacts of the development of oil and gas in private and state lands to those of actions on BLM-administered lands.

The impacts of oil and gas drilling and production described in the *Economic Conditions* section of this chapter relate to activities on BLM surface and federal mineral estate within the planning area. However, oil and gas activity on private and state land is estimated to constitute a substantial portion of projected oil and gas activity in all alternatives; Table 4.68, "Cumulative (including State and Private) Impacts of Oil and Gas Development over the Life of the Plan in the Planning Area" (p. 1652) displays the cumulative impacts of oil and gas development on federal as well as state and private land over the life of the plan. Specifically, in alternatives A, C, and D, oil and gas drilling and production on state and private land would comprise between 49 percent and 72 percent of total activity (about 49% in Alternative C, 60% in Alternative D, and 72% in Alternative A), while in Alternative B, about 98 percent of total drilling and production activity is expected to occur on private and state land. This also means that the additional activity on state and private land in Alternative B would partially mitigate the sharp reduction in oil and gas production on federal lands, and the overall reduction in earnings, employment, and output would be proportionally smaller than the reduction in activity on federal lands would suggest. To see this, note that the analysis earlier in Chapter 4 showed $199 million in earnings and 3,366 jobs related to oil and gas drilling, completion, and production in Alternative A, and just $1.3 million in earnings and 23 jobs for the same activities in Alternative B – a reduction of over 99 percent. The comparable figures incorporating state and private production are $425 million and 7,222 jobs for Alternative A, and $227 million and 3,880 jobs for Alternative B – about a 46 percent

reduction. While the reduction from Alternative A to Alternative B would still be substantial, the anticipated state and private production would moderate the change in BLM management actions.

Table 4.68. Cumulative (including State and Private) Impacts of Oil and Gas Development over the Life of the Plan in the Planning Area

Impact[1]	Alternative A	Alternative B	Alternative C	Alternative D
Annual Average Earnings	$424.9	$227.0	$465.2	$428.7
Annual Average Output	$2,130.9	$1,242.3	$2,537.3	$2,244.2
Net Present Value of Output	$19,847.2	$11,467.9	$23,429.4	$20,808.2
Annual Average Employment[2]	7,222	3,880	7,948	7,305
Change from Alternative A – Earnings	N/A	-$197.9	$40.3	$3.7
Change from Alternative A – Employment	N/A	-3,343	726	82
Percentage change from Alternative A (earnings, employment)	N/A	-47%	9%	1%
Percentage change from Alternative A (earnings, employment), for federal land only	N/A	-98%	20%	2%

Source: Calculated using the IMPLAN model, as described in the text. Includes oil and gas well drilling and completion, and production from new wells, as estimated in the BLM's Reasonably Foreseeable Development Scenario for federal, state, and private land.

[1]All dollar values are in millions of year 2011 dollars. Net present value of output is discounted at a 7% real discount rate, as recommended in Office of Management and Budget 2002.
[2]Employment is in annual job equivalents.

$ U.S. dollars
BLM Bureau of Land Management
IMPLAN Impact Analysis for Planning Model
N/A not applicable
OMB Office of Management and Budget

Under each alternative various management actions constrain mineral development on BLM-administered land for the protection of other resource values. These constraints can limit the mineral development activity on BLM surface and mineral estate, and constrict the minerals-based economy in the planning area. Table 4.69, "Reasonable Foreseeable Development Well Number Projections" (p. 1653) below summarizes the number of constrained federal wells and unconstrained non-federal wells for each alternative, including CBNG wells, over the life of the plan.

Table 4.69. Reasonable Foreseeable Development Well Number Projections

Well Type	Alternative A	Alternative B	Alternative C	Alternative D
Number of Projected New Federal Wells	2,731	108	7,270	4,494
Projected Number of Abandoned New Federal Wells	99	1	145	112
Projected Productive New Federal Wells	2,632	107	7,125	4,382
Number of Projected New Non-federal Wells	6,862	6,862	6,862	6,862
Projected Number of Abandoned New Non-federal Wells	137	137	137	136
Projected Productive New Non-federal Wells	6,725	6,725	6,725	6,726
Cumulative New Wells (Federal/Non-federal)	9,593	6,970	14,132	11,356
Cumulative Abandoned New Wells (Federal/Non-federal)	236	138	282	248
Cumulative Productive New Wells (Federal/Non-federal)	9,357	6,832	13,850	11,108
Source: Stilwell et al. 2012; Appendix G (p. 1937)				

The projected number of cumulative productive new wells is greatest under Alternative C (14,132) and the least under Alternative B (6,970). The percent increase/decrease from the number of new wells under Alternative A follows.

- Alternative B – 27 percent decrease
- Alternative C – 48 percent increase
- Alternative D – 19 percent increase

Increasing energy development and mining for mineral resources is likely to have a substantial social and economic impact within the planning area. As noted in the *Economic Conditions* section of this chapter, Alternative C is anticipated to result in the most substantial increase of economic opportunities with the highest projected forecasted job growth for the planning area followed by alternatives D, A, and B, in that order. Regional employment under Alternative C is also anticipated to average the greatest number of full and part-time jobs per year related to the oil and gas, livestock grazing, and recreation industries, which may result in beneficial impacts on quality of life as measured by economic opportunity. However, Alternative C may also result in adverse impacts to air quality, wildlife, and other resources that improve quality of life related to natural characteristics, as priorities would be placed on the use of resources such as oil and gas over the conservation of resources such as air quality and wildlife.

Comparatively, Alternative B would provide the least economic and social benefits as measured by jobs and income; priorities under this alternative are centered on conservation of land and existing environmental conditions. There could be some benefits to livestock operations when compared to other alternatives, but these would likely be too minor to be perceptible.

Alternative A would result in more opportunities than Alternative B, but fewer economic and social opportunities than Alternative C and Alternative D; Alternative A essentially represents the continuation of current trends. Alternative D would continue BLM's current practice of allowing multiple uses, balancing the use of resources such as oil and gas reserves with the conservation of resources such as air quality, open space, and wildlife range areas while providing an increase in job opportunities dispersed geographically across the planning area.

4.8.2.8. Conclusion

Based on the data from the IMPLAN model and qualitative analysis of economic activity from other sectors, earnings, output, employment, and tax revenues due to activities on BLM surface and federal mineral estate would be highest under Alternative C and lowest under Alternative B. Under Alternative D, economic activity would be somewhat lower than under Alternative C, and under Alternative A, economic activity would be slightly lower than under Alternative D. The primary driver is projected oil and gas activity, which would be highest under Alternative C, followed by alternatives D, A, and B. Earnings, output, and employment from recreation would be identical across all the alternatives, and economic activity related to grazing would be highest under Alternative A and lowest under Alternative C. However, the lower amount of economic activity resulting from oil and gas drilling, completion, and production would counteract the larger amount from livestock grazing, resulting in a lower total economic output.

Economic activity related to other sectors not modeled using IMPLAN, including coal, renewable energy, locatable minerals, and salable minerals, would be similar across all the alternatives, at least in the first 5 to 10 years of the planning period. In the latter half of the planning period, economic activity from renewable energy could be somewhat higher under alternatives A, C, and D compared to Alternative B, but there are many uncertainties.

It is useful to compare the differences in earnings and employment across alternatives, not only in absolute terms, but also to the size of the regional economy. Table 4.70, "Comparison of Projected Earnings and Employment to 2011 Levels" (p. 1655) compares projected earnings and employment related to oil and gas, livestock grazing, and recreation activities on BLM-administered lands to the levels in 2011 for the three-county region. Under alternatives A and D, average earnings from activities on BLM-administered lands analyzed in IMPLAN amount to 5.0 percent and 5.1 percent of 2011 personal income; under Alternative C, average earnings would be slightly higher at 6.0 percent of 2011 personal income; and under Alternative B, the corresponding figure is somewhat lower, 0.1 percent. Therefore, Alternative B would represent a substantial reduction in economic activity on BLM-administered lands by more than half compared to alternatives A, C, and D. Alternatives A or D would also represent a reduction compared to Alternative C, although this latter difference, when compared to the size of the overall economy, would be relatively minor (about 1% of overall earnings).

The comparison of employment among alternatives, and to the regional economy, produces similar conclusions. Under alternatives A and D, average employment from activities on BLM-administered lands analyzed in IMPLAN would amount to approximately 6.0 to 6.1 percent of 2011 total employment for the three-county planning area; under Alternative C, the figure is somewhat higher at 7.2 percent. Under Alternative B, the corresponding figure is 0.2 percent. The reduction in economic activity represented in Alternative B would be substantial compared to alternatives A, C, and D. This difference would be comparable to an increase in the unemployment rate of about 6.0 percent, which would be substantial and could lead to migration out of the area as people search for jobs elsewhere.

The difference between Alternative A and Alternative D would be barely noticeable in regional statistics. The difference between either of these alternatives and Alternative C would be noticeable, but would not likely lead to wholesale changes in regional economic activity (as can be seen by comparing the earnings and employment figures across alternatives A, C, and D). Other national, state, and regional policies and trends, such as the value of the dollar compared to other world currencies, federal fiscal and monetary policy, and global oil and gas prices, may have as meaningful an effect on economic activity in the planning area.

While the economic differences between alternatives are a relatively small part of regional statistics (except in Alternative B), the impacts are likely to be highly important from the perspective of individual operators and companies, as well as the individuals directly affected by loss of employment. In addition, the activities of BLM may be important within portions of the study region, depending on where the restrictions occur and where BLM's activities take place. Thus, the above discussion is not intended to minimize the impacts, rather to provide a perspective from the regional context.

Table 4.70. Comparison of Projected Earnings and Employment to 2011 Levels

Measure	Alternative A	Alternative B	Alternative C	Alternative D
Forecasted annual earnings due to activities on BLM surface[1]	$202.8	$3.9	$243.0	$206.4
Total personal income in 2011	$4,055	$4,055	$4,055	$4,055
Forecasted annual earnings / 2011 income	5.0%	0.1%	6.0%	5.1%
Forecasted annual employment due to activities on BLM surface[1]	3,482	109	4,206	3,562
Total employment in 2011	58,241	58,241	58,241	58,241
Forecasted annual employment / 2011 employment	6.0%	0.2%	7.2%	6.1%

Source: Forecasted annual earnings and employment are calculated based on the IMPLAN model, as described in the text. Earnings and employment for 2011 are from BEA (Bureau of Economic Analysis 2012a; Bureau of Economic Analysis 2012b). Earnings are in millions of year 2011 dollars.

[1]Estimate of annual earnings and employment includes direct, indirect, and induced economic activity (the multiplier effect) associated with those sectors for which sufficient quantifiable information was available: oil and gas, livestock grazing, and recreation.

% percent
IMPLAN Impact Analysis for Planning model

4.8.3. Health and Safety

Health and safety, as discussed in this section, includes abandoned mine lands (AMLs), coal seam fires, physical hazards, hazardous substances, and hydrogen sulfide (H_2S)gas.

The generation, use, disposal, or accidental release of hazardous substances are subject to the federal and state laws and regulations identified in Chapter 1 and Appendix A (p. 1771). In addition, Onshore Order #6 addresses requirements for conducting operations in areas that are known to or could produce H_2S gas. These laws and regulations are designed to safeguard human health and safety and to protect the environment, and would minimize the short- and long-term risks associated with hazardous substances and H_2S gas.

4.8.3.1. Methods and Assumptions

- Most AML sites in the planning area are identified and characterized. The BLM will set as its highest AML physical safety action priority the cleaning up of those AML sites situated at locations: (a) where a death or injury has occurred and the site has not already been addressed; or (b) situated on or in location with high visitor use (BLM 2000c). AML sites adversely affecting watersheds are also a high priority. The BLM continues to support the Wyoming DEQ AML Division in reclaiming AML sites on public surface.
- No assumptions were identified for physical hazards.
- All new hazardous materials and waste sites are identified and characterized.
- Resource development activities identify any possible generation of hazardous waste.
- With the transition from CBNG development to more conventional natural gas development, more hazardous materials use and waste generation will occur.
- The BLM Hazard Management and Resource Restoration Program responds to all hazardous material releases on public surface. Emergency cleanup actions are implemented on sites posing a substantial threat to the public and/or the environment.

4.8.3.2. Impacts Common to All Alternatives

Abandoned Mine Lands and Coal Seam Fires

To reduce the threat of physical and environmental impacts from AML sites and coal seam fires, the BLM will remediate sites based on risk.

Coal seam fires can be difficult to control and extinguish. Not being in close proximity to coal seam fires is the best way to reduce any potential exposure to their safety hazards. The BLM will manage safety concerns through hazard monitoring and public education. Based on site-specific risks, fencing, warning signs, or other institutional controls may be required. All of these management actions would reduce the potential for human health and safety risks from coal seam fires.

Long-term beneficial impacts to health and safety would result from the Wyoming DEQ AML Division continuing to work with the BLM to mitigate hazards associated with AML sites and coal seam fires.

Implementation of the alternatives are not anticipated to result in additional AML sites or increase the risks at AML sites or coal seam fires that may adversely impact health and safety.

Physical Hazards

Physical hazards will be managed to reduce risks to the public by providing warnings and, where appropriate, developing mitigation measures to avoid and minimize effects associated with physical hazards.

Implementation of the alternatives would not result in an increase in the potential for physical hazards; however, management may decrease the risks and potential impacts on health and safety resulting from physical hazards.

Hazardous Substances

Increases in human presence and activity associated with recreation, minerals exploration and development activities, and ROW development increase risks associated with the generation, use, transportation, and disposal of hazardous substances. Minerals-related activities are the most likely activities to increase the risk of hazardous substances to health and safety.

Impacts to health and safety from the management of hazardous substances would be the same under all alternatives, as there are no separate management actions by alternative.

Implementing hazardous materials management activities will address human health and environmental risks from hazardous substances and H_2S gas. Due to the increase in activity in oil and gas extraction, H_2S poses an increasing threat to human health and safety. To reduce the risks to human health, all H_2S plans would comply with Onshore Order #6, which identifies "uniform national requirements and minimum standards of performance expected from operators when conducting operations involving oil or gas that is known or could reasonably be expected to contain hydrogen sulfide." In addition, the BLM will mitigate safety concerns associated with H_2S through signs, warning sirens, and public education. All of these management actions would reduce the potential for human health and safety risks from H_2S. Any potential effects on health and safety from H_2S would increase in relation to the level of minerals-related activities that releases H_2S.

Hazardous materials are managed to reduce risks to visitors, employees, and the environment; to restore contaminated land; and to perform emergency-response actions, in accordance with appropriate laws, policies, and regulations. Management to reduce risk and contamination would result in reduced potential effects on health and safety from hazardous substances. There could be substantive indirect impacts related to risks from hazardous substances during remediation could exist.

Reporting spills and releases of chemicals, petroleum products, and produced water to the Wyoming DEQ would reduce the potential for both short- and long-term impacts, and increase the potential for beneficial impacts on health and safety by controlling spills and facilitating an appropriate response to hazardous substance spills.

4.8.3.3. Cumulative Impacts

As described in Chapter 3, the potential for more hazardous material spills will increase primarily from the increase in mineral development, particularly with conventional natural gas development. Cumulative impacts will be negligible due to immediate response and cleanup activities. Physical hazards, coal seam fires, and abandoned mines, will be mitigated directly or through other institutional controls, to protect human health and safety.

4.8.3.4. Conclusion

There would be beneficial impacts to health and safety from management of AML sites and coal seam fires under all alternatives. Under all alternatives, the BLM and Wyoming DEQ will identify and plan for remediation or mitigation of AML and coal seam fire sites, which would reduce adverse impacts to health and safety.

Primary impacts to health and safety from physical hazards would result from management that increases activities in areas with physical hazards and subsequently increases the risk and potential for accidents in those areas. Providing warning signs or other institutional controls would result in similar beneficial impacts under all alternatives.

The impacts from management of hazardous substances would be the same under all alternatives. The potential for impacts may vary by alternative based on the level of mineral-related activities. Alternative C, with the greatest amount of mineral-related activities, could increase the generation, use, transportation, and disposal of hazardous substances. To reduce adverse impacts to health and safety, authorized users would adhere to hazardous spill response plans, stipulations, and all applicable laws and regulations pertaining to hazardous substances. These requirements would provide detailed strategy and process for responding to releases of hazardous substances, therefore reducing short-term impacts from contamination.

4.8.4. Environmental Justice

This section addresses the potential for the alternatives to have disproportionate adverse effects on minority and low-income populations, including direct, indirect, short-term, and long-term effects. Appendix A (p. 1771) lists the laws, regulations, EOs, policies, and guidance considered in the analysis of disproportionate adverse effects.

Because the analysis of disproportionate adverse effects depends on effects identified for other resources, definitions of adverse effects as they apply to environmental justice issues are closely related to the definitions of adverse effects in other resource areas (e.g., social resources). For example, the displacement of a mobile home park that houses a low-income population to build a new road could be a direct disproportionate effect. An example of an indirect disproportionate effect would be a reduction in social services to low-income individuals that could result from decreased tax revenues as a result of decreased minerals production.

4.8.4.1. Methods and Assumptions

Because the analysis of disproportionate adverse effects is based on other effects identified for other resources, the assumptions for this analysis implicitly include the assumptions of other resource areas as they relate to the identification and analysis of effects. In addition, this analysis assumes that the latest available demographic data from the U.S. Census and other sources accurately represent the population in the study area.

In accordance with BLM and CEQ guidance for assessing environmental justice in the planning process, an area is considered to contain a minority population if either the minority population of the affected area exceeds 50 percent or the percentage of minority population in the affected area is meaningfully greater than the percentage in the general population. The “general population” is defined as a relevant comparison area, such as the state.

The minority population in the three planning area counties ranges from five percent (Johnson) to nine percent (Campbell), compared to a state average of 13 percent. Because none of the counties has a higher minority population than the state, they are not considered to contain a minority population concentration at the county level based on BLM and CEQ guidance. At the town level, two towns in the planning area (Arvada and Ranchester) had minority populations higher than the state average as of 2000 (more recent data are not available). These towns therefore have a relatively high concentration of minority population, as defined in BLM and CEQ guidance, compared to the state.

In terms of low-income populations, in 2007 all three counties had a poverty rate of less than 10 percent, which is the state level. Therefore, none of the counties has a minority population concentration at the county level. However, several towns had a higher poverty rate than the state in 2000 (the latest year for which town-level data are available): Arvada, Clearmont, Kaycee, Ranchester, and Story, and Sheridan's poverty rate is the same as the state. Therefore, there are concentrations of low-income populations in several regions of the planning area, as defined in BLM and CEQ guidance.

4.8.4.2. Impacts Common to All Alternatives

As noted above, demographic conditions in the planning area indicate concentrations of low-income populations in several towns, and concentrations of minority populations in the towns of Arvada and Ranchester. However, there are no direct or indirect effects under the alternatives that would affect these populations in a different way than the general population in the planning area. For example, the lower economic activity associated with Alternative B would cut across all sectors of the economy – from higher-skill managerial jobs to lower-skill service jobs. Therefore, there would be no identifiable environmental justice issues or direct or indirect effects associated with any of the alternatives that are specific to any minority or low-income community or population as defined in EO 12898 or BLM IM 2002-164 (BLM 2002).

As noted in Chapter 3, the Crow Indian Reservation and the Northern Cheyenne Indian Reservation are just north of the planning area, over the state border in Montana. Populations from both reservations use Sheridan, in particular, as a destination for shopping and services. However, no significant adverse effects were identified that would affect the quality of Sheridan as a destination for these services. Thus, there would be no significant adverse effects on residents of these reservations attributable to the actions in any alternative.

While there are minority and low-income populations in the planning area, no particular BLM actions proposed under any alternative have been identified as causing disproportionate adverse effects on these populations.

Environmental justice principles also require that the BLM provide opportunities for people of all backgrounds to have a meaningful voice in the planning process. The BLM has provided numerous opportunities in a variety of different formats, and has considered all input from persons regardless of their race, ethnicity, income status, or other social and economic characteristics.

4.8.4.3. Conclusion

The alternatives would be identical regarding potential effects on minority and low-income populations. No particular BLM actions proposed under any alternative would cause disproportionate adverse effects on minority or low-income populations. The BLM has

considered all input from persons regardless of their race, ethnicity, income status, or other social and economic characteristics.

4.8.5. Tribal Treaty Rights

Effects on tribal treaty rights can include limitations on access to tribal hunting, fishing, or resource collection areas that were reserved by certain treaty. Effects on such resources are usually identified on a project-specific basis in consultation with the appropriate tribes. The Crow, Northern Cheyenne, Northern Arapaho and potentially other tribes were granted hunting rights by treaty within the planning area which were never rescinded. However, hunting rights in Wyoming are managed by the WGFD and are not analyzed in this document.

Some tribes claim they retain treaty rights that the U.S. Government fails to recognize. For example, the Supreme Court determined in United States v. Sioux Nation of Indians that the U.S. Government violated the terms of the Fort Laramie Treaty of 1868 by taking lands that were entitled to the tribes by the treaty. The Sioux Nation declined to take compensation from the U.S. Government, because they did not want to give up their claim to the land. The entire planning area is within the original boundaries of the Sioux Nation as defined by the treaty, but is within what was defined as "unceded Indian Territory."

4.9. Cumulative Impacts

This section analyses the combined cumulative impacts of all resource programs. Cumulative impacts of individual resource programs were analyzed within their individual sections.

CEQ defines cumulative effects as:

> *The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions (40 CFR 1508.7).*

For the Buffalo RMP revision, each of the three components of this definition of cumulative effects is addressed as follows:

- *Incremental impacts of the RMP revision.* The incremental impacts of the action (i.e., the revision of the existing plan), are described for each resource in the preceding sections.
- *Impacts from all past and present actions.* The impacts from all past and present actions are captured in the baseline conditions presented in Chapter 3, Affected Environment. As discussed in that chapter, the description of the current affected environment reflects past and present actions.
- *Reasonably foreseeable future actions.* Other reasonably foreseeable future actions are identified in Appendix G (p. 1937).

The analysis of cumulative impacts serves to place the projected incremental impacts from the management alternatives in the context of past, present, and future impacts. This combination necessarily involves projections and limited analyses. Public documents prepared by federal, state, and local agencies are the primary sources of information regarding past, present, and future actions. Speculative projects are not included in the projections, but areas of high potential for development or resource use that are unconstrained by management actions are identified and

potential impacts are assessed. Necessarily, some of these analyses results will be qualitative, while others can be quantified. Certain developments might be identified as too speculative for analysis, such as in-situ coal gasification.

Analyses are limited because there is incomplete documentation of all past and present impacts on private and public lands, and limited knowledge of future development because of changing economic and technical conditions. Illustrative of this process is the expansion of oil and gas activities associated with horizontal wells, or the impact to management considerations with the USFWS decision that listing the greater sage-grouse under the ESA is warranted but precluded.

Methods and Assumptions

It is neither practical nor required to exhaustively analyze all possible cumulative impacts to all resources and uses. Instead, the CEQ indicates the cumulative impact analysis should focus on meaningful impacts. Therefore, the analysis in this document focuses on past, present, and future actions anticipated to result in substantial impacts to historically important resources. This analysis is likely predictive of cumulative impacts to other resources not analyzed here. The resources to be analyzed were developed based on issues identified during public scoping and through the professional judgment of BLM specialists and Cooperating Agencies.

Public documents prepared by federal, state, and local government agencies are the primary sources of information regarding past, present, and future actions considered in the cumulative effects analysis. Actions undertaken by private persons and entities are assumed to be captured in the information made available by such agencies. Speculative or uncommitted projects are not included in the projections. These projections are not planning decisions. Using them in this analysis does not constitute approval by BLM or any authorizing agency. These projections do not set a limit or cap on future BLM actions. Unforeseen changes in such factors as economics; public demand; and federal, state, and local laws and policies could result in different outcomes than those projected for this analysis.

Assumptions used in the calculation of impacts from non-BLM actions in the planning area include:

- Oil and gas activities are based on the Wyoming Reservoir Management Group's Oil and Gas RFD for the Wyoming BLM field offices.
- For cumulative impacts associated with non-BLM activities other than oil and gas, there is no "standard" assumption that can be made by extrapolating impacts associated with BLM management. The land and mineral ownership patterns in the planning area do not support attributing the same trends observed or identified for federal lands on state and privately owned lands.
- Generally, the context and intensity of non-BLM activities are not anticipated to vary by alternative because these activities do not directly depend on BLM management actions and allowable uses set forth in the RMP alternatives. However, coal development will likely depend upon BLM management.
- Cumulative impacts such as soil erosion, invasive species spread, and habitat fragmentation are anticipated to be commensurate with the amount of surface disturbance projected in the planning area (Table 4.71, "Cumulative Surface Disturbance from BLM and Non-BLM Reasonable Foreseeable Actions" (p. 1662)).
- Actions by private persons and entities are captured in public documents prepared by federal, state, and local agencies.

- The assumptions for reclamation are that short-term disturbance will be reclaimed within 2 years. This level of reclamation is based on soil stability and does not suggest a return to predisturbance conditions. Habitat fragmentation will not be restored in this timeframe; indeed predisturbance vegetation and habitat condition might not return for decades past the end of the planning period.
- Additional assumptions are identified under each issue.

Table 4.71. Cumulative Surface Disturbance from BLM and Non-BLM Reasonable Foreseeable Actions

Action	Alternative A	Alternative B	Alternative C	Alternative D
Total Acres Disturbed from BLM Actions	322,026	422,903	422,544	486,957
Total Acres Reclaimed from BLM Actions	221,888	344,752	291,923	358,871
Total Acres Long-Term Disturbance from BLM Actions	100,138	78,152	130,621	128,086
Total Acres Disturbed from Non-BLM Actions	2,123,460	1,890,239	2,531,611	2,168,799
Total Acres Reclaimed from Non-BLM Actions	1,943,463	1,766,623	2,174,564	1,965,851
Total Acres Long-Term Disturbance from Non-BLM Actions	179,998	123,617	357,048	202,949
Cumulative Long-Term Acres of Disturbance	280,135	201,768	487,669	331,035

Source: Appendix G (p. 1937)

BLM Bureau of Land Management

Site-specific actions that have already occurred (past) or are ongoing (present) are not considered in this cumulative impacts analysis because they are already captured in Chapter 3, Affected Environment. Only those reasonably foreseeable future actions are considered in this cumulative impacts analysis.

Quantifiable aspects of the analysis, including surface disturbance have been identified. It is important to note however, that the specificity of the numbers in the table suggests a degree of accuracy that the data do not support, particularly because historical trends are used to predict future activity. With the immediate impacts of fluctuation of commodity prices on development, historical trends might not be representative of the future. For example, historical trends in locatable mineral development include a 15-year period in which 8 years had prices of uranium averaging under $15.00 per pound and 1 year with prices close to $100 per pound. In addition, much of the BLM data were created before modern equipment made exact measurement possible. Historic surface disturbance is based on permitted activities rather than the as-built environment. Acknowledging the limitations of the data is not to undermine its utility for comparative analysis of alternatives, either for assessing cumulative impacts or for direct and indirect impacts. This is especially true for the RMP, which includes site-specific analysis.

Table 4.72, “Summary of Reasonably Foreseeable Future Actions” (p. 1664) identifies reasonably foreseeable future projects that are considered in this cumulative impacts analysis. The majority of the projects identified are programmatic and/or strategic in nature; therefore, the exact intensity or location of anticipated impacts cannot be quantified. Most projects identified in Table 4.72, “Summary of Reasonably Foreseeable Future Actions” (p. 1664) are ongoing and provide a management framework for site-specific actions implemented during the life of the various projects. Though they are considered in this cumulative impacts analysis, refer to Chapter 3 for a detailed description of site-specific past and present (i.e., ongoing) actions. Additional management plans that were reviewed to identify RFAs are listed in Table 1.3, “Related Plans” (p. 16).

Table 4.72. Summary of Reasonably Foreseeable Future Actions

Resource Plans	Physical Resources	Mineral Resources				Fire & Fuels	Biological Resources	Heritage & Visual Resources	Land Resources								Special Designations				Socioeconomic Resources
		Coal	Fluids	Locatable	Salable				Forest Products	Lands & Realty	Renewable Energy	Rights of Way & Corridors	Travel & Transportation	Recreation	Wilderness Characteristics	Livestock Grazing	ACECs	National Byways	Wild & Scenic Rivers	WSAs	
BLM RESOURCE MANAGEMENT PLANS																					
Bighorn Basin Draft RMP & EIS (2011)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Billings & Pompey's Pillar National Monument Draft RMP & EIS (2013)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X
Casper Field Office Approved RMP/EIS (2007)	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X		X
Miles City Draft RMP & EIS (2013)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Newcastle Field Office Approved RMP/EIS (2000)	X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X		X
Programmatic EIS on Wind Energy Development on BLM-Administered Lands in the Western United States (2005)	X										X	X									X
Programmatic EIS for Geothermal Leasing in the Western United States (2008)	X		X							X	X										X
OTHER FEDERAL AGENCY PLANS																					
Bighorn National Forest Approved Land & RMP (2005)	X		X	X	X	X	X	X	X	X		X	X	X	X	X				X	X
Generic Final EIS for In Situ Leach Uranium Milling Facilities (2009)	X			X			X	X					X								X
Programmatic EIS, Designation of Energy Corridors on Federal Land in 11 Western States (DOE/EIS-0386) (2008)	X									X	X	X									X
Thunder Basin National Grassland Approved Land & RMP (2002)	X	X	X		X	X	X	X	X	X		X	X	X	X	X			X		X
STATE AGENCY PLANS																					
WGFD Strategic Habitat Plan (2001)							X									X					
Wyoming Greater Sage-Grouse Conservation Plan (2003)	X		X				X									X					

Resource Plans	Physical Resources	Mineral Resources				Fire & Fuels	Biological Resources	Heritage & Visual Resources	Land Resources								Special Designations				Socioeconomic Resources
		Coal	Fluids	Locatable	Salable				Forest Products	Lands & Realty	Renewable Energy	Rights of Way & Corridors	Travel & Transportation	Recreation	Wilderness Characteristics	Livestock Grazing	ACECs	National Byways	Wild & Scenic Rivers	WSAs	
Wyoming Statewide Comprehensive Outdoor Recreation Plan (2009)													X			X					
Wyoming Statewide Trails Plan 2004 (2004)													X			X			X		
Wyoming SHPO Comprehensive Statewide Historic Preservation Plan (2007)								X													
COUNTY PLANS																					
Campbell County Comprehensive Plan (2007)	X	X	X				X	X		X			X			X					X
Johnson County Comprehensive Land Use Plan (2005)	X		X				X	X		X		X	X			X					X
Sheridan County Comprehensive Plan (2008)	X						X	X		X		X	X			X					X
CONSERVATION DISTRICT PLANS																					
Campbell County Conservation District Long Range & Natural RMP 2010-2015 (2009)	X						X		X	X	X				X	X					X
Lake DeSmet Conservation District Long Range Plan 2007-2012 (2006)	X						X									X					X
Powder River Conservation District Long Range Natural RMP 2010-2015 (2010)	X						X									X					X
Sheridan County Conservation District Long Range Plan 2010-2014 (2009)	X						X									X					X

4.10. Irreversible and Irretrievable Commitment of Resources

Section 102(2)(C) of NEPA and Section 1502.16 of the CEQ regulations for implementing NEPA require that the discussion of environmental consequences include a description of "…any irreversible or irretrievable commitment of resources which would be involved in the proposal should it be implemented." An irreversible commitment of a resource is one that cannot be reversed or cannot be renewed within a reasonable timeframe. Extinction of a species or disturbance to cultural resources would constitute irreversible impacts, as would extraction of sand, gravel, or oil or gas since these minerals resources cannot be renewed in the ground within a reasonable timeframe. An irretrievable commitment of a resource occurs when the resource or its use is lost for a period of time. For example, a decision not to treat juniper encroachment into adjacent sagebrush habitat results in the irretrievable loss of forage production from the grassland community. This action is not irreversible, because a treatment applied to the encroaching juniper could restore the forage production of the sagebrush habitat.

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

Assuming the BLM selects one of the action alternatives, and that subsequent implementation decisions authorize activity- or project-specific plans, some irreversible and irretrievable commitment of resources would occur. However, the specific nature and extent of the impacts cannot be clearly defined since the location, scale, timing, rate of implementation, and relationship to other actions is currently unknown. Such impacts can be better assessed after site-specific implementation, including implementation of mitigation measures and assessment of the efficacy of the mitigation measures.

Even without the specifics of implementation plans, the likelihood of irreversible and irretrievable effects on some resources can be estimated. Effects from some actions may be both irreversible and irretrievable for some resources. Resources most likely to be affected include minerals and energy development; vegetation including forests, forest products, and noxious weeds; fish and wildlife and their habitat; soils; water; visual resources; wilderness characteristics; and cultural and paleontological resources. The management actions most likely to result in irreversible and/or irretrievable effects include those related to development and surface disturbance such as mineral extraction, energy development, timber harvesting/silvicultural treatments, livestock grazing, and transportation and access.

Additionally, the effects of management actions are interrelated and generally affect multiple resources concurrently. For example, mineral extraction would result in an irreversible and irretrievable loss of those minerals. The effects of extraction on vegetation, associated wildlife habitat, and livestock grazing would be irretrievable and potentially irreversible if reclamation efforts prove unsuccessful. Irreversible effects on soils and water quality could occur, depending on the implementation of mitigation measures and their efficacy. Visual resources would be irretrievably affected during extraction activities, but the effects would not necessarily be irreversible. If the extraction activities occurred near a WSA or lands with wilderness

characteristics, those qualities could be irretrievably lost during extraction and such effects could be irreversible. Any cultural or paleontological resources affected by extraction would be irretrievably and irreversibly lost. However, all of these effects would be localized and have the potential to be minimized through effective mitigation.

4.11. Unavoidable Adverse Impacts

Section 102(C) of NEPA also mandates disclosure of "any adverse environmental effects which cannot be avoided should the proposal be implemented." These are impacts for which there are no mitigation measures or for impacts that remain even after the implementation of mitigation measures. Implementation of the RMP and subsequent activity- or project-specific plan implementation would result in unavoidable adverse impacts to some resources. The impacts resulting from implementation of the RMP are described in detail in Chapter 4, Environmental Consequences, and summarized herein. As discussed under the preceding section on irreversible and irretrievable impacts, the specific nature and extent of the implementation-level impacts cannot be clearly defined due to unknowns regarding site-specific implementation and associated mitigation measures.

In general, development and surface-disturbing activities including those from mineral extraction, energy development, vegetation treatments or timber harvesting, livestock grazing, and transportation and access would result in unavoidable adverse impacts including soil compaction and erosion, loss of vegetative cover, spread of noxious weeds, disturbance to and displacement of wildlife, visual intrusions on the landscape, and potential loss of cultural or paleontological resources. Conversely, proposed restrictions on some activities such as energy development or livestock grazing intended to protect sensitive resources and resource values would have unavoidable adverse impacts on some users, operators, and permittees by limiting their ability to use public lands and potentially increasing their operating costs.

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