

Chapter 4

Environmental Consequences

ENVIRONMENTAL CONSEQUENCES

This chapter describes environmental consequences that may result from implementing each of the three alternatives described in Chapter Two. The purpose of this chapter is to analyze and disclose potential impacts of the various alternatives on the human environment. The proposed action for this Environmental Assessment (EA) is the Bureau of Land Management's (BLM's) selection of an alternative on which future grazing use actions would be based.

The potential consequences of each alternative are described in this chapter as impacts using the same order of eight resource topics (e.g. Soil and Water Resources, Vegetation, Livestock Grazing, Wildlife/Fisheries Habitat, etc.) presented in Chapter Three.

The geographic area evaluated for this analysis is southern Fremont County and northern Sweetwater County.

INTRODUCTION

The human environment is interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment. Environmental consequences are usually described as being direct or indirect. Direct effects are caused by the action and occur at the same time and place. Indirect effects are caused by the action, but are later in time or farther removed in distance, yet are still reasonably foreseeable. Indirect effects may be induced changes. Effects include ecological, aesthetic, historic, cultural, economic, social, or health. Effects include both beneficial and negative effects.

ASSUMPTIONS

The assumptions listed below, and for each resource in the following section, are disclosed to provide a basis for the conclusions reached in this chapter. Assumptions common to all alternatives and all resources are listed below, whereas assumptions unique to specific resources are listed immediately following the impact analysis for that resource.

1. Impacts are assessed in the short-term and at the long-term. The short-term is defined as 2011-2014, the time period in which the grazing system begins to be implemented under Alternatives One and Two. The long-term is defined as 2014-2021, the time period in which the grazing system could be fully implemented and each use area and pasture would have gone through at least one full cycle of the proposed grazing systems. The longer-term, past the 10 year period of the permit in Alternatives One and Two, is not analyzed here, but it is likely that some of the objectives of the decision could only be reached in a longer time frame than being analyzed here.
2. Sporadic grazing use on uplands is generally not considered as having an adverse impact on most cultural resources, therefore it has not been considered in the cultural resources sections of the environmental consequences. Factors which cause intensified grazing use on uplands are addressed through standard cultural resource protection measures listed in Chapter Two. With the exception of the way the alternatives deal with range infrastructure and grazing authorizations, these protection measures do not vary by alternative.
3. Alternatives One and Two would allow for extensive permit (65 percent cattle and 80 percent sheep) nonuse, which has been authorized in the allotment over the past ten (2001-2010) years, to continue in the short-term to allow for drought recovery; fence and water project construction; and grazing system implementation. The GMCA grazing permittees who have been taking substantial levels of nonuse for four or more consecutive years, for reasons of "personal convenience", would be able to continue to have their active AUMs authorized for nonuse in the short-term in accordance with 43 Code of Federal Regulations (CFR) 4130.2(g). This regulation states: "Temporary nonuse ... may be approved by the authorized officer if such use is determined to be in conformance with applicable land use plans, AMP or other activity plans and the provisions of subpart 4180 of this part." The provision found at 43CFR 4130.3-2(f) may also be applicable in maintaining plan conformance by directing temporary non-use for additional time for protection of resources. Therefore, if circumstances conform to the above language, and the field manager has data or evidence and/or has signed an agreement with the permittee(s) supporting temporary non-use beyond the three-year period, BLM would continue to honor those plans or agreements made in good faith. In the

meantime, the BLM would continue to monitor and gather information in order to support any decisions it may make which might affect active grazing preference. The objective of this policy is to provide protection of the rangeland resource as discussed in Chapter One.

4. Another assumption for this EA is taken from a recent study of rest and deferred-rotation grazing systems in the Western U.S. Briske et al. (2008), have found that “Rest and deferment during periods of minimal plant growth; associated with low soil water availability or temperature extremes, limit the potential for positive vegetation responses. Rest periods that coincide with limited plant growth convey minimal benefit to plants so that the impacts of increased grazing pressure during short grazing periods may not be offset during subsequent rest periods. Conditions of limited and erratic precipitation are the rule, rather than the exception, on most rangelands throughout the West.” In other words, rest from livestock grazing has to occur during periods of average or better growing conditions to be effective in restoring or maintaining plant health.

EFFECTS COMMON TO ALL ALTERNATIVES

Impacts Common to All Resources and Uses under All Action Alternatives

Impacts to all resources that do not vary by alternative do not need to be analyzed in detail. The most important of these are the management for the benefit of greater sage-grouse and the placement of salt and mineral supplementation. While the limitations imposed by this management may have adverse impacts to livestock grazing and assuredly limited the location of infrastructure under Alternative Two, the management prescriptions do not vary by alternative. See Table 2.1.

Sage-grouse Guidelines - Since the U.S. Fish and Wildlife Service now considers the Greater Sage-Grouse a “Candidate” species under the auspices of the Endangered Species Act, the State of Wyoming has developed a “Core Population Area” strategy to conserve the sage-grouse in Wyoming. This statewide strategy has gained recognition from the U.S. Fish and Wildlife Service as a sound framework for a policy by which to conserve greater sage-grouse. More than 90 percent of the GMCA is within contiguous Core Area. With some of the highest lek density in the state and a high percentage of public land (468,407 acres of 522,000 acres are federally owned), the GMCA is an extremely important area with regards to sage-grouse conservation in Wyoming and the nation. It is the policy of WY BLM to manage sage-grouse seasonal habitats and maintain habitat connectivity to support population objectives set by the Wyoming Game and Fish Department.

Instruction Memorandum No. WY-2010-012, Greater Sage-Grouse Habitat Management Policy on Wyoming BLM Administered Public Lands including the Federal Mineral Estate provides guidance on sage-grouse habitat management for proposed activities and authorized uses. This guidance is consistent with guidelines provided in the Governor’s Sage-Grouse Implementation Team’s Core Population Area strategy, Governor’s Executive Order 2010-4, BLM National Sage-grouse Habitat Conservation Strategy, Wildfire Season and Sage-grouse Conservation. This guidance will be incorporated into the new Resource Management Plan being analyzed now. It is discussed in more detail in Chapter Three.

This guidance is structured to utilize an adaptive management approach to habitat conservation, restoration, and enhancement. The policy applies to all programs and activities occurring on public lands and Federal mineral estate in Wyoming, except for livestock grazing management within the range management program, because recommendations and policy regarding grazing patterns would be issued separately. The Lander Field Office would consider and evaluate the following sage-grouse habitat conservation measures related to timing, distance, and density for all proposed projects, including livestock developments, both within and outside of sage-grouse Core Population Areas in the GMCA.

Both action alternatives meet the requirements of the greater sage-grouse strategy identified by the BLM as required to limit adverse impacts to sage-grouse habitat. The strategy requires that it be implemented across BLM managed lands (and would be applied to state lands according to current guidance.) Therefore, this analysis does not have an alternative that does not support this strategy. This approach is particularly important in the 473,100 acres of the GMCA that are in greater sage-grouse Core Area. The impact to livestock grazing from this management would vary by alternative because it would be applied to future range infrastructure projects. However, Alternative Two

does not anticipate any additional infrastructure projects other than those analyzed here (which have been designed to limit adverse impacts to greater sage-grouse. Accordingly, there is likely to be little difference between the two action alternatives in the adverse impacts to livestock from greater sage-grouse management in the future.

The infrastructure to be installed under Alternative Two would not be implemented quickly enough to ensure progress towards rangeland health was being made with the AUMs that could be supported after the infrastructure was in place. Accordingly, for the first three years, Alternatives One and Two would be the same in their beneficial impacts to resources because the same stubble height triggers would limit impacts from livestock grazing use. Accordingly, for the first three years under Alternative Two, adverse impacts would be greater to livestock grazing because AUMs would be lower. Over time, as projects were built, a difference in the impacts would become more evident. The clearest difference between the two action alternatives that would develop overtime is that Alternative One would continue to have adverse impacts to livestock grazing but the adverse impacts under Alternative Two would be reduced. These negative impacts would be reduced because it is assumed that with the installation of additional wells and riparian pasture fencing, grazing permittees would be able to keep their livestock on the allotment longer. Under Alternative One, utilization standards would be reached sooner because it would be more difficult to control where livestock graze.

Regional Economic Impact Analysis

The economic and social impacts from the three alternatives are discussed below with all three alternatives looked at together.

Impacts to Soil and Water Resources Common to All Alternatives

Soil resources are beneficially impacted by management actions that benefit vegetation and riparian resources. As these resources improve (a process that can take years or decades) soil resources would also benefit. The process may be complicated by environmental conditions (e.g. drought) can slow or negate progress for some years.

Impacts in the uplands from bunched, herded livestock would have a negative effect on the brittle shrub component (i.e., sagebrush and bitterbrush) in some areas. On sandy soils, such as those in the Happy Springs Use Area, loss of these shrubs would lead to the initiation of accelerated wind erosion. Thus, to the extent that management improves or beneficially impacts these shrubs, the soil resources would be beneficially impacted.

In the existing riparian enclosures and pastures, increases in litter/vegetative cover and vegetative height would lower erosion rates and contribute increased amounts of organic matter to the soil. This is discussed in more detail under the riparian section.

ALTERNATIVE ONE

EFFECTS ON SOIL AND WATER RESOURCES (Alternative One)

Soil Resources

Summary of Impacts: Diligent livestock handling under Alternative One is crucial to successful protection and enhancement of wetland and riparian areas.

Under this alternative, beneficial impacts to soil resources would occur over time as stocking rates are reduced to meet stubble height objectives and suitability criteria. These beneficial impacts are expected to be observed in the short-term and continue into the long-term. With no new range improvement projects, soil resources would benefit from not being disturbed by project construction or the creation of sacrifice areas.

Adverse impacts would continue to occur at the existing range project livestock concentration areas, which amounts to roughly 133 acres. The use of grazing supplements, salt, and mineral blocks to attract livestock away from riparian areas and improve livestock distribution in the uplands would also decrease adverse impacts of soil compaction, and mechanical damage to streambanks and pugging in wet meadows.

Monitoring of livestock grazing use in this alternative would be sensitive enough to detect use of vegetation that

would adversely impact soil resources including those in areas of high wind or water erosion potential. The stubble height requirements would be monitored in selected key areas presently associated with vegetation frequency and density studies. While there are significant wetland/riparian zone resources, such as locations like Wilson Bar on the Sweetwater River, which would not be monitored, the number and geographic distribution of key areas (see Map 36) should be sufficient to address issues in any region of the allotment.

The saline soils on Alkali Creek Sheep Allotment prevent the establishment of willow plant communities, but do allow sedges and grasses to naturally thrive. In the long-term, managed grazing of sheep, at levels almost one-half that of historic sheep use, and with no hot season grazing would yield enhancements in the kinds and amounts of desirable vegetation supported by the wetland and riparian soils of this use area. Over time, this would also increase the organic matter content and volume of these lowland soils. Sheep use would occur in the far western portions of the allotment in the summer season and in the southern portion in the late fall and winter periods. The summer period of use poses a risk to the health of wetland/riparian plant communities and can adversely impact the ability of these soils to store and transmit water and withstand high flow events that can result in accelerated bank erosion. In the southern portion of the allotment the late fall/winter grazing would decrease the woody component of the plant communities and increase the herbaceous and forb components; this would serve to lessen runoff and soil erosion rates.

The long-term strategy should allow for enough rest in the uplands to maintain adequate soil cover to buffer the erosive effects of wind and precipitation. Also, by rotating use of pasture to different seasons each year there should be alleviation of soil compaction in the long term in the lowlands and transition zones to wetland and riparian areas.

EFFECTS ON WATER RESOURCES (Alternative One)

Summary of Impacts: The expected beneficial impacts to soil resources from Alternative One would also be experienced by water resources. Water storage should improve under this alternative as well as a reduction in erosion and bank trampling that has historically introduced sedimentation to the water courses and resulted in faster run-off. With no new livestock management projects proposed under this alternative there would be no new sacrifice areas created. There are approximately 133 acres of existing concentration areas associated with projects that would still exist. These locations typically possess compacted soils, accelerated erosion rates, and decreased infiltration rates. Reduced soil erosion rates, especially those of the lowlands, would be the largest contributing factors to water quality. With livestock use levels under this alternative expected to be light, a slow rate of riparian zone improvement can be expected. Drought would, of course, be a complicating factor retarding progress in some years; however, with the implementation of the utilization triggers and the BLM's drought policy, compounding impacts of livestock grazing in such periods would be mitigated.

Similar in impacts to those described under soil resources, Alternative One sheep management would yield riparian zone improvements sooner than the other use areas in the allotment. As a result of this management scenario, water quality parameters such as turbidity, total dissolved solids (TDS), and suspended sediment (SS) would be improved above the current situation. Sheep use would occur in the far western portions of the allotment in the summer season and in the southern portion in the late fall and winter periods. The summer period of use poses a risk to the health of wetland/riparian plant communities and can adversely impact the ability of these soils to store and transmit water and withstand high flow events that can result in accelerated bank erosion and sediment contribution to the system. In the southern portion of the allotment the late fall/winter grazing would decrease the woody component of the plant communities and increase the herbaceous and forb components; this would serve to maintain or lessen runoff.

The grazing system under this alternative would be determined by the permittees. According to some rangeland research the specific grazing strategy is not as important as a proper stocking intensity and the practice of good management so that control is maintained over livestock distribution and grazing intensity (Clary and Webster, 1989). Compliance monitoring of livestock grazing utilization would be used to eliminate further vegetation use on any given pasture once the utilization triggers were met. There can be improvement in the upland portions of the allotment with diligent livestock management.

Utilization triggers would also be used to lessen impacts to riparian areas where cattle tend to congregate, especially

in the summer season. This would beneficially impact water resources through the restoration of the functional integrity of the riparian systems. As the livestock use on the riparian areas would be substantially decreased, by use of utilization move triggers, water quality should be enhanced. This kind of grazing however, may be detrimental to the establishment of woody riparian shrubs species, such as willows. There is much risk with this alternative though, as only a few livestock left after a move can leave wetlands/riparian zones in unacceptable condition. The system requires the BLM to respond to observations of stubble heights and the time necessary to resolve disputes and enforce decisions to close regions of the allotment can allow continued levels of unacceptable use longer than desired. Of course, the exclosures and limited-use riparian pastures would show the most improvement.

EFFECTS ON RIPARIAN VEGETATION (Alternative One)

Summary of Impacts: Under Alternative One, livestock use levels would be reduced to achieve healthy rangeland standards. This alternative contains no provisions for additional fencing or new water development. Under this alternative, improvement in plant diversity, variety of age classes, and structure in plant communities in riparian areas, would be seen in the short and longer-term. Improvements would occur most rapidly in existing riparian pastures, because Alternative One requires these to be grazed only until stubble heights are met and this management would result in immediate improvement of riparian vegetation.

Adverse impacts would continue to occur at the existing 133 acres livestock concentration areas associated with range improvement projects. An estimated three percent, four acres, are located within riparian zones and wetlands. The remaining 129 acres occur in upland locations. The prohibition of new range improvement infrastructure would not benefit riparian areas that experience concentrated forage use from wildlife and wild horses but the implementation of stubble height triggers would directly benefit riparian vegetation from adverse impacts from livestock grazing. In the longer term, the improvements to upland conditions described below would beneficially impact riparian areas from reduced sedimentation and runoff and increased water infiltration.

Closing the Alkali Creek Sheep Allotment to hot season sheep grazing (at use levels less than half the historic rate) and to all cattle grazing would beneficially impact the riparian areas in that allotment although these are primarily on state and private lands. This grazing prescription would produce riparian zone improvements more rapidly than on the other use areas in the allotment.

Under this alternative, the riparian area along Crooks Creek would remain unfenced and would be grazed with strict adherence to stubble height triggers. Access to the creek for wild horses and wildlife would not be restricted which could have minor, short-lived adverse impacts on riparian vegetation. However, rapid improvement in plant diversity, variety of age classes, and structure particularly in the willow plant community along the creek, would be seen in the short term. In the longer-term, it is expected that there would be an improvement in condition in those riparian areas outside riparian management pastures within the Antelope Hills Allotment. Deferred-rotation grazing systems were evaluated by Platts and Nelson (1989). These systems were only rated as fair for improving stream and riparian habitats (refer to Appendix 20). However, the proposed reduction in grazing use levels, combined with the deferred-rotation grazing system, would allow for long-term improvement (Myers 1989, Masters et al. 1996b, Mosley, et al. 1997, Clary and Webster 1989, Clary and Webster 1990, USDI-BLM 1998).

In this alternative, compliance monitoring for unauthorized livestock would also be used to limit grazing use on any given riparian area for the remainder of the grazing season once the utilization triggers were met. Utilization triggers would also be used to lessen impacts to riparian areas where cattle tend to congregate, especially in the summer hot season which would begin the recovery and restoration of the functional integrity of these riparian systems. As the livestock use levels on these riparian areas would be substantially decreased, riparian vegetation would be enhanced.

EFFECTS ON VEGETATION RESOURCES (Alternative One)

Vegetation – General

Summary of Impacts: The long-term impacts to upland range sites adjacent to riparian areas as a result of a substantial reduction in livestock grazing would be moderately increased vegetation production. Increased seedling establishment, improved vigor and root growth/replacement, increased litter accumulation, and increased percent composition of grass and key forb species would occur under the implementation of Alternative One. The implementation of stubble height requirements for key upland sites for residual herbaceous cover would beneficially impact the upland vegetation sites.

Grazing Management

Grazing management under Alternative One is based on achieving stubble height criteria. The grazing strategies adopted by the permittees would determine whether the authorized AUMs would be used or if it would be necessary to remove the animals prior to full use because of stubble height triggers being met. The management that would result in the greatest number of AUMs being used would involve grazing strategies that keep the livestock off of key riparian areas such as frequent low stress livestock herding combined with pasture rotations.

Grazing strategies such as those discussed in detail under Alternative Two would likely not be adopted by the permittees because, as is identified for Existing Management, the infrastructure to support extensive herding would not be in place. This alternative would likely have various systems and approaches applied depending upon individual operations.

Upland Vegetation

In both the short and long-term, the impacts to the upland range would be beneficial as a result of reduced livestock use; however, the generally good condition of the uplands means that the improvement would be modest. Even if the full permitted use occurred, it is slightly more than half of the historic use. The majority of the upland rangeland met the RHS. However, the transition zones between riparian areas and uplands (now estimated at less than 2 percent of the allotment) were identified as needing improvement and did not meet RHS. These problem areas would be addressed under this alternative although the uplands would take longer to show improvement as compared to the riparian areas because this vegetation type responds less quickly than riparian. Depending upon the use of herding by the permittees, which would distribute the livestock out of the riparian and first terrace riparian sites, the upland triggers would not likely ever be a factor in determining if the livestock remain in the allotment, as the riparian and first terrace triggers would be reached before the 6-inch upland trigger would be reached. With herding, the uplands would receive more use but the very light stocking rate (approximately 40 acres per AUM) would result in beneficial impacts to upland vegetation through increased production due to increased seedling establishment, improved vigor and root growth/replacement, increased litter accumulation, increased percent composition of grass and forb species.

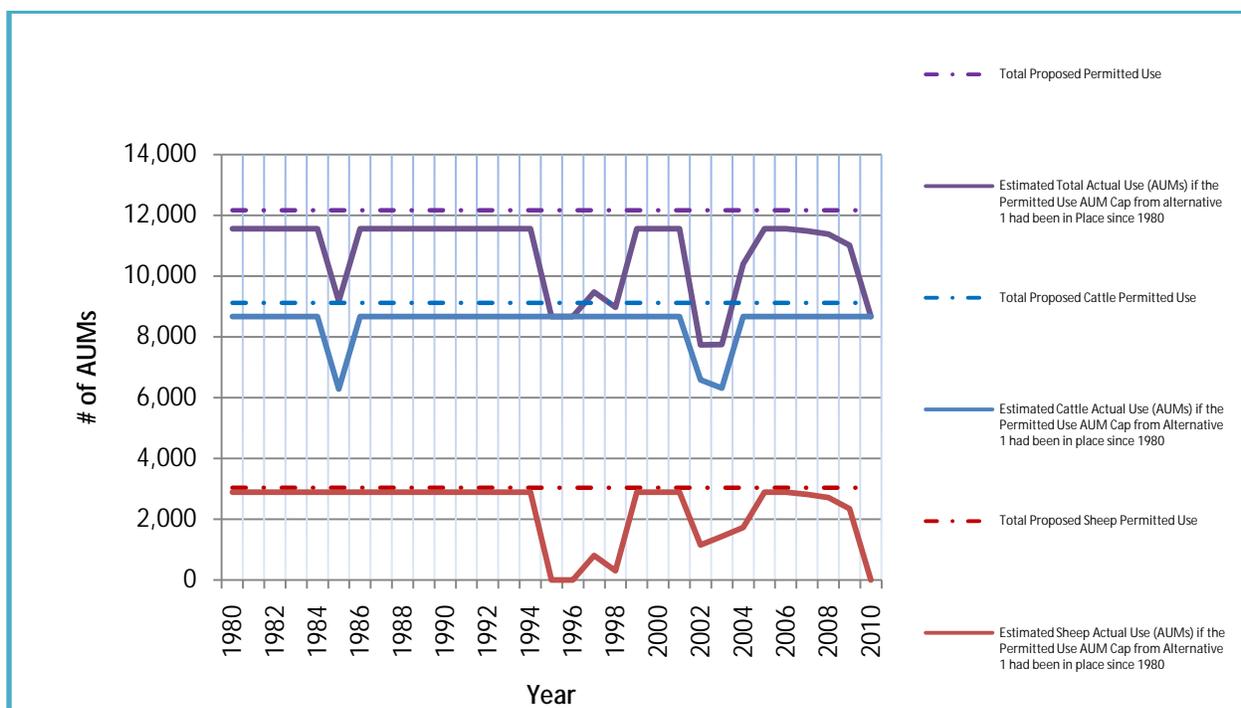
A key goal is the health and maintenance of stands of sagebrush with an herbaceous community featuring large cool season bunchgrasses such as needle & thread or bluebunch wheatgrass. These plant communities are known to transition to Sagebrush with an understory of more grazing adapted species, notably Sandberg bluegrass with heavy use or repeated grazing in the late spring critical growing season. Briske et al. (2005) described the concepts of state and transition models that depict plant succession. It is anticipated that the light grazing in this alternative would prevent the transition from the cool season bunchgrasses to the more grazing adapted type, but communities already dominated by Sandberg bluegrass would probably not shift to the more preferred communities.

The elimination of hot season grazing in the Alkali Creek Sheep Allotment and the closure of the allotment to grazing by cattle would beneficially impact upland vegetation in the short and longer-term.

EFFECTS ON LIVESTOCK GRAZING (Alternative One)

Figure 4-1 projects anticipated actual use in the GMCA in Alternative One. The chart presumes that a level of actual use would always form below the full permitted use for reasons described in the livestock grazing section of the affected environment. The figure takes known actual use from 1980 to present and applies the permitted use caps (12,160 Total AUMs, 9120 Cattle AUMs and 3,040 sheep AUMs) to estimate what the use levels would have been if the alternative’s permitted use caps had been in place since 1980. Whenever the historic actual use exceeded the permitted use specified in the alternative, 95% of the Alternative One permitted use was substituted for the historic figure. This analysis provides a reasonable index to estimate the actual use that may occur in the future. The analysis suggests that 10,736 AUMs of total use (with 8,444 AUMs of cattle and 2,292 AUMs of sheep) is the most likely level of long term use in the GMCA. The projected reduction in actual use would be 53% for total use 51% for cattle and 61% for sheep. Figure 4-1 shows that if the Permitted Use of 12,160 AUMs had been in place since 1980, the historic total actual use levels would have been restricted in 18 of the 31 years evaluated. Similarly cattle use would have been restricted in all but three years in the analysis period. Sheep use would have been restricted in 19 of the 31 years analyzed.

Figure 4-1. Proposed Permitted Use and Projected Actual Use Analysis Under Alternative One



This alternative contains no provisions for additional fencing or new water development. Consequently, no new range improvement construction costs or maintenance costs are presented or analyzed. Non-infrastructure range improvement projects such as vegetation treatments could be done which would benefit livestock grazing in both the short and longer-term although a temporary displacement could occur.

In this alternative, compliance monitoring for unauthorized livestock would also be used to limit grazing use on any given riparian area for the remainder of the grazing season once the utilization triggers were met. In both the short and longer-term, utilization standards would be reached sooner under Alternative One because it would be more difficult to control where livestock graze without additional infrastructure.

EFFECTS ON WILDLIFE/FISHERIES HABITAT AND SPECIAL STATUS SPECIES (Alternative One)

Under Alternative One, wildlife impacts that are likely to occur from proposed and potential activities within GMCA include direct and indirect loss of habitat. Direct impacts to wildlife habitat would occur in areas that are physically altered by development (e.g. construction of roads, pipelines, transmission lines, and livestock developments). Indirect impacts would occur from disturbances associated with construction and operation resulting from increased human presence and noise. Indirect impacts may displace wildlife or preclude the use of areas near human use/disturbance. Since no new range project infrastructure projects are planned under this alternative, direct and indirect impacts would be lower than Alternative Two.

Nongame Wildlife and Game Birds

Nongame wildlife and game bird habitat conditions have improved the most in those one-acre spring development/enhancement exclosures constructed over the last ten years. Within these exclosures, exclusion from livestock grazing has increased plant diversity, the variety of plant age classes, and the structure in plant communities. This has resulted in a likely increase in the abundance and species diversity of nongame wildlife.

Riparian-dependent, nongame wildlife in the remaining portions of the allotment have likely benefited to varying extents, depending upon the vegetation response within each exclosure. Habitat conditions within the five completed riparian pastures (of seven planned) have improved to varying degrees, depending upon how long they were rested before the resumption of grazing, the level of use each year, and the dependability of continued water flows. Although this improvement may not have been as dramatic as that noted in the spring exclosures, these pastures have likely provided a much greater benefit to nongame wildlife and other species including amphibians, owing to the greater number of acres involved. These beneficial impacts would be expected to continue in the future under this alternative.

Riparian habitat quality in areas outside exclosures could be expected to improve over time by controlling stocking levels, and the frequency and duration of grazing on riparian areas. This could be accomplished through diligent herding. Under this alternative herding would be used, at the discretion of the permittees, to move livestock within and between pastures once utilization standards have been met. Once stubble height requirements “triggers” have been met in key riparian and upland habitats, cattle would be removed from those areas so that over-utilization would not occur. Rigid adherence to stubble height standards under this alternative should result in a gradual improvement in riparian vegetation condition that would improve habitat for a variety of riparian obligate species including migratory songbirds, waterfowl, small mammals, bats and amphibians.

Under this alternative, herding would be optional to distribute livestock away from key areas. Although herding during the spring and early summer months could result in the trampling of nests of ground nesting birds, it is expected that this would occur infrequently. No motorized herding would be allowed under this alternative, which beneficially impacts habitat and avoids trampling nests.

Big Game

Forage competition between grazing animals could occur on years where vegetation production is low. Over the long term, this forage overlap may reduce the carrying capacity of winter ranges for deer and pronghorn by reducing the forage available for wildlife during the critical winter months. For instance, fall and winter grazing by sheep could deplete browse species important to deer and pronghorn during the winter on the Alkali Creek Sheep Use Area. Even though livestock use levels would be well below historical actual use levels under this alternative, competition between livestock and wildlife could occur due to longer season of use, earlier turnouts and yearlong grazing by sheep. Many species of wildlife depend on forbs to meet seasonal diet demands, particularly during the spring breeding/birthing period. While cattle generally select for grass, grazing during spring and early summer could affect the quantity and diversity of available forbs as cattle often select these plants when they are actively growing. Forbs consumed by cattle would be unavailable to wildlife during the critical May and June breeding and birthing period.

Because of lower stocking rates there should be more acreage left undisturbed for wildlife. With the expected

distribution of livestock through herding, big game species would be able to utilize ungrazed pastures prior to livestock movement and would be able to exhibit greater selectivity in ungrazed areas. Big game use of the Alkali Sheep Use Area would be expected to be higher during the summer period when livestock are not present and big game, particularly deer and elk, would utilize riparian habitats when cattle are absent from these areas. Under this alternative, herding, reduced livestock numbers (from historic use levels) and livestock movements due to the implementation of stubble height requirements should improve the quality and quantity of herbaceous riparian vegetation. Big game species would be able to utilize riparian areas once triggers have been reached and livestock moved away from those areas.

There are no new livestock developments planned in the GMCA under this alternative that would interfere with big game movements. Nor is there any new fencing projects planned in allotments immediately south of the GMCA (i.e. Cyclone Rim and Stewart Creek Allotments) that would interfere with the migration of the Red Desert pronghorn herd. Since there is no new water sources in areas that are not currently served, there would be no beneficial impacts to big game from new water sources. However, water sources are not considered to be a limiting factor for big game, so that the loss of new sources is likely to have little adverse impacts.

While, in general, the cumulative impacts identified for greater sage-grouse, below, reflect impacts to pronghorn, the following information is offered for the impacts to the Red Desert pronghorn herd. Mineral development and exploration would have an adverse effect, cumulatively, on some of the big game herds that occupy GMCA. For instance, loss of over 300 acres of actual disturbance in big sagebrush habitat would occur as a result of land disturbance within the Lost Creek ISR Project boundary considering only the actual acres proposed to have vegetation removed associated with well pads; the total area functionally disturbed is likely to be much higher. This area provides winter and yearlong habitat to the Red Desert pronghorn herd. Increased human presence due to construction and operation would displace big game in areas adjacent to the Project. In addition, exploratory drilling in the JAB-Antelope project area may result in short term displacement of big game during construction and drilling activities. The potential for wildlife vehicle collisions would increase in these areas as human activity increases.

Moose habitat associated with willow riparian habitats along the Sweetwater River and Crooks Creek, would improve gradually under this alternative. Lower stocking levels, the implementation of stubble height “triggers” and active herding should result in fewer willows being browsed and trampled by livestock. Livestock grazing would occur along the tributaries and meadows of the Sweetwater River, Crooks Creek and West Fork of Crooks Creek but adherence to stubble height requirements at key areas within these areas would help to prevent overutilization of important browse species. A gradual improvement in willow communities’ condition within the GMCA could be expected under this alternative. Moose habitat in other portions of the allotment is rare and is not likely to receive much improvement because livestock grazing would continue in these areas.

Fisheries

The impacts to riparian habitats under Alternative One relate directly to fisheries and cold water trout habitat. The Sweetwater River Riparian Pasture would provide the best opportunities for improvement of trout and nongame fisheries. Controlling livestock grazing intensity along the Sweetwater River and Crooks Creek, and the tributaries to these drainages, would improve fish habitat in the GMCA. Adherence to stubble height standards would result in an increase in residual vegetation available to protect stream banks from erosion and reduction in the amount of sediment from entering the streams. Additional stream bank vegetation would also provide cover to the water column of the stream by both herbaceous and woody species (i.e., willows, cottonwood, and aspen). This would provide hiding cover, and would help maintain cooler water temperatures to support trout throughout the summer period when water temperatures can limit trout survival.

Long term improvements in riparian vegetation within the GMCA, particularly in the northwest portion of the allotment, would improve both trout and nongame fisheries outside the allotment by allowing the restoration and healing of wetland “sponges” underlying riparian wetlands that serve as major water storage reservoirs. Improved water flows downstream would be a direct result of healthier riparian areas within the GMCA.

Special Status Species

None of the actions proposed under any of the three alternatives are likely to adversely affect any federally threatened or endangered species that may occur in the allotment. Prior to the authorization of surface-disturbing activities, a threatened or endangered species review would be conducted to determine if any adverse, site-specific effects would occur. If the review indicates that a “may affect” situation would occur for any listed species, consultation with the U.S. Fish and Wildlife Service (USFWS) would be initiated.

Chapter Three of this document (Affected Environment) mentions three federally listed species to be analyzed for potential adverse effects. They are the Ute ladies’-tresses, blowout penstemon, and the Gray wolf. Those species affected by Platte River depletion would also be included. The mountain plover, now a proposed species, and the Greater Sage-grouse, which has been listed as a candidate species, are BLM sensitive species that occur on the GMCA. Protection and implementation of best management practices provided to these two bird species now may preclude possible listing in the future.

Although potential habitat for the Ute ladies’ tresses occurs within certain parts of the allotment, there would likely be no adverse effect to this species for the following reasons: 1) This species has never been documented in Wyoming at elevations above 5,500 ft.; the lowest elevation in the GMCA is approximately 6,400 ft.; 2) The Ute ladies’-tresses require moist soils near perennial water; at the lowest elevation there is no perennial water; 3) this species requires non-alkaline soils; the soils at the lowest elevation are alkaline; and 4) any new surface-disturbing activities planned under any of the alternatives would be subject to a separate, site-specific NEPA review.

A small amount of suitable habitat for the blowout penstemon has been identified within the GMCA. However, there would likely be no adverse effect to this species for the following reasons: 1) suitable habitat locations within the GMCA have been surveyed, and no populations have been documented; 2) if present in the GMCA, the species is unlikely to be grazed by livestock because it is not a preferred forage plant, and also because livestock typically do not graze in its sparsely vegetated, sandy habitat; and 3) any new surface-disturbing activities planned under any of the alternatives would be subject to a separate, site-specific NEPA review.

The Gray wolf is considered a nonessential/experimental population by the U.S. Fish and Wildlife Service. The number of the Gray wolves and their home ranges appear to be expanding in the LFO during the past decade. A known pack of wolves is known to inhabit the southern portion of the Wind River Range. Although no established population is known to occur within the GMCA, individual sightings have been made. BLM wolf stipulations “terms and conditions” would be attached to all permit renewals within the GMCA.

In 2010, mountain plover was proposed by the U.S. Fish and Wildlife Service as a threatened species under the Endangered Species Act. A decision on the listing status of this species is expected in the spring 2011. The GMCA has been characterized as “low suitability” for mountain plover occurrence although plover are known to occur in the allotment. There would be no increase in plover habitat under this alternative as a result stubble height requirements and no new water developments. The greatest adverse impact that could occur to mountain plover under Alternative One would be trampling of nests.

Of the thirty-one BLM Sensitive plant and animal species carried forward from Chapter Three for consideration, impacts would vary widely, depending upon what effect livestock grazing and associated range improvements had on their respective habitat needs. Under Alternative One, impacts to bat species, such as the long-eared myotis and the spotted bat, would be mostly positive. Since these bats are insectivores, a gradual improvement of riparian vegetation through herding and reduced stocking rates would likely increase insect populations and increase foraging opportunities.

The greater sage-grouse can be negatively impacted throughout various stages of their life cycle by livestock grazing. Livestock may compete directly with sage-grouse for rangeland resources including reducing grass and shrub cover needed by nesting birds. Concentrations of livestock during herding can disrupt strutting during the breeding season and cause direct trampling of nests during the nesting period. Reduction of residual stubble height by livestock grazing below six inches may contribute to increased nest predation by reducing concealment of the eggs and young (Gregg et al., 1994). Connelly et al. (2000) found that sage-grouse preferred areas with high plant

species richness, moisture, and taller grasses and forbs during the brood-rearing portion of their life cycle. Overgrazing of riparian areas may diminish the quality of brood-rearing habitat.

Adherence to stubble height standards under Alternative One should result in a gradual improvement in live vegetation cover and the remaining residual cover would be adequate to provide sage-grouse nesting cover. The six inch cover height requirements in riparian areas would provide ample brood rearing habitat in those key areas. During the short term, the adverse impacts on riparian areas and to sage-grouse brood rearing habitat under this alternative would be similar to those under Alternative Two due to identical stubble height requirements. The prohibition on new fences and water developments would avoid the adverse impacts associated with them.

The white-tailed prairie dog evolved alongside large grazing ungulates such as bison and elk; thus, the continuation of livestock grazing would likely benefit this species. Prairie dog habitat would probably remain stable under this alternative. Moreover, none of the alternatives considered in this document permit the removal of prairie dogs without BLM authorization.

Although undocumented occurrences of the swift fox have been reported in the GMCA (as mentioned in Chapter Three), it is likely that their populations in the GMCA are low. If they occur at all, they are not likely to be impacted by this alternative, because large-scale habitat type conversions are not being proposed. Predator control measures designed to eliminate coyotes that might accidentally harm the swift fox are not authorized in any of the alternatives being considered.

The primary threat to pygmy rabbit habitat associated with livestock grazing is the removal of dense sagebrush to improve forage for cattle (Keinath, D. A. and McGee, 2004). Distribution of pygmy rabbit habitat across the GMCA is patchy and site specific data is lacking for much of the area. However, rabbit surveys have been conducted in the Bison Basin oil field, Pappy Draw Geophysical Project area, and Dawson Geophysical Project area where 770 positive pygmy rabbit sightings (actual sightings, pellet observations, tracks, etc.) were made; see Map 24. Adverse impacts to rabbit habitat would likely be minimal under this alternative.

Impacts to the mountain plover resulting from Alternative One would likely be mixed. Plover habitat tends to be maintained in areas that are repeatedly overgrazed, such as pipeline rights-of-way. However, this is a ground-nesting species, and individual nests could be trampled as a result of concentrations of livestock during herding and at water sources. Plover habitat generally does not occur near riparian areas, so riparian pastures or enclosures already constructed or planned would have little impact on this species. It is unlikely that there would be severe adverse impacts to mountain plover habitat from Alternative One.

The northern goshawk, a forest-dwelling raptor, is most threatened by removal of the mature forests it requires for nesting and foraging (Smith and Keinath, 2004). No such habitat conversion is proposed in any of the alternatives considered, so this type of impact would not occur. However, Smith and Keinath also found that excessive grazing in aspen stands and riparian communities could alter habitat complexity, thus reducing prey base. Proper livestock distribution through herding should prevent such overgrazing, so adverse impacts upon this species are unlikely to arise from Alternative One.

Other raptors such as the ferruginous hawk and peregrine falcon are threatened by fragmentation or disturbance of habitat. Although the former species is frequently seen in the GMCA, the latter is not known to occur there, probably due to lack of nesting habitat. As the peregrine falcon nests in cliffs, its nests are not susceptible to trampling by livestock. However, this is not the case with the ferruginous hawk which often places its nest on the ground. On occasion, such nests are trampled and whatever eggs they contain are lost. Otherwise, habitat conversion is not being proposed in any alternative, so the likelihood of impact to these species is low.

The burrowing owl in Wyoming is closely associated with the prairie dog, because burrowing owls often use prairie dog burrows for roosting, nesting, and escape cover for their young after they have fledged. Lantz et al. (2004) found that this species prefers areas of high burrow densities for “satellite burrows” around a central nesting burrow. They also found that burrowing owls select sites where the grass has been closely clipped (i.e., by bison, prairie dogs, domestic cattle, etc.) so as to provide greater visibility. Burrowing owls are most threatened by conversion of suitable habitat to other purposes (Lantz et al., 2004). None of the alternatives considered here include proposals for

habitat type conversions so burrowing owls would not likely to be negatively impacted.

Shrub-nesting species such as the sage thrasher, loggerhead shrike, Brewer's sparrow, and sage sparrow are all most negatively impacted by loss of suitable habitat, through extensive fragmentation, modification, or conversion to other purposes. None of the alternatives considered here include proposals for such actions, so these species are not likely to be negatively impacted by Alternative One, nor any of the other alternatives.

Impacts to the meadow pussytoes would be slightly negative under Alternative One. As vegetation conditions improve in riparian areas, the number of individual plants (meadow pussytoes) would likely be diminished. However, sufficient suitable habitat should remain to prevent a trend toward federal listing.

Limber pine is not likely to be negatively impacted by Alternative One, nor any of the other alternatives.

The remaining BLM sensitive plants considered in this section include: Porter's sagebrush, Cedar Rim thistle, Fremont bladder pod, Beaver Rim phlox, Rocky Mountain twinpod, persistent sepal yellowcress, and Shoshonea. Of these seven species, none have been documented in the GMCA. They are discussed here because computer modeling suggests that suitable habitat for these eight plants may occur within the allotment. These species evolved with large grazing animals such as bison and elk, so it would be unlikely that livestock grazing under this alternative would contribute to the need for federal listing.

EFFECTS ON WILD HORSES (Alternative One)

This alternative would have beneficial impact on the existing situation within the wild horse HMAs by reducing livestock grazing substantially and protecting vegetation through the use of stubble height triggers. A decreased number of livestock would provide more forage and less competition for wild horses; there would be short-term displacement of wild horses during any time livestock herding is taking place. While herding would not be mandated by the BLM, the permittees may herd because that would improve distribution and thus increase the number of AUMs used before the stubble height triggers were met. Any herding taking place under this alternative would need to be conducted on horseback as the use of OHVs is prohibited.

This alternative assumes no net increase in water developments which avoids surface disturbance and loss of vegetation. Adequate water is available for wild horses so there is no adverse impact from the lack of water development. It can be expected that forage conditions would improve over the current situation. This could lead to better herd health and better forage conditions during winter months, when horses experience stress from windy and cold conditions.

This alternative's limitation on new fences would allow for continued wild horse migration and unrestricted access between herd areas. This would result in stable genetic integrity among the herd areas, clearly a beneficial impact. Migration within HMAs would also allow for optimum movement during periods of stress. Supplements such as lick tubs used to improve livestock distribution would be safe for all classes of animals if placed on the rangeland. These supplements would not only be used by livestock, but by wild horses as well helping with improved distribution within the allotment. However, wild horses generally do not need supplements as they can obtain all their needs from existing habitat.

Under this alternative, absence of additional water developments would help maintain the integrity of the historic wild horse use areas within the HMAs. No loss of wild horse visitor days would occur in this alternative, and the opportunity to develop a wild horse viewing loop in any one of the three HMAs would still be a viable option.

EFFECTS ON CULTURAL RESOURCES (Alternative One)

Alternative One is projected to have beneficial effects to prehistoric and historic sites near riparian areas as well as upland areas.

Stubble-height monitoring and adherence to utilization standards plus reduced livestock numbers under this alternative would, in the short term, allow riparian areas and other areas experiencing heavy grazing to begin to

repair themselves. This would decrease the erosion and degradation of prehistoric and historic cultural resource sites that is now occurring. In the long term, continued stubble-height monitoring and adherence standards and reductions of livestock numbers and presence would allow heavily grazed areas to become stable and less erodible. This would in turn stabilize any cultural resource sites upon them.

Fences, salt and mineral supplement placements, and vegetation treatments under this alternative would not affect any known important cultural resources and would be designed to avoid as-yet unknown cultural resources.

Wildlife and wild horse population levels would be maintained at their current levels. Together with the reduced livestock numbers under this alternative, the conditions of prehistoric or historic resources in heavily grazed areas would be maintained or improved under this alternative.

Twenty-seven known significant prehistoric sites would be beneficially affected under this alternative, as positive conditions (reductions of both erosion and livestock concentration on these sites) outweigh previous negative conditions. Five riparian areas located along sections of the Seminole Cutoff of the California National Historic Trail, and a site associated with the Seminole Cutoff (Immigrant Spring), would also be beneficially affected, for the same reasons.

EFFECTS ON RECREATION AND VISUAL RESOURCES (Alternative One)

Recreation

Since Alternative One proposes no new infrastructure on the allotment, there would be no change to the recreation settings from this alternative; therefore there would not be a change to the recreation activities, experiences, and benefit opportunities available on the allotment. Alternative One would also maintain the unfenced character of the allotment. Finally, this alternative substantially reduces livestock stocking rates; which would in-turn reduce the instances and intensity of visitor experience inhibiting encounters with livestock. Overall, this alternative would result in moderate increases in visitor demand for the GMCA.

Visual Resources

Since Alternative One proposes no new infrastructure on the allotment, there would be no change to the visual resources of the allotment except the potential for beneficial impacts as riparian areas improved.

ALTERNATIVE TWO

EFFECTS ON SOIL AND WATER RESOURCES (Alternative Two)

Soil Resources

Summary of Impacts: Under this alternative, beneficial impacts to soil resources would occur over time through close adherence to stubble height objectives and monitoring results. These beneficial impacts are expected to be observed in the short-term, by the improved growth of vegetation, and continue into the long-term, with increasing amounts of litter and decreased amounts of bare ground. Beneficial impacts to soils in the Crooks Creek Riparian Pasture would be seen as a result of the pasture being rested for three to five years. This is more beneficial than under Alternative One which does not have a similar rest.

Adverse impacts would continue to occur at the existing 133 acres associated with range project livestock concentration areas and to this another 80 acres would be added through new range improvement (infrastructure) projects. The use of grazing supplements, salt, and mineral blocks to attract livestock away from riparian areas and improve livestock distribution in the uplands would also decrease adverse impacts of soil compaction, and mechanical damage to streambanks and pugging in wet meadows in the same manner as under Alternative One.

This alternative allows for the highest numbers of livestock after the projects are built, being near to historic use levels. By virtue of the numbers of livestock involved, this alternative has the greatest risk of failure with adverse impacts to soil resources. Diligent livestock control and adherence to the prescribed stubble height requirements would be necessary for this alternative to succeed.

Monitoring of livestock grazing use in this alternative would be sensitive enough to detect use of vegetation that would adversely impact soil resources including those is areas of high wind or water erosion potential. The stubble height requirements would be monitored in selected key areas presently associated with vegetation frequency and density studies. There are however, significant wetland/riparian zone resources, such as locations like Wilson Bar on the Sweetwater River which would not be monitored. As noted in the discussion of Alternative One, the number and distribution of key areas in the allotment should provide an adequate index to overall use in any region of the allotment.

The saline soils on Alkali Creek Sheep Allotment prevent the establishment of willow plant communities, but do allow sedges and grasses to naturally thrive. In the long-term, Alternative Two management (one month in spring and fall) would have beneficial impacts to soils by providing more managed use and would yield enhancements in the kinds and amounts of desirable vegetation supported by the wetland and riparian soils of this use area. Over time, this would also increase the organic matter content and volume of these lowland soils. Sheep use in the Arapahoe Creek Common Allotment would occur in the late fall and winter period grazing would decrease the woody component of the plant communities and increase the herbaceous and forb components; this would serve to lessen runoff and soil erosion rates.

The Antelope Hills Allotment would receive up to five months of use, from May through September; this include the hot-season use period which is the most sensitive time for grazing wetland and riparian zone soils. Sheep use would follow cattle use in this allotment. There is little chance for wetland vegetation re-growth in late August to early September. If the cattle grazers take the wetland and riparian zone vegetation to the minimum stubble height, the following sheep use can adversely impact soil cover and vegetation necessary to withstand high flow events and prevent accelerated erosion the next spring. However use periods in any one area would be restricted to only 30 days per year, and no more than three of the pastures would be used in the hot season.

Beneficial impacts to soils would be variable; but improvements in vegetative expression would be expected to occur over a period of several normal precipitation years. Functional integrity of the riparian systems would take longer to restore (the health of riparian systems is a strong component of soil health by limiting erosion.) In the short-term, some improvement to the present condition of lowlands (i.e., riparian areas) would be apparent, due to the implementation of stubble height triggers and reduced livestock grazing use. In the riparian exclosures and pastures, increases in litter and vegetative cover and vegetative height would lower erosion rates and contribute

increased amounts of organic matter to the soil. Both water and nutrient storage of these sites would be enhanced, as would water quality.

The long-term grazing strategy would likely allow for the uplands to maintain adequate soil cover to buffer the erosive effects of wind and precipitation. There is a danger of over-use of vegetation on wetland and riparian zone soils that are not located in, or near key areas for utilization monitoring. Also, by rotating use of pastures to different seasons each year there should be alleviation of soil compaction in the long term in the lowlands and transition zones to wetland and riparian areas.

WATER RESOURCES (Alternative Two)

Summary of Impacts: The impacts to water resources from Alternative Two would be similar to those identified for soil resources: on a long-term basis, Alternative Two management would beneficially impact water resources but in a slower time frame than under Alternative One. Longer-term livestock actual use is expected to be almost double that under Alternative One so that beneficial impacts would take longer to achieve. Herding should beneficially impact water resources by limiting erosion that results from loss of vegetation; see below under vegetation and grazing.

Under this alternative, accelerated soil erosion, especially on the lowlands, would be the largest contributing factor to water quality but should diminish over time although less quickly than under Alternative One. Water quality would be beneficially impacted by improvement in riparian vegetation, which would decrease bank erosion and sediment transport. This is particularly true in the Alkali Creek Sheep Allotment which is closed for hot season grazing; as in Alternative One. The same benefit to water resources that were described for soils in the Crooks Creek Riparian Pasture from the rest would be expected to occur more quickly than under Alternative One.

On Alkali Creek Sheep Allotment long-term, managed grazing of sheep, with no hot season grazing, would yield enhancements in the kinds and amounts of desirable vegetation supported by the wetland and riparian soils of this use area. Over time, this would also increase the capacity of the lowland soils to store and slowly release water. Sheep use in the Arapahoe Creek Common Allotment would occur in the late fall and winter period grazing would decrease the woody component of the plant communities and increase the herbaceous and forb components; this would serve to maintain or lessen runoff rates. The Antelope Hills Allotment would receive up to five months of use, from May through September; this includes the hot-season use period which is the most sensitive time for grazing wetland and riparian zone soils. Sheep use would follow cattle use in this allotment. There is little chance for wetland vegetation re-growth in late August to early September. If the cattle grazers take the wetland and riparian zone vegetation to the minimum stubble height the following sheep use can adversely impact soil cover and vegetation necessary to withstand high flow events and contribute higher amounts of sediment to streams the next spring.

Beneficial impacts to water would be variable; but improvements in vegetative expression would be expected to occur over a period of several normal precipitation years. Functional integrity of the riparian systems would take longer to restore so that improvements to water. In the short-term, some improvement to the present condition of lowlands (i.e., riparian areas) would be apparent, due to the implementation of stubble height triggers and reduced livestock grazing use. In the riparian enclosures and pastures, increases in litter and vegetative cover and stubble would lower erosion rates and contribute increased amounts of organic matter to the soil. Both water and nutrient storage at these sites would be enhanced, as would water quality.

The long-term grazing strategy should allow for the uplands to maintain adequate soil cover to buffer the erosive effects of wind and precipitation. There is a danger of over-use of vegetation on wetland and riparian zone soils that are not located in, or near key areas for utilization monitoring. Also, by rotating use of pastures to different seasons each year there should be alleviation of soil compaction in the long term in the lowlands and transition zones between the uplands and the wetland and riparian areas.

EFFECTS ON RIPARIAN VEGETATION (Alternative Two)

If not excluded by herding or fences, cattle (and, to a lesser degree, sheep and wild horses) would congregate around riparian and wetland areas during hot weather conditions. Riparian areas offer everything that livestock need: readily available drinking water, succulent forage plants, and cooler soil temperatures during the hot season to loaf on, and shade. For these reasons, livestock would remain in these areas until they have consumed most of the desirable forage. Wetland-riparian areas receiving heavy utilization of vegetation and trampled until they have dried out do not perform their natural functions of retaining sediment, holding back water, cooling water by shading, and providing productive habitat for wildlife.

Alternative Two addresses the potential of livestock grazing to adversely impact riparian vegetation by providing the operational tools necessary to prevent the concentration of livestock in the riparian zones. Alternative Two would result in improvements in riparian habitat by limiting livestock use in each pasture (through the construction of riparian pasture fences) and implementing deferred-rotation grazing systems. Please see “Alternatives Considered but Not Analyzed in Detail” earlier in this chapter for additional information regarding difficulties implementing a herding strategy absent fencing that makes implementation impossible.

Under this alternative, compliance monitoring for unauthorized livestock would also be used to limit grazing use on any given riparian area for the remainder of the grazing season once the utilization triggers were met. Utilization triggers would also be used to lessen impacts to riparian areas where cattle tend to congregate, especially in the summer hot season which would begin the recovery and restoration of the functional integrity of these riparian systems. As the livestock use levels on these riparian areas would be substantially decreased, riparian vegetation would be enhanced.

In Alternative Two, the riparian area along Crooks Creek would be fenced and rested for three years in the short term. In the long term, grazing would be altered through the evaluation process to address chronic use levels above the stubble height objectives. Access to the creek for wild horses and wildlife would not be restricted in the late fall, winter and early spring which could have minor, short-lived adverse impacts on riparian vegetation. However, rapid improvement in plant diversity, variety of age classes, and structure particularly in the willow plant community along Crooks Creek, would be seen in the short term. In the longer-term, it is expected that there would be a continued improvement in stream bank conditions and full recovery of the willow community.

The riparian areas inside the Magpie Creek Pasture would be fenced away from the other pastures in Arapahoe Creek Allotment. This riparian management pasture would be grazed in the spring period prior to the hot season (June 15th) in the short term. In the long term, grazing would occur in the fall after the hot season (September 15th) and if necessary grazing would be adjusted through the evaluation process to achieve to stubble height and willow utilization objectives. Access to West and East Arapahoe Creeks and Magpie Creek for wild horses and wildlife would not be restricted in the late fall, winter and early spring which could have minor, short-lived adverse impacts on riparian vegetation. However, slower improvement (than Crooks Creek) in plant diversity, variety of age classes, and structure particularly in the willow plant community along these creeks, would be seen in the short term. In the longer-term, it is expected that there would be a continued improvement in stream bank conditions and full recovery of the willow communities.

In those riparian areas outside the Granite-Creek Rocks Pasture, and other riparian management pastures within the Antelope Hills Allotment conditions would improve. However, improvement would occur at a slower rate than those riparian areas within these pastures. Deferred-rotation grazing systems were evaluated by Platts and Nelson (1989). These systems were only rated as fair for improving stream and riparian habitats (refer to Appendix 20). However, the proposed reduction in grazing use levels, combined with the deferred-rotation grazing system, and the strict adherence to stubble height triggers in the short term would allow for long-term improvement (Myers 1989, Masters et al. 1996b, Mosley, et al. 1997, Clary and Webster 1989, Clary and Webster 1990, USDI-BLM 1998).

EFFECTS ON VEGETATION RESOURCES (Alternative Two)

Vegetation – General

Summary of Impacts: The long-term impacts to upland range sites as a result of a moderate reduction in livestock grazing would be slightly increased vegetation production. Increased seedling establishment, improved vigor and root growth/replacement, increased litter accumulation, and increased percent composition of grass and forb key species would occur under the implementation of Alternative Two. The implementation of stubble height requirements for key upland sites for residual herbaceous cover would beneficially impact the upland vegetation sites. Compared to Alternative One, these beneficial impacts would occur at a slower rate due to the higher stocking rate of approximately 17 acres per AUM as compared to approximately 40 acres per AUM (see Table 2-1 and Figure 4-2).

Grazing Management

Alternative Two makes progress towards rangeland health by implementing a smaller (44% instead of 74%) reduction from long-term (1980-2010) use than Alternative One, but with grazing management strategies that would provide rest, deferment and rotation. However, grazing management in the short term under Alternative Two is also based on achieving stubble height criteria. In the short term, grazing strategies proposed under this alternative could not be implemented by the permittees because the pasture fencing and additional water developments needed to support extensive herding would not be in place. Initially, herding methods applied by the permittees would determine whether the authorized AUMs are used or if it would be necessary to remove their animals prior to full use because of stubble height triggers being met. The grazing management that would result in the greatest number of AUMs being utilized would involve herding techniques that keep the livestock off of key riparian areas such as frequent low stress livestock herding combined with pasture rotations.

The Alternatives Considered but Not Analyzed in Greater Detail section in Chapter Two discusses under what circumstances deferred-rotation grazing was successful and where it failed.

A study by Gibbens and Fisser (1975) in the Red Desert region (in which the southern portion of GMCA is located) on a two-pasture deferred-rotation grazing system found that plant composition, calculated as a percentage by species of the total vegetation cover would result in a relative increase in the grasses and forbs, a beneficial impact.

In this same study, a two pasture deferred-grazing system showed an increase in grass cover from 1967 to 1971 of 31 percent outside of a control, while the grass cover increase inside the control was 25 percent. Therefore, the net increase of grass cover of six percent from 1967 to 1971 was a result of the two-pasture deferred grazing system. Shrub cover changed from 1967 to 1971 outside the enclosure decreased 11 percent, while inside the enclosure, it increased 34 percent. These results indicate that a two-pasture deferred grazing system should cause a reduction of shrub cover, when compared to the absence of grazing. It is estimated that the proposed three-pasture or four pasture deferred-rotation grazing systems in the southern portion (Red Desert Region) of GMCA would decrease shrub cover 10 percent. The amount of shrubs in the community did not actually decline. However their relative percentage of the plant community declined as the herbaceous percentage increased.

The proposed three-pasture seasonal grazing system in the Happy Springs Use Area is expected to have these long-term impacts: improved vigor and root growth/replacement of vegetation species, increased litter accumulation, increased seed production and seedling establishment, and increased production.

Grazing in the Arapahoe and Happy Springs Use Areas would take place during the summer and winter months (refer to Table 4-27, Annual Grazing Treatments in Appendix Five and Table 4-28, Riparian Management Pastures in Appendix Five). The winter grazing season, which would comprise about 10 percent of the livestock grazing use, is least detrimental to the vegetation (Garrison 1972, Blaisdell and Holmgren 1984, Masters, et al. 1996a). The adverse impacts, such as decreased litter and seedling establishment, created by grazing from May 1 through July 15 in the Lost Creek Use Area, would be detrimental in the area of the summer sheep use.

The increase in sheep grazing use during the winter, (no increase would be expected from wildlife or wild horses), would not be significant enough to be detrimental to the vegetation resource over the long-term. This increase would be greater than Alternative One but still not enough to be harmful in the longer-term. Reduction of growing season grazing intensity would improve vigor of vegetation species, and increase production in the long-term (Blaisdell, et al. 1982, Blaisdell and Holmgren 1984, Masters, et al. 1996a, Holechek, et al. 1998).

The Lost Creek drainage would be expected to improve in condition and production over the long-term, as a result of reduced livestock grazing levels and the deferred-rotation grazing system (Blaisdell, et al. 1982, Blaisdell and Holmgren 1984, Masters, et al. 1996a, Holechek, et al. 1998). Over the entire Eagle's Nest pasture the production and condition would be expected to improve considerably, due to the distribution of livestock, wildlife, and wild horses by water developments and reduced livestock grazing levels. As mentioned previously, the winter season is considered to be the least detrimental to the vegetation, in terms of grazing. Winter is also considered to be the least detrimental period of utilization for shrubs (Garrison 1972, Blaisdell and Holmgren 1984). The lack of grazing pressure during the growing period would allow the vegetation to improve in terms of vigor, seed production, seedling establishment, and litter accumulation.

Concentration of sheep, wildlife, and wild horses in areas offering shelter during winter storms is not considered detrimental to the vegetation in the long-term, because there are numerous locations offering protection throughout the Arapahoe Creek Allotment. In addition, the deferment of grazing during the spring and summer months would allow the vegetation to recover from the depletion of carbohydrate reserve levels from winter grazing. Long term increases in forage production over the entire Arapahoe Creek Allotment would be expected from this alternative.

Areas which are favored as sheep bed grounds would be expected to receive excessive grazing pressure. This alternative requires the allotment's sheep operators to move the sheep bed grounds 1.5 miles every week. The exception to this would be in the Picket Lake and Daley Lake Pastures of the Antelope Hills Allotment, and the Lost Creek Use Area of the Arapahoe Creek Allotment, where three miles of movement is required. Areas which have been historically-favored bed grounds, such as areas near water or which offer protection from adverse weather, would have the vegetation completely removed, or damaged so severely that recovery would be impossible. Approximately one to three acres per bed ground would be expected to be impacted. Heavy grazing of the sheep bed grounds would not be considered detrimental to the overall vegetation in the long-term. The deferred-rotation grazing and reduced livestock grazing levels should allow the vegetation to recover from these short periods of heavy grazing.

Range Improvements

Table 4-1 depicts the estimated number of surface acres that would be disturbed as a result of the construction, maintenance, and continued existence of the proposed range improvements for this alternative.

Table 4-1. Surface Acres Disturbed as a Result of Implementing Alternative Two Long-Term Proposed Range Improvements*

TYPE IMPROVEMENT	NUMBER	ACRES DISTURBED PER UNIT	TOTAL ACRES DISTURBED
Spring protection fence (buck-and-pole)	5	0.61/miles	3.1
Three-Wire fence (Pasture boundary)	27.5 miles	1.5/miles	41.3
Riparian pasture fence	10 miles	1.5/miles	15
Cattleguard	17	0	0
Water well (existing) development	3	1.8	5.4
Water well (new) development	4	1.8	7.2
Reservoir reconstruction	2	4.0	8.0
		TOTAL	80.0

*See Appendix Three for disturbance figure assumptions.

Construction of the proposed range improvements would remove approximately 80 acres from production. Table 4-1 lists the total acres disturbed by each type of range improvement and the total acres that would be disturbed under this alternative. The range improvements disturbing the major proportion of the acres would be spring protection fences (3.1 acres), pasture boundary fences (41.3 acres), riparian pasture fences (15 acres), water wells (12.6 acres), and reservoirs (8 acres). The overall impact to the vegetation within the GMCA, as a result of range improvement construction under this alternative, would be minor.

Even though fences offer the opportunity to enhance livestock management in a manner to address the timing and volume of use on vegetation, they can result in adjacent trails as livestock, wildlife, and wild horses travel along the fenceline. This would result in the deterioration of the vigor of plants along fences, due to overgrazing and trampling. Use of motorized vehicles for fence maintenance would also lead to the emergence of trails adjacent to the fence. The construction of new range improvements in conjunction with increased grazing pressure provides an opportunity and mode of transport for the introduction and spread of noxious/invasive weeds. A change in composition of the vegetative species could occur in areas near a fence; however, these impacts would be less noticeable. Heavy to severe grazing would cause a decrease in preferred species and an increase in less-preferred species such as cheatgrass.

The existing fence on the southern boundary of the GMCA concentrates summer cattle use on the north side of the fence, near Lost Creek. Forage in areas of concentration would be removed by livestock, through consumption and trampling. This grazing would result in the decline of the preferred species and an increase in the less-preferred forage species. The overall production, seed production, vigor, condition, and trend of the vegetation would decline in the areas of concentration.

Impacts created through the development of water wells would include removal of vegetation, changes in composition, and decrease in vigor of plants. Use of the development by livestock would result in removal of vegetation

immediately around the water trough, a circle roughly 50 yards in radius. These bare areas would occur adjacent to each of the water wells. Total disturbed area would be 1.8 acres per water well development (Table 4-30). Vegetation would be removed mainly by livestock trampling. These areas would be mostly devoid of vegetation and would remain in that disturbed condition, due to the continual use of the water trough. It is anticipated that there would be a decrease in the vigor of the vegetative species immediately surrounding these bare areas. The vigor decrease would come about from: dust on the plants, partial trampling of vegetation by livestock, and heavy to severe grazing, which commonly takes place around water sources. While no disturbance would occur under Alternative One, approximately 20 acres would be disturbed from proposed water developments under this alternative.

The development of seven water wells under this alternative would improve the distribution of livestock over the southern pastures of the AHA and ACA, thus promoting a more even utilization of the upland forage. Proper utilization of forage is important in maintaining or improving vegetative vigor, production, or range condition (Blaisdell, et al. 1982, Blaisdell and Holmgren 1984). Properly-placed water developments, combined with the riparian management fences and herded pasture rotations, would pull the livestock from overused existing natural water sources, such as Crooks Creek and Lost Creek, allowing these areas to improve in vigor and production.

Heavy to severe grazing is marked by a disappearance of preferred plants or of those plants physiologically less-resistant to grazing. Less preferred or more resistant plants may survive and replace the removed plants (Stoddart, Smith, and Box 1975). This would eventually lead to a change in composition. Continued grazing would cause an influx of species such as halogeton, called invaders, which are not part of the natural plant communities. These invaders would be mobile annuals, but later would encourage the establishment of herbaceous or woody perennials of low value (Stoddart, Smith, and Box 1975). These adverse impacts should be precluded by the reduction in AUMs and the implementation of grazing management strategies. If this proves untrue, management would be adjusted through the evaluation process.

Summary

Most of the acreage in the allotment is currently lightly used, and would not be affected by the alternative. Some areas immediately adjacent to new range projects would be adversely affected by livestock concentration. However the most important change would accrue in areas currently preferred by the livestock. By reducing AUMs and controlling the timing and utilization these plants would be subjected to levels of grazing use that are sustainable. It is anticipated that vigor (health of key vegetation), root growth/replacement, seed production, and litter accumulation would positively affect those sites currently being overused. The resulting short-term impacts, such as increased vigor and seedling establishment, which would benefit the vegetation, are considered greater than those which would be detrimental, due to the marked decrease in grazing use below the 1980-2006 level (Blaisdell, et al. 1982, Blaisdell and Holmgren 1984, Holechek et al. 1998).

The projected long term use level (23,035 AUMs) for all grazing animals (cattle, sheep, wildlife, and wild horses) under Alternative Two is approximately 40 percent of the long-term average available livestock forage shown in Table 3-8, Present Allotment Production. Blaisdell and Holmgren recommended the basic stocking level on Intermountain salt-desert rangelands to be 75 percent of the long-term average forage production, because of the normal inability to adjust animal numbers to the wide variations in forage yield. This recommendation was based on long term forage (1935-1974) production on moderately-grazed (11 acres per AUM) salt desert rangeland, and provided adequate forage except in years when production was extremely low. Alternative Two's projected long term use level (23,035 AUMs) for all grazing animals (cattle, sheep, wildlife, and wild horses) would set an average stocking rate of 20.3 acres per AUM on the public land within GMCA. During the recent drought years (1999-2007) of below average precipitation required lower livestock use levels, to manage for rangeland health standards and provide for drought recovery. These past conditions are reflected in the voluntary and negotiated non-use, and decreased levels of use, by the livestock operators over this period. Jeffrey City, in the recent years of 2009 and 2010, has seen precipitation levels of 13.21 inches and 10.78, respectively. This, in turn, has led to a positive vegetative response and good growth on most areas of the allotment.

Under this alternative, it is anticipated that long term actual use levels would accrue at levels approximately 15% less than the long term average generated since 1980. Only one pasture in the Antelope Hills allotment would be used in the critical growing season for cool season bunchgrasses.

The upland and lowland areas within the Alkali Creek Sheep Allotment and Long Slough Riparian Pasture would improve in long term vigor, root growth/replacement, production, seedling establishment, seed production, and litter accumulation, due to the lack of grazing during the summer growing season.

From implementation of this alternative, a long-term increase in production is expected (USDI-BLM 1979, Blaisdell and Holmgren 1984). In the longer-term, it is expected that there would be an improvement in upland range condition, and an improvement in condition in those riparian areas outside riparian management pastures within the Antelope Hills Allotment. Deferred-rotation grazing systems were evaluated by Platts and Nelson (1989). These systems were only rated as fair for improving stream and riparian habitats (refer to Appendix 20). However, the proposed reduction in grazing use levels, combined with the deferred-rotation grazing system, would allow for long-term improvement (Myers 1989, Masters et al. 1996b, Mosley, et al. 1997, Clary and Webster 1989, Clary and Webster 1990, USDI-BLM 1998).

Overall, the impacts upon vegetation from implementation of this alternative are: (1) an increase in the percent composition of those vegetation species that are more desirable forage for livestock, wild horses, and wildlife (i.e., grasses, forbs, saltbush, and winterfat would increase relative to big sagebrush); (2) an increase in plant vigor, root growth/replacement, seed production, litter accumulation and production; (3) an improvement of at least one-half condition class on the upland areas adjacent to water sources, and on an estimated 75 percent of the public land riparian areas in the allotment; and (4) an upward trend in upland range condition, resulting in an increase of two percent in live vegetation cover (USDI-BLM-1979) (Holechek et al. 1998).

The projected long term use level (23,035 AUMs) for all grazing animals (cattle, sheep, wildlife, and wild horses) is approximately 40 percent of the long-term average available livestock forage shown in Table 3-8, Present Allotment Production. Blaisdell and Holmgren recommended the basic stocking level on Intermountain salt-desert rangelands at 75 percent of the long-term average forage production, because of the normal inability to adjust animal numbers to the wide variations in forage yield. This recommendation is based on long term forage (1935-1974) production on moderately-grazed (11 acres per AUM) salt desert rangeland. This recommendation provided adequate forage except in years when production was extremely low.

In the longer-term, it is expected that there would be an improving trend in upland range condition and in those riparian areas outside riparian management pastures within the proposed fenced portion (approximately 38,460 acres) of the Granite Creek-Rocks Pasture of the Antelope Hills Allotment. The proposed modification to the deferred-rotation grazing system, which limits the summer grazing period to 30 days would allow for long-term improvement (Myers 1989, Masters et al. 1996b, Mosley, et al. 1997, Clary and Webster 1989, Clary and Webster 1990, USDI-BLM 1998).

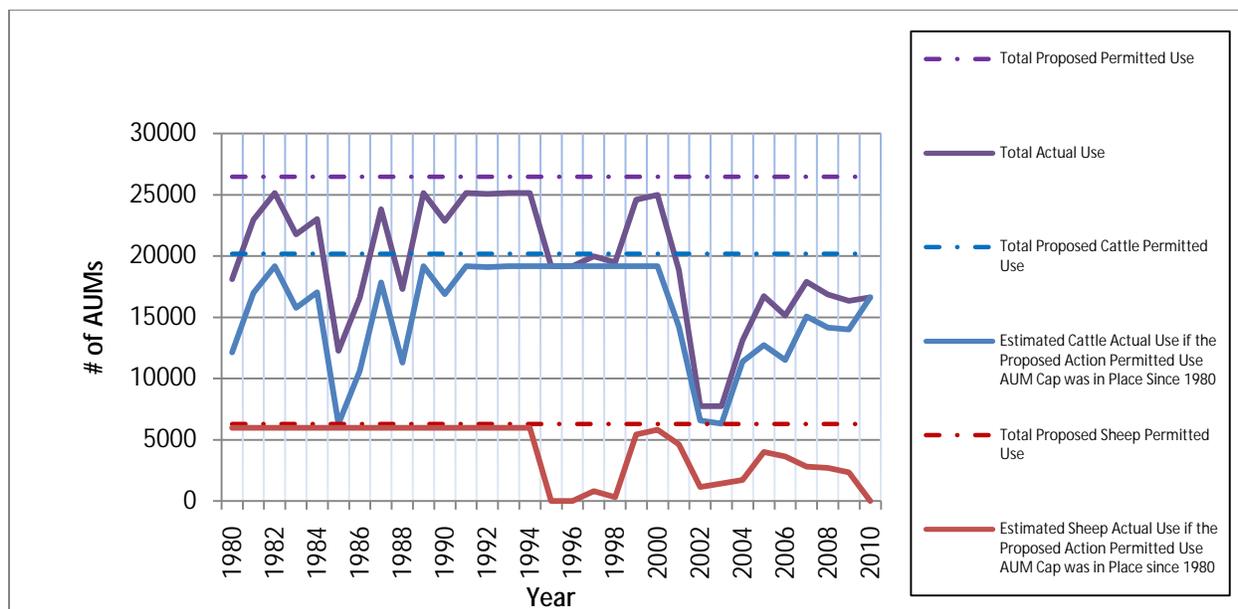
EFFECTS ON LIVESTOCK GRAZING (Alternative Two)

Figure 4-2 projects anticipated actual use in the GMCA in Alternative Two. The chart presumes that a level of actual use in the same manner described for Alternative One. The figure takes known actual use from 1980 to present and applies the permitted use caps (26,476 Total AUMs, 20,178 Cattle AUMs and 6,298 sheep AUMs) to estimate what the use levels would have been if the alternative's permitted use caps had been in place since 1980. The analysis suggests that 19,485 AUMs of total use (with 15,402 AUMs of cattle and 4,083 AUMs of sheep) is the most likely level of long term use in the GMCA. The projected reduction in actual use would be 15% for total use 10% for cattle and 30% for sheep. Figure 4-2 shows that if the permitted use of 26,476 AUMs had been in place since 1980, the historic total actual use levels would have been restricted in 7 of the 31 years evaluated. Similarly cattle use would have been restricted in 11 years, and sheep use would have been restricted in 16 of the 31 years analyzed.

However, short term grazing management (prior to the implementation of the range projects needed to fully implement the proposed grazing strategies) would be based on adherence to the stubble height standards discussed in Chapter Two. Pastures of the proposed new allotments would be closed when stubble height standards are met as determined by the BLM in consultation with the permittees and interested publics. The grazing permittees would have sole responsibility for meeting these stubble heights requirements in the short term. It is anticipated that until

the range improvement projects are constructed, it is likely that stubble height standards would be reached sooner than in the long term. The permittees would then be required to move their livestock from the pastures or allotments sooner than authorized. As a result, livestock actual use levels would be lower than the projected 15 percent reduction discussed above in the short term.

Figure 4-2. Proposed Permitted Use and Projected Actual Use Analysis for Alternative Two



Range Improvements

Table 4-2 lists the proposed range improvements and estimated project costs for their construction and installation at \$432,070. The estimated construction costs would be \$0.92 per public land acre or \$16.32 per BLM proposed permitted AUM. (For context, the LFO has approximately \$150,000 per year of monies to be used for all range improvement projects, including non-structural projects.) Estimated maintenance costs for the proposed range improvements of \$6,160 per year.

Herding

The deferred-rotation grazing systems require moving livestock from one pasture to the next for pasture rotation. In addition, “back riding” would be required to gather remaining cattle left behind in the initial pasture move. In addition, herding would be needed to keep the cattle within the prescribed use areas, allotments and pastures. A more intensive level of cattle herding would be required under this alternative, especially in the short term, before fences necessary to protect key riparian areas are installed. Nine to ten seasonal riders with the associated higher labor costs discussed in Effects on Socioeconomics would be necessary to accomplish effective herding. The proposed range improvements allowed in Alternative Two would make the herding program more manageable and effective and thus would beneficial impact the grazing program. However the herding workload would remain substantial indefinitely. Sheep herding would also be required. It is estimated that the sheep herding would necessitate hiring two to three herders with the associated costs discussed in Effects on Socioeconomics.

Livestock operators in the allotment would benefit by the proposed pasture and riparian management fencing and use area, allotment and/or pasture rotation because their cattle would be confined in a smaller area than presently. Although moving cattle during the summer (June-July-August) from one pasture to the other would result in temporarily reduced weight gains until the cattle adjust to their new range, cattle would be limited to an area of approximately one-quarter to one-third the size of the area they can now graze unrestrained. This would increase the probability of a cow being bred (USDI-BLM, 1979).

Table 4-2 provides the cost of the infrastructure that would be built under this alternative and the cost to maintain it subsequently (Table 4-3)

**Table 4-2. Construction and Labor Requirements under Alternative Two
For the Proposed Range Improvement Projects**

YEAR	PROJECT	UNITS/MILES	COST ¹	TOTAL
1-3	Three-wire (Use Area/Pasture Boundary)	27.5 miles	\$5,090 mile	\$139,975
1-3	Riparian Pasture Fencing (1 Pasture/Year)		\$5,090 mile(barbed)	\$35,630
		10 miles	\$2,672 mile (permanent or temporary electric)	\$8,016
1-3	Cattleguards (5-6 each/Year)	2 15	\$3,373 2-lane-24' \$1,782 1-lane-12'	\$6,746 \$26,730
1-5	Spring Protection Fencing (1 Each/Year)	5 (0.61 mile Buck/Pole)	\$ 7,362 each	\$36,810
2-3	Reservoir Reconstruction	2	\$ 7,636 each	\$15,272
1-4	Water Well Development (new) (1 Each/Year)	4	\$33,088 each	\$132,352
1-3	Water Well Development (existing) (1 Each/Year)	3	\$ 10,180 each	\$30,540
	TOTAL Buck-and-Pole Fence (miles)	3.0		
	TOTAL Barbed Wire Fence (miles)	25.8		
	TOTAL Electric Fence Various Types (miles)	11.7		
	TOTALS	40.5	\$ 0.92/public land acre	\$ 432,070

¹ Cost information on file in the Lander Field Office.

Table 4-3. Estimated Maintenance of Proposed Range Improvements (Alternative Two)

Improvement	Number of Units	Annual Maintenance Cost/unit¹	Total Annual Maintenance Cost	Estimated Life of Improvements
Spring Protection Fences	5 (0.61 mile/spring)	\$127	\$ 635	20+ years
Wells	7	255	1,785	20+
Reservoirs	2	126	252	20+
Three-wire Fence	27.5 (miles)	64	1,760	20+
Riparian Pasture Fence	10.0 (miles)	64	640	20+
Cattleguards	17	64	1,088	20+
		Total	\$6,160	

¹Cost information on file in the Lander Field Office.

EFFECTS ON WILDLIFE/FISHERIES HABITAT AND SPECIAL STATUS SPECIES (Alternative Two)

Nongame Wildlife and Game Birds

Improved habit for nongame and game birds within spring exclosures and in the five completed riparian pastures are the same as in Alternative One. An additional five springs would be fenced within the Granite Creek-Rocks pasture that would eliminate livestock grazing within these areas providing an additional benefit to nongame wildlife.

Under this alternative, the short- term exclusion of livestock from the Crooks Creek riparian pasture would result in an improvement in riparian vegetation within that pasture. Over the long term livestock grazing would be eliminated during the hot season in both the Granite Creek-Rocks pasture and Crooks Creek riparian pasture once those fences are completed.

Annual stubble height measurements, herding and livestock developments proposed under this alternative would result in better livestock distribution and the elimination of hot season grazing on important riparian areas over the long term. Implementing these requirements should result in improved residual cover and vegetation structure within these habitats that would benefit a variety of nongame wildlife and game birds. It is expected that these management practices would help restore damaged riparian areas over the long term and result in a slowly improving trend in riparian vegetative condition.

In the short term, nongame and game bird habitat outside exclosures would likely improve slightly. Past efforts to keep cattle off of riparian areas during the summer have shown that successful herding would be critical to the success of this alternative, especially over the short term, prior to the construction of fences and water developments. During the short term the adverse impacts from livestock grazing on riparian areas, and nongame species that depend on these areas, would be similar to those under Alternative One.

Big Game

Under Alternative Two, the potential for competition between grazing animals (i.e. livestock and big game) would be slightly higher than under Alternative One. However, the shorter season of use proposed in Alternative Two would minimize the potential for competition. The elimination of year-long sheep grazing would reduce the adverse impacts of sheep grazing on pronghorn and mule deer winter habitat on the east side of GMCA (i.e. Lost Creek, base of Crooks Mountain). Big game use of the Alkali Sheep Use Area would be expected to be higher during the summer period when livestock are not present. Summer long rest treatment would increase vigor, litter accumulation, seedling establishment, and seed production for the Alkali Creek Sheep Use area. In the long term, big game could utilize the five new spring protection exclosures within the Granite Creek-Rocks pasture.

Studies conducted by Anderson and Scherzinger (1975) and Clark et al. (2000) indicate the potential benefits associated with livestock grazing on elk winter range. These studies have shown that grazing by livestock during

late spring can improve the vegetation quality on elk winter ranges. It is conceivable that moderate livestock grazing on portions of the GMCA during late spring could improve forage quality on elk winter habitat. Successful grazing strategies to improve elk winter habitat would depend on turnout dates and location (i.e. elk winter habitat would only be grazed during the late spring and adequate residual vegetation for wintering elk) primarily in the Antelope Hills Allotment.

Under this alternative, the development of range improvement projects over time would have both positive and negative impacts to big game. Proposed construction of the Granite Creek-Rocks pasture, Crooks Creek riparian pasture and Magpie pasture fences would impede the movement of big game species in those areas and could hinder animals from transitioning between seasonal habitats. These fences would not likely result in the permanent fragmentation of big game herd unit boundaries within the GMCA, although, animals crossing the fence could get entangled in the wires resulting in injury or mortality. In situations where passage over or under a fence is further complicated by sudden snowfall, a fence can become an insurmountable barrier to migration. Pronghorn could be affected more than other big game species during winter migrations. Deep snow can prevent antelope from getting under the bottom wire, restricting their ability to move across the landscape. Animals that are young and/or weak are more hindered by fences, and thus tend to use up much needed energy reserves attempting to find a way through. There is no new fencing projects planned in allotments immediately south of the GMCA (i.e. Cyclone Rim and Stewart Creek Allotments) that would interfere with pronghorn migration.

Although fences can be useful in the location and distribution of livestock or for exclusion of livestock from sensitive areas, all fences present some degree of interference to big game movements. The proposed Granite Creek-Rocks pasture fence would be located within elk crucial winter range. The majority of this fence (18 miles) would be permanent three wires (2 barbed, 1 smooth) which would impede big game movements yearlong. Sections of this fence would include pole top construction, that would provide the dual role of minimizing entanglement and increasing visibility, and double gates that would be opened when cattle are not in the allotment (Map 10). Much of the southern portion of Granite Creek-Rocks pasture fence, (8.1 miles electric “lay down” and 1.4 miles temporary electric fence) would be removed once cattle are moved out of the pasture.

The Crooks Creek riparian pasture and North Magpie pasture fences have wildlife mitigation measures included in their design that are similar to the Granite Creek-Rocks pasture fence, including removal sections, pole top construction and double gates (Map 11). Although the design and construction of all fences would be as wildlife friendly (designed to facilitate the movement of big game animals) as possible, techniques such as double gates and let-down sections do not entirely mitigate impacts associated with fences. Nonetheless, some of adverse effects of new fencing being proposed under this alternative would be offset by the elimination of hot season grazing (i.e. Granite Creek-Rocks and Crooks Creek riparian pasture) by livestock resulting in an improvement in herbaceous riparian vegetation. Studies have shown that grazing by livestock during late spring can improve the vegetation quality on elk winter ranges (Anderson and Scherzinger, 1975, Clark et al., 2000). It is possible that moderate livestock grazing on portions of the GMCA during late spring could improve forage quality on elk winter habitat. Depending on the size and location of the riparian area, big game, particularly deer and elk, would likely utilize riparian habitats during the hot season when cattle are absent from these area. The negative impacts of fences to big game species would be greater under this alternative than under Alternative One due to more miles of fencing being proposed.

Seven water developments are proposed under Alternative Two. As water is developed under this alternative there would be an increase in the distribution of domestic livestock in those pastures resulting in fewer acres left ungrazed for wildlife. Proposed water developments would result in better livestock distribution that would relieve grazing pressure on sensitive riparian areas. Livestock water developments tend to concentrate livestock and repeated use by livestock around the water source creates a disturbance of up to 2.6 acres around the well or spring. Areas around water developments can be denuded of forage and the soil compacted so as to be unproductive in the future for both livestock and big game. Big game (primarily elk and mule deer) tend to avoid areas in which domestic livestock concentrate and the presence of livestock around water sources can displace wildlife during summer months. These impacts notwithstanding, such wells may provide water for big game where it was previously unavailable.

Moose habitat conditions, especially those associated with willow riparian habitats along the Sweetwater River and Crooks Creek would be improved the most due to seasonal deferment and shorter grazing periods (30 days). These

willow habitats are associated with the Sweetwater River, Crooks Creek and their tributaries. Moose habitat in other portions of the allotment would not likely receive much improvement. Additional fencing of interior pastures, herding and water developments proposed under Alternative Two would result in improved livestock distribution that would relieve grazing pressure on willow communities in the GMCA resulting in an overall improvement in moose habitat.

Fisheries

The impacts to riparian habitats proposed in Alternative Two relate directly to fisheries and cold water trout habitat. The beneficial impacts that would result from the implementation of this proposal would be similar to those mentioned in Alternative One. Over the short term woody and herbaceous vegetation along the Sweetwater River riparian zone and its tributaries would likely recover more slowly under this alternative than under Alternative One because of higher stocking rates and associated difficulty of removing cattle from this area. Once the Granite Creek-Rocks fence and Crooks Creek riparian pasture fences are completed and cattle are not allowed to remain in these areas throughout the summer, the vegetation condition along the Sweetwater River and Crooks Creek should improve more rapidly than under Alternative One. Controlling the timing and grazing intensity along Crooks Creek and the Sweetwater River and their tributaries would improve fish habitat in those areas. The reduced impacts from livestock grazing and trampling under this alternative would increase vegetation cover, and thus protect stream banks from erosion and reduce sediment from entering the stream, thus improving the fisheries over the long-term.

Long term improvements in riparian habitats within the GMCA would improve both trout and nongame fisheries outside of the allotment by providing more reliable flows of water into the major drainages flowing from the GMCA than would otherwise be available. This is due to the water holding capacity of the soils underlying riparian wetlands that serve as major water storage reservoirs. Improved water flows would be a direct result of healthier riparian areas. The impact to fisheries outside of the GMCA would be mostly positive and similar to Alternative One.

Special Status Species

Chapter Three of this document (Affected Environment) identifies three federally listed species and one proposed species to be analyzed for potential adverse effects. As discussed in Alternative One, there would likely be no adverse impacts to any of these species. Any future water developments proposed in the allotment under Alternative Two would be subject to review (and possible consultation) under the Platte River Recovery Implementation Program. The U.S. Fish and Wildlife Service has adopted a policy that water-related activities in the Platte River basin resulting in less than 0.1 acre-foot per year of depletions in flow to the nearest surface water tributary to the Platte River system do not affect the Platte River target species, and thus do not require consultation with the Service for potential effects on those species.

Under Alternative Two, impacts to bat species, such as the long-eared myotis and the spotted bat, would be mostly positive. Livestock improvements and grazing management strategies proposed in this alternative should result in improvement in riparian vegetation conditions at a rate similar to Alternative One. Since these bats are insectivores, a gradual improvement of riparian vegetation would likely increase insect populations and, increase foraging opportunities. Proposed water developments in Alternative Two could benefit bats by providing additional water sources.

The greater sage-grouse can be negatively impacted throughout various stages of its life cycle by livestock grazing and associated range improvements. Constructions of fences create the potential for predator (raptor and corvids) perch sites and may facilitate predator corridors into sagebrush habitats resulting in a negative impact on sage-grouse. Fence collisions continue to be identified as a source of mortality for sage-grouse although the effects of direct strike mortality on sage-grouse populations are not well understood and not all fences present the same mortality risk to sage-grouse. The potential for sage-grouse mortality increases as new fences are developed, especially in known migration areas. Direct mortality risk appears to be dependent on a variety of factors including design of fencing, landscape topography, and spatial relationship with seasonal habitats (Christiansen 2009). High tensile electric fence may pose a greater collision risk for sage-grouse, with its low visibility, than other types of fences (e.g. permanent barbed wire).

Mitigation techniques such as the installation of warning reflectors could help reduce collisions; however, they are

not a sure-proof technique for preventing sage-grouse and other upland bird mortalities. Preliminary results indicate that fence markers on electric fences reduced bird fence collisions by as much as 70% over unmarked sections (Christiansen 2009). Some of the negative impacts related to sage-grouse fence collisions can be reduced through attempts to increase fence visibility using markers, especially in areas around leks, as greater sage-grouse tend to fly more frequently during the breeding period than other time periods.

The BLM Warm Springs fence sage-grouse collision reconnaissance project was started in August 2010 in an attempt to document fence strikes by sage-grouse. The on-going project involves surveying approximately 3 miles of fence lines on a routine schedule. As of February 1, 2011 technicians have surveyed this section of fence over two dozen times (total of 75 miles) and have documented one sage-grouse mortality as a result of colliding with the fence.

All new pasture fencing that is proposed in this alternative would be located more than 500 ft. from riparian areas and at least 0.6 miles from leks. All new fencing would be equipped with markers to make the top wire more visible to sage-grouse and other birds. Sections of let down fence described above (see big game) would eliminate sage-grouse collisions during the winter. Construction of fences creates the potential for predator (raptors and corvids) perch sites and may facilitate predator corridors into sagebrush habitats. New fencing in the GMCA could result in the functional loss of habitat due to sage-grouse avoiding areas that may harbor predators. This increased habitat fragmentation and potential risk of mortality resulting from new fences could have localized impacts (i.e. some mortality on local populations) on sage-grouse.

Development of water sources to support livestock in upland habitats could artificially concentrate domestic and wild ungulates, thereby exacerbating impacts such as heavy grazing and vegetation trampling in those areas. Concentrations of livestock during herding and/or near water developments could disrupt strutting (if too close to a lek) during the breeding season and cause direct trampling of nests during the nesting period. Repeated use by livestock around the water source creates a disturbed area of up to 2.6 acres around the well or spring that could result in trampling of nests and destruction of brood rearing habitat. Although providing water where none existed before, water developments tend to attract sage-grouse predators and increase the potential for accidental drowning. In addition anthropogenic water sources can facilitate the spread of West Nile virus (WNV), a virus now seen as a major threat to sage-grouse population persistence throughout the bird's entire range (Walker and Naugle, 2009). Some of these detrimental impacts would be partially mitigated through the use of bird ladders to prevent accidental drowning and the use of larvicide added to water developments to prevent the spread of WNV. To minimize impacts to breeding and nesting grouse water wells would be located in areas deemed unsuitable as nesting habitat and at least 0.6 miles from occupied leks. There are ten occupied leks within four miles of the seven proposed wells. The seven wells proposed under this alternative would have greater adverse impacts than the no water development proposal in Alternative One.

This alternative is designed to establish more uniform livestock distribution and the elimination of hot season grazing in the Granite Creek-Rocks pasture and Crooks Creek riparian pasture. Despite potential negative impacts to sage-grouse, livestock developments proposed in this alternative could result in beneficial impacts on sage-grouse nesting and early brood rearing habitats due to improved riparian condition over the long term. Shifting grazing utilization from riparian areas to uplands, through livestock developments, would improve sage-grouse habitat during key periods. For example, preventing hot season grazing on riparian areas and improving livestock distribution on the uplands through the use of fencing, water developments and herding could help maintain sufficient residual vegetation to provide nesting, foraging and hiding cover for sage-grouse.

Off road vehicles would not be allowed to herd livestock until after the sage-grouse nesting period (i.e. July 15th). The addition of new livestock water wells and fencing would result in better livestock distribution that would help to alleviate some of the negative impacts of livestock grazing on riparian areas. Since riparian pastures provide important spring and summer habitat for sage-grouse, these birds should benefit as summer long access to riparian areas by livestock is eliminated. The negative impacts to sage-grouse due to construction of livestock developments (e.g. fencing and water wells) would be greater under Alternative Two than under Alternative One, although, the improvement in upland and riparian vegetation condition, as a result of these developments, would offset some of the negative impacts related to these developments. The short term impacts to sage-grouse habitats under this alternative would be similar to Alternative One.

The primary threat to pygmy rabbit habitat associated with livestock grazing is the removal of dense sagebrush to

improve forage for cattle (Keinath, D. A. and McGee, 2004). Alternative Two does not allow for vegetation treatments to modify existing plant communities. As discussed in Alternative One, pygmy rabbit habitat is patch and site specific data is lacking for much of the area Map 24. Livestock improvement projects such as water developments and fences could have adverse impacts to local rabbit populations due to removal and trampling of vegetation adjacent to the developments. Generally, these developments have been located away from dense stands of sagebrush and potential pygmy rabbit habitat, although some sections of proposed fencing under this alternative would likely intrude upon and have a negative impact on local pygmy rabbit populations. It is possible that overgrazing may negatively impact some sagebrush habitat used by pygmy rabbits which may also result in localized population declines, however, the addition of livestock move indicators and range developments proposed in Alternative Two would result in better distribution of livestock and a stable or upward trend in upland vegetation over the long term.

The white-tailed prairie dog evolved alongside large grazing ungulates such as bison and elk; thus, it is unlikely to be impacted by the continuation of livestock grazing. Impacts to other species status animals such as burrowing owl, ferruginous hawks, swift fox and mountain plover would be similar to the impacts discussed in Alternative One, thus, these species are not likely to be adversely impacted by this alternative.

As riparian conditions gradually improve due to the continued implementation of herding, water developments, and riparian exclosures and pastures, habitat for species known to utilize these areas, such as the long-billed curlew, Northern leopard frog, Great Basin spadefoot, spotted frog, and boreal toad, would likely improve. However, the curlew, a ground-nesting bird species, can suffer nest and egg loss from trampling in areas of heavy livestock grazing (Dark-Smiley and Keinath, 2004). As a result, negative impacts may occur to this species during periods of livestock concentration (i.e., turnout and herding).

As in Alternative One, impacts to the meadow pussytoes would be slightly negative under Alternative Two. However, sufficient suitable habitat should remain to prevent a trend toward federal listing. If any of the other sensitive plants considered in this section occur in GMCA (e.g. Limber Pine) it is unlikely that the negative impacts caused by livestock grazing would require federal listing.

EFFECTS ON WILD HORSES (Alternative Two)

Alternative Two would result in more impacts to wild horses than would Alternative One. The primary differences between Alternative One and Alternative Two are the amount and type of range improvement projects and the stocking levels. Alternative Two proposes more project infrastructure (water, fencing, and cattleguards) than Alternative One, and many of these projects would alter wild horse use patterns of the HMAs because they are largely unfenced. The impact of authorizing up to 19,485 of projected AUM use (long term) would increase the competition for forage between domestic livestock and wild horses over Alternative One's projected 10,736. These AUM figures are for the entire allotment, as opposed to just the Herd Management Areas within. However, both approaches would manage for rangeland health, so riparian and vegetation adverse impacts would only be somewhat more under Alternative Two. Both alternatives should, through lower stocking rates and herding in Alternative Two, have a long-term beneficial impact on forage.

Alternative Two's authorization of herding with OHVs after July 15th would be moderately more disruptive to wild horses than Alternative One. However, the beneficial impacts of more efficient herding that removes horses more quickly would help to avoid adverse impacts to vegetation through less successful herding.

Antelope Hills/Cyclone Rim HMA

One project with the potential to adversely impact wild horses in the Antelope Hills/Cyclone Rim HMA is the proposed Granite Rocks Fence of which 8.1 miles of this fence is electric lay-down and bisects the HMA from east to west. In addition to laying down the wire the proposal includes removing the posts (except for corners and "H" braces) whenever cattle are not using the Picket and Daley Lakes pastures, in order to facilitate wild horse movement. These 8.1 miles the fence would adversely affect wild horse movement for approximately 35 days per year on the section west of PB Springs, and 65 days per year on the section east of PB springs sometime between May 20th and September 20th. Even though this portion of the fence is temporary, the horses would remember the location of the fence, after having an encounter with it during the livestock grazing season. Therefore, it is important that the mitigation measures for this fence be followed. The fence would be laid on the ground standing posts removed and wires bundled (zipped stripped together) when livestock are not grazing the area to allow

maximum opportunity for horses to navigate this temporary portion of the fence.

The proposed section of permanent 3-wire fence runs north/south for approximately 18.0 miles. This north/south section includes a 1.4 mile segment which would be temporary electric and removable. This segment, which would only be in place for approximately 35 days per year, is designed to address visual resources associated with the Seminoe Cutoff of the Oregon Trail, but it would also facilitate wild horse movement. These three segments total 27.5 miles. The only fence within the HMA boundary is the 8.1 miles of electric lay-down fence with removable posts. The other segments lie outside the HMA. They cross wild horse migration and travel routes but would not impede wild horse movement based on the mitigation measures designed into the fences.

Any fence in the vicinity of wild horses could cause mortality if a winter storm pushed them into a fence and they became disoriented and trapped. However none of the fences in the proposal are located in a manner where such an event is likely.

An indirect effect of these fences and the loss of horses would be the result of reduced genetic diversity among the horse herds. Genetic diversity in this herd area has been dependent upon the interchange of horses from Crooks Mountain, Lost Creek and the Divide Basin HMA's. Further, the Crooks Mountain horses frequently interchange with the Green Mountain HMA horses as well. This interchange occurs among HMAs by horses exercising their "free movement" nature. These movement areas are depicted on Map 26. The fences would tend to isolate the herd and prevent interchange from occurring. However the two fences involved, the Granite Creek Rocks fence and the Crooks Creek fence both have segments of lay down wire.

Under this alternative, four new water developments are proposed in the west portion of the GMCA within the Antelope Hills Herd Management Area. These new waters could draw horses away from tradition concentration areas and may facilitate new bands of wild horses to establish within the HMA. However, this water would also benefit the wild horses when the Granite Rocks Fence is installed and working, which would prevent migration and movement of wild horses north and south throughout their Herd Management Area during certain times of the year between May 20th and September 20th.

The proposed deferred-grazing system for this portion of the allotment could improve upland range vegetation over the long term. However, current evaluations of deferred-grazing systems do not improve or heal riparian habitats over time unless they include short use periods. Vegetative expression may occur every third year in the deferred fall pasture. The increased fencing and the resulting fragmentation of the herd area would diminish the wild, free-roaming character of this herd. The loss of these values would only modestly be offset by the expected improvement of upland ranges.

Crooks Mountain HMA

The fencing (approximately 2.5 miles) and proposed grazing system for the south side of Crooks Mountain is located just outside the southeast corner of the Crooks Mountain Wild Horse HMA. The proposed fencing would limit wild horse access between the Crooks Mountain HMA to the Green Mountain HMA. Although, this fence is outside the Crooks Mountain HMA, this fence would impact wild horses using the migration routes by preventing migration through these zones during the livestock grazing season. Without proper mitigation as identified in the mitigation section of Chapter Two, wild horses would not be able to exchange with other horses from other HMAs. A mitigation measure for this fence is that .8 miles of this fence would be removable high tensile electric fence. This fence would be removed when livestock are no longer using this area to allow wildlife and wild horses to migrate freely from the north side of Crooks Mountain to the south side of Crooks Mountain. The southern section of the fence approximately 1.0 mile would have double wide gates installed that can be opened during the non-livestock grazing season to allow wild horses to freely move. These fences on the south side of Crooks Mountain are outside the HMA, but use of migration routes would be maintained for genetic exchange between HMAs.

Green Mountain HMA

The fencing (approximately 6.5 miles) and proposed grazing system for that portion of the GMCA that occurs south of Crooks Creek is outside the Green Mountain HMA. This fence would limit interchange between the Crooks Mountain HMA and the Stewart Creek HMA located to the south, in the Rawlins Field Office. Green Mountain wild horses use the migration routes to mix and breed with horses in Crooks Mountain HMA, thus keeping genetic viability strong. However, a segment of this fence would be laid down during the non livestock grazing season to

allow wild horses to migrate to the Crooks Mountain HMA and, or winter ranges to the south. Wild horses have limited abilities to negotiate fences in deep snows, and fencing in these areas would increase the chances of a winter die-off. The increased fencing would have the same effects as described above in the Antelope Hills/Cyclone Rim HMA. However, mitigation strategies for this fence would be that approximately 1.4 miles of lay down fence would be installed to allow wild horses during a portion of the year following the livestock grazing season to freely move through the interchange travel zones and mix with horses in adjacent HMAs. This lay down fence would provide an unobstructed visual avenue for wild horses to navigate during the late fall and winter season following livestock grazing. This lay down fence would only be installed during the livestock grazing season.

EFFECTS ON CULTURAL RESOURCES (Alternative Two)

Alternative Two is projected to have both detrimental and beneficial effects to prehistoric and historic sites near riparian areas as well as upland areas.

Once stubble-height monitoring and adherence standards are implemented under this alternative, riparian areas and other areas experiencing heavy grazing would begin to repair themselves. This would decrease the erosion and degradation of prehistoric and historic cultural resource sites that is now occurring, and they would begin to stabilize. It is possible that once the pasture and riparian fences are built, this stabilization process may accelerate. In the long term, affected cultural sites would become stabilized and maintain their integrity.

The two fences proposed under this alternative would adversely impact two important cultural resources. The proposed Granite Creek Rocks riparian pasture fence would adversely affect the Seminoe Cutoff of the California National Historic Trail, and the Crooks Creek riparian fence would adversely affect the Rawlins-Fort Washakie Trail. However, mitigation measures built in to the design of the two fences (hardly visible electric fencing, removable fencing elements including fence poles, placement for the least visibility, etc.) would render the effects to the trails as adverse but not significantly so.

There are no other range improvement proposals under this alternative, considered likely to adversely affect cultural resources.

Wildlife and wild horse population levels would be maintained with their current AML levels. Together with improved livestock distribution, the long term conditions of prehistoric or historic resources in heavily grazed areas would be maintained or improved under this alternative.

Twenty-seven known significant prehistoric sites would be beneficially affected under this alternative. As stubble-height monitoring and adherence standards are implemented and as important pasture and riparian fences are installed, positive conditions (reductions of both erosion and livestock concentration on these sites) would outweigh previous negative conditions. Five riparian area sections of the Seminoe Cutoff of the California National Historic Trail, and a site associated with the Seminoe Cutoff (Immigrant Spring), would also be beneficially affected, for the same reasons.

EFFECTS ON RECREATION AND VISUAL RESOURCES (Alternative Two)

Recreation

Since Alternative Two proposes new infrastructure on the allotment, this alternative would contribute to the trend of the recreation setting moving toward a more urban/industrial recreation environment. New fences, water developments, and motorized vehicle activities associated with project maintenance and livestock herding would result in new roads, decreased naturalness, and increased contacts with others. Alternative Two would reduce the unfenced character of the allotment by 9.2% and the larger Red Desert unfenced area by 8%. This alternative does reduce permitted livestock stocking rates and provides for improved dispersal/decreased timing; which would in turn reduce the instances and intensity of visitor experience inhibiting encounters with livestock. However, the experience inhibiting encounters would remain higher than that observed in Alternative One. In addition the increased amounts of infrastructure would also decrease visitor demand, some of this decrease would be offset by the improved condition of the areas; especially the Crooks Creek riparian pasture which would be rested for 3 years in conjunction with the fence project. The overall appearance of riparian areas in the Granite Creeks Rocks area would be improved, which may add to visitor enjoyment of the area. Overall this alternative would result in low to no increases in visitor demand for the GMCA.

Visual Resources

Actions proposed under Alternative Two would impact the visual environment of the Congressionally Designated Trails in the allotment; however as a result of the mitigation measures identified, this impact would meet or exceed VRM class objectives for these trails. In addition, the impacts resulting from the construction of the Granite Creek Rocks pasture fence would be temporary, as the visible portion of this fence is in place for less than 60 days.

ALTERNATIVE THREE

EFFECTS ON SOIL AND WATER RESOURCES (Alternative Three)

Soil Resources

Summary of Impacts: Under this alternative, beneficial impacts to soil resources, by increased plant and litter cover, would occur most rapidly in comparison to the other alternatives. These vegetation attributes would decrease erosion and sediment contribution to stream channels. These beneficial impacts are expected to be observed in the short-term and continue into the long-term. As no new range improvement projects are proposed soil resources would benefit from not being disturbed by project construction or the creation of sacrifice areas. Where fencing is removed, soil resources would improve very slowly over time as the area became re-vegetated.

Adverse impacts would continue to occur at the existing range project sacrifice areas, which amounts to roughly 133 acres in the short-term. In the long-term, improvement is expected to occur at the livestock concentration areas as soil compaction decreases through natural freeze/thaw and wetting and soil infiltration rates return to normal. However, in some very limited areas, too much topsoil has been lost and soil salinization has occurred to an extent that rapid improvement is not expected to occur.

Water Resources

Summary of Impacts: Under this alternative, beneficial impacts to soil resources, by increased plant and litter cover, would occur most rapidly. These vegetation attributes would decrease erosion and sediment contribution to stream channels. These beneficial impacts are expected to be observed in the short-term and continue into the long-term. As no new range improvement projects are proposed soil resources would benefit from not being disturbed by project construction or the creation of sacrifice areas. However, exiting fences and range projects would remain for the short-term, at least.

Adverse impacts would continue to occur at the existing range project sacrifice areas, which amounts to roughly 133 acres in the short-term. In the long-term, improvement is expected to occur at the sacrifice areas as soil compaction decreases through natural freeze/thaw and wetting and soil infiltration rates return to normal.

EFFECTS ON RIPARIAN VEGETATION (Alternative Three)

Complete rest from livestock grazing would cause an improvement in vegetation production in those riparian areas currently being overused. Meadows and riparian areas would have more shrubs (willows) and increases in grasses, sedges, rushes and other grass-like plants. Improved habitat condition would be most evident on riparian habitat types on public land. Here extensive regeneration and reestablishment of cottonwood, aspen and willow vegetation would take place. Complete elimination of livestock grazing would result in an improvement in riparian area condition and trend. There would not be concentrations of livestock on meadows and riparian areas. The riparian vegetation would respond by increased production and vigor in the short term.

The selection of this alternative would have highly positive short and long term effects on most BLM riparian habitats and some positive effects on state and private land habitat. Much of this positive response from the selection of this alternative would be short term because of rapid recovery of riparian vegetation due to large reductions in cattle and sheep grazing and trampling. In the long term, most existing BLM riparian habitat would approach its full production potential.

Implementation of this alternative would be beneficial to riparian area vegetation in the GMCA. Vegetation production would increase, riparian conditions would improve, and declining trend would stabilize in the short term and then move upward in the long term.

EFFECTS ON VEGETATION RESOURCES (Alternative Three)

Vegetation – General

Elimination of livestock grazing would allow increased vigor, litter accumulation, and reproduction of individual plants by the short and long term. Big game and wild horses would not impact the vegetation to a significant degree nor cause any changes in vegetation. The allocation of forage for wildlife would be adequate to support the increase in big game.

Table 4-9 compares the predicted production in 1998, and the future key species composition with the present production and key species composition. Range condition would be expected to remain approximately the same as the present situation.

A study by H.G. Fisser and R.E. Ries compares two treatments; no grazing and grazing. The average total basal cover inside the control (no grazing) was six percent from 1962 to 1970. The average total basal cover outside the control (grazing) from 1962 to 1970 was five percent. Cover of the southern pastures in the Arapahoe Creek and Antelope Hills Allotments would be expected to increase an estimated two percent by the longer-term. The main reason for the increase in cover would be the slight increase in production. The elimination of livestock would also cause the increased cover because livestock would consume portions of the litter.

Because the herbaceous (primarily grass) component of the vegetation would be allowed to grow to full potential, with most of the current year's growth not being consumed; wildfires may become more frequent (especially near Green Mountain). In the longer-term, the fire return interval may then shorten, resulting in a higher potential for more frequent wildfires as well as, an increase in severity.

Grazing Management

The maintenance requirements of the existing range improvements would have an insignificant impact on vegetation.

Upland Vegetation

The overall impact on upland vegetation from this alternative should be beneficial. While vegetative condition would not change; the upland vegetation would exhibit increased vigor, litter and plant reproduction along with increased production and slight increases in cover.

EFFECTS ON LIVESTOCK GRAZING (Alternative Three)

Elimination of authorized livestock grazing in the GMCA would terminate the possible use of 35,910 cattle AUMs and 10,134 sheep AUMs (based on existing permitted use). This would cause the estimated loss in production of approximately 2,845 cattle and 4,890 sheep annually in the GMCA. This estimate is based on average authorized/actual use made by the permittees from 1980 through 2010 (Figure 3-2) using a six month season of use.

None of the sixteen livestock operators are totally dependent upon the GMCA for their grazing use. Six of the sixteen operations presently do not actually run livestock in GMCA—they either take nonuse or lease the base property to which their federal grazing preferences are attached. Elimination of grazing probably would not cause any of the operators to go out of business, but it would adversely impact all of them. Even though the GMCA contributes a large percentage of grazing for only a few operators, the small percentage contribution the GMCA makes to the remaining active livestock operations is a significant part of each total operation. In most cases, the GMCA grazing use has been used for many years to complement the grazing use of other areas by each livestock operation. It would be anticipated that the scattered tracts of state and private land in the GMCA may no longer be used for grazing if this alternative were selected. The state of Wyoming would lose the income from its grazing lands in the GMCA. The 2011 grazing fee is \$4.64/AUM. (As per personal conversation with Robert Moulton, Wyoming State Lands and Investments-Lander Office.)

Trailing through the GMCA would increase because one permittee would need to cross the allotment once in the spring and once in the fall. No allocation of forage for livestock trailing use would be made. Instead, trailing use would be authorized by a trailing permit, would not exceed 5 days, and the livestock would be estimated to be two bands of 2,000 sheep each annually or approximately 132 AUMs (2,000 sheep for 10 days).

Livestock operators south of GMCA (Rawlins Field Office - Cyclone Rim Allotment) would have the same herding problems as identified under Alternative One in keeping their livestock out of the GMCA.

EFFECTS ON WILDLIFE/FISHERIES HABITAT AND SPECIAL STATUS SPECIES (Alternative Three)

Nongame Wildlife and Game Birds

Improved habitat for nongame and game birds within spring enclosures and in the five completed riparian pastures are the same as in the other two alternatives. The result of this improvement has likely been a corresponding increase in the abundance and species diversity of nongame wildlife, including amphibians.

Nongame and game bird habitat outside these enclosures would improve at a faster rate than in the other alternatives because of the elimination of grazing by domestic livestock. Improved habitat condition would be most evident on riparian habitat types on public land. Here extensive regeneration and reestablishment of cottonwood, aspen, and willow vegetation would take place. The abundance and species diversity of nongame wildlife would increase considerably in these areas. An increase in vegetation cover and a decrease in disturbance from trampling would occur in most riparian areas, although some negative impacts could occur from wild horses. Game birds and other nongame species would benefit from substantial increases in protective brood-rearing cover, insects for food, succulent forage and water. These factors would therefore increase the health of the ecosystem.

In the long-term, the removal of livestock grazing would result in a decrease in species diversity as the plant community moves toward climax. Although there would be a decrease in species diversity, the biomass would increase or remain approximately the same within the GMCA. Those species requiring denser cover would increase, especially in riparian areas. Those species which require little or no ground cover would decrease (see Special Status Species). The long-term effect would be a more stabilized ecosystem which would tend to be less likely to fluctuate from year to year in numbers of animals present. Additional nongame species could be found in the GMCA, because the niche requirements not now present would be exploited.

Big Game

Under this alternative, big game would not have to compete with livestock for forage, cover and space. Complete rest from livestock grazing would cause an improvement in vegetation production in those areas currently being overused. Elk and deer would not be encouraged by fencing or new water sources to use overgrazed or disturbed sites. Under this alternative, there would be more grazing on browse and forb species by big game, thus reducing use on grasses.

Pronghorn habitat would improve over most of the GMCA with the elimination of livestock use. The elimination of livestock grazing would allow wintering pronghorn to distribute themselves according to forage and cover availability and allow these animals to utilize the best available locations. Although there is the potential for forage competition between livestock and pronghorn it is unlikely that pronghorn populations would increase dramatically due to the elimination of livestock grazing, although, a decrease in mortality and increase in fawn production would result in limited population increases. Removal of unnecessary fences within the GMCA would allow pronghorn to move unhindered throughout the area. Alternative Three is the only alternative that allows for removal or modification of fences if they are identified as being detrimental to wildlife use patterns or migration.

Deer and elk populations would be held at levels set by Wyoming Game and Fish Commission. Elk numbers have been increasing in the GMCA and are now well above population objectives set by the Commission. To control the elk population in this area the Wyoming Game and Fish Department would likely increase the number of female elk permits offered hunter for those hunting districts that fall within the GMCA. The overall condition of mule deer and

elk would be expected to improve with the elimination of livestock. However, mule deer habitat is not presently receiving a great deal of livestock use so these areas would not greatly improve over the long-term. Competition between deer and elk, and livestock would be eliminated, making more forage, water and space available for these wild ungulates. However, factors suppressing mule deer population are not well known and may not be related to livestock grazing.

Excellent calving/fawning areas would be provided for moose and mule deer, and all big game ungulates would benefit from the increased availability of forage and cover. An improvement in moose habitat conditions, especially those associated with willow riparian habitats along the Sweetwater River and Crooks Creek Riparian Pastures, would be similar to that described in Alternative Two, but would occur at a faster rate due to elimination of livestock grazing.

If extensive fencing of private lands occurred under this alternative, it is likely that big game ungulates could be adversely affected. Such fencing might significantly restrict animal movements, however; removal of 17 miles of fencing on public lands would increase the size of wildlife habitat and facilitate wildlife movement. Fencing of private land could have a negative impact on some winter habitats that could result in winter mortality.

Fisheries

Under this alternative, stream fisheries within GMCA would improve due to improved habitat conditions. The selection of this alternative would have positive short and long-term effects on nearly the entire fish habitat within the GMCA. Due to improved water quality and reduced stream temperatures and sediment load within the GMCA, some improvement of state and private lands downstream would also occur. Much of the positive response from this alternative would be short term because of the rapid recovery of riparian vegetation due to reductions in ungulate grazing and trampling. In the long term, most existing fish habitat would approach its full production potential. However, this habitat would not achieve pristine conditions because of other land uses on BLM lands and the grazing and other land uses on private and state land in most of the affected drainages. Improvements in trout and nongame fisheries under Alternative Three would occur much faster than in the other alternatives owing to the elimination of livestock grazing within riparian pastures.

Special Status Species

Chapter Three of this document (Affected Environment) mentioned three federally listed species to be analyzed for potential adverse effects. They were the Ute ladies' tresses, blowout penstemon, and the Gray wolf. Under the no grazing alternative there would likely be no adverse impact to the Ute ladies' tresses or blowout penstemon. Since there would be no future water developments in the allotment under Alternative Three, there would be no new depletion requiring FWS consultation under the Platte River Recovery Implementation Program.

Of the 31 BLM Sensitive plant and animal species carried forward from Chapter Three for consideration most would benefit as habitat improves from the elimination of livestock grazing. As with nongame wildlife, eliminating livestock grazing would improve habitat for some species and decrease it for others. Those species requiring denser cover would increase, while those which require little or no ground cover would decrease. As riparian conditions improve due to removal of livestock grazing habitat for species known to utilize these areas, such as northern leopard frog, long-billed curlew and Great Basin spadefoot, would likely improve. Likewise, habitat for shrub-nesting species such as the sage thrasher and Brewer's sparrow would be improved as a result of livestock removal. On the other hand, species that evolved with and that are dependent on ungulate grazing may be negatively impacted. For instance, the elimination of livestock grazing would result in an increase in vegetative cover that could reduce the number of white-tailed prairie dogs and species associated with prairie dogs such as the burrowing owl and mountain plover in the GMCA.

In general, eliminating livestock grazing within the GMCA would result in the following; 1) improvement of mountain plover, white-tailed prairie dog, and burrowing owl habitat from localized overgrazing would **not** occur, 2) Sage-grouse population and other riparian obligate species would increase over the long-term, 3) a rapid improvement in riparian conditions due to removal of livestock grazing would provide much improved sage-grouse

brood-rearing habitat, and habitat for other riparian obligate species; and 4) the threat or likelihood of trampling or disturbance of the nests of sensitive ground-nesting or shrub-nesting bird species would be greatly reduced, although nests may still be destroyed by horses, wildlife and humans.

EFFECTS ON WILD HORSES (Alternative Three)

Under the No Grazing Alternative, the wild horses' natural movements would not be restricted; so their wild and free-roaming behavior would remain intact more so than under either action alternative. The wild horses would continue to exist and be viewed in a natural setting. Competition with livestock for water, forage, and space would cease. Wild horses would not have any fences to navigate and would be able to freely move throughout their respective HMA. The wild horses would not be disturbed and displaced by domestic grazing animals or related human activity. Populations would thrive with the absence of livestock on the landscape and wild horses would be able to freely roam the HMAs without completion for forage and open space.

The Lander Field Office would continue to manage the three HMAs within its current AML range and would not allow numbers to increase. The impacts of letting wild horse numbers increase would increase utilization on the range and a decline in meeting rangeland health standards. Further, if wild horse numbers increased, added costs associated with gathering additional numbers would be a concern. Additional horses would move out of HMAs and would seek new areas to establish new populations. Under the 2003 Consent Decree with the State of Wyoming, Wyoming BLM is to maintain wild horse numbers within the AML limits that were established by the Lander Field Office Herd Management Plan.

Under this alternative, 17 miles of fence and two cattleguards would be removed and provide safe and un-obstructed passage of wild horses migrating from summer to winter ranges. Fence removal would provide wild horses increased opportunity to use the migration routes between HMAs, thus maintaining genetic diversity and viability of the herds. This ability for wild horses to exchange with each of the HMAs assures a viable and healthy population of wild horses as part of the landscape of this area. The date of removal has not been identified but is assumed to be in the term of the permit and a short to long-term beneficial impact.

Under this alternative, OHV use would not occur off-road except for necessary tasks as under Alternative One. Accordingly the beneficial impacts to wild horses would be similar to Alternative One although only a moderate difference with Alternative Two.

EFFECTS ON CULTURAL RESOURCES (Alternative Three)

Alternative Three is projected to have beneficial effects to prehistoric and historic sites near riparian areas as well as upland areas.

Elimination of livestock under this alternative would, in the short term, allow riparian areas and other areas experiencing heavy grazing to begin to repair themselves. This would decrease the erosion and degradation of prehistoric and historic cultural resource sites that is now occurring. In the long term, continued elimination of livestock would allow heavily grazed areas to become stable and less erodible. This would in turn stabilize any cultural resource sites upon them.

There would be no developments under this alternative, so there would be no adverse impacts to as-yet unknown cultural resources.

Wildlife and wild horse population levels would be maintained at their current levels. Together with the elimination of livestock, the conditions of prehistoric or historic resources in heavily grazed areas would be maintained or improved under this alternative.

Twenty-seven known significant prehistoric sites would be beneficially affected under this alternative, as positive conditions (reductions of both erosion and elimination of livestock on these sites) outweigh previous negative conditions. Five riparian area sections of the Seminole Cutoff of the California National Historic Trail, and a site associated with the Seminole Cutoff (Immigrant Spring), would also be beneficially affected, for the same reasons.

EFFECTS ON RECREATION AND VISUAL RESOURCES (Alternative Three)

Recreation

Since Alternative Three proposes removing unnecessary infrastructure on the allotment, this alternative would actually reverse the trend of the recreation setting moving toward a more urban/industrial recreation environment. Removal of livestock infrastructure and drastic reductions in motorized vehicle activities would result in reduced road densities, increased naturalness, and decreased contacts with others. Alternative Three would increase the unfenced character of the allotment and the larger Red Desert unfenced area. Alternative Three entirely removes livestock from the GMCA; which would in-turn eliminate visitor experience inhibiting encounters with livestock. In addition, the decreased amounts of infrastructure would also increase visitor demand, some of this increase would be offset by a decrease in demand in an around fenced private and state lands. Overall this alternative would result in the highest increase in visitor demand for the GMCA.

Visual Resources

Areas where projects are removed would see improved visual resources over Alternative One. Outside of these areas, the impacts from Alternative Three would be the same as Alternative One.

ECONOMIC EFFECTS (All Alternatives)

Introduction

This section provides a qualitative discussion of the socioeconomic impacts associated with the management alternatives considered in this document. More specifically, it is not intended to quantify the impacts but rather provide a qualitative discussion of the impacts associated with each alternative.

In addition to the qualitative discussion it should be pointed out that even though the nonmarket impacts were not quantified for the purposes of this analysis it does not mean that these values were considered inconsequential. On the contrary, other studies done by authors such as John Loomis (Colorado State University) have clearly shown that once these nonmarket values are quantified they often represent a substantial contributor to the overall impacts.

Regional Economic Impact Analysis Common to All Alternatives

For the purposes of this discussion it is important to have a general understanding of the likely economic outcome associated with BLM decisions affecting federal grazing on the GMCA. In other words, what is the likely economic affect of federal grazing reductions? Of course that depends on whether or not the reductions are real. Are they paper reductions or are they actual reductions that impact the historic stocking levels on the GMCA? If they affect the historic stocking levels then there are cash flow implications. If not, it can be argued that the cash flows are not impacted. But it needs to be noted that even “paper” reductions limit an operator’s future opportunities. However in order to determine if these cash flows reductions are actually realized, they have to be compared to historical long run actual use that will be discussed later on in this section.

It would be inappropriate for the purposes of this discussion to focus only on the impact of BLM grazing reductions because it does not fully account for the overall impact to the individual ranching operations. In other words, this discussion must recognize that the reductions affecting long term actual use will likely have a disproportionately larger impact on the operators relative to the actual reductions. The reasons this will likely happen is because the timing of the reductions occurs during a time when operators are putting up hay and generally do not have alternative private grazing on their home place available. Further complicating matters is that a BLM decision to reduce grazing that simultaneously impacts all the operators over a large area increases the demand for alternative private grazing that will probably lead to increased grazing costs. This will put further pressure on the affected operators and could end up being the catalyst that puts some out of business. Should this actually happen, the economic impact to the study area would be based not on just a loss of the value of the federal grazing but on a loss of economic activity from operations going out of business. However, it is unlikely that all operators would go out of business. Some operations would be sold and the new operator may be able to either continue producing livestock at a scaled back level or get out of livestock production entirely and manage the operation for a wildlife

preserve or simply as a private retreat. Moreover, other income producing activities could spring up in place of these operations shutting down, which would again offset the negative effect to the study region.

It should be noted that some of the affected permittees would adjust their operation to maximize profits rather than going out of business. But their ability to adjust their operation would depend on the severity of the reduction in federal grazing on the GMCA. Nonetheless, based on Linear Programming (LP) work done at the University of Wyoming, this would entail a reduction in herd size that produces a negative impact on cash flows. There would also be a corresponding reduction in the economic activity in the study area. However, historical and recent experience suggests that there are social factors associated with ranch ownership that make it desirable even if not economically justified.

Geographic Area Evaluated for Impacts

The study area for this analysis is Fremont County.

Historical Use

Table 4-4 illustrates both historical permitted and actual use from 1980 through 2010. And while the actual use fluctuates somewhat over those years, on average actual use has been about 50 percent of permitted use.

Table 4-4. Historical Permitted and Actual Use from 1980 through 2010.

YEAR	Historical Total Permitted use	Historical Total Actual Use	% of Total Permitted Use Actually Used	Historical Permitted Cattle Use	Historical Actual Cattle Use	% of Permitted Historical Cattle Use Actually Used	Historical Permitted Sheep Use	Historical Actual Sheep Use	% of Permitted Historical Sheep Use Actually Used
1980	48,174	20,814	43%	36,223	12,136	34%	11,951	8,678	73%
1981	48,174	28,224	59%	36,223	16,988	47%	11,951	11,236	94%
1982	48,115	28,953	60%	36,164	21,472	59%	11,951	7,481	63%
1983	48,115	23,563	49%	36,026	15,780	44%	12,089	7,783	64%
1984	48,083	26,990	56%	35,749	17,045	48%	12,334	9,945	81%
1985	47,995	16,225	34%	35,454	6,280	18%	12,541	9,945	79%
1986	47,722	21,263	45%	35,193	10,626	30%	12,529	10,637	85%
1987	47,922	27,789	58%	35,193	17,843	51%	12,729	9,946	78%
1988	47,922	21,453	45%	35,193	11,315	32%	12,729	10,138	80%
1989	47,922	33,353	70%	35,193	23,191	66%	12,729	10,162	80%
1990	47,922	27,016	56%	35,693	16,881	47%	12,229	10,135	83%
1991	47,723	29,069	61%	35,910	20,436	57%	11,813	8,633	73%
1992	47,723	29,222	61%	35,910	19,088	53%	11,813	10,134	86%
1993	47,723	33,885	71%	35,910	23,752	66%	11,813	10,133	86%
1994	47,723	34,903	73%	35,910	24,769	69%	11,813	10,134	86%
1995	47,723	24,144	51%	35,910	24,144	67%	11,813	0	0%
1996	47,723	23,333	49%	35,910	23,333	65%	11,813	0	0%
1997	47,723	24,888	52%	35,910	24,078	67%	11,813	810	7%
1998	47,361	28,844	61%	35,910	28,535	79%	11,451	309	3%
1999	47,361	28,160	59%	35,910	22,736	63%	11,451	5,424	47%
2000	47,361	31,457	66%	35,910	25,634	71%	11,451	5,823	51%
2001	47,361	18,872	40%	35,910	14,235	40%	11,451	4,637	40%
2002	47,361	7,735	16%	35,910	6,585	18%	11,451	1,150	10%
2003	47,361	7,747	16%	35,910	6,312	18%	11,451	1,435	13%
2004	47,361	13,111	28%	35,910	11,385	32%	11,451	1,726	15%
2005	47,361	16,727	35%	35,910	12,731	35%	11,451	3,996	35%
2006	47,361	15,152	32%	35,910	11,516	32%	11,451	3,636	32%
2007	47,361	17,898	38%	35,910	15,078	42%	11,451	2,820	25%
2008	47,361	16,861	36%	35,910	14,149	39%	11,451	2,712	24%
2009	47,361	16,354	35%	35,910	14,010	39%	11,451	2,344	20%
2010	47,361	16,621	35%	35,910	16,621	46%	11,451	0	0%
Averages	47,672	22,923	48%	35,823	17,054	48%	11,849	5,869	49%

*Figures derived from historic billing and actual use records

Alternative Discussion

Existing Management

The level of use for this alternative is based on the average historical use from 1980 through 2010. Based on that assumption, Table 4-5 illustrates the projected actual level of use for cattle, sheep and the total from 2011 through 2030.

Table 4-5. Projected Actual level of Use from 2011 to 2030 Under Existing Management.

Year	Existing Management Projected Actual Cattle Use	Existing Management Projected Actual Sheep Use	Existing Management Projected Total Actual Use	% of Average Historical Actual Cattle Use	% of Average Historical Actual Sheep Use	% of Average Historical Actual Total Use
Projected Averages through 2030	17,054	5,869	22,923	100%	100%	100%

Using this projection, the economic impact to the GMCA operators would be minimal. In other words, the cash flows for the GMCA operators would not be expected to change much compared to the last 31 years.

Alternative One (Low Stocking – No New Infrastructure)

Alternative One represents the low stocking alternative that is marked by no new infrastructure for livestock grazing. The percent of average historical use under this alternative for cattle, sheep and total use is 50, 39 and 47 percent respectively.

This alternative would be expected to produce lower cash flows for the GMCA operators that would probably exceed the reductions in actual use. And the anticipated result would be that many of the operators would no longer be able to stay in business. And those operations that did not survive would likely be sold or subdivided. For those that were sold and turned into retreats, there would be a potential for an improvement in wildlife habitat and open space, for the most part, would be maintained. But a loss of regional economic activity would be expected even though some of the operations could potentially generate regional economic activity if they were turned into dude ranches catering to the hunting, fishing and wildlife viewing clients.

Some of the ranches going out of business would inevitably end up being subdivided. As a result, the cost of services to local government would be expected to go up and there would be an anticipated loss of open space and wildlife habitat. It is uncertain what the impact to the regional economy would be under this alternative. For one thing, the property tax revenues from subdividing would be expected to increase. The question is whether these increased property taxes would offset the cost of services. Secondly, if these new subdivisions bring in new residents to the area there will be an increase in economic activity associated with the growth in population. But all this would have to be weighed against the loss in western culture of the area and the historical loss in values and attitudes that would likely occur.

However, regardless of decisions made as to AUMs on public lands, some of the ranches could go out of business because of the decision of the operator to liquidate the business. Increasingly, throughout Wyoming, this is an approach utilized by an aging ranching population to finance retirement. Sometimes this decision has resulted in subdivision of the ranches into “ranchettes” (usually when the property is located closer to town such as in the Red Canyon area near Lander) and sometimes this has resulted in the purchase of the ranch by an owner interested in the social benefits of ranch ownership and the desire to obtain a personal retreat, often for hunting privileges. (Privacy concerns do not allow the identification of allotments on which this has occurred.)

Table 4-6. Projected Actual Level of Use from 2011 to 2030 Under Alternative One.

Year	Alt. 1 Projected Actual Cattle Use	Alt. 1 Projected Actual Sheep Use	Alt. 1 Projected Total Actual Use	% of Average Historical Actual Cattle Use	% of Average Historical Actual Sheep Use	% of Average Historical Actual Total Use
Projected Averages through 2030	8,444	2,292	10,736	50%	39%	47%

Alternative Two (Proposed Action)

Alternative Two represents the Proposed Action and compared to Alternative One, the percent of average historical use being recommended is much higher. To illustrate, the percent of average historical actual use for this alternative is 90, 70 and 85 percent for cattle, sheep and total use respectively.

Even though there is a reduction in actual use under this alternative, the economic impact to the GMCA operators would be less severe and therefore there would likely be less operations going out of business. Consequently, the regional economic impact would be less than Alternative One. But for those operations that would go out of business, the consequences would be similar to what was discussed under Alternative One but less severe.

Table 4-7. Projected Level of Actual Use 2011 to 2030 Under Alternative Two.

Year	2011 Alt. 2 Proposed Action Projected Actual Cattle Use	2011 Alt. 2 Proposed Action Projected Actual Sheep Use	2011 Alt. 2 Proposed Action Projected Total Actual Use	% of Average Historical Actual Cattle Use	% of Average Historical Actual Sheep Use	% of Average Historical Actual Total Use
Projected Averages through 2030	15,402	4,083	19,485	90%	70%	85%

Alternative Three (No Grazing)

The no grazing alternative would shut down domestic livestock grazing in the GMCA. As such, it would have a major impact on the GMCA operators. Many, if not all, the operators would be unable to sustain their individual operations as they now exist. And given the fact that all of them would need to acquire replacement grazing, the cost of private grazing would be driven up, which would further depress the cash flows.

The regional economic impact would be similar to what was discussed in Alternative One except it would be much more severe. Complicating matters would be having that many operations financially stressed to the point of going out of business simultaneously, which could conceivably flood the market with ranches going up for sale, thus depressing land prices. The end result would be a major loss of traditional lifestyle in conjunction with the custom and culture accompanying the ranching sector. However, ranch prices are not entirely dependent upon a return on investment; prior to the real estate slow down starting in 2008, ranch prices and particularly in the period 2002-2007, the price of farm land (which included agricultural land as well as ranch land) increased from approximately \$300 per acre to \$900 per acre (source: USDA NACC, 2008) although this is the period of severe drought with reduced AUMs authorized on public lands (See Figure 3-2).

Summary

Overall, the 2008 earnings and employment generated by the agriculture sector (not just public land livestock grazing) accounts for 0.18% of total earnings and about 6% of total employment for Fremont County (Regional Economic Information System (REIS), Bureau of Economic Analysis (BEA), RCN-0955, May 2010). And even though there is a variation in the regional economic activity produced by each of the alternatives, the overall economic impact to Fremont County would be inconsequential.

While the anticipated economic impact to Fremont County from any of the three alternatives is small, as previously mentioned, there would be important economic ramifications affecting individual livestock operations. All the alternatives, with the exception of the alternative entitled “Existing Condition” lead to “real” reductions in varying amounts to livestock grazing on BLM administered lands on the GMCA. In other words, the implementation of Alternatives One, Two, or Three will not produce “paper reductions”, but instead, will result in a reduction in historical stocking rates. So they represent reductions in grazing levels that are lower than long term historical levels (to a varying degree) and will have a negative impact on cash flows. And the ability to cope with these reductions will depend on the level of financial stability of the individual operations. In addition, other options are available to assist in ranch financing such as conservation easements and carbon sequestration improvements that could replace lost income from ranching operations. One GMCA permittee at least has entered into a conservation easement through the NRCS which contributed to ranch finances.

Open space is another consideration that should be factored into the analysis when looking at potential decisions that could impact ranch viability. For example, a report entitled “Strategic Ranchland in the Rocky Mountain West”; written by American Farmland Trust (AFT), the Center of the American Trust and the Nature Conservancy has a table showing the “Strategic Ranchland at Risk in 25 Rocky Mountain Counties, 2000-2020” ranks Fremont County number 21. This same table indicates 5% of the Fremont County’s strategic ranchlands are at risk, which also places 11% of the State of Wyoming’s strategic ranchlands at risk. But the data in the aforementioned table does not indicate the location of these lands so it is unclear whether or not the ranches owned by the GMCA permittees would fall under this category. It is likely that more of the ranches being analyzed are closer to urban populations such as the subdivision of ranches near Casper. In addition, with the real estate downturn that began in 2008, ranch subdivisions have slowed as well.

Ultimately the market place will determine whether or not ranchland will end up being converted to residential development. However, if this conversion occurs, it is expected that the burden on local services would be substantially higher compared to maintaining these same lands in ranching. But some of that cost would likely be offset by increased property taxes resulting from an increase in assessed value of these lands, particularly since ranch land has a lower property tax rate than residential land.

Finally, while the social considerations are difficult to quantify, this area has a longstanding cultural background tied to livestock grazing. And even though livestock grazing on the GMCA represents a minor contribution to Fremont County economy, the cultural impact from displacing ranching operations in this area could be more important in the long run than the economic considerations would suggest but only to the extent that the displacement of one operator was not replaced by another operator. In the final analysis, both the social and economic considerations in conjunction with the resource concerns affecting all uses in the impacted area will be factored into the decision process leading to an agency selected alternative.

MITIGATION MEASURES

In addition to the mitigation measures identified in the action alternatives in Chapter Two, the following mitigation measures apply to both action alternatives. Since there would be no livestock grazing under Alternative Three, there would be no mitigation measures to apply under that alternative.

Soil and Water Resources

- Blading along fence lines would not be permitted. Brush that needs to be cleared along fence lines would be cleared by brush-beating or similar equipment. Vegetation needing to be cleared would be limited to within 10 feet of the fence line.
- Increased noxious weed monitoring and necessary control would occur in concentration areas, soils disturbed by projects, roads associated with projects and project maintenance, and areas of heavy livestock trampling.
- Locate range improvements in close proximity to existing disturbances, especially existing roads.

Wildlife/fisheries Habitat and Special Status Species

- Locate range improvements in close proximity to existing disturbances, especially existing roads (Alternative Two only).
- Larvicide should be added to livestock watering developments where WNV has been suspected.
- To protect crucial big game winter habitat, surface-disturbance activity would not be allowed during critical periods such as winter and calving. Time periods when activities would be prohibited could depend on species impacted and winter conditions.
- To protect important raptor nesting habitat, surface-disturbance activities would not be permitted during nesting periods. Disturbance timing and distance from nests would be determined by the species of raptor.
- All new water developments and existing as opportunities occur would be provided with bird ladders to prevent accidental drowning.
- All new permanent fences would be equipped with removable sections to facilitate wildlife movement when the fence is not being used to control livestock.
- Mark top wire of new permanent fencing constructed within suitable sage-grouse nesting/brood-rearing habitat and all new electric fencing with markers patterned after those developed by Sutton Avian Research Center.

In Alternative Two, motorcycles would not be used for herding until after July 15th which would reduce impacts to nesting sage-grouse.

Wild Horses

- Cattleguards on public land that are within the existing HMA's would have rebar welded between the rails to minimize wild horse entrapment when attempting to cross. (Note: under the third alternative, two cattle guards would be removed.)

- All permanent fences within HMAs would be equipped in areas identified with double wide gates to facilitate wild horse movement when the fence is not being used to control livestock. Minimum width of double wide gates would be 32' with a single post in the center.
- The Ice Slough Fence would have approximately one mile of let-down electric fence on the northwesterly side and approximately 400' of lay-down fence on the southern boundary. Wires would be bundled (zip stripped) to prevent animals from getting entangled or dragging wire all through the vegetation. This fence would be modified as described above for the period of November 1st through April 30th each year.
- The Granite Rocks Fence would have approximately 8.1 miles of lay-down fence on the southern boundary. Posts would be removed and wires would be bundled (zip stripped) to prevent animals from getting entangled or dragging wire through the vegetation. Another .8 miles of removable, let down fence would be installed in the Magpie Pasture and approximately 1.4 miles of the Crooks Creek electric fence would have the wires laid on the ground, however, posts would remain standing.
- In Alternative Two, motorcycles would not be used for herding until after July 15th which would prevent impacts to wild horses during months when they are experiencing winter and spring weather stress.

Recreation and Visual Resources

- Install two pass-through stiles in the North Magpie and Granite Creek-Rocks Pasture Fences at crossings of the CDNST (see Map 10) to ease pedestrian fence negotiation.
- Using the Visual Resource Contrast Rating System, the BLM would develop range improvements in a manner that does not substantively alter the characteristic visual environment and described below.
- Potential modifications to range improvements could include (1) siting improvements near existing visually modified environments, (2) changing the location of the proposed improvement to a location not in view, (3) using materials that match the color of the landscape, and/or (4) changing the design of improvements within view of key recreational use areas to reduce visual contrast.

Cultural and Prehistoric

- The placement of salt blocks would be prohibited in areas where adverse effects would result to cultural resources.
- The proposed Granite Creek-Rocks Pasture Fence would be designed to minimally affect the historically significant Seminole Cutoff. Within view of this trail, the electric fence would be constructed of removable, earth tone-colored materials including, small fiberglass posts, to have the least visual impact on the trail. In addition, the fence would be in place for only 30-45 days per year.
- The proposed Crooks Creek Riparian Pasture Fence would be designed to minimally affect the historically significant Rawlins-Fort Washakie Stage Trail. Within view of this trail, the electric fence would be constructed of removable, earth tone-colored materials including fiberglass posts, to have the least visual impact on the trail. In addition, the fence would be in place for 154 days per year.
- Before construction of range improvements or conducting vegetative manipulations, areas of potential effect would be inventoried, cultural resources discovered would be evaluated, and attempts would be made to avoid significant sites and areas of high site density. If this is not possible, the State Historic Preservation Officer would be consulted to develop acceptable mitigation strategies. Locations of cultural sites would not be disclosed to the public. If cultural material or sites or paleontological materials are discovered during project construction, work would cease until a BLM-approved archaeologist evaluated the site and recommended an appropriate course of action.

RESIDUAL EFFECTS

The CEQ requires that the anticipated effectiveness of mitigation measures and any direct, indirect, and cumulative effects that remain after the application of all mitigation measures – that is, the residual effects (Question 39, CEQ, Forty Most Asked Questions Concerning CEQ’s NEPA Regulations.) However, BLM’s NEPA Handbook (<http://web.blm.gov/internal/wo-500/directives/dir-hdbk/hdbk-dir.html> Handbook H-1790-1) states that “If mitigation measures are incorporated into the proposed action or alternatives, they are called design features, not mitigation measures [citation omitted].”

Alternative Two contains design features that could also, in some cases, be described as mitigation measures, such as the design of fences and equipping water developments with bird ladders. Whether characterized as design features or mitigation, the range infrastructure in Alternative Two has been designed to generally reduce residual impacts to an inconsequential amount beyond what is described above under direct and indirect impacts. However, the acres of disturbance associated with the range infrastructure projects under Alternative Two would have 80 acres of surface disturbance as residual effects. While efforts would be made to monitor the disturbance to prevent the spread of weeds, within the period being analyzed here the disturbance would exist of bare ground.

CUMULATIVE IMPACTS

Introduction

The NEPA requires an assessment of the potential cumulative impacts of the proposed project. Cumulative impacts evaluate the incremental impact of actions under each alternative when added to other past, present and reasonably foreseeable future activities. Cumulative impacts can result from individually minor, but collectively significant actions occurring over a period of time.

The CEQ regulations do not require that cumulative impacts to all resources be analyzed. Instead, the CEQ indicates that 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. Impacts to greater sage-grouse, for example, are likely to be predictive of impacts to other wildlife species. The resources to be analyzed were identified as important in internal scoping and over the past history of the allotment and are greater sage-grouse, riparian health, and socio-economics. Necessarily, some of these analyses will be qualitative; some can be quantified. Certain development might be identified as too speculative for analysis such as geothermal energy production.

Greater Sage-grouse

Based on recent scientific information indicating the need for large spatial analysis, the BLM-LFO will use a distance of 33.5 miles (54 km) from the GMCA boundary as the area to analyze the cumulative impacts to greater sage-grouse within Core Areas. Recent radio telemetry studies in the Stewart Creek Allotment (RFO) and in the vicinity of the Lost Creek Uranium Project have shown that marked birds are non-migratory and that most sage-grouse movements are less than 20 miles (M. Holleran and F. Blomquist, pers. comm.). Sage-grouse respond to and are affected by habitat characteristics at large spatial scales and to environmental factors at larger spatial scales than those currently applied in management (Leu and Hanser, 2009). Connectivity analyses of Knick and Hanser (2009) provide a quantitative basis to estimate distance thresholds that potentially isolate populations. In their analysis, they used a distance of 18 km (11.2 miles) between leks to assess movement between populations. They also found that the most significant spatial scales for environmental predictors of lek persistence or abandonment were proportion of sagebrush cover within 54 km (33.5 miles) of the lek.

Cumulative impacts to greater sage-grouse habitat would result from surface-disturbing and other disruptive activities that result in the direct and indirect loss of habitat and bird displacement. Proposed and potential development activities within the sage-grouse cumulative impact area of analysis (CIAA) include; 1) livestock

grazing and developments, 2) oil and gas development 3) wind energy development, and 3) uranium exploration and mining. As indicated in Chapter Three, renewable energy development is not anticipated to be authorized within the foreseeable period beyond ten years.

Restrictions that limit resource use in greater sage-grouse habitat on federal land would reduce habitat loss, but would not prevent further habitat destruction from occurring on non-BLM administered land. Consequently, greater sage-grouse habitat on private land may not receive the same level of protection and may result in greater habitat degradation on these lands. However, with the exception of the possible construction of fences on private property under Alternative Three, development on private lands would be expected to be low under all alternatives.

Impacts Common to all Alternatives – Greater Sage-grouse

The majority of cumulative effects on sage-grouse habitat within sage-grouse cumulative impact area of analysis (CIAA) would result from surface disturbing and disruptive activities, such as mineral development and associated wells, roads, pipelines, and facilities; rangeland improvements; and other such activities (e.g. geophysical exploration). Effects would be in the form of habitat fragmentation and animal displacement (short or long term). Sage-grouse avoidance of disturbed areas and human associated activities could extend beyond the areas of disturbance. There are various oil and gas, uranium, renewable energy (wind) and other natural resource extraction and exploration that have been ongoing, and that are planned for future operation within the sage-grouse CIAA. These along with other uses such as rangeland and recreational activities contribute to the overall cumulative impacts seen in the area.

Under all alternatives, the Core Area strategy provides the context by which greater sage-grouse will be managed to prevent ESA listing. A very similar strategy has been adopted by the State of Wyoming. While it is possible that the State of Wyoming could alter its policy, this document assumes that state lands will be managed in accordance with this strategy. The U.S. Fish and Wildlife Service have stated that the Wyoming Core Area strategy is a sound framework for a policy by which to conserve greater sage-grouse. The relative intensity of the cumulative impacts to sage-grouse is described relative to Core Areas (map) within the CIAA.

Livestock Grazing- There is more than 140 livestock grazing allotments within the Greater Sage-grouse CIAA. Active permitted AUMs and actual use vary by allotment. In general, livestock management and associated livestock developments in the LFO and adjacent field offices are designed to establish more even livestock distribution throughout the allotments resulting in a shift of grazing utilization from the riparian areas to the uplands. Greater sage-grouse habitat within some riparian pastures should benefit as season-long access to these areas would be eliminated and proper use levels established. No benefit to sage-grouse habitats in riparian areas would likely accrue in those areas that continue to be grazed during the hot season.

On BLM administered lands “triggers” are commonly used to ensure that minimum residual stubble heights remain after the removal of livestock. This should result in a stable or improving trend in riparian and upland habitat condition that would provide residual vegetation for sage-grouse nesting cover and brood rearing habitat throughout the CIAA.

Livestock developments could have both beneficial and adverse impacts on sage-grouse. Currently, there is at least 4,735 miles of fencing within the CIAA, most of which is permanent wire fencing. With the exception of the Continental Peak Allotment, which proposes the construction of approximately 20 miles of new fencing, there are no other fencing projects being proposed in the CIAA. There are an undetermined number of water developments that will likely be proposed and developed in the RFO and RSFO over the next decade. These developments could have adverse impacts on sage-grouse by attracting predators and facilitating the spread of West Nile virus, but they could also have beneficial impacts on sage-grouse habitat by relieving grazing pressure on riparian areas.

Mining- At the present time, there are two existing uranium mining districts and four additional areas of uranium exploration within the sage-grouse CIAA. All operating uranium mine fields and many reclaimed tailings are fenced to exclude animals (personal communication with K. Yannone), thereby introducing the adverse impacts associated with fencing around the perimeter of the project. These fences would be considered adverse impacts over

the short and long term. None of the mines are sufficiently defined to provide an estimate of the miles of fences that would be required and some of the areas are already fenced.

BLM received a 43 CFR 3809 Plan of Operations for a proposed uranium mining operation titled Lost Creek In Situ Recovery (ISR) Project. The Lost Creek ISR Project is located near the southern boundary of the GMCA in T. 25 N., R. 92 W. and T 25 N. R. 93 W. and consists of approximately 4,250 acres, all within sage-grouse Core area. There are four active leks within two miles from the permit area and another lek near a main road which could be subject to increased traffic volume as a result of project construction and operations. Under the proposed plan no more than 324 acres would be subject to actual surface disturbance, although, the close proximity of the individual disturbances tallied under the proposed plan of operation and the associated infrastructure, noise and human disturbance that would occur in conjunction with this project would increase the functional loss of sage-grouse habitat to include nearly the entire project area (i.e. 4,250 acres). The Lost Creek ISR site provides high quality sage-grouse habitat, including winter habitat, with proximity to higher elevation habitat to the north (Naugle et al., 2006; WGFD, 2003). Local sage-grouse populations will continue to be monitored and research on local populations will continue in conjunction with this ISR project (M. Holleran, pers. comm.) Although BLM has not approved the project, it is considered to be more likely than not to be approved in some form including with mitigation of adverse impacts to greater sage-grouse.

Titan Uranium has started an application to reopen the uranium mine in the Sheep Mountain area near Crooks Creek. Titan has started reclamation activities of historic mining disturbance with beneficial impacts to soils, water, vegetation and riparian resources. The Sheep Mountain Project, located about seven miles south of Jeffrey City, at approximately T28 North, Range 92 West in Sections 20, 21, 22, 27, 28, 29, and 32 as well as 791 acres on state and private lands. A total of 3,606 acres are in the project; approximately 61% are on public lands. The mine is not in Core Area because of historic disturbance but is located right next to it. The nearest lek is approximately 5 miles away.

Uranium One has been authorized to conduct exploratory drilling operations for uranium resources on two properties known as the JAB site and the Antelope site (i.e. collectively known as JAB-Antelope) within GMCA in T. 26 N. R. 93 W. and T 26 N. and R. 94 W., respectively. Five leks were monitored in the Antelope survey area with one lek located inside the project area itself (Harrier lek). One additional lek was found within the JAB project area (Arapahoe lek). The total surface disturbance associated with JAB-Antelope is approximately 550 acres which includes drill sites and roads, all of which is within sage-grouse Core Area. It is not possible to foresee if these exploratory activities will result in a mining development. Uranium mines must be permitted by the WDEQ and are evaluated for conformity with the Core Area strategy including limits on surface disturbance.

Evolving Gold Corporation is conducting gold exploration in the Rattlesnake Hills area of the LFO. Authorized activity will disturb approximately 17 acres from drilling and road construction. Although this area is within sage-grouse Core Population Area, there is an absence of historical sage-grouse leks on or within 2 miles of this site, and limited sagebrush habitat near this area, so effects on sage-grouse should be minimal. Nearby, Big Bear Mining has also submitted notices of intent to drill 14 gold exploration holes in T. 31, R 88 sections 5, 8, and 9. Surface disturbing and/or disruptive activities will be prohibited at these proposed drill site locations from March 1st through July 15th to protect sage-grouse nesting and brood rearing habitats. It is not expected that gold exploration will have a large impact on the Core Area strategy.

In summary, proposed mining and exploration activities may result in nearly 900 acres of actual surface disturbance in sage-grouse CIAA and perhaps as much as several times that depending upon the surface disturbance being tightly controlled. The functional loss of habitat from associated infrastructure, noise and human disturbance would have an even greater adverse impact on sage-grouse within the CIAA or immediately adjacent to it.

Renewable and Non-Renewable Energy Developments- Perhaps the greatest potential loss of habitat and habitat function for sage-grouse in the CIAA may likely be from energy development (i.e. oil and gas and wind development). Research has shown (Holleran, 2005, Walker et al. 2007) that sage-grouse breeding and nesting habitat may be impacted over four miles from active oil and gas energy development. In discussing whether adequate regulatory mechanisms are in place to protect the sage-grouse the FWS stated that constructing wind farms

in core areas, even for research purposes, prior to demonstrating it can be done with no impact to sage-grouse, negates the usefulness of the core area concept as a conservation strategy.

Anticipated adverse impacts of wind development specifically include: collisions with turbine blades, fences, guy wires, power lines and vehicles; behavioral avoidance and habitat fragmentation; auditory and visual disturbance; increased predator access and spread of invasive weeds (WGFC, 2009). Long-term impacts are caused by the cumulative footprint of the turbine towers, roads, powerlines and supporting infrastructure that removes or alters habitats which displaces birds from preferred habitats and causes birds to avoid impacted areas. Cumulative impacts would be greater where development is more intense.

As of February 2011, all met tower applications which may have been located within the GMCA have been withdrawn, and as a result, there are no wind farms or met tower projects proposed in this allotment. Met tower applications to conduct wind energy research on 13,128 acres of BLM surface in the LFO portion of the CIAA are pending. Approximately 136,000 acres of BLM surface within the RFO portion of the CIAA is also being considered for site testing and monitoring. Of the eight met tower applications in the RFO, five have been authorized and three are pending. The Governor's 2010 E.O states that wind energy development should not be conducted in Core Areas. There is currently no full field wind energy development within the CIAA. Wind energy development in the CIAA is speculative given the distance from transmission lines and the Core Area strategy limitations.

Existing and reasonably foreseeable oil and gas development within the sage-grouse CIAA includes the Bison Basin, Sheep Creek, Jack Morrow Hills (JMH), along with other smaller, scattered projects. JMH has the highest potential for oil and gas development within the sage-grouse CIAA, however; there are only 33 active oil and gas wells on four units and 3 applications for permit to drill on one of the units within the JMH project area at the current time.

There are currently four authorized oil and gas units wholly or partially inside the GMCA. The acreage associated with these units contained within the boundary of GMCA comprises 23,389 acres or about 4 percent of the allotment. The most active of these is the Bison Basin Unit. There are currently 68 wells in some stage of active production in the GMCA and an estimated 142 wells within the CIAA. Future oil and gas development may result in an additional 20 applications for permit to drill within the GMCA over the next 5 years resulting in an additional 100 acres of disturbance. While not all of these wells are in suitable sage-grouse nesting or breeding habitat, each one represents several acres of direct habitat loss from well pad, access roads, and pipeline construction as well as an impairment of habitat surrounding these developments.

Overall, mineral and energy development would have the greatest effects on greater sage-grouse habitats within the CIAA. In assessing the threats to sage-grouse the FWS utilized a large body of scientific information on the negative impacts of road-and-pad based development on the behavior, movements, survival and productivity of the sage-grouse. Sage-grouse have high site fidelity to seasonal habitats, including breeding and nesting areas (Fischer et al. 1993). Given what is known about effects of human activities on sage-grouse, mineral and energy development located in areas of greater sage-grouse lek concentration would likely cause long-term displacement of animals through habitat loss and lek abandonment thus contributing to local population declines.

Summary

The difference in surface disturbance due to new grazing infrastructure among the alternatives is relatively minor, (133 acres in Alternatives One and Three, and 213 acres in Alternative Two) in comparison to the surface disturbance that may or is likely to occur from cumulative impacts that are common to all alternatives. The adverse impacts to the greater sage-grouse from the mineral activities will be managed in accordance with the Core Area strategy which is designed to avoid the listing of the bird under the ESA. However, BLM does not assert that this management will entirely avoid adverse impacts to sage-grouse.

To the extent that cumulative impacts occur within the CIAA, the beneficial impacts associated with improved habitat conditions in the GMCA would become more important for the sage-grouse. Accordingly, the more the

alternative benefits greater sage-grouse by improving vegetation and cover and the less the alternative has adverse impacts from over-grazing and fencing, the better the alternative would be to reduce the cumulative adverse impacts. Under this rationale, considering the magnifying effect of the cumulative impacts, Alternative Three has the least adverse impacts, followed by Alternative One and then Alternative Two.

RIPARIAN AREAS

As discussed in Chapter Three, riparian and wetland vegetation makes up less than one half of one percent of the area of analysis. However, even though the overall percentage of riparian and wetland habitats is less than one percent, riparian areas provide the greatest vegetative production and habitat diversity than any other plant community on the allotment. It is also true that most of the riparian habits within the GMCA were found to be either non-functional or functioning at risk with a static or downward trend.

Riparian zone cumulative impact assessment will be conducted within the boundary of the GMCA. The cumulative impacts to riparian resources and their health will generally be the sum of those impacts described previously in this chapter combined with those of reasonable and foreseeable mineral and energy development. This is the appropriate area of analysis because the adverse impacts from livestock grazing are site specific riparian areas.

The entire area covered by locatable minerals claims, oil and gas potential, uranium deposits, and wind energy development will not be treated as if it would all be developed over the life of this EA. Commercial logging on Green Mountain is primarily limited to several post and pole sales and a minor amount of firewood cutting which is really too small to be analyzed for impacts (fewer than \$5,000 of sales in the entire field office which includes wooded areas outside of the GMCA. Past trends in the development of these industries will be used to assess the cumulative impacts they may bring to the riparian zones of this area. Also, according to present RMP prescriptions:

- Logging cannot occur within 100 feet of riparian areas/wetlands.
- Mineral and Realty program actions are prohibited from locating surface disturbing activities within 500 feet of surface water and riparian areas/wetlands. This limit would not be applied to locatable mineral development but would be applied to exploration activities unless the areas could not be avoided.
- On case-by-case basis riparian area/wetlands in the Sweetwater River watershed not meeting PFC are given management priority, as the Sweetwater River is a WDEQ designated water quality Class 1 water body from the confluence of Alkali Creek upstream to its source.

There are currently estimated to be 133 acres of livestock concentration areas which are essentially devoid of vegetation in the GMCA. An estimated three percent, four acres, are located within riparian zones and wetlands. The remaining 129 acres occur in upland locations. We will be use four acres in our estimate of riparian area cumulative impacts.

Cumulative Impacts to Riparian Areas Common to all Alternatives

There are 4,462 mining claims, amounting to 112,243 acres, within the GMCA. This is approximately 21 percent of the entire GMCA acreage. Currently, there are about 703 riparian zone/wetland areas, based on Fremont County Cooperative Soil Survey information, that occur on BLM administered public lands under locatable mineral claims.

There are currently no active mines permitted in the GMCA. All, but two exploration notices have expired. There are four pending plans of operation: two of which are under consideration by EIS and the other two projects are for exploration only and are EA-level projects; see above discussion under greater sage-grouse. While one of these is in Core Area and subject to State of Wyoming core-area regulation, the other is not. BLM considers that it is likely that these mines will be developed in some form. Surface disturbance may adversely impact riparian areas but the Plan of Operations would require that adverse impacts to riparian areas would be limited. In some areas of historic disturbance, reclamation efforts associated with new development (such as on older roads or exploration areas) would beneficially impacts riparian areas by reducing erosion and sedimentation. During the planning phase here, there would be limited beneficial impacts and some potential for adverse impacts.

Additionally, there are 59 riparian zone/wetland acres that occur within the boundaries of mine plan areas. Development of these areas is not influenced by the alternatives presented in this livestock grazing program environmental assessment. The mine plan areas could be developed, but, they commonly only disturb a minor percentage of the plan area. The total estimated riparian acreage for the GMCA is 2,092 acres, as stated in Chapter Three. Of the total project area acreage of all plans, only 4.25 percent of this is actual surface disturbance. Therefore it is reasonable and foreseeable that locatable mineral development is not expected to impact more than three of these acres.

Cumulative Impacts to Riparian Areas by Alternative

Alternative One, the Low Stocking-No Infrastructure Alternative

There are currently an estimated three percent, four acres, of livestock concentration areas which are essentially devoid of vegetation, located within riparian zones and wetlands. Adding to this figure the estimated three acres of riparian zone/wetland impacts from mining activities yields a cumulative impact sum of seven acres of riparian zone/wetland impacts.

Alternative Two, the Proposed Action

Under this alternative, an estimated 80 acres of new livestock concentration areas would develop. An estimated three percent, three acres, would develop in riparian areas and wetlands. There are currently an estimated three percent, four acres, of livestock concentration areas existing within riparian zones and wetlands. Add to these seven acres the estimated three acres of riparian zone/wetland impacts from mining activity yields a cumulative impact sum of ten acres of riparian zone/wetland impacts. While more severe than the impacts under Alternative One, the context is the 2,000 acres (approximately) of riparian areas in the GMCA.

Alternative Three, the No Grazing Alternative

There are currently an estimated three percent, four acres, of livestock concentration areas which are essentially devoid of vegetation, located within riparian zones and wetlands. Adding to this figure the estimated three acres of riparian zone/wetland impacts yields a short-term cumulative impact sum of seven acres of riparian zone/wetland impacts.

However, it is anticipated in the long-term that currently impacted riparian zone/wetland acres will heal or be actively rehabilitated. In the long-term only mining affected acres would be present, amounting to three acres of mining-related disturbance to riparian zones/wetlands.