

Green Mountain Common Allotment Proposed Grazing Management Environmental Assessment WY050-EA07-153

April 2008



MISSION STATEMENT

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

BLM/WY/PL-08/016+1020

WY050-EA07-153



United States Department of the Interior

BUREAU OF LAND MANAGEMENT

Lander Field Office
P.O. Box 589 (1335 Main Street)
Lander, Wyoming 82520-0589



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NO. 32001
1792

April 28, 2008

Dear Reviewer:

Enclosed is the environmental assessment (EA) of proposed grazing management for the Green Mountain Common Allotment (GMCA) in the Lander Field Office. The document analyzes a proposed action and three other alternatives.

The decisions made as a result of this analysis will guide the grazing management on public land in the GMCA for many years to come. Please review the EA and submit your written comments by May 28, 2008, to the Lander Field Office, P.O. Box 589, Lander, Wyoming 82520. You may also submit comments by email to: Lander_wymail@blm.gov

Following the comment period, we will consider the comments received and issue a Decision Record outlining our decision and rationale. Once this decision is made, we will begin to implement management actions for the 2009 grazing season.

On behalf of myself and the GMCA Interdisciplinary Team, I would like to thank you for your interest and involvement in the process that has led up to the completion of this EA. Following our decision, we would appreciate your continuing participation as we develop and implement the allotment management plan.

If you have any questions on the EA, please contact John Likins or Rubel Vigil, Jr., at (307) 332-8400.

Sincerely,

Robert B. Ross, Jr.
Field Manager

**GREEN MOUNTAIN COMMON ALLOTMENT
PROPOSED GRAZING MANAGEMENT
ENVIRONMENTAL ASSESSMENT
NO. WY050-EA07-153**



**Bureau of Land Management
Lander Field Office
1335 Main Street
Lander, Wyoming 82520**

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Chapter 1

Purpose and Need

PURPOSE AND NEED

The purpose of this environmental assessment (EA) is to describe and analyze four alternatives for the development of an allotment management plan (AMP) for the Green Mountain Common Allotment (GMCA). An AMP enables the Bureau of Land Management (BLM) to properly manage the public land and resources under its jurisdiction; to maintain stability in the livestock industry dependent on public lands; and to provide for the orderly use, improvement, development, and reclamation of public lands, consistent with multiple-use objectives. This responsibility and authority evolves from a series of legal mandates, including the Taylor Grazing Act, the National Environmental Policy Act (NEPA), the Wild and Free-Roaming Horse and Burro Act, the Federal Land Policy and Management Act (FLPMA), and the Public Rangelands Improvement Act.

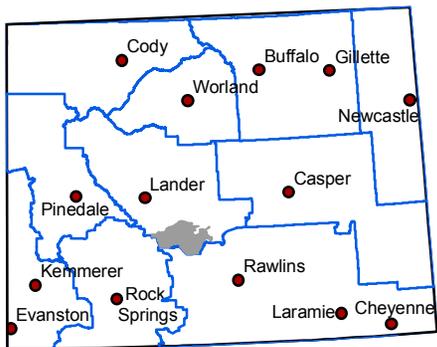
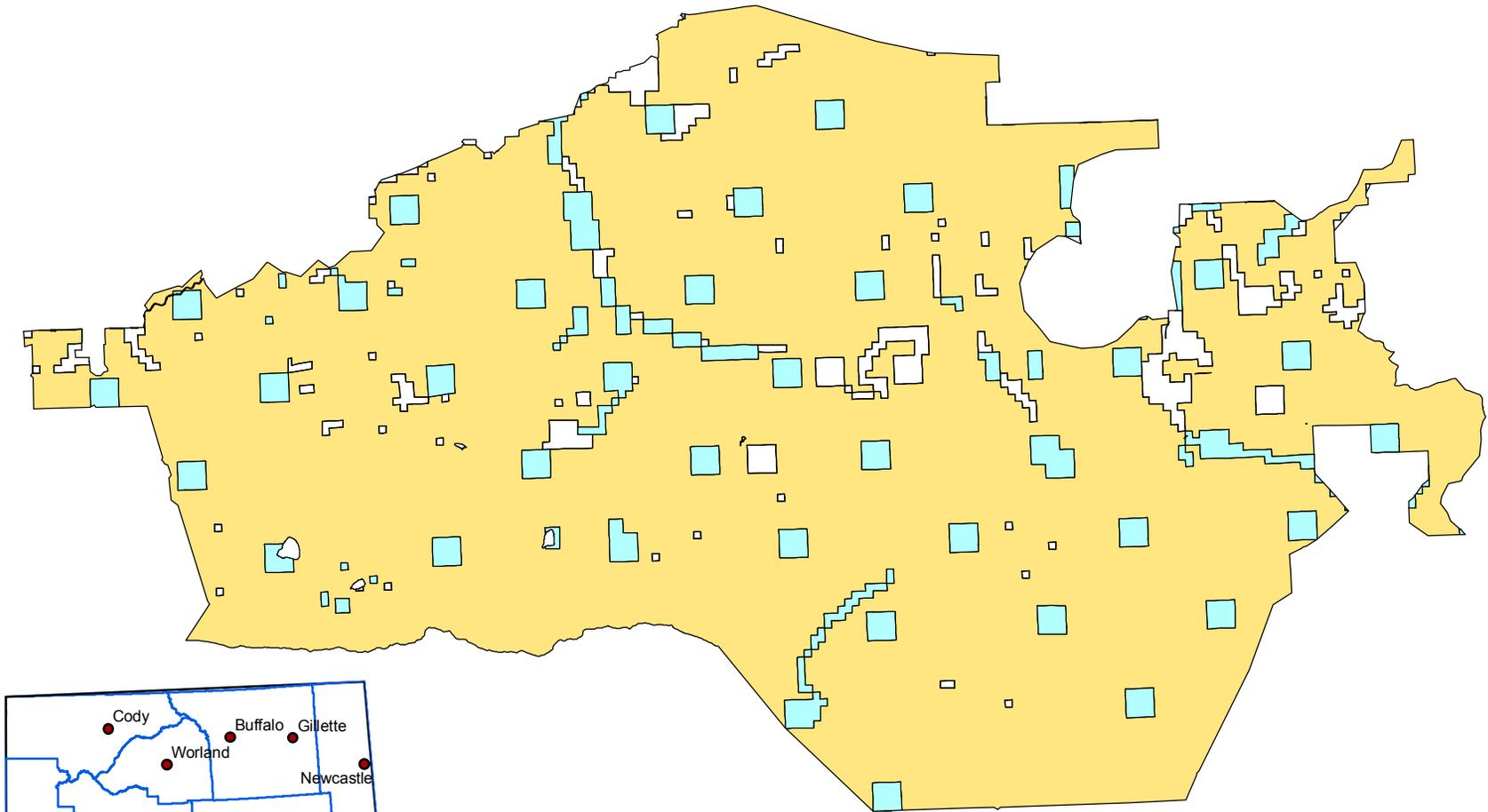
The GMCA is a common use allotment encompassing approximately 522,000 total acres in southern Fremont County and portions of Sweetwater County (see Map 1-1.) Bureau of Land Management-administered public lands in the GMCA are primarily used for livestock grazing, wild horses, wildlife habitat, mineral exploration and production, and recreation. Other uses include rights-of-way for transportation, communication, and utility systems, and timber production on Green Mountain.

Sixteen individuals share livestock grazing use within the allotment on 19 grazing permits. Prior to 1999, no formal livestock management system had been in place throughout the allotment's previous 100 years of use. Internal fencing has been limited to small pastures of mostly private and state land.

In 1996, the BLM initiated a large-scale planning effort involving the general public, local government, special interest groups, and permittees to address the varied and sometimes conflicting uses of the GMCA. This planning effort considered requests to convert the remaining sheep grazing use to cattle grazing and was intended to mitigate the known resource conflicts within the allotment. The planning effort identified a number of management issues and developed a list of goals and objectives to resolve the issues. An analysis documented in an EA (No. WY-050-EA9-039) resulted in the BLM's August 31, 1999 decision for managing livestock grazing on the Green Mountain Common Allotment. The goals and objectives covered in that earlier analysis established that there is a need to:

1. Improve or maintain riparian areas.
2. Maintain wild horses within appropriate management levels.
3. Improve the distribution of water sources.
4. Improve the distribution of grazing animals.
5. Maintain the open spaces and natural character of the allotment and the uses that are dependent on these values.
6. Maintain public access and dispersed recreational opportunities while respecting private property in the allotment.
7. Maintain big game populations near objective levels established by the Wyoming Game and Fish Department.
8. Maintain or improve habitat quality for plant and animal populations and communities.
9. Provide adequate forage and water on a sustained-yield basis to satisfy the present management levels of livestock, wild horses and big game animals.
10. Provide workable solutions that encourage positive economic impacts on the multiple uses.

Map 1-1: Green Mountain Common Allotment Surface Ownership, Lander Field Office



Wyoming BLM Field Offices

Surface Ownership

-  Bureau of Land Management
-  Private
-  State

11. Maintain and improve soil productivity and minimize soil erosion.
12. Improve or maintain upland plant communities so that they are diverse and able to recover from disturbance.
13. Manage the public lands in a manner that will protect and improve the quality of the water resources.
14. Share expenditures on rangeland improvements among all concerned interests wherever possible.
15. Maintain open, honest, and constructive communication among the interested and affected parties including the public. Foster understanding, involvement, and cooperation in resource management.

On July 23, 1999, coincident with the development of BLM's EA, the Lander Field Office made a determination that not all of the Wyoming Standards for Rangeland Health were being met on the GMCA.

"Appropriate actions" were identified pursuant to 43 CFR 4180.2(c) to correct the failure of the allotment to meet all of the Standards. These appropriate actions were included in the BLM's Final Decision of August 31, 1999, EA No. WY-050-EA9-039. The 1999 Decision is the management plan that continues to be in effect today.

The 1999 Decision renewed six GMCA grazing permits for a term of 10 years beginning October 1, 1999 and ending September 30, 2009. The 1999 Decision set initial use levels of 35,910 AUMs for cattle and 11,451 AUMs for sheep. The season of use was changed to yearlong for sheep. Frequent riding and herd movement were to be used in controlling livestock distribution.

The grazing management actions were to be implemented in three phases: initial, interim, and long-term. The initial phase was provided as an intensive effort by the BLM and the permittees to get started on livestock management, herding, and the construction of rangeland improvements necessary to meet the 15 management goals listed above. The interim phase was designed to achieve full implementation and monitoring, and to allow for the adjustments necessary in meeting the goals and objectives. The long-term phase of management was intended for monitoring, adjustments, and implementation.

Full implementation of the 1999 Decision's management actions was to be accomplished over a ten year period with specific actions and rangeland improvements being phased in to provide the best chance of success for the Green Mountain Common Allotment. Some of the first actions included water developments, riparian pastures, and herding to improve distribution throughout the use areas and pastures. A cost summary of the completed rangeland improvements through December 2007 is located in Appendix 1.

An AMP was to be prepared in consultation with the permittees and other interested publics following implementation of the final decision. An AMP contains the necessary guidelines for the management of livestock grazing on public lands to meet resource condition, sustained yield, multiple use, economic, and other objectives (See Appendix 2). However, the AMP was never completed due to grazing management changes implemented by BLM in response to persistent drought conditions which began in October 1999 and has lasted through 2007.

In 2002, a comprehensive rangeland health assessment and evaluation report was completed to determine whether public lands within the Green Mountain Common Allotment were meeting the standards for rangeland health. The evaluation concluded that rangeland health standards were not being met. In particular, riparian health was determined to be the highest priority goal and the biggest rangeland health issue on the allotment.

In 2005, the BLM renewed two GMCA permits under the authority provided under Public Law 108-108 (appropriation rider). Appeals to the Interior Board of Land Appeals were filed protesting the renewal of permits without an environmental assessment (EA). This EA has been prepared as part of a stipulated settlement of those appeals and is designed to identify, develop and describe vital information and data that will be utilized to assist the interdisciplinary team and the decision-maker in making a decision that is "based on understanding of environmental consequences, and take actions that protect, restore and enhance the environment." CEQ 1500.1(c).

This EA is also being prepared to analyze the impacts within the GMCA associated with re-issuing 19 grazing

permits for a new, 10-year period. This analysis will identify the appropriate terms and conditions that should be included in the grazing permits as part of this authorization.

CONFORMANCE WITH THE LAND USE PLAN

The management actions in the alternatives that are analyzed in detail are in conformance with the 1987 Lander Resource Management Plan (RMP) and Record of Decision, with a few exceptions. For instance, the proposed Granite Creek – Rocks Pasture Fence in the Proposed Action would cross the Seminoe Cutoff of the Oregon National Historic Trail in two highly pristine locations. This action would be contrary to decisions made in the Lander RMP (see Appendix 3 for more details). In the event that a non-conforming action is selected for implementation in the decision record, appropriate mitigation measures, such as fence relocation, would be applied. Appropriate mitigation measures to bring actions into conformance with the RMP decisions have been described and analyzed in this EA.

The Lander RMP states, "Management decisions affecting grazing use will be made when monitoring data are sufficient to support those decisions and may include changing livestock numbers, periods of use, or a combination of both." The alternatives being analyzed in detail in this document are in conformance with the Standards for Healthy Rangelands and Guidelines for Grazing Management for Wyoming (1997).

PUBLIC PARTICIPATION AND CONSULTATION

The BLM decision-making process is conducted in accordance with the requirements of the Council on Environmental Quality (CEQ) regulations implementing the National Environmental Policy Act (NEPA), and the United States Department of Interior (USDI) and BLM policies and procedures implementing NEPA. NEPA and the associated regulatory and policy framework require federal agencies to involve the interested public in their decision-making.

This EA has been developed in consultation and coordination with the allotment’s grazing permittees, state and local agency personnel, other affected parties, and interested members of the public-at-large. Table 1-1 below provides a summary of several key meetings regarding public participation and consultation in the development of this EA. A more detailed summary and chronology of public participation and consultation is located in Chapter 5 of this document.

Table 1-1. Public Involvement, Coordination, and Consultation for the GMCA EA

Date	Location	Type of Meeting
December 13, 2007	Lander, Wyoming	Open House/Public Scoping
October 3, 2007	Lander, Wyoming	Scoping Letter to USF&WL
April 18, 2007	Lander, Wyoming	Open House/Public Scoping
November 8, 2006	Lander, Wyoming	Permittee Meeting (Update/Scoping)
November 9, 2006	Jeffrey City, Wyoming	Permittee Meeting (Update/Scoping)
April 13, 2006	Lander, Wyoming	Open House

Chapter 2

Proposed Action and Alternatives

PROPOSED ACTION AND ALTERNATIVES

INTRODUCTION & ALTERNATIVE FORMULATION

This Environmental Assessment (EA) evaluates four resource management alternatives identified by the numbers One, Two, Three and Four. The No Action (Alternative One) represents the continuation of current management direction. The BLM developed Alternatives Two, Three and Four (action alternatives) through consultation, coordination and public meetings. The alternatives were developed to resolve resource issues and provide for the management of livestock grazing, consistent with BLM policy and applicable laws and regulations.

Reasonable Foreseeable Development and Reasonable Foreseeable Action Scenarios

At the present time, the potential for extensive energy development is being explored in the eastern half of the GMCA. This includes evaluation of conventional oil and natural gas, coal bed natural gas, uranium, and wind energy. Although no plan of development has been submitted to the BLM's Lander Field Office for full production of these resources, there currently are:

- Thirty approved permits to drill for conventional oil or natural gas.
- Twenty permits to drill likely to be approved soon for a coal bed natural gas pilot project.
- Several thousand acres of uranium mining claims being evaluated for possible mining (both *in situ* and open pit).
- Applications pending for wind energy evaluation in at least two areas.
- Five additional proposed oil wells in an existing field.

ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

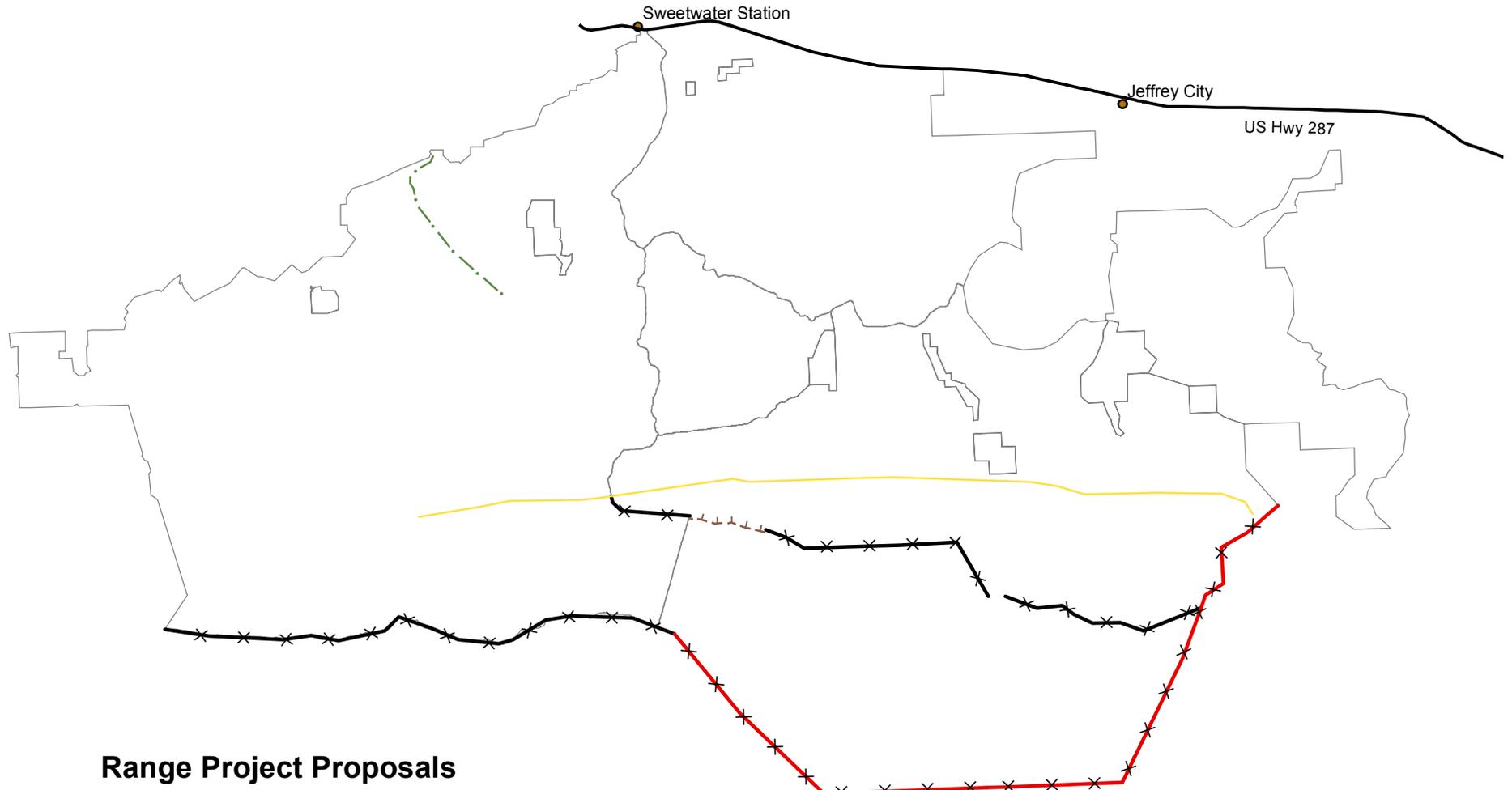
Alternatives and proposals described in this section were considered but not carried forward for a full, detailed analysis because (1) they did not fulfill requirements of the Federal Land Policy and Management Act (43 United States Code [USC] 1701 et seq.) (FLPMA) or other existing laws and regulations; (2) they did not meet the purpose and need as described in Chapter 1; (3) they were already part of an existing plan, policy, or administrative function; (4) they did not fall within the limits of the planning criteria; (5) they contain components that are part of alternatives that were carried forward; or (6) they were not technically or economically feasible or presented unacceptable impacts to other resource values.

The following is a brief description of these alternatives or proposals and the rationale for why they were not carried forward for detailed analysis (see Map 2-1):

Two Allotments (North-South): Hot-season grazing would be prohibited on sensitive areas. Let-down fencing would be used to separate the southern portion of the GMCA (having fewer sensitive riparian areas) from the northern portion, and graze the southern portion in the summer months

The intent of this alternative was to rest the northern half of the allotment during the hot season in order to benefit the majority of sensitive riparian areas. However, it was determined that water sources in the southern part of the GMCA were inadequate to support all the livestock at the same time. In addition, this approach would require the construction of a lengthy east to west fence that would interfere with the migration and movement of big game and wild horses as well as unnecessarily impact sage-grouse nesting and early brood rearing habitat. Three of the alternatives analyzed in detail would provide for additional water sources in the southern portion of the allotment; however, those water sources would only be developed over time, requiring a long phase-in of this alternative.

Map 2-1: Proposed Projects Considered but Not Analyzed



Range Project Proposals

- Proposed pipeline
- · - Proposed powerline
- × — Proposed permanent fences
- × — Conversion of let-down to permanent fence
- T - - Unfenced rim



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Two Allotments (East-West): Divide the GMCA into two allotments, east to west, down the Bison Basin Road. Use a one-herd, modified rest-rotation, grazing system in each allotment. Use low-stress herding and limited fencing to control livestock. Move herds by utilization of stubble height “triggers” in key areas.

The grazing components of this alternative are incorporated into Alternatives 3 and 4. The use of stubble height “triggers” is part of both Alternatives 3 and 4. A one-herd rest-rotation grazing system and low stress herding is part of Alternative Four. In certain ways, the grazing systems presently used by permittees in the western half of the allotment resemble this proposal. Creating two separate allotments was considered to be more of a management arrangement with no different environmental consequences than those alternatives analyzed in detail.

Prohibit hot-season grazing and reduce seasons of use (eliminate June 15 to September 15 grazing): Under this alternative, livestock would graze in the spring and fall and be removed from the allotment in the summer.

This alternative would present an economic hardship in that the costs of transportation and management would increase. It would be difficult for permittees to find summer grazing areas for their livestock since summer grazing pastures are limited in Fremont County. These impacts would adversely affect the stability of the local grazing industry and would be in conflict with the Taylor Grazing Act.

Change the class of livestock: from cow/calf to yearlings.

The rationale for this alternative was that yearlings would be easier to distribute and make more effective use of the allotment’s forage and be less inclined to linger in riparian areas (BLM Technical Reference, TR137-14, 1997). Permittees already have this option and, in fact, incorporate a certain percentage of yearlings into their cow/calf operations. However, if required by the BLM, this alternative would result in less flexibility for permittees in cattle purchasing decisions. This would create adverse economic impacts to GMCA permittees by potentially undermining the equity value of their cattle operations. Under certain market conditions, ranches could be affected to a greater degree by market timing and price fluctuations. Because yearlings are not always available for purchase when needed, such operations tend to be economically less stable than cow/calf operations. These impacts would adversely affect the stability of the local grazing industry and would be in conflict with the Taylor Grazing Act.

Water Pipeline Proposal: Construct a 30 mile-long, east to west, pipeline to carry water for livestock from an existing well on the east edge of the GMCA.

As originally proposed, this pipeline would have been installed parallel to a new 30-mile long fence with spur pipelines extending at regular intervals on either side to supply watering troughs. A review of wildlife habitat data and onsite inspections revealed that the combined water developments and fence would have impacted sage-grouse breeding and nesting/early brood rearing habitat by concentrating livestock in important habitat and by providing perches for raptors that would prey upon the sage-grouse. Moreover, the fence would act as a barrier to big game and wild horse movement and the water developments would tend to draw wild horses away from their customary herd management areas. It is also not known whether adequate forage exists along the pipeline route to support the additional livestock, wildlife, and wild horse use that would occur.

In addition, onsite review and consultation with the Wyoming Department of Agriculture (WDA), the Natural Resource Conservation Service (NRCS), and the Popo Agie Conservation District (PACD) indicated that because of topography, the project would require large diameter, high pressure pipe and several pumping stations to carry water the intended distance. The necessary pumping stations would entail installation of utility systems to provide electricity. This would result in a total anticipated cost of one to two million dollars. By comparison, the total cost of all the projects developed on the GMCA from 1998 through 2007 was about \$652,000. Therefore, the project is considered by the BLM to be prohibitively expensive and incompatible with meeting other resource objectives.

Overhead Power Line: Construct an eight mile-long overhead power line to provide electricity to two existing wells in the Alkali Creek Pasture.

This proposal would cross the National Historic Trail Corridor (Seminoe Cutoff). The power line would have a direct adverse effect on the trail (as defined in NHPA and the Wyoming State Protocol) by creating a modern

intrusion in a pristine trail segment. In addition, the proposal would not be in conformance with the Lander Resource Management Plan which requires that important segments of the trails and trail-related sites have special protection and that modern intrusions and disturbances be minimized or prohibited within one-quarter mile or the visible horizon of selected trail segments.

***Pasture Division Fence:** Construct an east/west fence to separate the Lost Creek and Eagles Nest Pastures, on the south, from the East Alkali and Bare ring Butte Pastures on the north.*

This proposal was determined to present a barrier to migrating big game and wild horses because the east/west orientation of the fence would bisect the north/south movements of the animals. Alternative Two includes a north/south fence proposal that would manage the livestock better by reducing the amount of herding and also minimize the barriers to big game and wild horse movements.

***Boundary Fence Modification:** Modify the boundary fence between the Lander and Rawlins Field Offices by converting the existing “let-down” fence to a permanent fence and extend this permanent fence along the currently unfenced Cyclone Rim.*

An agreement between the BLM and the Wyoming Game and Fish Department requires a “let-down” fence and an unfenced segment of the southern boundary of the GMCA to facilitate migration of big game, primarily antelope. The proposal would violate this agreement and also present a barrier to migration of antelope and interfere with the movement of wild horses in and out of the allotment.

ALTERNATIVES ANALYZED IN DETAIL

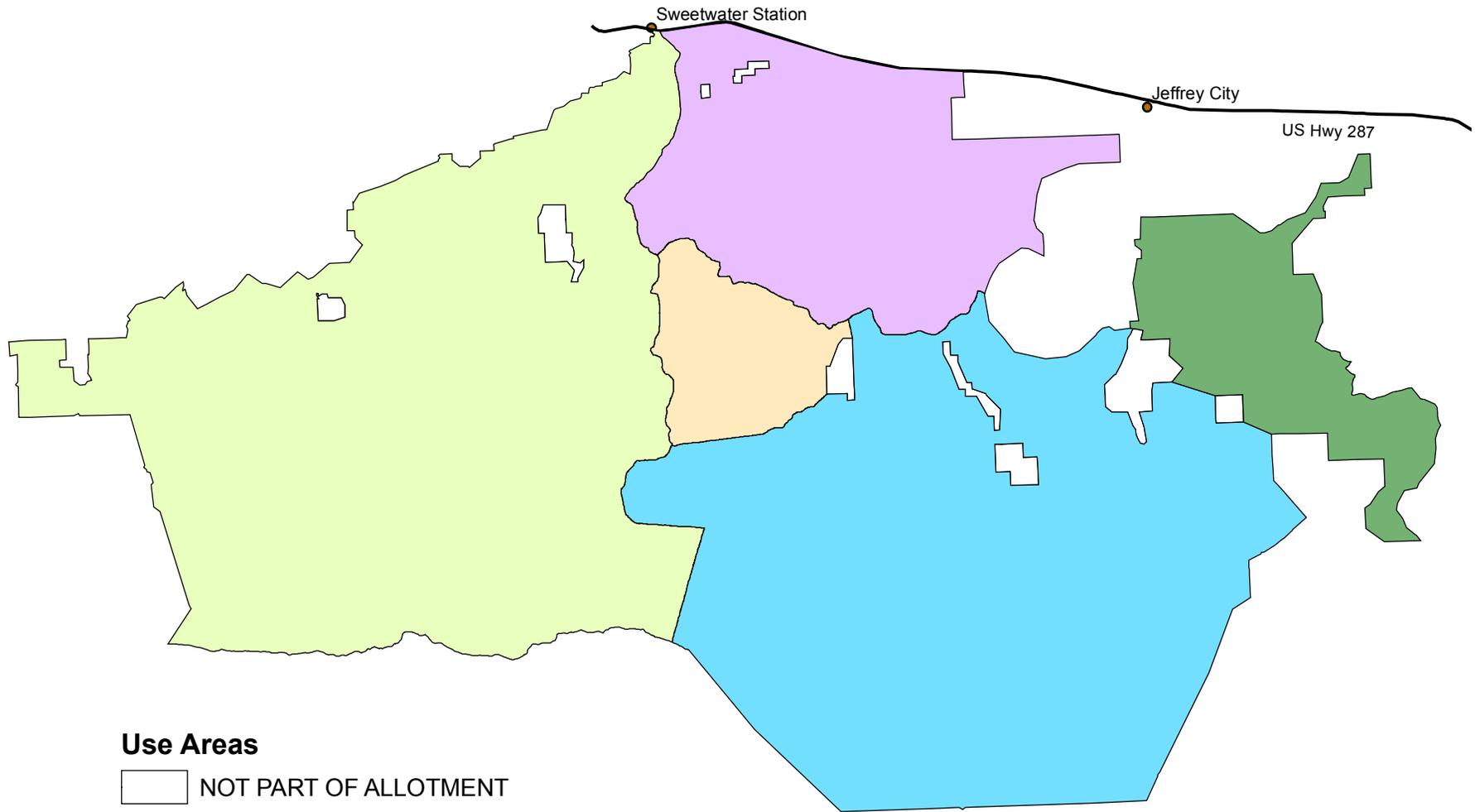
This section summarizes the four alternatives analyzed in detail. A description of the alternatives considered requires a narrative to describe what decisions each alternative will establish. Following the alternative narratives, a summary of management actions is displayed in a table designed to give the reader a better understanding of the alternatives when compared against each other.

ALTERNATIVE ONE (No Action Alternative)

Alternative One represents the “no action” alternative which would result in a continuation of the present management as proposed in Environmental Assessment No. WY050-EA9-039 and adopted with modifications from the alternatives by a decision of the Lander Field Office Manager on July 12, 1999 (see Map 2-2). Alternative One continues the existing plan of adjustments to the timing, duration, and livestock use levels of each pasture or use area based on periodic monitoring of allotment conditions. It remains to be determined whether or not changes in livestock use levels are needed under this livestock management prescription for the GMCA. The long term evaluation is scheduled to be conducted during the winter of 2009-2010. Long term changes in grazing management would be made in accordance with the findings and recommendations of this evaluation. It is known that livestock herding, the upland water developments and deferred-rotation grazing, if implemented properly, would make more efficient use of the forage supply in the allotment. BLM would continue to rely on the monitoring and scheduled evaluations to determine whether or not the long term permitted use levels are appropriate to meet the allotment goals as well as the Wyoming Standards for Healthy Rangelands. Under Alternative One, the following provisions (as established by the 1999 decision) would be incorporated into the Green Mountain Common Allotment Management Plan (AMP) (See Appendix 2):

1. Use Levels – Table 2-1 below describes the initial, interim and long term periods for livestock use levels, a period of time ranging from 2008-2027. These use levels are projected for analysis under Alternative One.

Map 2.2: Use Areas Alternative 1



Use Areas

-  NOT PART OF ALLOTMENT
-  ALKALI CREEK SHEEP
-  ANTELOPE HILLS/PICKET LAKE
-  ARAPAHOE
-  GREEN MOUNTAIN
-  HAPPY SPRINGS



0 2 4 8 Miles

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Table 2-1. Livestock Use Levels Based on Initial, Interim and Long-term Periods

Period	Use Levels	Percent of Permitted Use
Initial (2008 - 2012)	13,030 cattle AUMs 4,350 sheep AUMs	37 %
Interim (2013 – 2017)	14,280 cattle AUMs 4,800 sheep AUMs	40%
Long Term (2018 – 2027)	17,880 cattle AUMs 6,000 sheep AUMs	50%

Permitted AUMs – Table 2-2 below represents the amount of forage permitted by kind of livestock or ungulate species until the scheduled evaluation(s) are completed. Higher levels of AUMs could be authorized during each period (Initial, Interim and Long-Term) as listed in Table 2-2 below, however because of several factors, including dry conditions, lack of adequate livestock drinking water and low forage production, it is anticipated that annual use levels would normally be less than permitted AUMs (i.e. less than full numbers). Under this alternative, permitted use would remain the same; there would be no permanent reduction in AUM levels.

Table 2-2. Permitted Livestock and Ungulate Use Levels (AUMs)

Livestock or Wildlife Species	Animal Unit Months Allocated*
Cattle	35,910 (5,985 head X 6 mo.)
Sheep	11,451 (4,770 head X 12 mo.)
Wild horses (upper AML)	3,550
Antelope	2,050
Mule Deer	2,960
Elk	2,270
Moose	130

*Animal Unit Month – Defined as that amount of forage required to support a cow-calf or five sheep for one (1) month. The total AUMs for livestock grazing (cattle and sheep) under Alternative One is 47,361.

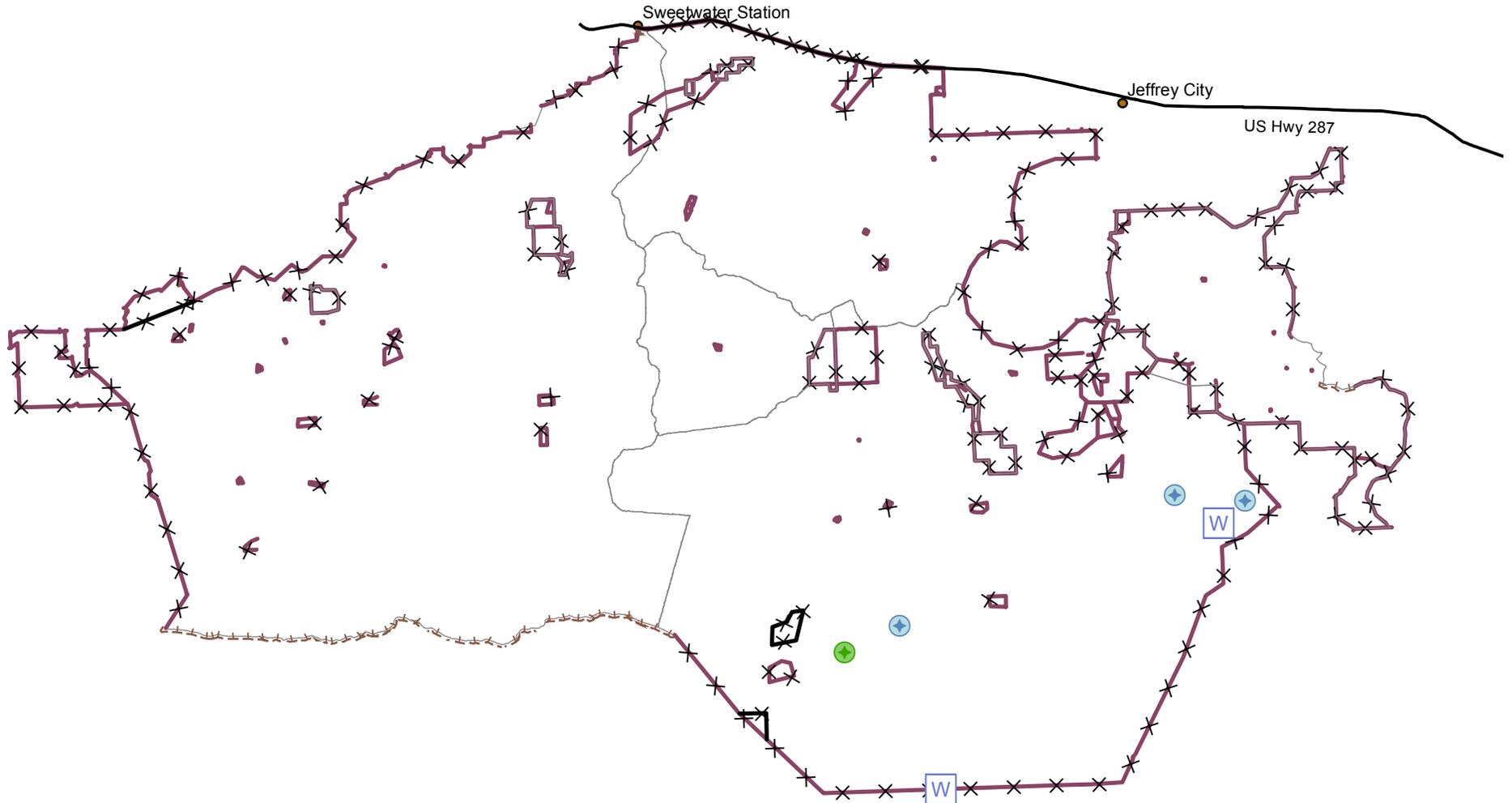
2. Livestock Season of Use – Under Alternative One, cattle could be placed on the allotment as early as May 1 or as late as May 15 (depending on range readiness conditions) and would be removed from the allotment 185 days later (November 1 to November 15). Sheep use would be year-long or 365 days.

*Use levels and season of use would apply only under normal conditions and would not preclude adjustment for unexpected occurrences that would affect forage availability such as drought, wildfire, insect outbreak, etc.

3. Range Improvements – As part of the 1999 Decision, a schedule of proposed range improvements and water developments was adopted to help balance the needs of grazing permittees and sustainable rangeland health. These improvements initially included 48 miles of fencing to protect riparian and other sensitive areas and development of 68 springs, pipelines, wells, and reservoirs to provide water for both livestock and wildlife. Of these improvements, 9 miles of riparian fencing, 3 cattle guards, and 18 water developments are yet to be constructed (see Map 2-3). It is recognized that there will not be sufficient range improvement funds to provide for the construction of these projects and that cost-sharing between BLM and the permittees will be necessary. BLM will strive for 50% cost share with the permittees. Alternative One would continue with the provision of these improvements as funding allowed.

4. Use Areas / Pastures – The 1999 Decision provides for the Green Mountain Common Allotment to be managed as one allotment, divided into five use areas (four for cattle and one for sheep), and further sub-divided into 16 pastures as described in Table 2-3 below (see Map 2-4).

Map 2-3: Range Project Proposals Alternative 1



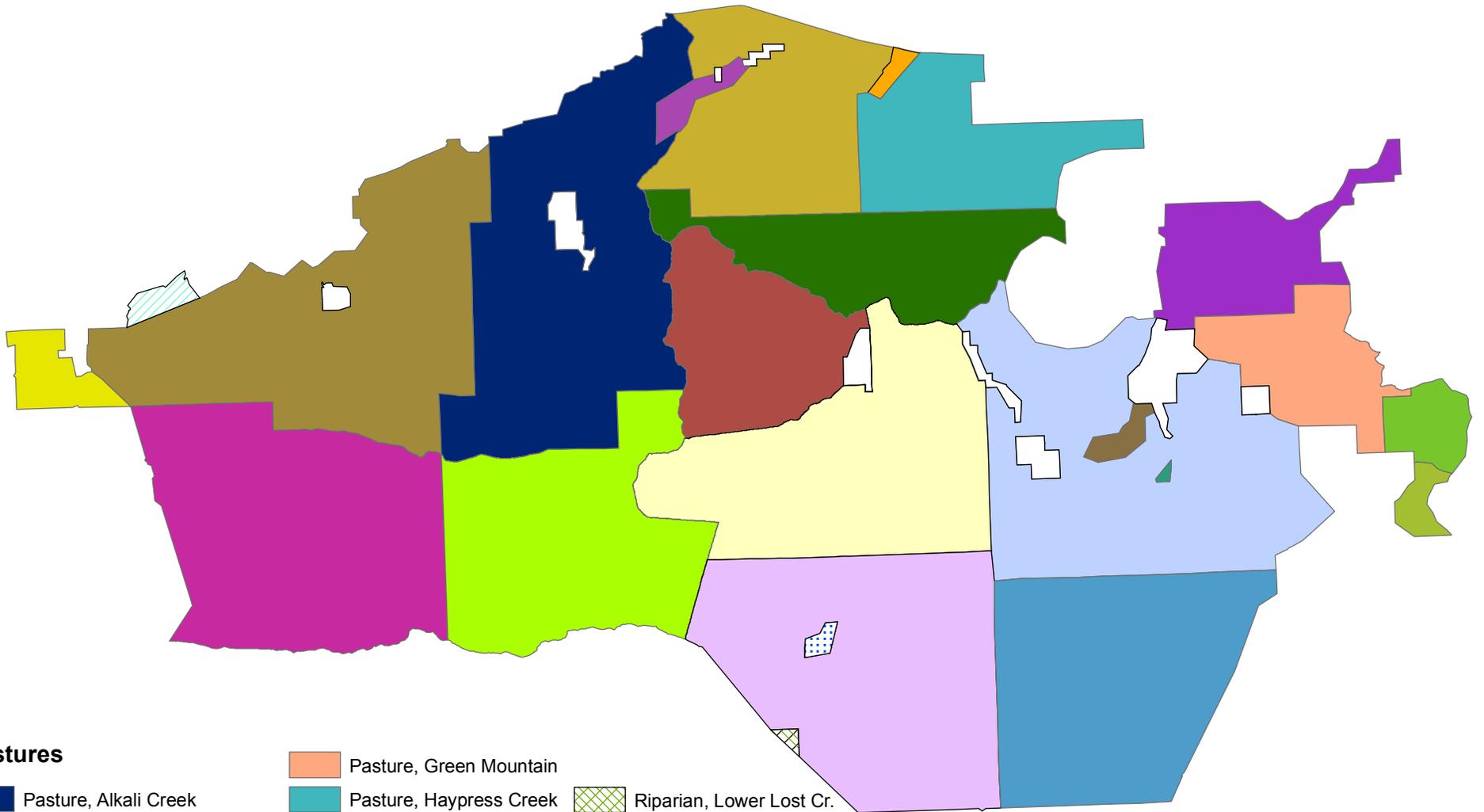
Range Project Proposals

- | | | | |
|---|------------------------|---|--|
|  | Develop Existing Well |  | Proposed New Fences |
|  | Re-drill Existing Well |  | Existing Fence |
|  | Re-construct Reservoir |  | Cyclone Rim (un-fenced) |
| | | | 12 new springs with locations to be determined |



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Map 2-4: Pastures Alternative 1



Pastures

- | | | | |
|--|---|---|-------------------------|
|  | Pasture, Alkali Creek |  | Pasture, Green Mountain |
|  | Pasture, Alkali Creek Sheep |  | Pasture, Haypress Creek |
|  | Pasture, Bare Ring Butte |  | Pasture, Lost Creek |
|  | Pasture, Crooks Mountain |  | Pasture, Picket Lake |
|  | Pasture, Daley Lake |  | Pasture, Sheep Creek |
|  | Pasture, Eagles Nest Draw |  | Pasture, Stratton Rim |
|  | Pasture, East Alkali Creek |  | Pasture, Warm Springs |
|  | Pasture, Granite Creek/Rocks |  | Pasture, Willow Creek |
| |  | | Not Part of Allotment |

- | | |
|---|---------------------------------------|
|  | Riparian, Lower Lost Cr. |
|  | Riparian, Upper Lost Cr. |
|  | Riparian, Sweetwater River/Wilson Bar |
|  | Riparian, Bare Ring Slough |
|  | Riparian, Ice Slough |
|  | Riparian, Long Slough |
|  | Riparian, Warm Springs |
|  | Riparian, West Fork Crooks Creek |



0 2 4 8 Miles

NO WARRANTY IS MADE BY THE BLM FOR USE OF THE DATA FOR PURPOSES NOT INTENDED BY BLM.

Table 2-3. Livestock Use Areas and Pastures Names under Alternative One

Use Area	Pastures
Alkali Creek (Sheep)	Alkali Creek Sheep (one pasture)
Antelope Hills / Picket Lake	Alkali Creek, Granite Creek-Rocks, Daley Lake, Picket Lake
Arapahoe	Bare Ring Butte, East Alkali Creek, Eagles Nest Draw, Lost Creek
Green Mountain	Sheep Creek, Green Mountain, Willow Creek, Stratton Rim
Happy Springs	Haypress Creek, Warm Springs, Crooks Mountain

Under Alternative One, these use areas and pastures would remain as described.

5. Grazing Systems and Treatments – Under the provisions of the 1999 Decision, the grazing systems (See Appendix 4) and treatments (See Appendix 5) to be implemented under Alternative One are summarized in Table 2-4.

Table 2-4. Grazing Systems and Treatments - Alternative One

Use Area	Grazing System	Treatments
Alkali Creek (Sheep)	Spring and fall / winter continuous seasonal grazing.	G
Antelope Hills / Picket Lake	Four-pasture deferred rotation grazing.	M
Arapahoe	Four-pasture deferred rotation grazing.	N
Green Mountain	Four-pasture deferred rotation grazing.	N
Happy Springs	Three-pasture deferred rotation grazing.	N

Treatment G – Rest summer-long (June 16 through September 15).

Treatment M – Graze key riparian sites at a proper use level of 50 percent on meadow riparian areas early in the summer to allow for re-growth. Graze at 30 – 40 percent if season will run to September 1. Maintain a stubble height of four inches or more on key riparian sites after planned grazing use.

Treatment N - Graze key riparian sites at a proper use level of 50 percent on meadow riparian areas early in the summer to allow for re-growth. Graze at 30 – 40 percent if season will run to September 1 - 15. Maintain a stubble height of three to four inches on key riparian sites after planned grazing use.

Adjustments to the timing, duration, and use levels of each pasture or use area would be based on periodic evaluations of allotment conditions.

6. Salt and Mineral Placement – Under Alternative One, salt and mineral supplements would be located at least 0.5 mile from water sources to promote better livestock distribution and discourage livestock from concentrating near water sources.

7. Herding of Livestock – Herding of both cattle and sheep is an essential part of the management prescriptions outlined in the 1999 Decision. Under Alternative One, herding would be required to move livestock to and from each pasture and to keep them properly distributed, preventing them from concentrating in riparian areas during the hot part of the grazing season.

In accordance with the 1999 Decision, grazing permittees will be required to meet the four inch (or more) stubble height objective for key riparian areas within each pasture during the prescribed grazing period. When it is determined that cattle must change pastures in order to meet the stubble height objective, permittees will have (3) days to vacate the currently used pasture. It is expected that the permittees will use herding as a means to achieve the stubble height objectives.

8. Flexibility – Flexibility in yearly grazing operations would be addressed through the development of an annual operating plan. This plan would adjust authorized use, pasture rotations, turnout dates/pastures, and gathering dates/pastures based on range readiness, range conditions, and permittee needs. These constraints would be discussed with the permittees at an annual pre-turnout meeting in mid-April of each year and a written plan would be issued prior to the grazing season.

9. Riparian Management Pastures – The 1999 Decision provided for the establishment of seven riparian management pastures to allow for rest and recovery of key riparian areas. These pastures would vary in amount of rest, season of use, and duration of use as described in Table 2-5 (see Map 2-4).

Table 2-5. Riparian Pasture Name and Prescribed Use Under Alternative One

Riparian Pasture	Prescribed Use	Status
West Fork of Crooks Creek	Spring or fall grazing (but not both) not to exceed 15-30 days.	Completed
Ice Slough	Spring or fall grazing (but not both) not to exceed 15-30 days.	Completed
Warm Springs	Spring or fall grazing (but not both) not to exceed 15-30 days.	Completed
Long Slough	Spring grazing of up to 30 days.	Completed
Sweetwater River (Wilson Bar Area)	1 year initial rest followed by spring grazing of up to 30 days.	Not Completed
Crooks Creek-Bare Ring Slough	2 years rest remaining followed by spring or fall grazing (but not both) not to exceed 15-30 days.	Completed
Lost Creek	10 years initial rest followed by spring or fall grazing (but not both) not to exceed 15-30 days.	Not Completed

Alternative One would continue the construction of these riparian management pastures as funding allowed.

10. Predator Control – Predator control by grazing permittees would be limited as follows:

The permittee/lessee and/or his/her employees would not use or place poison or M-44 devices for prairie dog or predator control on BLM-administered public lands. Predator, prairie dog or trophy animal predation control actions would be carried out by the Animal and Plant Health and Inspection Service (APHIS), Wildlife Services (WS), or the Wyoming Game and Fish Department, or whoever has the responsibility for the offending species. If predation problems and conflicts with prairie dogs arise, the permittee/lessee would immediately notify the BLM Lander Field Office and the appropriate agency.

11. Vegetation and Land Treatments – The 1999 Decision allows for the planning and implementation of land treatments to modify the existing plant community and control undesirable plant species. These treatments could include the use of prescribed burning, mechanical treatments, herbicide treatments, or other acceptable methods and would be planned and coordinated with other federal and state agencies and private landowners to the greatest practical extent.

In the case of each treatment, the method to be used would be dependent upon such factors as environmental impacts, effectiveness, safety, cost-effectiveness, practicality, etc. and would be evaluated for compliance with the Final EIS – Vegetation Treatment on BLM Lands in Thirteen Western States, 1991, and the Northwest Area Noxious Weed Control Program Final EIS, 1985.

12. Allotment Monitoring and Evaluation – The 1999 Decision provides for a cooperative monitoring effort with

the active participation of the interested publics being encouraged, or required as a grazing permit condition (e.g., actual use reports) to accomplish the measurement and assessment of such factors as range condition and trend, vegetation attributes, forage utilization, grazing impacts, precipitation, water quality, soil quality, and actual use. The information gathered from monitoring these parameters would be used to determine forage production and utilization levels and evaluate the effects of grazing on vegetation, water quality, and soils. This would aid range managers in deciding whether adjustments in stocking levels, season and duration of use, and other management considerations should be made. This comprehensive monitoring and evaluation program would be conducted in accordance with BLM standard operating procedures.

Routine allotment monitoring, Rangeland Health and PFC assessments are evaluated to supply WDEQ with data for suspect water bodies for inclusion in its monitoring schedule to assess water quality and beneficial uses.

13. Drought Planning – Under Alternative One, Wyoming BLM would implement a drought policy that addresses drought conditions on a case-by-case basis. BLM would meet with grazing permittees or groups of permittees as necessary prior to livestock turn-out to listen to proposed grazing plans. The BLM would review range conditions with permittees on the ground, as necessary. During emergency conditions related to drought, insect infestations, or wildfire, the BLM would close pastures or the allotment to livestock grazing.

ALTERNATIVE TWO (Proposed Action)

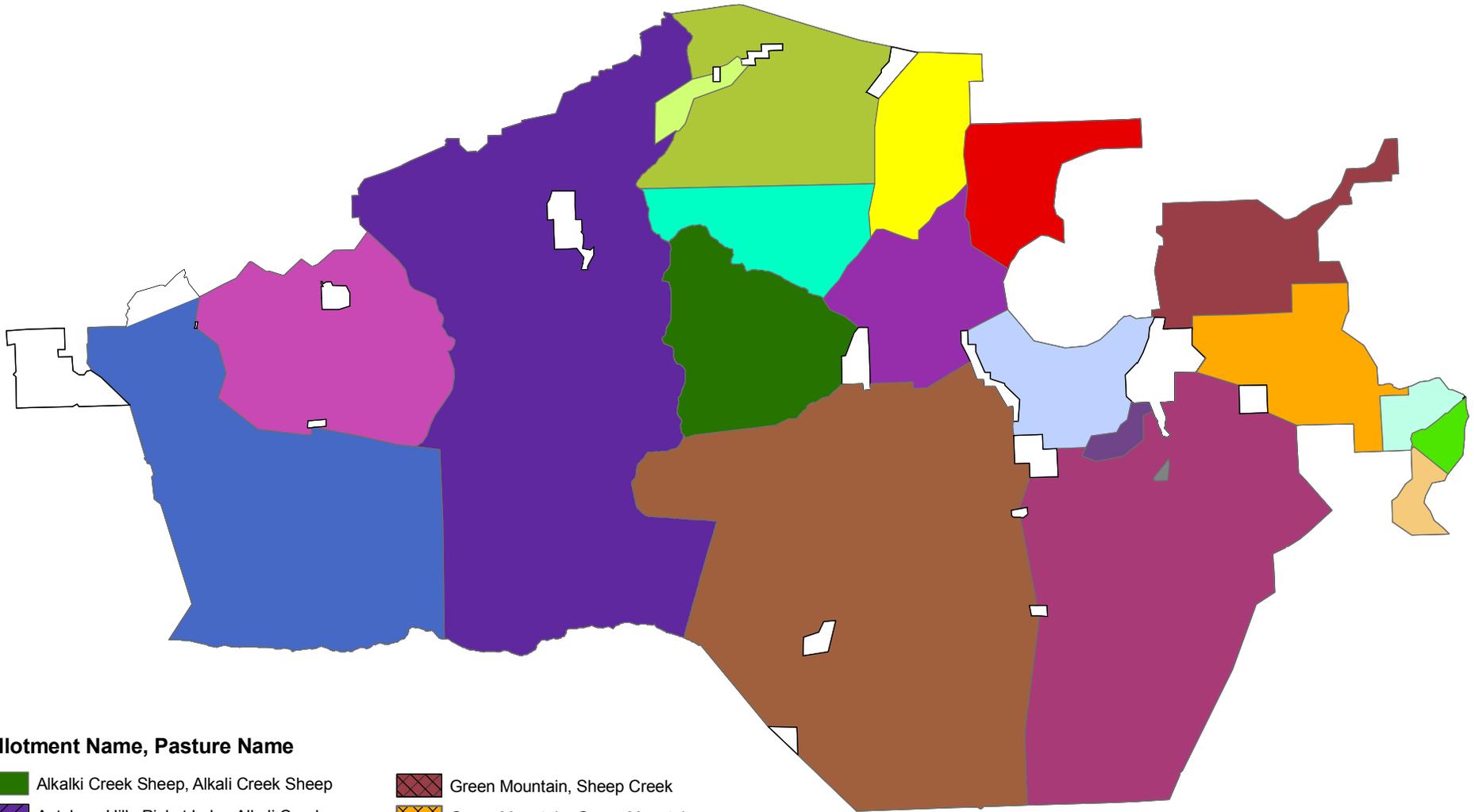
Under this alternative, the Green Mountain Common Allotment would be divided into six smaller grazing allotments (see Map 2-5). A comprehensive water plan would be developed for range management on the allotment, with no long term changes in the grazing season or the permitted livestock numbers. The GMCA permittees would be encouraged to form a grazing association or a working corporation to facilitate on-the-ground management of the allotment. Other major components of this alternative include implementing a cooperative monitoring plan, increased permittee flexibility, the construction of 94 miles of permanent and 4 miles of temporary electric fencing, and development of 35 springs, pipelines, wells, and reservoirs.

1. Use Levels – Table 2-6 below summarizes the use levels anticipated from 2008 to 2027. They are projected for analysis in the environmental assessment under Alternative Two. Higher levels of AUMs could be authorized during each period (Initial, Interim and Long-Term) as listed in Table 2-6 below, however because of several factors, including dry conditions, lack of adequate livestock drinking water and low forage production, it is anticipated that annual use levels would normally be less than permitted AUMs (i.e. less than full numbers). Under this alternative, permitted use would remain the same; there would be no permanent reduction in AUM levels.

Table 2-6. Use Levels and Period of Use under Alternative Two

Period	Use Levels	Percent of Permitted Use
Initial (2008 - 2012)	13,030 cattle AUMs 4,350 sheep AUMs	37%
Interim (2013 – 2017)	17,890 cattle AUMs 5,970 sheep AUMs	50%
Long Term (2018 – 2027)	26,990 cattle AUMs 9,070 sheep AUMs	76%

Map 2-5: Allotments and Pastures Alternative 2



Allotment Name, Pasture Name

 Alkalki Creek Sheep, Alkali Creek Sheep	 Green Mountain, Sheep Creek
 Antelope Hills-Picket Lake, Alkali Creek	 Green Mountain, Green Mountain
 Antelope Hills-Picket Lake, Granite Creek-Rocks	 Green Mountain, East Willow Creek
 Antelope Hills-Picket Lake, Picket Lake	 Green Mountain, West Willow Creek
 Arapahoe, Lost Creek	 Green Mountain, Stratton Rim
 Arapahoe, Eagles Nest	 Haypress, Haypress
 Arapahoe, Magpie Creek	 Haypress, Cottonwood (Soapholes)
 Happy Springs, Warm Springs	 Haypress, Wood Gulch
 Happy Springs, W. Crooks Mountain	 Not Part of Allotment



0 2 4 8 Miles

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Permitted AUMs – Table 2-7 below summarizes the amount of forage permitted by kind of livestock or ungulate species under Alternative Two until the scheduled evaluation(s) are completed.

Table 2-7. Permitted AUMs for Livestock and Wildlife Species under Alternative Two

Livestock or Wildlife Species	Animal Unit Months Allocated*
Cattle	35,910 (5,985 head X 6 mo.)
Sheep	11,451 (4,770 head X 12 mo.)
Wild horses (upper AML)	3,550
Antelope	2,050
Mule Deer	2,960
Elk	2,270
Moose	130

*Animal Unit Month (AUM) is defined as the amount of forage required to support a cow-calf or five sheep for one (1) month.

Use levels for wild horses under Alternative Two would be strictly maintained within AML as agreed to in the consent decree with the State of Wyoming. Due to the large acreage of riparian habitat within the Granite Creek-Rocks Pasture, and the need to minimize grazing impacts to these areas, wild horse gathers would take precedence over other wild herd management areas within the GMCA.

2. Livestock Season of Use – Under Alternative Two, sheep use would be year-long or 365 days. Cattle could be turned out as early as May 1 or as late as May 15 (depending on forage conditions) and would come home 185 days later (November 1 to November 15). Spring turnout would start no earlier than May 1st and require about two weeks to complete. Similarly, fall roundup will take about two weeks and will be completed by the off date.

3. Range Improvements – Under this alternative, range improvement construction planned under the 1999 Decision would continue. A permanent barbed wire fence between the current Picket and Daley Lake pastures would be constructed to develop the Granite Creek-Rocks Pasture boundary. This fence is being proposed to provide for improved riparian management in the Granite Creek-Rocks Pasture and to keep cattle out once they have been moved off this pasture. Wild horse numbers and utilization would also be carefully monitored in this area.

This proposal includes the construction of 98 miles of new fence (see Map 2-6). Of the 98 miles of new construction, 71 miles of new, permanent barbed wire fence (including two miles of lay-down); 23 miles of permanent electric fence and 4 miles of temporary electric fence would be constructed. Table 2-8 summarizes the total number of miles of new fence (temporary and permanent) fence construction under Alternative Two.

Table 2-8. Miles of New Fence Construction under Alternative Two

Permanent Fence (barbed wire)	Lay-down Permanent Fence	Permanent Electric Fence	Temporary Electric Fence	Proposed Total Miles of New Fence
69 Miles	2 Miles	23 Miles	4 Miles	98 Miles

With increased emphasis on reducing grazing impacts to riparian areas, the construction of water developments to improve grazing distribution is proposed for wildlife, wild horses and livestock. It is estimated that nearly 400 water developments are required to provide water within a two mile radius of each other on the Green Mountain Common Allotment. Academic range references and technical guides from the Natural Resource Conservation Service (NRCS) recommend water be developed within a one mile radius to provide adequate water for livestock and wildlife. Under this proposal, a comprehensive water development plan would be developed through a partnership with permittees, the BLM and the State of Wyoming Water Development Commission.

Under this alternative, numerous additional water developments would be constructed. Specifically, this alternative

proposes to drill and equip ten new water wells and re-drill and upgrade six existing wells (see Map 2-6). Six new pipelines totaling approximately 22 miles in length would also be constructed within the proposed Haypress, Green Mountain and Arapahoe Allotments. In addition, five new spring developments, one new reservoir, and one reservoir reconstruction.

All proposed water developments would be reviewed for cultural and special status species concerns and would be analyzed in a separate NEPA document to determine appropriate location and feasibility. BLM would strive for 50% permittee cost share, with assistance (if available) from various State agencies or other funding entities. Economic analysis of the initial cost for these projects will be part of the comprehensive water development plan. In accordance with BLM policy, cost share cooperative agreements would also be developed. Maintenance would be outlined in the cooperative agreement and would be assigned to the primary beneficiary.

4. Use Areas / Pastures – Alternative Two provides for the Green Mountain Common Allotment to be divided into six different grazing allotments as described in the table below. The names for each of the use areas would also be the new allotment names (see Map 2-5). Additional temporary fence and herding as described in sections three and seven would also be used.

Table 2-9. Allotment and Pasture Names under Alternative Two

Allotment Name (New)	Pasture Names
Alkali Creek Sheep	Alkali Creek Sheep
Antelope Hills-Picket Lake	Alkali Creek, Granite Creek-Rocks, Picket Lake
Arapahoe	Lost Creek, Eagles Nest, Magpie Creek
Green Mountain	Sheep Creek, Green Mountain, East Willow Creek, West Willow Creek, Stratton Rim
Happy Springs	Warm Springs, West Crooks Mountain
Haypress	Haypress, Cottonwood (Soapholes), Wood Gulch

5. Grazing Systems and Treatments –The grazing systems and treatments applied to the allotments described above are summarized under Table 2-10 below. Definitions for the various grazing treatments (See Appendix 5) are described immediately following Table 2-10.

Table 2-10. Grazing System and Treatments under Alternative Two

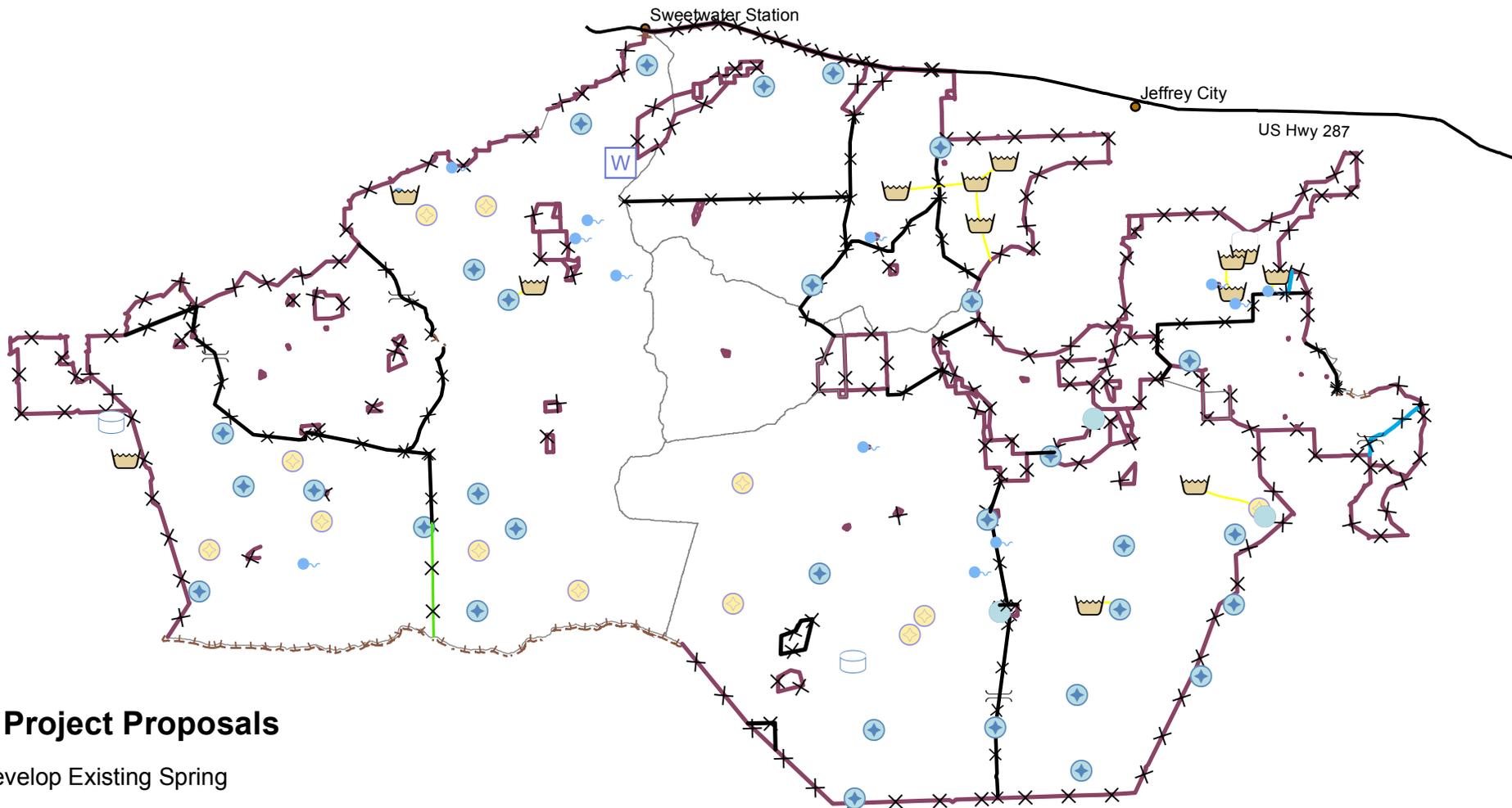
Allotments	Grazing System	Treatments
Alkali Creek Sheep	Spring and fall / winter continuous-seasonal	G
Antelope Hills-Picket Lake	Three pasture deferred-rotational	M
Arapahoe	Three pasture modified deferred-rotation	G-N
Green Mountain	Five pasture deferred-rotational	N
Happy Springs	Continuous-seasonal	N
Haypress	Three pasture rest-rotational	N

Treatment G – Rest summer-long (June 16 through September 15).

Treatment M – Graze key riparian sites at a proper use level of 50 percent on meadow riparian areas early in the summer to allow for re-growth. Graze at 30 – 40 percent if season will run to September 1. Maintain a stubble height of four inches or more on key riparian sites after planned grazing use.

Treatment N - Graze key riparian sites at a proper use level of 50 percent on meadow riparian areas early in the

Map 2-6: Range Project Proposals Alternative 2



Range Project Proposals

-  Develop Existing Spring
-  Develop Existing Well
-  Proposed New Cattleguard
-  Proposed temporary fences
-  Proposed Reservoir
-  Proposed New Storage Tank
-  Proposed New Trough
-  Proposed New Well
-  Proposed permanent fences
-  Convert existing to let-down permanent fence
-  Existing fence
-  Cyclone Rim (un-fenced)



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summer to allow for re-growth. Graze at 30 – 40 percent if season will run to September 1 - 15. Maintain a stubble height of three to four inches on key riparian sites after planned grazing use.

The initial grazing season of use would be May 1 to November 15 for all allotments described above. Adjustments to the timing, duration, and levels for each pasture to be grazed, would be based on periodic evaluations of allotment conditions performed by the BLM and permittees and agreed to by the permittees.

Under this alternative, stubble height monitoring would be conducted but would not be used as the sole indicator for livestock moves. Stubble height monitoring, if performed, would be used to indicate priority for green-line monitoring and would not be used as the only move indicator when livestock are in the fall use pastures each year. Pasture moves would be determined primarily by the scheduled dates for each individual pasture as listed in the annual operating plan. Pasture move dates would be coordinated annually between the BLM and grazing permittees.

6. Salt and Mineral Placement – Salt and mineral supplements would be located at least 0.5 mile from water sources to promote better livestock distribution and discourage livestock from concentrating near water sources.

7. Herding of Livestock – Several of the allotments would require moving cattle from one pasture to the next and would require minimal movements of cattle and some herding. Range improvements would be installed to make the herding program more manageable. Pasture moves would be a phased movement of livestock from one pasture to the next occurring over a five to eight day period.

8. Flexibility – Permittees would coordinate with BLM to determine turnout dates each year based on year-specific conditions. The grazing plan would include a number of days of acceptable use for each allotment and pasture. Earlier turn in dates would be evaluated. On and off dates would be flexible based on vegetative conditions. When the allotment was experiencing a “dry season”, the BLM would allow more flexibility to the grazing permittees based on operational needs and site-specific conditions. The grazing permittees would determine numbers of livestock during drought situations to meet long term vegetative objectives. The BLM would be more flexible in accommodating “drift” from one pasture to another when making pasture moves.

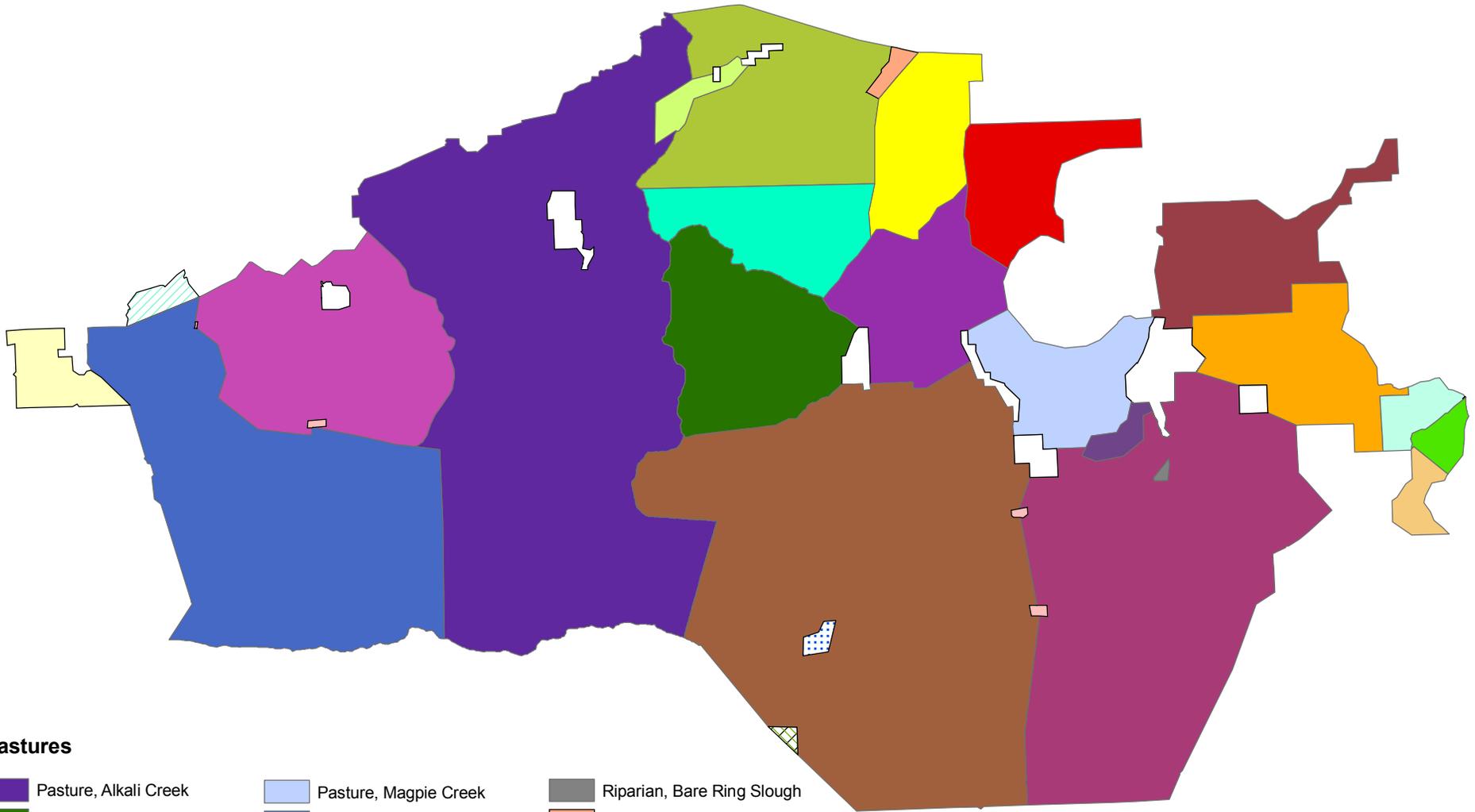
9. Riparian Management Pastures – Alternative Two proposes the development of a “time and timing” grazing system. Riparian pastures agreed to in the 1999 decision would continue to be implemented under this alternative (see Map 2-7). In addition, a permanent barbed wire fence conforming to BLM standards for wildlife movement would be constructed to fence out the Granite Creek-Rocks Pasture (see Map 2-6) to defer grazing use within critical riparian habitat. The Granite Creek-Rocks area contains some of the most abundant riparian habitat areas within the GMCA.

10. Predator Control – Predator control by grazing permittees would be limited as follows: The permittee/lessee and/or his/her employees would not use or place poison or M-44 devices for prairie dog or predator control on BLM-administered public lands. Predator, prairie dog or trophy animal predation control actions would be carried out by the Animal and Plant Health and Inspection Service (APHIS), Wildlife Services (WS), or the Wyoming Game and Fish Department, or whoever has the responsibility for the offending species. If predation problems and conflicts with prairie dogs arise, the permittee/lessee would immediately notify the BLM Lander Field Office and the appropriate agency.

11. Vegetation and Land Treatments – Under Alternative Two, vegetative treatments (fire, chemical or mechanical) would be implemented within the Antelope Hills/Picket Lake Pasture (see Map 2-8) for a total of approximately 4,200 acres. These vegetative treatments would be tied to Desired Future Condition (DFC) as determined by the BLM. The vegetative treatments would be implemented over a period of years to minimize economic impacts to the permittees, who would otherwise be required to rest a larger portion of the allotment. Each treated area will be fenced for a minimum of two growing seasons to provide the opportunity for herbaceous species to germinate and re-establish.

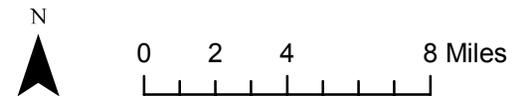
12. Allotment Monitoring and Evaluation – Permittees would develop a comprehensive monitoring plan in cooperation with the BLM for each of the six new grazing allotments. The permittees would establish photo points

Map 2-7: Pastures Alternative 2



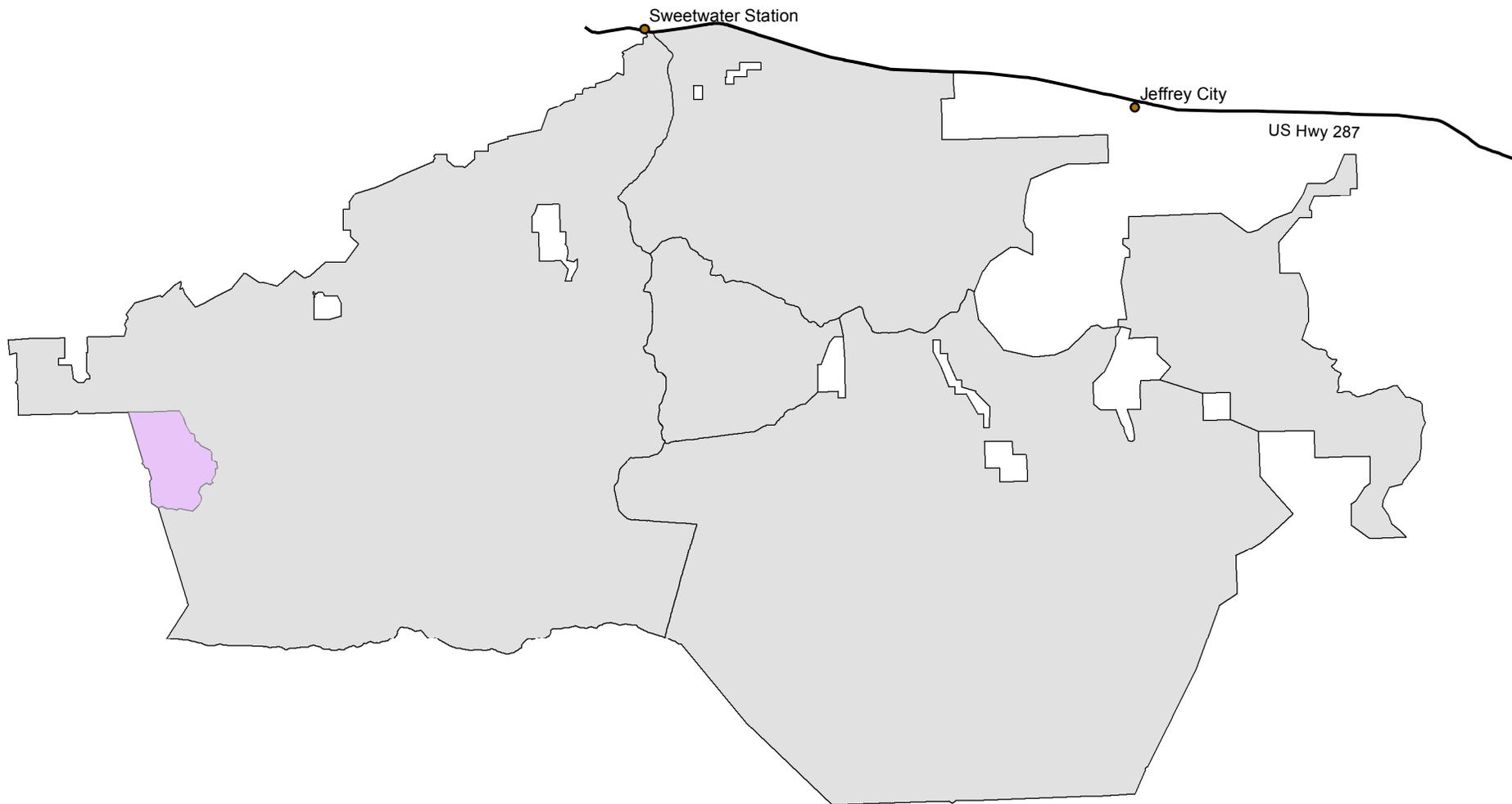
Pastures

 Pasture, Alkali Creek	 Pasture, Magpie Creek	 Riparian, Bare Ring Slough
 Pasture, Alkali Creek Sheep	 Pasture, Picket Lake	 Riparian, Ice Slough
 Pasture, Cottonwood	 Pasture, Granite Creek-Rocks	 Riparian, Long Slough
 Pasture, W. Crooks Mountain	 Pasture, Sheep Creek	 Riparian, Warm Springs
 Pasture, Eagles Nest	 Pasture, Stratton Rim	 Riparian, West Fork Crooks Creek
 Pasture, East Willow Creek	 Pasture, Warm Springs	 Riparian, Sweetwater River/Wilson Bar
 Pasture, Green Mountain	 Pasture, West Willow Cr.	 Riparian, Lower Lost Creek
 Pasture, Haypress	 Pasture, Wood Gulch	 Riparian, Upper Lost Creek
 Pasture, Lost Creek	 Holding Pen or Enclosure	 Not Part of Allotment



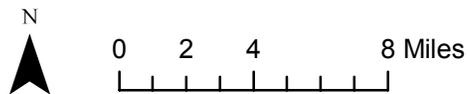
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Map 2-8: Vegetation Treatment Areas Alternative 2



Treatment Area

 Picket Creek - Prescribed burning, chemical or mechanical treatments



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in all grazing areas. Photos will be taken at the beginning and at the end of the grazing season. The permittees would implement this through a joint Permittee/BLM cooperative monitoring program. Clear and concise natural resource goals for monitoring would be established and incorporated into the new allotment management plan.

Monitoring should be conducted to separate out the effects of wildlife, wild horses, livestock and other users of the resource. All monitoring will be planned, conducted, and analyzed jointly with the GMCA permittees and BLM. Water quality monitoring should be conducted according to the following hierarchy:

- Impaired Streams (303(d) List)
- Streams on the WDEQ Monitoring List (suspected impairment)
- PFC Inventory streams indicating possible impairment
- Perennial streams

Selected creeks should be sampled for water quality where the creek enters and exits each of the new allotments. Water quality monitoring will measure the effects of livestock grazing within each new allotment. Suggested parameters include: dissolved oxygen, ambient temperature (water and air), pH, salinity (TDS), coliform (or e.coli), turbidity, and phosphate.

A change from current riparian monitoring methods would be made. Green line composition and photo points would be used for long-term monitoring. Riparian stubble height would be used for short-term monitoring.

Upland monitoring methods would be changed. Trend to desired plant community descriptions would be the focus of long term monitoring. Height-weight utilization mapping and data would be done for short-term monitoring to determine if allotments are above or below objectives.

Evaluation would focus on quantitative data. Permittees and BLM would work together to periodically adjust the grazing plan for ease of management, benefit to the resource, or other reasons mutually agreed upon. Management changes would focus on duration of grazing rather than reducing stocking rates.

Forage utilization cages would be installed and distributed throughout the allotments at the beginning of the grazing season. At the end of the grazing season, these areas would be evaluated for plant diversity, utilization and range trend by permittees in cooperation and consultation with the BLM.

A comprehensive monitoring plan would be developed by BLM, permittees, environmental organizations and the University of Wyoming prior to the grazing season.

Changes would be made in the grazing plan if monitoring shows that livestock grazing objectives are not being met. Changes in the grazing plan can be made if permittees and BLM agree that changes would be beneficial to the resource and livestock even if monitoring data do not show that livestock grazing causes objectives not to be met.

13. Drought Planning

Under Alternative Two, the grazing permittees, in cooperation with the BLM would initiate a “dry-season mitigation plan” to deal with drought as follows:

- Intensify management of livestock to assure improved distribution
- If necessary, reduce number of grazing animals.
- Work with BLM staff on options (e.g., seek other pastures or leases).
- Use precipitation data and resulting forage production levels for April, May, and June as an indicator for adjustments needed during dry conditions.

Permittees would work with the BLM on the establishment of a complete weather station to use as an aid in gathering data for drought management purposes.

ALTERNATIVE THREE (Conservation Alternative)

Under this alternative, the BLM would conduct an intensive suitability and capability study to determine the appropriate carrying capacity for livestock on the GMCA (see Map 2-9). The BLM would identify key areas to monitor and would develop stubble height, willow and stream bank trampling indicators. Stubble height and stream bank alteration objectives would be enforced to protect riparian habitat. Livestock would be removed from the pasture (or the allotment if in the last pasture of the rotation sequence) once the thresholds (or “triggers”) were met. The following proposal, in greater detail constitutes Alternative Three.

1. Use Levels. Under Alternative Three, the BLM would conduct a detailed suitability, capability and forage production analysis to determine specific carrying capacities and use levels for livestock. Once a forage production analysis was completed, a Geographic Information System (GIS) layer displaying areas where rangeland standards and guidelines were not being met would be overlaid with a map of those areas on the allotment that were producing less than 50% of their potential. The combination of these two data layers would be categorized as areas needing “recovery prescriptions”. Recovery prescriptions are management actions designed to achieve rangeland health standards as soon as possible. Recovery prescriptions would range from several years of rest to season-specific livestock grazing. Forage allocation levels for wild horses, antelope, mule deer and moose would be the same as Alternatives One, Two and Four. Permitted AUMs for cattle and sheep however, would be different under Alternative Three, as shown in Table 2-11 below:

Table 2-11. Livestock and Wildlife Use Levels under Alternative Three

Livestock or Wildlife Species	Animal Unit Months Allocated
Cattle	9,120
Sheep	3,040

A permanent reduction of AUMs would be determined through a detailed suitability, capability and forage production analysis. For the purposes of this analysis, a projection of approximately 25% of permitted AUMs has been used. Unlike, the other three alternatives, Alternative Three assumes the various levels of livestock AUMs (Initial, Interim and Long Term levels) would remain constant after the suitability, capability and forage production analysis are complete.

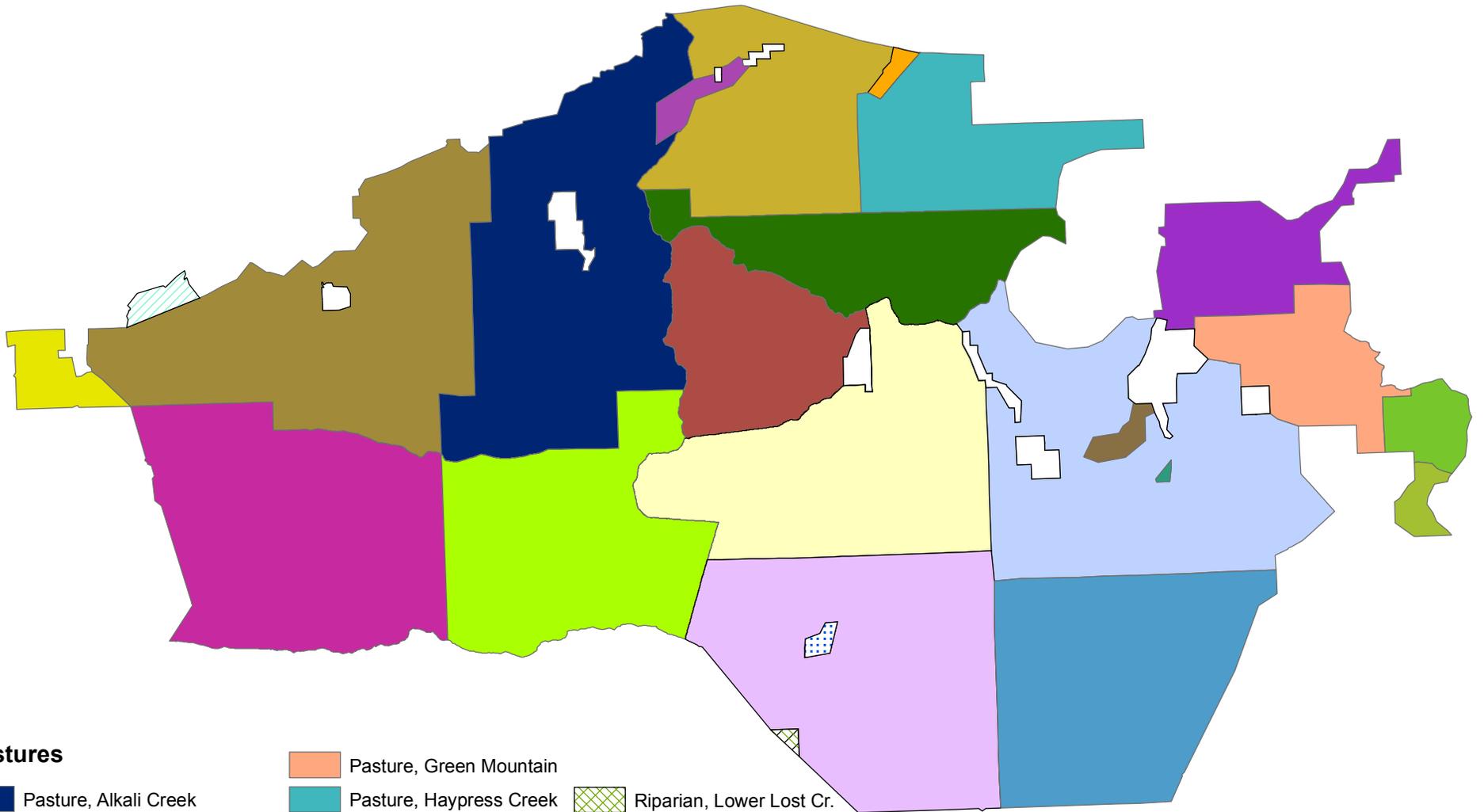
2. Livestock Season of Use – Under Alternative Three, the permitted livestock season of use would be the same as Alternative One, however the season of use would be adjusted after detailed suitability, capability and forage production analyses are completed. Annually, the season of use could vary depending on specific grazing prescriptions and the implementation of livestock move indicators.

Each pasture would have at least one key area identified, with a goal of designating a total of 30 key areas throughout the GMCA. Each key area would have livestock move indicators based on percent utilization on willow communities or a stubble height trigger of 6 inches on riparian sedge communities. If the pasture is in a “recovery prescription”, the stubble height requirement on riparian areas would be 8 inches. Mandatory livestock herding requirements and monitoring of stream bank trampling would also be established. A more detailed explanation of monitoring and “move indicators“ is discussed in the monitoring section of this alternative.

3. Range Improvements – Under this alternative, no “net” increase in fences would be authorized. Nine miles of riparian fencing identified under the 1999 Decision, however would be constructed (see Map 2-10). Should any new fences be constructed, they would only be temporary and would be removed once livestock had completed grazing in that area. The BLM would require the permittees to fund at least 50% of the total cost of new improvements. As a general practice, no additional water developments would be authorized unless they would provide a direct benefit to wildlife. All fences impeding wildlife migration routes within the allotment would be evaluated and modified or removed if they were identified as being detrimental to wildlife use patterns or migration.

4. Use Areas / Pastures – Alternative Three has the same use areas and pastures as described under Alternative One. However, wildlife migration routes within the GMCA would be identified and evaluated for additional protection measures to ensure long-term big game herd viability.

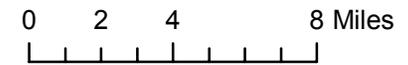
Map 2-9: Pastures Alternative 3



Pastures

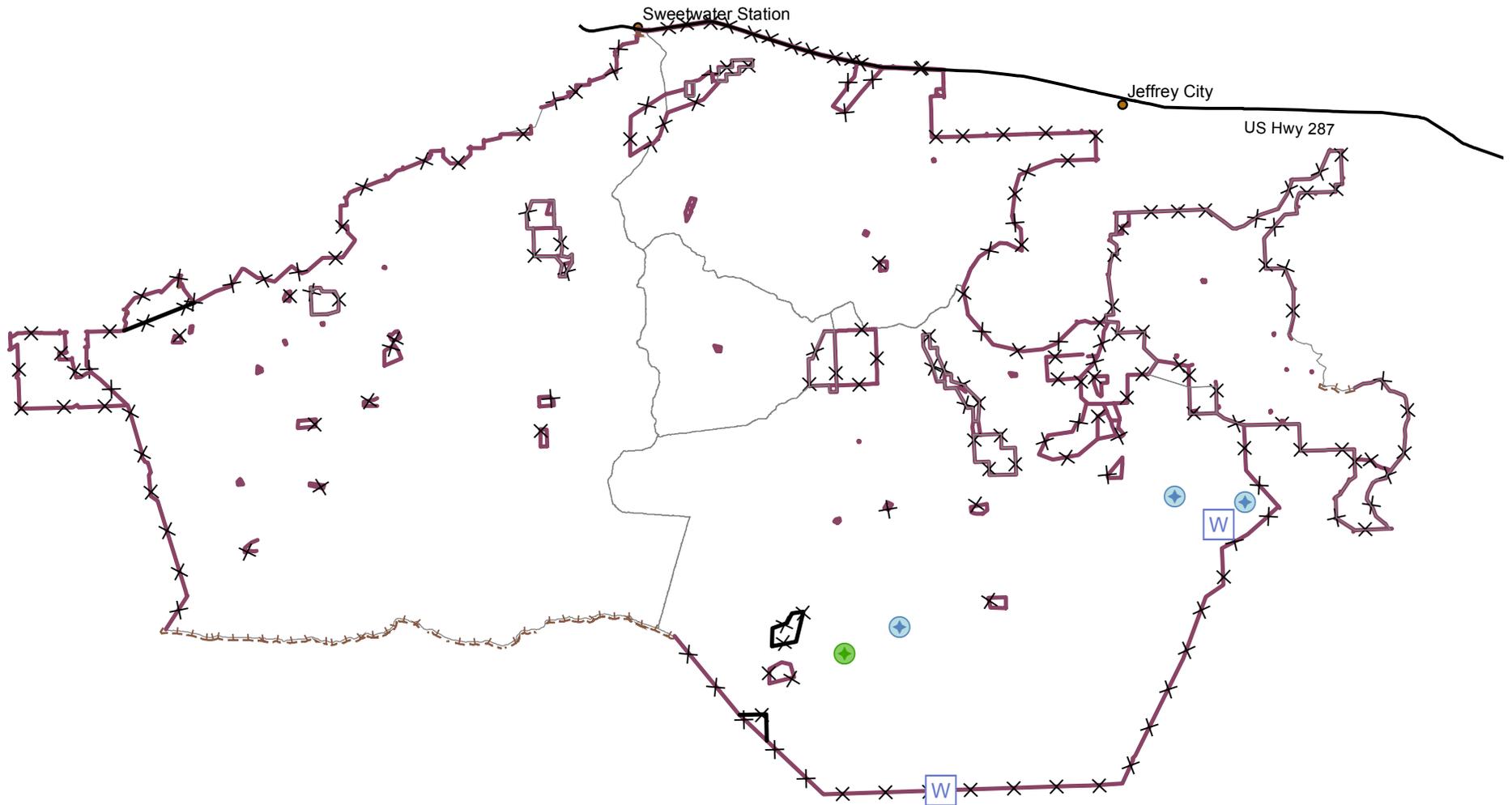
- | | | | |
|--|------------------------------|---|-------------------------|
|  | Pasture, Alkali Creek |  | Pasture, Green Mountain |
|  | Pasture, Alkali Creek Sheep |  | Pasture, Haypress Creek |
|  | Pasture, Bare Ring Butte |  | Pasture, Lost Creek |
|  | Pasture, Crooks Mountain |  | Pasture, Picket Lake |
|  | Pasture, Daley Lake |  | Pasture, Sheep Creek |
|  | Pasture, Eagles Nest Draw |  | Pasture, Stratton Rim |
|  | Pasture, East Alkali Creek |  | Pasture, Warm Springs |
|  | Pasture, Granite Creek/Rocks |  | Pasture, Willow Creek |
| | |  | Not Part of Allotment |

- | | |
|---|---------------------------------------|
|  | Riparian, Lower Lost Cr. |
|  | Riparian, Upper Lost Cr. |
|  | Riparian, Sweetwater River/Wilson Bar |
|  | Riparian, Bare Ring Slough |
|  | Riparian, Ice Slough |
|  | Riparian, Long Slough |
|  | Riparian, Warm Springs |
|  | Riparian, West Fork Crooks Creek |



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Map 2-10: Range Project Proposals Alternative 3



Range Project Proposals

- | | |
|--|---|
|  Develop Existing Well |  Proposed New Fences |
|  Re-drill Existing Well |  Existing Fence |
|  Re-construct Reservoir |  Cyclone Rim (un-fenced) |



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5. Grazing Systems and Treatments – The grazing systems (See Appendix 4) and treatments (See Appendix 5) applied to the use areas under Alternative Three are the same as under Alternative One, except that the treatments would vary based on move indicators; see element 12 below which explains how the move indicators will be implemented.

Adjustments to the timing, duration, and use levels in each pasture or use area would be based on the conditions as described in the monitoring and evaluation section of this alternative. The BLM would develop “recovery prescriptions” for areas within the GMCA that are not at their ecological potential based on species distribution, ground cover and productivity. Recovery prescriptions might include implementing one or more of the following actions: (a) long-term rest, (b) reduced stocking rates, (c) research-based grazing systems, (d) reseeding with native plant species, and (e) vegetation treatments and other methods.

6. Salt and Mineral Placement – Salt and mineral placement is the same under Alternative Three as under Alternative One, except under Alternative Three, the BLM would require the permittees to place salt and mineral supplements at least 0.5 mile from scenic and historic trails. Similar to Alternative One, storing and feeding supplemental forage would be prohibited on public land and emergency feeding would only be allowed with prior approval.

7. Herding of Livestock – Alternative Three has the same provisions for livestock herding as Alternative One plus the following requirements: Permittees would need to maintain at least one herder for every 500 head of cattle on the allotment. Active herding would be required to take place at least five days per week. If active daily riding were not observed more than twice in a particular use area, in a grazing season, the permittee(s) using that use area will be issued a 10% suspension in permitted AUMs to begin the following year and taken in animal numbers or time.

Temporary fencing would be used only on a site-specific basis and only to improve herding and distribution. Temporary fencing would be removed annually to allow for free-ranging wildlife migrations to occur.

8. Flexibility – Alternative Three addresses flexibility in the same way as Alternative One plus the following requirements: The BLM would require all livestock within the GMCA to be ear-tagged prior to entering the allotment to help investigate livestock trespass situations. The BLM would encourage the permittees to reduce or eliminate “sub-leasing” of their livestock on the allotment in order to improve livestock handling in the allotment.

The BLM, in cooperation with the permittees and interested publics would encourage incentives to private landowners to protect open space through voluntary conservation easements, particularly of existing native critical wildlife migration routes and winter range to minimize displacement and to allow for wild, free-ranging herd movement.

Permittee flexibility would be performance-based and would require the permittees to comply with more rigid performance standards than under Alternative One. The frequency and effectiveness of permittee herding would determine the length of the livestock grazing season. Flexibility in yearly grazing operations would be addressed through the development of an annual operating plan for each allotment. These operating plans would adjust authorized use, pasture rotations, turnout dates / pastures, and gathering dates / pastures based on range readiness, range conditions, and permittee needs. These constraints would be discussed with the permittees at an annual pre-turnout meeting in mid-April of each year and a written plan would be issued prior to the grazing season.

9. Riparian Management Pastures – Alternative Three has the same provisions for Riparian Management Pastures as Alternative One except that funding to complete the riparian pastures would require a 50/50 permittee match and the riparian pastures would be rested until the riparian areas within those pastures meets the Standards for Rangeland Health (see Map 2-9). Alternative Three provides for the following:

The 1999 Decision provided for the establishment of seven riparian pastures to allow for rest and recovery of key riparian areas. The rest and recovery of four of the seven pastures has been completed. Under Alternative Three, construction of the remaining riparian management pastures, Sweetwater River and Lost Creek (Upper and Lower), would continue as funding allows.

10. Predator Control – Alternative Three has the same provisions for predator control as Alternative One.

11. Vegetation and Land Treatments – Alternative Three has the same provisions for vegetation treatments as Alternative One, including the planning and implementation of land treatments to modify the existing plant community and control undesirable plant species. These treatments would include the use of prescribed burning, mechanical treatments, and limited herbicide treatments.

In the case of each treatment, the method to be used would depend upon such factors as environmental impacts, effectiveness, safety, cost-effectiveness, practicality, etc. and would be evaluated for compliance with the Final EIS – Vegetation Treatment on BLM Lands in Thirteen Western States, 1991, and the Northwest Area Noxious Weed Control Program Final EIS, 1985.

12. Allotment Monitoring and Evaluation – Alternative Three provides for the same comprehensive allotment monitoring and evaluation program, as Alternative One, including the gathering of range condition and trend, vegetation attributes, forage utilization, grazing impacts, precipitation, water quality, soil quality, and actual use data. The information gathered from monitoring these parameters would be used to determine forage production and utilization levels and to evaluate the effects of grazing on vegetation, water quality, and soils. This information would aid range managers in deciding whether adjustments in stocking levels, season and duration of use, and if other management considerations should be made.

In addition, Alternative Three provides that information from monitoring would be used by range managers in deciding whether livestock should be moved from one pasture to another or off the allotment if in the last pasture of the rotation sequence.

Table 2-12 below summarizes the monitoring protocol that would be used under this alternative and the required actions if in non-compliance:

Table 2-12. Monitoring Protocol to be Used Under Alternative Three

Key Site	Monitoring Timeframe	Protocol Used	Trigger Point	If in Non-Compliance
Willows	Every 15 days	Browse Method	35% use on leader growth	10% suspension of AUMs if standard is not met.
Sedges	Every 15 days	Stubble Height Method	6” Stubble Height. Final Reading at End of Season	10% suspension of AUMs if standard is not met.
Herding	5 days per week (Mon.-Fri.)	Observation of Active Herding. One Herder per 500 cows.	If no Active Herding is done	10% suspension of AUMs if standard is not met.
Stream Bank Trampling	Every 15 days	Stream Bank Alteration Method	When Stream Bank Alteration exceeds 15%	10% suspension of AUMs if standard is exceeded.

13. Drought Planning – Alternative Three has the same drought requirements as Alternative One which provides for Wyoming BLM to address drought conditions on a case-by-case basis. BLM would meet with grazing permittees or groups of permittees as necessary prior to livestock turn-out to listen to proposed grazing plans. The BLM would review range conditions with permittees on the ground, as necessary. During emergency conditions related to drought, insect infestations, or wildfire, the BLM would close pastures or the allotment to livestock grazing.

ALTERNATIVE FOUR

Under this alternative, the GMCA would be divided into two separate grazing allotments (see Map 2-11). The existing Green Mountain Use Area and the Hadsell Pasture Allotment would be separated from the current GMCA and made into a new allotment. The remaining area, which represents the majority of acreage, would remain one large grazing allotment. New allotment names would be given to each of the two allotments based on dominant geographic features within their respective boundaries as displayed under Table 2-13 below.

Table 2-13. Proposed Changes to Allotment Names under Alternative Four

Current Name	New Allotment Name	Number of Pastures	Total Acres
Green Mountain Common Allotment	Alkali Creek Common	5 Pastures	471,058
Green Mountain Use Area	Green Mountain Allotment	6 Pastures	51,233

The Alkali Creek Common Allotment would be managed under a one-herd, rest-rotation grazing system. The Green Mountain Allotment (old Green Mountain Use Area and the Hadsell Pasture Allotment) would be managed under a deferred-rotation grazing system. Active livestock herding would be required and a key part of this alternative. The grazing season would be shortened, and the active AUM's would be reduced to approximately the historic averages (authorized and actual use over a 25 year period).

The existing use areas within the new Alkali Creek Common Allotment would be combined to create five large grazing pastures. Sheep grazing would occur within the Alkali Creek Common and within the Alkali Creek Sheep Use Area. Lambing, docking and shipping would be done primarily in the Alkali Creek Sheep Use Area. Allotment management plans would be developed for both grazing allotments. The following proposal, in greater detail, constitutes Alternative Four:

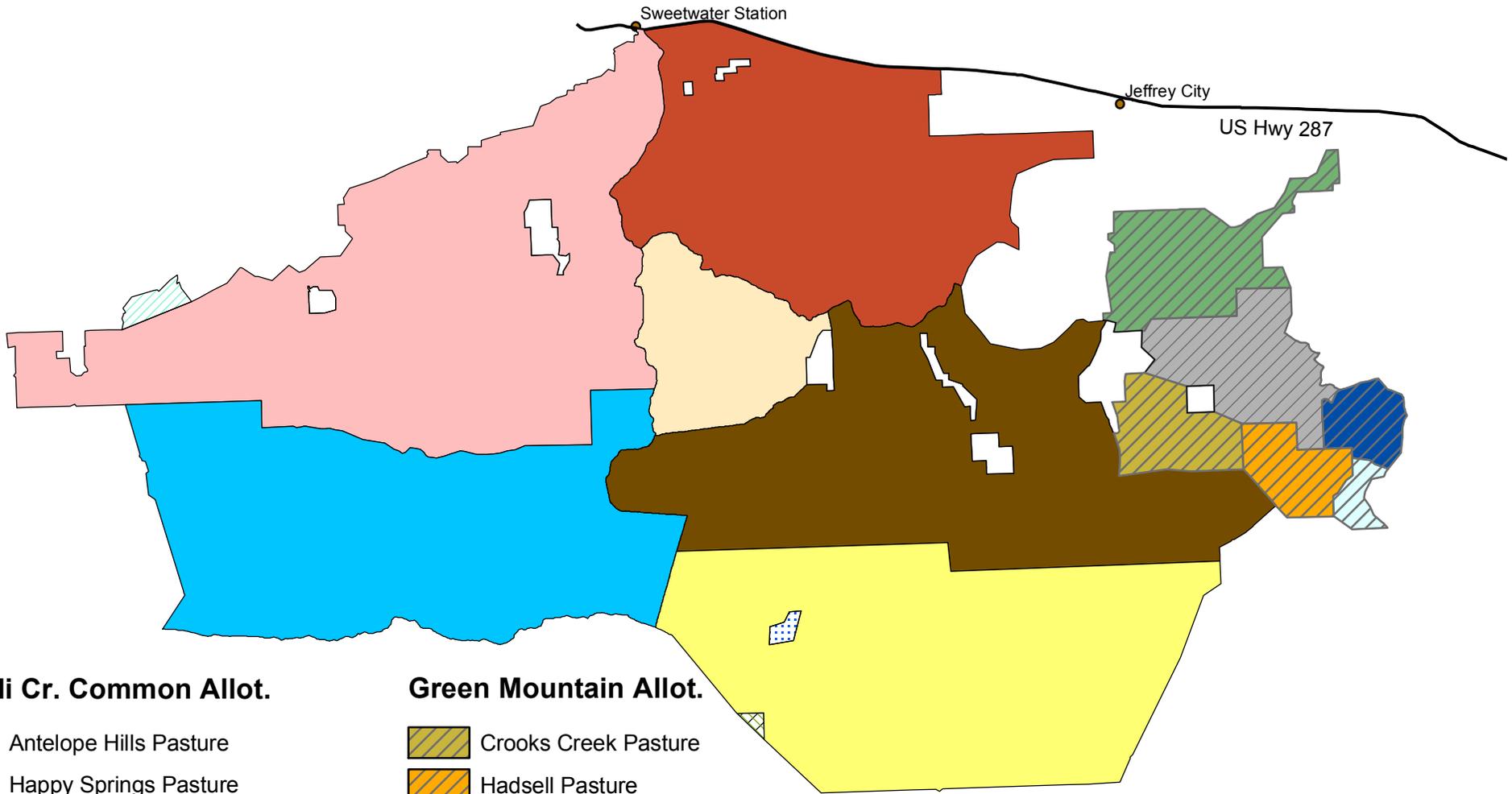
1. Use Levels – Under Alternative Four, livestock use levels over the long term, would be reduced to sixty percent of the permitted AUMs. This is slightly above the historic long term active use for both allotments. The long-term average (1980-2006) is 50% of permitted use. This means that over the course of the past 27 years, the average level of active grazing use that has been authorized on the GMCA is about 50%. The table below describes the initial, interim and long term periods for use levels. The use levels for the initial period are based on the lack of water availability for the implementation of a one-herd grazing system as described in element 5 of this alternative. As water wells are developed, water availability would cover a larger service area making it possible to increase use levels above the historic long term average of 50% of permitted AUMs. Table 2-14 describes the proposed use levels during each period of use under Alternative Four.

Table 2-14. Use Levels Under Alternative Four

Period	Use Levels	Percent of Permitted Use
Initial (2008 - 2012)	9,120 cattle AUMs 3,040 sheep AUMs	26 %
Interim (2013 – 2017)	17,700 cattle AUMs 5,640 sheep AUMs	49%
Long Term (2018 – 2027)	21,660 cattle AUMs 6,840 sheep AUMs	60%

As background information, some of the present day GMCA permitted AUMs were once in fall-winter-spring sheep use. The permitted use in the Seven Lakes Common Allotment (SLCA) was transferred to the Lander Field Office (LFO) in 1980 from the Rawlins Field Office (RFO). The SLCA was permitted for both sheep and cattle grazing use. The conversion ratios for sheep to cattle were analyzed in the Seven Lakes Grazing EIS. However, many years prior to this EIS, several sheep permits were converted to cattle permits. These conversions were made at the standard five sheep to one cow ratio. A suitability analysis was not used to ensure that there was sufficient water and forage available to accommodate livestock, big game, and wild horse needs. Presently, cattle still concentrate

Map 2-11: Allotments and Pastures Alternative 4

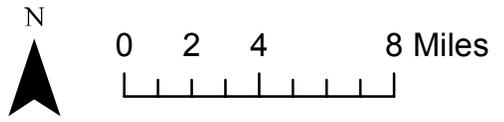


Alkali Cr. Common Allot.

-  Antelope Hills Pasture
-  Happy Springs Pasture
-  North Arapahoe Pasture
-  Picket Lake Pasture
-  South Arapahoe Pasture
-  Sweetwater River/Wilson Bar Riparian
-  Lower Lost Creek Riparian
-  Upper Lost Creek Riparian

Green Mountain Allot.

-  Crooks Creek Pasture
-  Hadsell Pasture
-  Sheep Creek Pasture
-  Stratton Rim Pasture
-  Willow Creek Pasture
-  Reserve Pasture
-  Alkali Creek Sheep Use Area



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around water sources, resulting in poor distribution of livestock, with some areas receiving heavy grazing and other areas, light grazing (Seven Lakes Final Grazing EIS, 1978, Green Mountain Final Grazing EIS 1982, BLM EA No. WY050-EA9-039, 1999 and BLM GMCA Evaluation, 2002). Consequently, the historic authorized use levels (50 percent) on GMCA reflect the available summer cattle AUMs within service areas of the limited water sources present during this time period.

Because of the suitability issue discussed above, twelve new water wells would be drilled and equipped in the South Arapahoe and Picket Lake Pastures of the Alkali Creek Common Allotment to support the water needs for the entire herd (at one time). The installation of these wells is dependent on funding availability; therefore, until all water wells are developed, authorized livestock numbers for both cattle and sheep will need to be temporarily reduced as shown in the table above. The authorized numbers would gradually increase to above the historic long term average as the water wells are developed. The goal is to have all necessary water wells developed within a 13-year period. Water hauling would be authorized on a case-by-case basis to minimize the overall reduction in livestock numbers until these twelve wells are developed.

2. Livestock Season of Use – Under Alternative Four, the cattle turn-out date for the Green Mountain Allotment would be May 1 (depending on range readiness conditions) and the off-date would be October 1, for a total of 154 days. This would be a reduction of 31 days from the current season of use. The cattle turn-out date for the Alkali Creek Common Allotment would be May 1 (depending on range readiness conditions) and the off-date would be September 17, for a total of 140 days. This would be a net reduction of 45 days from the current season of use. This reduction is needed to lessen the number of grazing days per pasture in order to provide rest and deferment that will provide for long term riparian area recovery. Sheep use would be year-long or 365 days, from March 1 to February 28. The total number of sheep in the interim period would be 2,350 divided into two bands. The total number of sheep in the long term would be 2,850 divided into two bands.

Both use levels and season of use would apply only under normal conditions and would not preclude adjustment for unexpected occurrences that would affect forage availability such as drought, wildfire, etc.

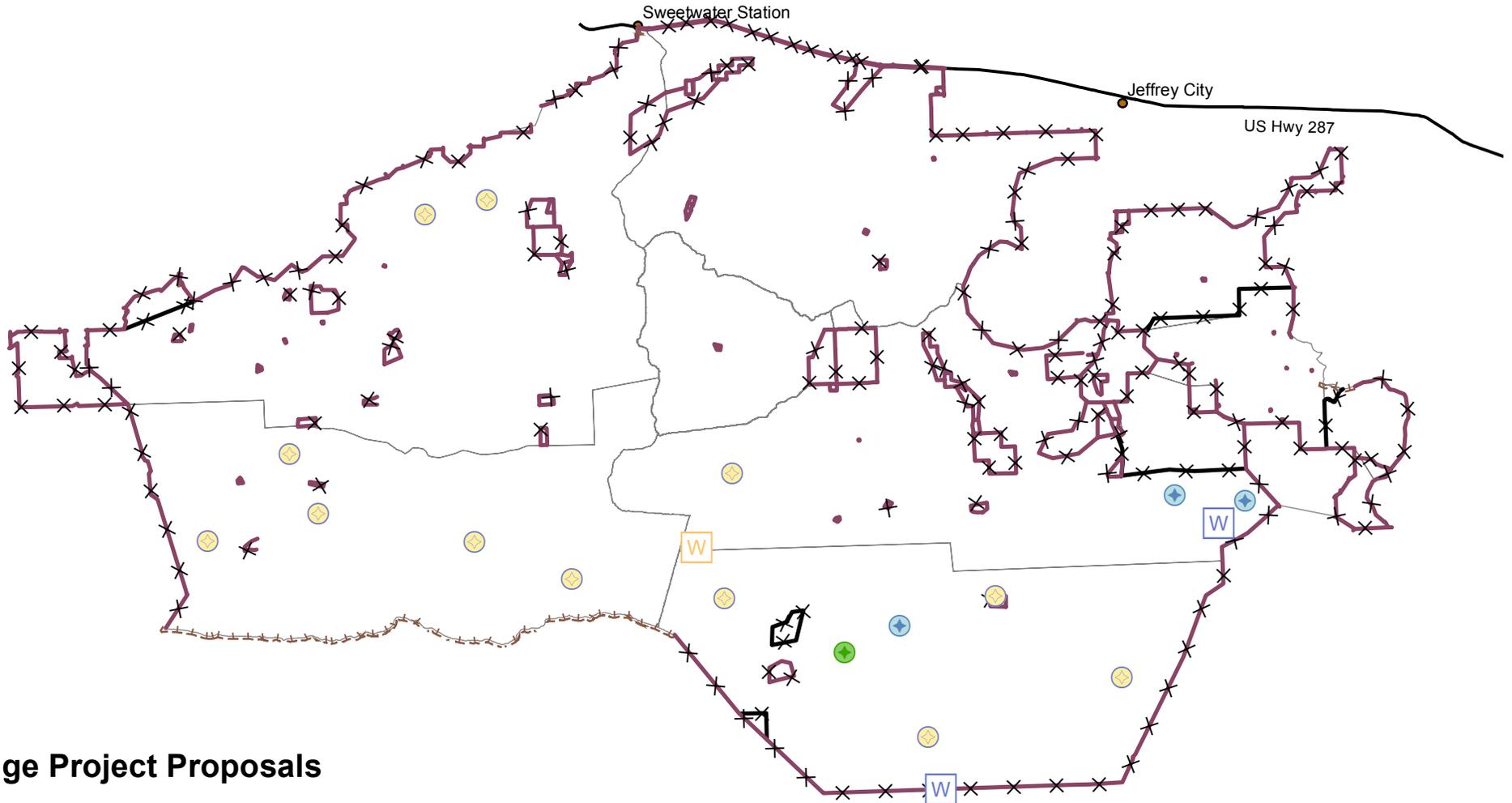
3. Range Improvements – Under this alternative, the schedule of proposed fence construction and water development included in the 1999 Decision would continue to be implemented. The development of these range improvements would help balance the needs of grazing permittees and provide for sustainable, long-term rangeland health. Of these improvements, 9 miles of riparian fencing, 3 cattle guards, and 18 water developments are yet to be constructed (see Map 2-12). Additional proposed projects include: developing 12 springs, drilling 12 wells, equipping 3 existing wells, re-drilling 1 existing well, constructing 1 reservoir, reconstructing 2 reservoirs, and constructing 19 miles of permanent pasture fences. It is recognized that there would not be sufficient range improvement funds to provide for the construction of the additional new improvements, especially the twelve water wells, and that cost-sharing between BLM and the permittees would be necessary. The BLM would also work with the Wyoming Department of Agriculture and Wyoming Water Development Commission as a source of additional funding for the development of these water projects.

The timeframe for developing the 12 wells would vary, and is dependant of funding availability, however for the purposes of this analysis, the BLM is projecting they will be completed within 13 years. This means that during the time that livestock are in the South Arapahoe and Picket Lake Pastures, authorized numbers would need to be temporarily reduced so there is enough water for them to use. The authorized livestock numbers would be increased annually (up to 60% of permitted numbers), as these new wells are developed and able to sustain increased livestock numbers. Water hauling would be authorized in these two pastures to allow for improved livestock distribution and to provide additional water for livestock so the overall reduction in livestock numbers is lessened.

In order to divide the Green Mountain Allotment from the Alkali Creek Common Allotment and to provide additional management options, approximately 19 miles of new pasture fences would be constructed. This would include 7 miles of fence along the southern portion of the Sheep Creek Pasture, 6 miles along the south and west boundaries of the Willow Creek Pasture, 2 miles along the south and west portion of the Hadsell Pasture Allotment and 4 miles along the south and west portions of the Crooks Creek Riparian Pasture (see Map 2-12).

Under this alternative, temporary electric fences would be authorized on a case-by-case basis for the purposes of

Map 2-12: Range Project Proposals Alternative 4



Range Project Proposals

- | | | | |
|---|------------------------|---|-------------------------|
|  | Proposed New Well |  | Proposed New Fences |
|  | Develop Existing Well |  | Existing Fence |
|  | Re-drill Existing Well |  | Cyclone Rim (un-fenced) |
|  | Proposed New Reservoir | 12 new springs with locations to be determined | |
|  | Re-construct Reservoir | | |



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controlling livestock use in sensitive riparian areas. If approved, these fences would be limited to three strands of smooth wire and would require the grazing permittee to remove the fence after livestock use has taken place. The construction of permanent corner brace posts may be authorized on a limited basis on pre-selected sites to provide the grazing permittees with increased flexibility and management options.

4. Use Areas / Pastures – The 6 major use areas within the current GMCA would be converted to five large grazing pastures to form the Alkali Creek Common Allotment. The remaining use area (Alkali Creek Sheep Use Area) would not be used as a component of the grazing system for cattle (see Map 2-11). Table 2-15 below describes the pastures in the new Alkali Creek Common Allotment and the number of acres in each pasture:

Table 2-15. Proposed Pasture Names Under Alternative Four

Pasture Name	Total Acres	BLM-Administered Public Land
Happy Springs	72,882	94%
North Arapahoe	86,063	91%
South Arapahoe	99,536	94%
Picket Lake	86,261	95%
Antelope Hills	110,001	87%

5. Grazing Systems and Treatments – Under this alternative, the Alkali Creek Common Allotment would operate under a 5-pasture, rest-rotation grazing system as described in Table 2-16 below.

Table 2-16. Grazing System and Treatments under Alternative Four

Pasture Name	YEAR ONE		YEAR TWO		YEAR THREE		YEAR FOUR		YEAR FIVE	
	Rotation Order	Days of Grazing								
Happy Springs	1 st	35	Rest	0	4 th	35	3 rd	35	2 nd	35
North Arapahoe	2 nd	35	1 st	35	Rest	0	4 th	35	3 rd	35
South Arapahoe	3 rd	35	2 nd	35	1 st	35	Rest	0	4 th	35
Picket Lake	4 th	35	3 rd	35	2 nd	35	1 st	35	Rest	0
Antelope Hills	Rest	0	4 th	35	3 rd	35	2 nd	35	1 st	35
Total Days		140		140		140		140		140

The Alkali Creek Sheep Use Area would not be grazed by cattle. Sheep would continue grazing the Alkali Creek Sheep Use Area under a spring and fall/winter continuous seasonal grazing system. Under this alternative, cattle trailing would only be authorized in the turnout pasture in the spring and the fourth pasture in the fall. Trailing would not be authorized across the deferred and rest pastures.

The Green Mountain Use Area would be separated from the GMCA and become its own grazing allotment as described above. The allotment name would be the Green Mountain Allotment and would use a modified 6-pasture deferred rotation grazing system. Table 2-17 below describes the type of grazing systems that would be implemented on both of these allotments.

Table 2-17. Proposed Grazing Systems for the Alkali Creek Sheep and Green Mountain Allotments

Allotment or Use Area Name	Grazing System
Alkali Creek Sheep Use Area	One-pasture, spring and fall / winter continuous-seasonal grazing.
Green Mountain Allotment	Six-pasture deferred rotation grazing.

Adjustments to the timing, duration, and levels to be grazed would be based on periodic evaluations of allotment conditions. Under this alternative, livestock grazing would be closed to further use in the pasture(s) that has already been used. Livestock that are found and identified in a pasture that has already been used would be considered in trespass and appropriate administrative action would be taken on the offending permittee.

6. Salt and Mineral Placement – Under Alternative Four, salt and mineral supplements would be located at least 0.5 mile from water sources to promote better livestock distribution and discourage livestock from concentrating near water sources.

7. Herding of Livestock – Under Alternative Four, herding would be mandatory on both allotments. The BLM, in cooperation with the GMCA permittees, and the Wyoming Department of Agriculture would secure funding to conduct one additional “low stress livestock herding” training session within the first 3 years of when the AMP is developed. Monitoring of active herding, by the BLM, would be done routinely and would be considered successful if stubble height requirements and riparian objectives are being met. The BLM would encourage the establishment of a recognized grazing association with by-laws and protocol for each permittee to follow. Included in this would be rules regarding fence maintenance responsibilities, herding requirements and other proactive management actions.

8. Flexibility – Under Alternative Four, flexibility in yearly grazing operations would be addressed through the development of an annual operating plan for each allotment. These operating plans would adjust authorized use, pasture rotations, turnout dates / pastures, and gathering dates / pastures based on range readiness, range conditions, and permittee needs. These constraints would be discussed with the permittees at an annual pre-turnout meeting in mid-April of each year and a written plan would be issued prior to the grazing season.

9. Riparian Management Pastures – Under Alternative Four, the construction of riparian pastures would continue as authorized under the 1999 Decision. The 1999 Decision provided for the establishment of seven riparian management pastures to allow for rest and recovery of key riparian areas. Five of the seven riparian pastures have been constructed. The Sweetwater River and Lost Creek Riparian Pastures have been carried over from the 1999 Decision and the East and West Willow Creek Riparian Pastures are new proposals and would be constructed by 2014. Table 2-18 below also describes the level of use prescribed for each pasture:

Table 2-18. Riparian Pastures to be completed Under Alternative Four

Riparian Pasture	Prescribed Use	Status
Sweetwater River	3-5 years initial rest followed by spring grazing of up to 30 days.	Not Completed
Lost Creek	3 years initial rest followed by spring or fall grazing (but not both) not to exceed 15-30 days.	Not Completed
East Willow Creek	1 year initial rest followed by summer or fall grazing (but not both) not to exceed 15-30 days.	Not Completed
West Willow Creek	1 year initial rest followed by summer or fall grazing (but not both) not to exceed 15-30 days.	Not Completed

10. Predator Control – Alternative Four is the same as Alternative One, which incorporates existing BLM policy. The permittee/lessee and/or his/her employees would not use or place poison or M-44 devices for prairie dog or predator control on BLM-administered public lands. Predator, prairie dog or trophy animal predation control actions will be carried out by the Animal and Plant Health and Inspection Service (APHIS), Wildlife Services (WS), or the Wyoming Game and Fish Department, or whoever has the responsibility for the offending species. If predation problems and conflicts with prairie dogs arise, the permittee/lessee would immediately notify the BLM Lander Field Office and the appropriate agency.

11. Vegetation and Land Treatments – Table 2-19 describes the vegetation treatments (see Map 2-13) that would be applied in the Alkali Creek Common and Green Mountain Allotments over a 10 to 15 year period under Alternative Four.

Table 2-19. Vegetation and Land Treatments under Alternative Four

Treatment Type	Location	Acres	Comment
Prescribed Burn	Cottonwood Creek	5,700	Habitat Enhancement
Prescribed Burn	Crooks/Fremont/Happy Springs Area	6,600	Habitat Enhancement
Prescribed Burn	Jost/1 st /4 th Creek Area	8,150	Habitat Enhancement
Prescribed Burn	Pickett Creek	4,200	Habitat Enhancement
Prescribed Burn	Magpie/Mason Creeks	3,000	Habitat Enhancement
Mechanical Treatment	East Fork Cottonwood Area	35	Fuels Reduction in Aspen Stand
Total Acres		27,685	

In the case of each treatment, the method to be used would be dependent upon such factors as environmental impacts, effectiveness, safety, cost-effectiveness, practicality, etc. and would be evaluated for compliance with the Final EIS – Vegetation Treatment on BLM Lands in Thirteen Western States, 1991, and the Northwest Area Noxious Weed Control Program Final EIS, 1985.

Noxious weeds would continue to be inventoried and treated in accordance with existing policy and BLM regulations.

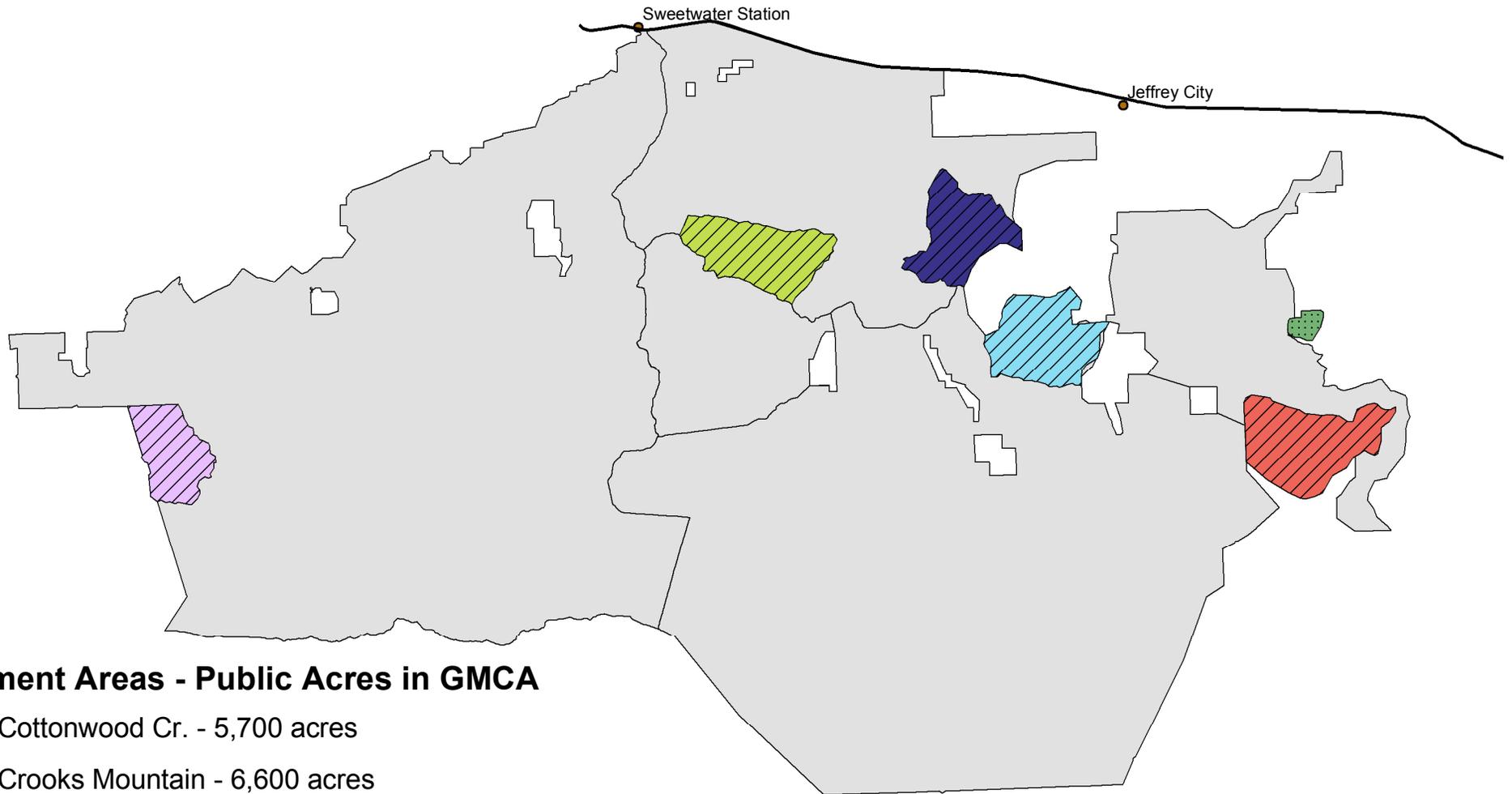
12. Allotment Monitoring and Evaluation – Under this alternative, the BLM, in cooperation and consultation with the grazing permittees of both allotments, the University of Wyoming Extension Service (UWCES), Wyoming Department of Agriculture (WDA) and Interested Publics would develop and implement a monitoring plan to determine whether the new Allotment Management Plan is meeting the intended goals and objectives.

The BLM in cooperation with the UWCES, WDA, WDEQ and Wyoming Game and Fish Department (WGFD) would train and encourage the Alkali Creek Common and Green Mountain grazing permittees to assume a larger role in conducting and implementing the monitoring requirements described above. In the long term, grazing permittees would be expected to initiate pasture moves based on the vegetative monitoring data they collect. Once the grazing permittees are able to effectively conduct this monitoring, the BLM would periodically confirm their monitoring results to ensure proper protocols are being followed.

This alternative provides for a comprehensive allotment monitoring and evaluation program to measure such factors as range condition and trend, vegetation attributes, forage utilization, grazing impacts, precipitation, water quality, soil quality, and actual use. The information gathered from monitoring these parameters would be used to determine forage production and utilization levels and evaluate the effects of grazing on vegetation, water quality, and soils. All monitoring would be conducted in accordance with BLM approved methods.

Initial allotment evaluations would be conducted following the completion of the five-year grazing cycle on the ACCA and the six-year grazing cycle on the Green Mountain Allotment. These initial evaluations would assist

Map 2-13: Vegetation Treatment Areas Alternative 4



Treatment Areas - Public Acres in GMCA

-  Cottonwood Cr. - 5,700 acres
-  Crooks Mountain - 6,600 acres
-  Jost/1st/4th Creeks - 8,150 acres
-  Magpie/Mason Creeks - 3,000 acres
-  Picket Creek - 4,200 acres
-  East Fork Cottonwood Cr. - 35 acres

Treatment

-  Mechanical treatment
-  Prescribed burn



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BLM managers in deciding whether interim adjustments in stocking levels, season and duration of use, and other management considerations should be made in the allotment management plan.

Allotment evaluations would be conducted again following the completion of the second, five-year grazing cycle on the ACCA and the second, six-year grazing cycle on the Green Mountain Allotment. These evaluations would assist BLM managers in deciding whether long term adjustments in stocking levels, season and duration of use, and other management considerations should be made in the allotment management plan.

Allowable livestock forage utilization levels under this alternative would be similar to Alternative One, except that specific standards would be identified by plant community as described in Table 2-20 below. Monitoring would take place in key areas identified in the 1999 decision. In general, each pasture would have at least two key areas.

Table 2-20. Forage Utilization Levels Under Alternative Four

Plant Community Type and Monitoring Method	** Forage Utilization Standard	When Would Standard be Implemented?
Riparian Vegetation (Stubble Height Method)	6 Inch Stubble Height within key areas	During the last two pastures of the grazing rotation
Willows (Browse Method)	35-45% use on leader growth (not all key areas would be monitored for willow use. Site-specific locations would be identified).	During the last two pastures of grazing rotation
Upland Vegetation (Height-Weight Method)	35-45% use on herbaceous key species within key areas	35% use during the last two pastures of the grazing rotation

** Stubble height monitoring would be conducted during the grazing season and again after livestock are removed from their respective allotments. During the time livestock are in the first two pastures of the rotation schedule, stubble height monitoring would not be used as a move indicator. If livestock are in either of the last two pastures of the rotation sequence, and stubble height monitoring indicates the utilization standard has been reached, livestock would be moved to the last pasture of the rotation schedule or off the allotment if in the last pasture.

Water quality monitoring would be conducted in cooperation with the Wyoming Department of Environmental Quality (WDEQ), the local conservation district, and other interested publics. The BLM would continue using existing PFC information and gather new information where necessary. WDEQ would follow their established protocols of monitoring to determine if beneficial uses for these water bodies are, or are not, being met. WDEQ would then make a determination to list or not to list a particular water body as impaired.

13. Drought Planning – Alternative Four has the same drought provisions as Alternative One which provides for Wyoming BLM to address drought conditions on a case-by-case basis. BLM would meet with grazing permittees or groups of permittees as necessary prior to livestock turn-out to listen to proposed grazing plans. The BLM would review range conditions with permittees on the ground, as necessary. During emergency conditions related to drought, insect infestations, or wildfire, the BLM would close pastures or the allotment to livestock grazing.

Summary of Management Actions

The following table, “Summary of Management Actions”, is a succinct comparison of many of the provisions of the different alternatives. The table makes reference to the applicable narrative description of the alternatives where more detail is provided. The Summary of Management Actions and the narrative address how each of the fourteen resource elements, such as use levels, range improvements, and season of use, would be managed under each of the alternatives. Included in this analysis are management actions, assumptions and mitigation measures.

Table 2-21. Summary Of Management Actions, Assumptions, And Mitigation By Alternative

Management Actions, Assumptions and Mitigation	Alternative One (Existing Management)	Alternative Two (Proposed Action)	Alternative Three	Alternative Four
Management Actions				
Permitted AUMs	47,361 Cattle and Sheep AUMs (No permitted use reduction.)	Same as Alternative One	Reduction to approx. 12,160 Cattle and Sheep AUMs. See alternative narrative.	Reduction to approx. 28,500 Cattle and Sheep AUMs. See alternative narrative.
Suitability Study	No Similar Action	No Similar Action	An intensive suitability and capability analysis of the entire allotment would be made by in the short term to determine the appropriate livestock carrying capacity and re-adjust the permitted AUMs accordingly. See narrative.	No Similar Action
Livestock Use Levels <i>Anticipated Use Levels in AUMs from 2008 to 2027 projected for analysis in the environmental assessment. In Alternatives One and Two, "Permitted AUMs" could be grazed in any given year, but anticipated annual uses would be less than "Permitted AUMs" on average. Anticipated use in Alternatives Three and Four reflect "Permitted AUM" reductions.</i>	<i>Initial Level:</i> 13,030 cattle AUMs 4,350 sheep AUMs <i>Interim Level:</i> 14,280 cattle AUMs 4,800 sheep AUMs <i>Long Term Level:</i> 17,880 cattle AUMs 6,000 sheep AUMs	<i>Initial Level:</i> 13,030 cattle AUMs 4,350 sheep AUMs <i>Interim Level:</i> 17,890 cattle AUMs 5,970 sheep AUMs <i>Long Term Level:</i> 26,990 cattle AUMs 9,070 sheep AUMs	<i>Initial Level:</i> 9,120 cattle AUMs 3,040 sheep AUMs <i>Interim Level:</i> 9,120 cattle AUMs 3,040 sheep AUMs <i>Long Term Level:</i> 9,120 cattle AUMs 3,040 sheep AUMs	<i>Initial Level:</i> 9,120 cattle AUMs 3,040 sheep AUMs <i>Interim Level:</i> 17,700 cattle AUMs 5,640 sheep AUMs <i>Long Term Level:</i> 21,660 cattle AUMs 6,840 sheep AUMs
Seasons of Use: Cattle	May 1 – 15 to November 1 -15 for 185 days.	Same as Alternative One	Same as Alternative One but adjusted after suitability analysis and utilizing triggers.	<u>Alkali Creek Common Allotment:</u> Depending on range readiness, May 1 to September 17 for 140 days. <u>Green Mountain Common Allotment:</u> Depending on range readiness, May 1 to October 1 for 154 days.

Table 2-21. Summary Of Management Actions, Assumptions, And Mitigation By Alternative

Management Actions, Assumptions and Mitigation	Alternative One (Existing Management)	Alternative Two (Proposed Action)	Alternative Three	Alternative Four
Season of Use: Sheep	Sheep: Year Long	Same as Alternative One	Same as Alternative One	Same as Alternative One
Range Improvements -Riparian fencing	9 miles of riparian fencing	Same as Alternative One	Same as Alternative One	Same as Alternative One
Range Improvements -Other fencing	No Similar Action	98 miles of fencing including 4 temporary electric fences	Temporary, site-specific fencing to improve livestock herding and distribution. Temporary fencing would be removed annually to allow for wildlife migration.	19 miles of pasture fencing. Temporary electric fences would be allowed case-by-case. See narrative.
Range Improvements -Fence removal	No Similar Action	No Similar Action	All fences within wildlife migration routes would be evaluated and modified or removed if they are identified as being detrimental to wildlife use patterns or migration.	No Similar Action
Range Improvements -Cattleguards	3 cattleguards	17 cattleguards	No cattleguards would be developed.	Same as Alternative One
Range Improvements -Water developments	18 springs, pipelines, wells, and/or reservoirs would be developed.	33 springs, pipelines, wells, and/or reservoirs would be developed. See narrative.	None, unless the water development provides a direct benefit to wildlife. See narrative.	12 new wells and 12 new springs would be developed. See narrative.
Range Improvements -Funding	When funding range improvements, BLM would strive for a 50 percent cost-share between the BLM and permittees over a period of time. (The historical average cost share has been 70 percent BLM, 11 percent permittees, and 19 percent cooperators.)	Same as Alternative One	Each range improvement would require a 50 percent cost-share between the BLM and permittees before approval.	Same as Alternative One
Use Areas and Pastures	1 allotment, 5 use areas, 16 pastures	6 allotments, 16 pastures	Same as Alternative One except that wildlife migration routes would be evaluated for additional protective measures and long term viability.	2 allotments, Alkali Creek Common Allotment with 5 pastures on 471,058 acres; Green Mountain Allotment with 6 pastures on 51,233 acres.

Table 2-21. Summary Of Management Actions, Assumptions, And Mitigation By Alternative

Management Actions, Assumptions and Mitigation	Alternative One (Existing Management)	Alternative Two (Proposed Action)	Alternative Three	Alternative Four
Grazing Systems and Treatments (General)	Adjustments to the timing, duration, and use levels of each pasture or use area would be based on periodic evaluations of allotment conditions over several years.	Adjustments to the timing, duration, and use levels of each pasture or use area would be based on joint inspections of allotment conditions with the BLM during the grazing season.	Livestock would be moved based on utilization standards. (See alternative narrative description.)	Livestock would be moved based on utilization standards. (See alternative narrative description for specific standards.)
	No Similar Action	No Similar Action	BLM would develop “recovery prescriptions” for areas not at ecological potential based on species distribution, ground cover, and productivity.	No Similar Action
Grazing Systems Alkali Creek (Sheep)	Spring and fall / winter continuous seasonal grazing; rest summer long 6/16 – 9/15	Same as Alternative One	Same as Alternative One	Same as Alternative One
Grazing Systems Antelope Hills / Picket Lake	Four-pasture deferred rotation grazing	Three-pasture deferred rotation grazing	Same as Alternative One	No Similar Action
Grazing Systems Arapahoe	Four-pasture deferred rotation grazing	Three-pasture modified deferred rotation grazing	Same as Alternative One	No Similar Action
Grazing Systems Happy Springs	Three-pasture deferred rotation grazing	Continuous seasonal grazing	Same as Alternative One	No Similar Action
Grazing Systems Haypress Allotment	No Similar Action	Three-pasture rest-rotation grazing	Same as Alternative One	No Similar Action
Grazing Systems Green Mountain	Four-pasture deferred rotation grazing	Six-pasture deferred rotation grazing	No Similar Action	Same as Alternative Two
Grazing Systems Alkali Creek Common	No Similar Action	No Similar Action	No Similar Action	One herd cattle, rest-rotation
Grazing Treatments Antelope Hills / Picket Lake	Graze key riparian sites at a proper use level of 50% on meadow riparian areas early in the summer to allow for re-growth. Graze at 30 to 40% if season will run to September 1. Maintain a stubble height of 4 inches or more on key riparian sites after planned grazing use.	Same as Alternative One	No Similar Action	No Similar Action

Table 2-21. Summary Of Management Actions, Assumptions, And Mitigation By Alternative

Management Actions, Assumptions and Mitigation	Alternative One (Existing Management)	Alternative Two (Proposed Action)	Alternative Three	Alternative Four
Grazing Treatments Green Mountain, Happy Springs, Haypress	Graze key riparian sites at a proper use level of 50% on meadow riparian areas early in the summer to allow for re-growth. Graze at 30 to 40% if season will run to September 1 to 15. Maintain a stubble height of 3 to 4 inches on key riparian sites after planned grazing use.	Same as Alternative One	No Similar Action	No Similar Action
Grazing Treatments Arapahoe	Graze key riparian sites at a proper use level of 50% on meadow riparian areas early in the summer to allow for re-growth. Graze at 30 to 40% if season will run to September 1 to 15. Maintain a stubble height of 3 to 4 inches on key riparian sites after planned grazing use.	Rest summer-long (June 16 through September 15). Graze key riparian sites at a proper use level of 50 percent on meadow riparian areas early in the summer to allow for re-growth. Graze at 30 – 40 percent if season will run to September 1 - 15. Maintain a stubble height of three to four inches on key riparian sites after planned grazing use.	No Similar Action	No Similar Action
Salt and Mineral Placement	Salt and mineral supplements would be placed at least 0.5 mile from water sources.	Same as Alternative One	Same as Alternative One except that BLM would designate location.	Same as Alternative One
Supplemental Feeding	Storing or feeding supplemental forage on public land would require prior approval. Forage to be fed or stored on public lands must be certified noxious weed-free.	Same as Alternative One	Storing or feeding supplemental forage would be prohibited on public land. Emergency feeding would only be allowed with prior approval.	Same as Alternative One

Table 2-21. Summary Of Management Actions, Assumptions, And Mitigation By Alternative

Management Actions, Assumptions and Mitigation	Alternative One (Existing Management)	Alternative Two (Proposed Action)	Alternative Three	Alternative Four
Herding	Livestock would be herded as necessary to achieve the forage and utilization standard of four inches on key riparian areas after grazing use, as described above under Grazing Treatments. Permittees would have 3 days to vacate pasture after determination that pasture must be changed.	Several allotments would require moving cattle from one pasture to the next with minimal movements of cattle and some herding. Range improvements would make the herding program more manageable. Pasture moves would be phased movements of livestock from one pasture to the next over a 5 to 8 day period.	Same as Alternative One. In addition, a herder or rider would be required for every 500 head of cattle on the allotment. Herding would be required at least 5 days per week.	Same as Alternative One, although additional utilization standards would be identified by plant community. See alternative narrative.
	No Similar Action	No Similar Action	No Similar Action	Low stress herding would be emphasized, with training provided on techniques.
	No Similar Action	No Similar Action	No Similar Action	BLM would encourage the establishment of a formal grazing association to coordinate herding.
Flexibility -Operating Plan	An annual operating plan would be issued with appropriate adjustments in authorized livestock use levels, pasture rotation schedules, turnout pastures and dates, gathering dates, and instructions on the operation and maintenance of range improvements.	No Similar Action	Same as Alternative One, except that BLM would encourage voluntary conservation easement incentives and discourage subleasing. All cattle on the allotment would be ear-tagged. See narrative for performance standards.	Same as Alternative One

Table 2-21. Summary Of Management Actions, Assumptions, And Mitigation By Alternative

Management Actions, Assumptions and Mitigation	Alternative One (Existing Management)	Alternative Two (Proposed Action)	Alternative Three	Alternative Four
Flexibility -Grazing Plan	No Similar Action	Permittees in coordination with BLM would determine turnout dates based on year-specific conditions. The grazing plan would describe the number of days of acceptable use for each allotment and pasture. On and off dates would be flexible based on vegetative conditions. Permittees would decide livestock numbers during drought to meet long-term vegetative objectives. The BLM would accommodate “drift” during pasture moves. See alternative narrative.	No Similar Action	No Similar Action
Riparian Area Pastures to be Constructed and Rested 1 year of rest followed by spring grazing of up to 30 days	Sweetwater River	Same as Alternative One	Same as Alternative One	No Similar Action
3-5 years of rest	No Similar Action	No Similar Action	No Similar Action	Sweetwater River
10 years of rest followed by spring or fall grazing	Lost Creek	Same as Alternative One	No Similar Action	Same as Alternative One
Variable rest, until areas meet rangeland health standards	No Similar Action	No Similar Action	Sweetwater River, Lost Creek	No Similar Action
Riparian Area Pasture (existing) to be Rested	Crooks Creek – Bare Ring Slough (2 years rest remaining)	Same as Alternative One	Same as Alternative One	Same as Alternative One
Riparian Area Pasture to be Constructed for Deferred Grazing	No Similar Action	Granite Creek – Rocks	No Similar Action	East and West Willow Creek Pastures
Riparian Area Pastures (existing) Managed for Deferred Grazing	Ice Slough, Warm Springs, West Fork of Crooks Creek, Long Slough, Crooks Creek-Bare Ring Slough	Same as Alternative One	Same as Alternative One	Same as Alternative One

Table 2-21. Summary Of Management Actions, Assumptions, And Mitigation By Alternative

Management Actions, Assumptions and Mitigation	Alternative One (Existing Management)	Alternative Two (Proposed Action)	Alternative Three	Alternative Four
Predator Control	To be carried out by the Animal and Plant Health and Inspection Service, Wildlife Services, WGFD, or the person or agency responsible for the offending species. No permittee predator control would be allowed.	Same as Alternative One	Same as Alternative One	Same as Alternative One
Vegetation and Land Treatments	Treatments may include prescribed burning, mechanical treatments, and herbicide treatments.	Same as Alternative One	Same as Alternative One	Same as Alternative One
	Vegetation and land treatments would be used to meet a variety of multiple use management objectives such as maintaining fire-adapted ecosystems, reducing hazardous fuels loading, enhancing habitat, and increasing forage production.	Vegetation and land treatments would be used to reduce sagebrush canopy cover and increase forage production for livestock, with a secondary goal of reducing hazardous fuels loading.	Vegetation and land treatments would be used to maintain and enhance wildlife habitat.	Same as Alternative One
Allotment Monitoring -Data Collection	Data would be collected pertaining to range condition and trend, forage utilization, riparian stubble height, actual use, climate, water quality, and soil quality. See alternative narrative for additional details.	Data emphasizing water quality would be collected as determined by the permittees in cooperation with the BLM. See alternative narrative for additional details.	Same as Alternative One	Data to be collected would be determined by the BLM, University of Wyoming, Department of Agriculture, interested publics and the permittees, who would be trained to collect data. See alternative narrative.
Allotment Monitoring -Collaboration	BLM would encourage a cooperative monitoring effort with the active participation of the interested public.	Same as Alternative One	No Similar Action	Same as Alternative One

Table 2-21. Summary Of Management Actions, Assumptions, And Mitigation By Alternative

Management Actions, Assumptions and Mitigation	Alternative One (Existing Management)	Alternative Two (Proposed Action)	Alternative Three	Alternative Four
Allotment Monitoring -Water quality	Routine allotment monitoring, rangeland health, and PFC assessments would be evaluated to supply WDEQ with data for suspect waterbodies for inclusion in WDEQ’s monitoring schedule to assess water quality and beneficial uses.	Permittees and the BLM would develop water quality monitoring plans with clear and concise natural resource goals. Water quality samples would be taken to obtain credible data. See alternative narrative.	Same as Alternative One	Permittees and the BLM in cooperation with the UWCES, WDA, WDEQ, and WGFD would develop water quality monitoring plans to supply WDEQ with data for suspect waterbodies.
Allotment Evaluation	Monitoring data would be evaluated to determine whether adjustments in stocking levels, season and duration of use, and other management considerations should be made. Long term changes in grazing management would be made in accordance with the findings and recommendations of the 2009-2010 evaluation by applying appropriate guidelines to meet Wyoming BLM Standards for Healthy Rangelands.	Evaluations would focus on quantitative data. Permittees and the BLM would work together to periodically adjust grazing plans for ease of management, to benefit resources, or for other reasons mutually agreed upon. Management changes would focus on duration of grazing rather than reducing stocking rates.	Same as Alternative One	Same as Alternative One, although the evaluation would be conducted following 5 years of grazing on the Alkali Creek Common Allotment and following 6 years on the Green Mountain Allotment. Long-term evaluations would be conducted after 10 and 12 years respectively.
Drought Planning	The BLM would address drought conditions case-by-case. The BLM would meet with permittees prior to livestock turn-out to consider proposed grazing plans. The BLM would review range conditions with permittees on the ground, as necessary. See alternative narrative.	Grazing permittees, in cooperation with the BLM would address drought conditions by intensifying management of livestock for better distribution, reducing number of grazing animals, and working with BLM on options such as other pastures or leases.	Same as Alternative One	Same as Alternative One

Table 2-21. Summary Of Management Actions, Assumptions, And Mitigation By Alternative

Management Actions, Assumptions and Mitigation	Alternative One (Existing Management)	Alternative Two (Proposed Action)	Alternative Three	Alternative Four
Drought Indicators	No Similar Action	Precipitation data and forage production levels for April, May, and June would be used as primary indicators for adjustments. See alternative narrative.	No Similar Action	No Similar Action
	During emergency conditions related to drought, insect infestations, or wildfire, the BLM would close pastures or the allotment to livestock grazing.	Same as Alternative One	Same as Alternative One	Same as Alternative One
Sage Grouse Prescriptions (General)	The Wyoming Greater Sage-Grouse Conservation Plan's recommended management practices would be applied to all habitat manipulation projects.	Same as Alternative One	Same as Alternative One	Same as Alternative One
Sage Grouse Prescriptions for leks (within 0.6 mile)	No vegetation manipulation, surface disturbance or surface occupancy allowed, no salt or mineral supplements, no disruptive activity from 1 hr. before sunset to 1 hr. before sunrise March 1 to May 15.	Same as Alternative One	Same as Alternative One	Same as Alternative One
	No sheep bedding or livestock concentrations would be allowed on leks.	Same as Alternative One	Same as Alternative One	Same as Alternative One

Table 2-21. Summary Of Management Actions, Assumptions, And Mitigation By Alternative

Management Actions, Assumptions and Mitigation	Alternative One (Existing Management)	Alternative Two (Proposed Action)	Alternative Three	Alternative Four
Sage Grouse Prescriptions for suitable nesting/early brood rearing habitat	Within 3 miles of the perimeter of the lek, and within nesting/early brood rearing habitat elsewhere: Maintain 15 to 30% sagebrush cover at 11 to 32 inches tall and grasses/forbs at 6 inches or more from March 15 to July 15. No surface disturbance or disruptive activities allowed from March 15 to July 15. Locate range improvements in least sensitive areas and mitigate to prevent raptor predation.	Same as Alternative One	Same as Alternative One	Same as Alternative One
Sage Grouse Prescriptions for Winter Concentration Areas	No vegetation manipulation allowed. No surface disturbance or disruptive activities from November 15 to March 14.	Same as Alternative One	Same as Alternative One	Same as Alternative One
Off Highway Vehicle Use	The use of OHVs, such as ATVs, would only be allowed for building and maintaining range improvements, tending to sick livestock, and placing salt and mineral supplements on the public lands. The shortest reasonable route of travel, without causing resource damage, would be required to and from existing roads and trails.	Same as Alternative One	Same as Alternative One	Same as Alternative One
	The use of OHVs, such as ATVs, would be prohibited for herding livestock except on existing or designated motorized routes identified in the LFO Resource Management Plan.	Same as Alternative One	Same as Alternative One	Same as Alternative One

Table 2-21. Summary Of Management Actions, Assumptions, And Mitigation By Alternative

Management Actions, Assumptions and Mitigation	Alternative One (Existing Management)	Alternative Two (Proposed Action)	Alternative Three	Alternative Four
Penalties for Noncompliance with Permit Terms and Conditions or Resource Condition Objectives	Noncompliance would be addressed consistent with the grazing permit standard terms and conditions.	If noncompliance with permit terms and conditions or with resource condition objectives is verified for two grazing seasons in a row, downward adjustments in grazing use would be made for the next two grazing seasons.	Noncompliance with herding and stocking rates would result in partial suspension of AUMs. See alternative narrative.	Same as Alternative One
	No Similar Action	Adjustments to address noncompliance may include reductions in livestock use, a shortened grazing season, or permit suspension.	Adjustments to address noncompliance would reduce grazing by 10% for the next grazing season taken in numbers or in kind.	No Similar Action
ASSUMPTIONS FOR ANALYSIS				
<u>Assumptions for Analysis</u> -funding	It is assumed that all management actions would be adequately funded and completed on schedule.	Same as Alternative One	Same as Alternative One	Same as Alternative One
<u>Assumptions for Analysis</u> -wildlife populations	Wildlife population management would continue through sport hunting harvest levels authorized by the Wyoming Game and Fish Commission. Big game population objectives would remain as currently set, unless public desires or habitat conditions warrant adjustments of these objectives.	Same as Alternative One	Same as Alternative One	Same as Alternative One

Table 2-21. Summary Of Management Actions, Assumptions, And Mitigation By Alternative

Management Actions, Assumptions and Mitigation	Alternative One (Existing Management)	Alternative Two (Proposed Action)	Alternative Three	Alternative Four
Assumptions for Analysis -wild horse gathers	Wild horse numbers in the GMCA would be reduced in accordance with the Lander Herd Management Area Plan (HMAP), the Seven Lakes HMAP, and the State of Wyoming consent decree of 2003.	Same as Alternative One	Same as Alternative One	Same as Alternative One
	The Green Mountain Herd Management Area (HMA) would have a maximum of 300 horses, a minimum of 170 horses, and an average of 250 horses. The Crooks Mountain HMA would have a maximum of 100 horses, a minimum of 65 horses, and an average of 82 horses. The Cyclone Rim/Antelope Hills HMA would have a maximum of 82 horses, a minimum of 65 horses and an average of 73 horses.	Same as Alternative One	Same as Alternative One	Same as Alternative One
MITIGATION MEASURES				
Mitigation Measures -cultural and prehistoric resources	Grazing would be excluded or fenced off where significant historic trails/ sites and prehistoric sites near water sources or riparian areas are found to be suffering adverse effects from livestock trampling and congregating.	Same as Alternative One	Same as Alternative One	Same as Alternative One

Table 2-21. Summary Of Management Actions, Assumptions, And Mitigation By Alternative

Management Actions, Assumptions and Mitigation	Alternative One (Existing Management)	Alternative Two (Proposed Action)	Alternative Three	Alternative Four
Mitigation Measures -cultural and prehistoric resources (continued)	The placement of water sources and rangeland developments would avoid significant cultural resource sites.	Same as Alternative One	Same as Alternative One	Same as Alternative One
	The placement of salt blocks would be prohibited in areas where direct and adverse visual effects would result to significant cultural resources.	Same as Alternative One	Same as Alternative One plus a requirement that salt be at least 0.5 miles from scenic and historic trails.	Same as Alternative One
	No Similar Action	Three fences proposed for crossing the Seminole Cutoff would be routed to avoid pristine segments of this trail.	No Similar Action	Proposed fences that would damage the Rawlins-Fort Washakie Stage Trail and its historic settings would be considered for relocation to avoid adverse effects.
	No Similar Action	Proposed pipelines and troughs that would negatively impact the Rawlins-Fort Washakie Stage Trail and its historic settings would be considered for relocation to avoid adverse effects to this trail and its historic settings.	No Similar Action	No Similar Action
	New range improvements in other parts of the GMCA would avoid or mitigate effects to significant cultural resources through the use of standard cultural resource management as described below:	Same as Alternative One	Same as Alternative One	Same as Alternative One

Table 2-21. Summary Of Management Actions, Assumptions, And Mitigation By Alternative

Management Actions, Assumptions and Mitigation	Alternative One (Existing Management)	Alternative Two (Proposed Action)	Alternative Three	Alternative Four
<p>Mitigation Measures -cultural and prehistoric resources (continued)</p>	<p>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.</p>	<p>Same as Alternative One</p>	<p>Same as Alternative One</p>	<p>Same as Alternative One</p>
<p>Mitigation Measures -soil and water resources</p>	<p>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.</p>	<p>Same as Alternative One</p>	<p>Same as Alternative One</p>	<p>Same as Alternative One</p>

Table 2-21. Summary Of Management Actions, Assumptions, And Mitigation By Alternative

Management Actions, Assumptions and Mitigation	Alternative One (Existing Management)	Alternative Two (Proposed Action)	Alternative Three	Alternative Four
Mitigation Measures -soil and water resources (continued)	Increased noxious weed monitoring and necessary control would occur around sacrifice areas, soils disturbed by projects, roads associated with projects and project maintenance, and areas of heavy livestock trampling.	Same as Alternative One	Same as Alternative One	Same as Alternative One
	BLM would ensure compliance with National Pollution Discharge Elimination System (NPDES) Storm Water Permits for construction activities related to livestock management that disturb WDEQ's minimum acreage threshold (currently 1 acre) to help prevent erosion from such activities and support ecosystem reconstruction.	Same as Alternative One	Same as Alternative One	Same as Alternative One
	Under deferred rotation grazing systems, care would be exercised by the livestock herders to avoid using the same approaches to natural water sources every year. This would ensure that compacted soils are given enough time to recover, and that permanent trail development is not initiated.	No Similar Action	Same as Alternative One	Same as Alternative One
	Water pipelines would be constructed in or adjacent to existing disturbances (such as roads) where possible.	Same as Alternative One	Same as Alternative One	Same as Alternative One
	Locate range improvements in close proximity to existing disturbances, especially existing roads.	Same as Alternative One	Same as Alternative One	Same as Alternative One

Table 2-21. Summary Of Management Actions, Assumptions, And Mitigation By Alternative

Management Actions, Assumptions and Mitigation	Alternative One (Existing Management)	Alternative Two (Proposed Action)	Alternative Three	Alternative Four
Mitigation Measures -soil and water resources (continued)	During fence and other range project construction, limit the frequency of vehicle passes to the minimum amount necessary for construction.	Same as Alternative One	Same as Alternative One	Same as Alternative One
Mitigation Measures -wildlife, sage-grouse	Sage-grouse management prescriptions: See separate Sage-Grouse Section above.	Same as Alternative One	Same as Alternative One	Same as Alternative One
Mitigation Measures -wildlife, crucial big game habitat	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 would be determined by the species impacted and winter conditions.	Same as Alternative One	Same as Alternative One	Same as Alternative One
Mitigation Measures -wildlife, raptor habitat	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.	Same as Alternative One	Same as Alternative One	Same as Alternative One
Mitigation Measures -wildlife, wildlife guzzlers	Where needed, small mammal/bird guzzlers would be included in pipelines to provide supplemental water for wildlife. Guzzlers would be designed to minimize evaporative loss.	Same as Alternative One	Same as Alternative One	Same as Alternative One

Table 2-21. Summary Of Management Actions, Assumptions, And Mitigation By Alternative

Management Actions, Assumptions and Mitigation	Alternative One (Existing Management)	Alternative Two (Proposed Action)	Alternative Three	Alternative Four
Mitigation Measures -wildlife, power lines	To protect raptors and other migratory birds, power lines and electrical facilities would be designed utilizing methods identified in <u>Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006</u> (Avian Power Line Interaction Committee 2006).	Same as Alternative One	Same as Alternative One	Same as Alternative One
Mitigation Measures -wildlife, bird ladders	All water developments would be provided with bird ladders to prevent accidental drowning.	Same as Alternative One	Same as Alternative One	Same as Alternative One
Mitigation Measures -wildlife, fences	All permanent fences should be equipped with removable sections to facilitate wildlife movement when the fence is not being used to control livestock.	Same as Alternative One	Same as Alternative One	Same as Alternative One
Mitigation Measures -wildlife, West Nile Virus	Larvicide should be added to livestock watering developments where West Nile Virus has been found to threaten local sage-grouse populations.	Same as Alternative One	Same as Alternative One	Same as Alternative One
Mitigation Measures -visual resources and recreation	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.	Same as Alternative One	Same as Alternative One	Same as Alternative One

Table 2-21. Summary Of Management Actions, Assumptions, And Mitigation By Alternative

Management Actions, Assumptions and Mitigation	Alternative One (Existing Management)	Alternative Two (Proposed Action)	Alternative Three	Alternative Four
Mitigation Measures -visual resources and recreation (continued)	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.	Same as Alternative One	Same as Alternative One	Same as Alternative One
	In order to provide water for the recreating public along the Continental Divide National Scenic Trail (CDNST), BLM would build exclosures around some unfenced water sources while providing off-site water for livestock nearby.	Same as Alternative One	Same as Alternative One	Same as Alternative One
	No Similar Action	When new water projects are built along the CDNST, the BLM would use some of the developments to provide water sources to hikers.	Same as Alternative One	Same as Alternative One
	No Similar Action	Pass through stiles would be developed in fence lines crossing the CDNST to ease pedestrian and equestrian fence negotiation.	No Similar Action	No Similar Action
	Realign the Wilson Bar fence. See "Effects Common to All Alternatives" in Chapter 4.	Same as Alternative One	Same as Alternative One	Same as Alternative One

Table 2-21. Summary Of Management Actions, Assumptions, And Mitigation By Alternative

Management Actions, Assumptions and Mitigation	Alternative One (Existing Management)	Alternative Two (Proposed Action)	Alternative Three	Alternative Four
Mitigation Measures -wild horses	In Wild Horse HMAs, fences could be designed with let-down or removal designs (in whole or in part), and would comply with the standards provided in BLM Handbook H-1741-1 for wild horses.	Same as Alternative One	Same as Alternative One	Same as Alternative One
	All permanent fences should be equipped with removable sections to facilitate wild horse movement when the fence is not being used to control livestock.	Same as Alternative One	Same as Alternative One	Same as Alternative One
	Water developments outside HMAs within the GMCA should be kept to a minimum to avoid migration of wild horses outside of herd areas and the expansion of areas used by wild horses.	Same as Alternative One	Same as Alternative One	Same as Alternative One
	The BLM would consider making the Ice Slough riparian fence a two- or three-wire electric fence that would be completely removed on or about September 15, promoting riparian area healing and allowing for fall-winter use of the area by horses.	Same as Alternative One	Same as Alternative One	Same as Alternative One

MANAGEMENT ACTIONS COMMON TO ALL ALTERNATIVES

IMPLEMENTATION OF MANAGEMENT ACTIONS

Under all alternatives, the existing management situation would continue until the Decision Record (DR) becomes final. Appropriate project clearances would be completed and range improvements would be constructed as identified in the final decision and range improvements would be funded as dollar allocations allow.

If it is determined that adjustment in grazing preference are necessary, the initial adjustment would be made in the third year of implementation, and the balance of the adjustments would be made in the fifth year and tenth year . However, before implementation of the fifth and tenth year adjustments, a review of available information would be made to determine whether the amount of adjustment should be modified. Adjustments in permitted use, turn-out dates and seasons of use would be phased in over a period not to exceed 10 years.

MONITORING

Any monitoring occurring under the alternatives would be conducted in accordance with BLM standard operating procedures and policy. Existing range condition and trend studies would continue to be monitored under all four alternatives. A cooperative effort with the active participation of the affected interests would be encouraged, or required as a grazing permit condition (actual use reports), to accomplish the necessary monitoring.

1. The BLM Manual, Wyoming State Office Supplement Handbook H-4423-1, Section 4423.56 would be used as a general guide in developing range condition trend-monitoring procedures. Plant frequency, density, production and utilization, and ground cover would be sampled to evaluate vegetation and soil erosion trends. Other parameters, such as canopy cover, seedling or shrub characteristics would be considered as needed on unique areas such as riparian zones, aspen stands, and bitterbrush or other mountain shrub thickets.
2. During and after grazing of each pasture, forage utilization would be measured by the height-weight method or the key forage plant method described in BLM Manual, Wyoming State Office Supplement Handbook H-4423-1, Section 4423.47. This would aid in determining whether existing stocking levels are providing proper use and what adjustments in the present management, if any, would be needed. These studies would also help determine a schedule for seasonal use within a grazing system.
3. Selected key areas (meadows and riparian areas) would be monitored to determine impacts from grazing as described in the BLM Manual, Wyoming State Office Supplement Handbook H-4423-1, Section 4423.56C; Marlow and Clary (1996); and BLM Technical Reference TR 1737-3, Inventory and Monitoring of Riparian Areas.
4. Rain gauges would be used to measure precipitation to help interpret vegetative production variations resulting from climatic changes.
5. Water quality and discharge would be monitored using only methods/data types acceptable to Wyoming Department of Environmental Quality (WDEQ) so that it can make valid water quality assessments. Before water quality data is collected, WDEQ would be consulted. A monitoring strategy acceptable to both the WDEQ and BLM would be developed and documented. The initiation of a large-scale water quality effort for the entire GMCA by BLM is not practical. Cooperation with the WDEQ, other federal agencies, and affected interests would be necessary for gathering data on those specific waters of concern.
6. Soil quality monitoring would utilize data that is being collected as part of other monitoring efforts in this allotment. Soil cover will be of primary concern to discern how well the monitored sites would be protected from erosion under the chosen management scenario. This data can then be used to compare existing cover to that expected to be present on a particular range site. The data can also be used as part of an erosion equation to develop erosion rates for each year that monitoring is completed; these annual rates of erosion can then be compared to identify trends in soil and vegetation condition.
7. Actual use information would be required to evaluate the future AMP. Direct and indirect methods (according to the guidelines in BLM Manual 4400.23A, Wyoming State Office Supplement Handbook H-4423-1, Section 4423.3)

would be used to collect this information.

8. The approval and use of rangeland monitoring data collected by non-BLM entities will comply with existing Wyoming State Office policy. The BLM may approve and utilize monitoring data collected on public land by parties other than BLM; however, the acceptance of this data by the BLM is not automatic. The BLM will have the final decision authority concerning the planning, collection, and interpretation of monitoring data that is used to make resource management decisions. The BLM will take advantage of these offers of monitoring data from non-BLM entities to the extent feasible, and will honor the concept of public involvement and stewardship in the management of the public rangelands.

GRAZING ADMINISTRATION

Grazing administration under the alternatives would be conducted in accordance with the following standard operating procedures:

1. Permits specifying the allotment, season of use, and number and kind of livestock would be issued to each operator. Operators would be required to obtain BLM approval before changing the grazing specifications outlined in their permits.
2. Livestock operators would be required to file actual-use reports showing how many and how long livestock grazed in each allotment and/or pasture. Use on the allotments would be supervised by BLM throughout the grazing year.
3. If necessary, actions to resolve unauthorized use would be initiated as described in 43 CFR 4150. The unauthorized use would be eliminated and payment would be collected from those responsible for damage and consumption of forage.
4. The AMP would incorporate site-specific objectives for maintaining or improving livestock, wild horse, wildlife, and fish habitat within the allotment. The grazing system implemented under the AMP is designed to achieve those objectives on an overall basis.
5. The use of supplemental feed would conform to Wyoming BLM policy. Prior to the placement of supplemental feed on public lands, livestock operators would obtain authorization from the field manager.
6. All four alternatives would allow for extensive permit nonuse which has been authorized in the allotment over the past nine (1999-2007) years to continue in the short-term to allow for drought recovery. The GMCA grazing permittees who have been taking more nonuse or 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) which 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 4130.2(g) may 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.

RANGE IMPROVEMENTS

All range improvements required by the alternatives would be subject to analysis under the National Environmental Policy Act. Data collection and analyses sufficient to disclose the environmental effects of the action would be addressed in an environmental document before improvements are approved for construction. In addition to the project-specific requirements listed below, other mitigation measures would be developed during site-specific analysis of individual projects. Cooperative agreements with grazing permittees would outline maintenance responsibilities for range improvement projects.

General

Before construction of range improvements or vegetative manipulation, 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 was not possible, the State Historic Preservation Officer would be consulted with to develop acceptable mitigative strategies. Locations of cultural sites would not be disclosed to the public. If cultural material or sites or paleontological materials were discovered during project construction, work would cease until a BLM-approved archeologist evaluated the site and recommended an appropriate course of action.

Consultations concerning endangered species would be conducted according to Section 7 of the Endangered Species Act if deemed necessary, and appropriate mitigative or avoidance actions would be taken.

In accordance with BLM Manual, Section 8341, visual resource management contrast ratings would be used in the project planning stages of all proposed land-management activities that would disturb the soil, change or remove vegetation, or place a structure on the landscape. These ratings would be used to determine the amount of contrast between a proposed activity and the existing landscape. Assessing the amount of contrast would indicate the severity of impact. This would serve as a guide in determining what would be required to reduce the contrast (visual impact) to the point where it would meet the visual management class requirements for the area.

Construction sites would have soils described and evaluated as provided for in BLM Manual section 7100.3. Recommendations or conclusions that result from an onsite evaluation would become a part of any environmental analysis document.

National Pollutant Discharge Elimination Systems permits (storm water discharge permits) would be obtained for construction projects as required by WDEQ.

The U.S. Army Corps of Engineers (US-ACE) would be contacted for all construction projects involving wetlands/riparian areas. The determination of necessary permit coverage for construction-related activities would be left to US-ACE personnel after project consultation.

Fences

Fences would be installed according to spacing, height, and other specifications described in the BLM Handbook H-1741-1 for the control of livestock as well as the protection of wild horses and wildlife. For example, the bottom wire of a three-wire fence would be placed at 16 inches above the ground in pronghorn antelope ranges. Variances from these standards could be approved by the authorized officer after consultation with affected parties.

Herding

Livestock herding (both cattle and sheep) is an essential part of Alternatives One, Three and Four management prescriptions. Even with the pasture fencing, water developments, and riparian management pastures, herding would still be needed and required under those alternatives. Herding would be required to move cattle and sheep between pastures for the proposed deferred-rotation grazing systems for each of the use areas proposed for the allotment.

Herding would be needed to move cattle into the upland pastures and riparian management pastures at the beginning of the prescribed season of use. Most importantly, herding would keep livestock, particularly cattle, properly distributed during the hot grazing season (June 15-September 30). It is during this portion of the grazing season, that cattle most concentrate their grazing use on riparian areas. Herding would also be essential to completely remove cattle and sheep from upland pastures and riparian pastures at the end of the prescribed season of use.

The use of off highway vehicles, such as ATVs, would be prohibited for herding livestock except on existing or designated motorized routes identified in the LFO Resource Management Plan.

Water Developments

Livestock watering developments on public land would be available and safe for wildlife and wild horse use.

After the excavation of a spring, a head box would be installed. The water would be piped into a trough with an overflow pipe leading back into the original drainage or into a new pit. The meadow complex around the spring would be fenced.

All water troughs would be either circular rings with concrete bases, rubber tires, or metal troughs. Wildlife escape ramps would be installed and maintained on all tanks and open storage tanks to prevent birds and small animals from drowning and to permit escape. The appropriate State Engineer's Office permits would be obtained for each project.

Weed and Pest Control

Presently, the GMCA remains relatively free of noxious weed species. The use of certified weed-free forage, mulch, and seed is required of licensed outfitters operating on BLM-administered lands for both storm water management and for land rehabilitation activities. Vigilance in preventing the introduction of noxious weeds is necessary in maintaining the fairly noxious weed-free status this area currently enjoys.

All alternatives propose winter sheep and/or cattle use. Due to the severe winter weather conditions that can occur on the allotment, it is anticipated that requests for supplemental forage in the winter season would occur. Therefore, only certified noxious weed-free forage would be authorized for use. Certified noxious weed-free forage is that which conforms to the Regional Forage Certification Standards for Noxious Weed-Free Forage as set forth in the Wyoming Weed and Pest Control Act of 1973.

Land Treatments

Reclamation of disturbed areas would involve following those items as set forth by The Wyoming Department of Environmental Quality (WDEQ), which requires National Pollutant Discharge Elimination System (NPDES) permits for those construction activities or industrial sites of one acre or more for small construction, and greater than five acres for large construction activities. The Wyoming BLM policy on reclamation, set forth in Instruction Memorandum Number WY-2007-009 Wyoming Interim Reclamation Policy, would be followed (see Appendix 6). Furthermore, BLM must ensure compliance with the state of Wyoming NPDES Storm-water Discharge permitting requirements as per BLM Wyoming Instruction Memorandum WY-98-25. The BLM's primary long-term goal for reclamation is eventual ecosystem reconstruction, and will be carried out consistently with the NPDES requirements for monitoring, Best Management Practices (BMP) maintenance, and final stabilization.

Coverage under NPDES Storm-water Discharge Permits for bureau-authorized construction activities or industrial sites must be maintained until the site is "finally stabilized". To meet the definition of "final stabilization", the following conditions must be met:

- All soil-disturbing activities are complete.
- A uniform perennial vegetative cover with a density of at least 70 percent of the native background cover has been established on all disturbed areas that have not been paved over or covered by permanent structures.

Currently, the WDEQ Abandoned Mine Land (AML) program has reclaimed roughly 430 acres of BLM-administered lands primarily in the Green Mountain, Sheep Mountain, and Crooks Gap areas of the allotment. At present, there remain less than ten acres of potentially reclaimable BLM land in these areas.

Since the 1999 Green Mountain AMP/EA, a number of BLM policies directly relating to land treatments have been issued. These include:

- IM WY 2005-018 Rest Period after Vegetative Treatment requires that livestock grazing will not be allowed for a period of two complete growing seasons. This may be adjusted for less than or greater than two years based on environmental conditions and management objectives consistent with Wyoming's standards for healthy rangelands.

- IM WO 2006-073 Weed-Free Seed Use on Lands Administered by the BLM, which sets a limit of zero percent for noxious weed seed in seed purchased for use on bureau-administered lands.
- Executive Order 13112 Invasive Species, direction to federal agencies has been mentioned above in the previous Weed and Pest Control section.
- IM WY-2007-009 Wyoming Interim Reclamation Policy. This policy is to be finalized in 2008. The long-term goal is to prevent any unnecessary degradation and to provide for eventual ecosystem reconstruction. The short-term goal is to stabilize disturbed areas and to provide the conditions necessary for achieving the long-term goal.

Wildlife

Improvement of aquatic and riparian habitats should be a high priority in the Green Mountain Management Unit (Lander RMP Record of Decision).

Sheep would not be bedded, or cattle or sheep supplementally fed within 0.25 mile of all known sage-grouse strutting grounds.

Sage-grouse Guidelines – Based on the most recent research concerning the seasonal habitat needs of the greater sage-grouse and its response to disturbance, the following vegetation management objectives and restrictions will be applied to livestock management within the GMCA. These are the same for all four alternatives.

Sage-grouse leks (see Map 2-14 for Alternative One, Map 2-15 for Alternative Two, Map 2-16 for Alternative Three and Map 2-17 for Alternative Four):

- No vegetation manipulation, surface occupancy, or surface disturbance within 0.6 mile radius of the identified perimeter of a lek.
- No placement of salt or mineral supplements within 0.6 mile radius of the identified perimeter of a lek.
- No disruptive activity within 0.6 mile radius of the identified perimeter of a lek between one hour before sunset to one hour after sunrise from March 1 to May 15 (this restriction does not include casual use as described by the Code of Federal Regulations).
- No bedding of sheep or concentration of livestock within 0.6 mile of the identified perimeter of a lek.

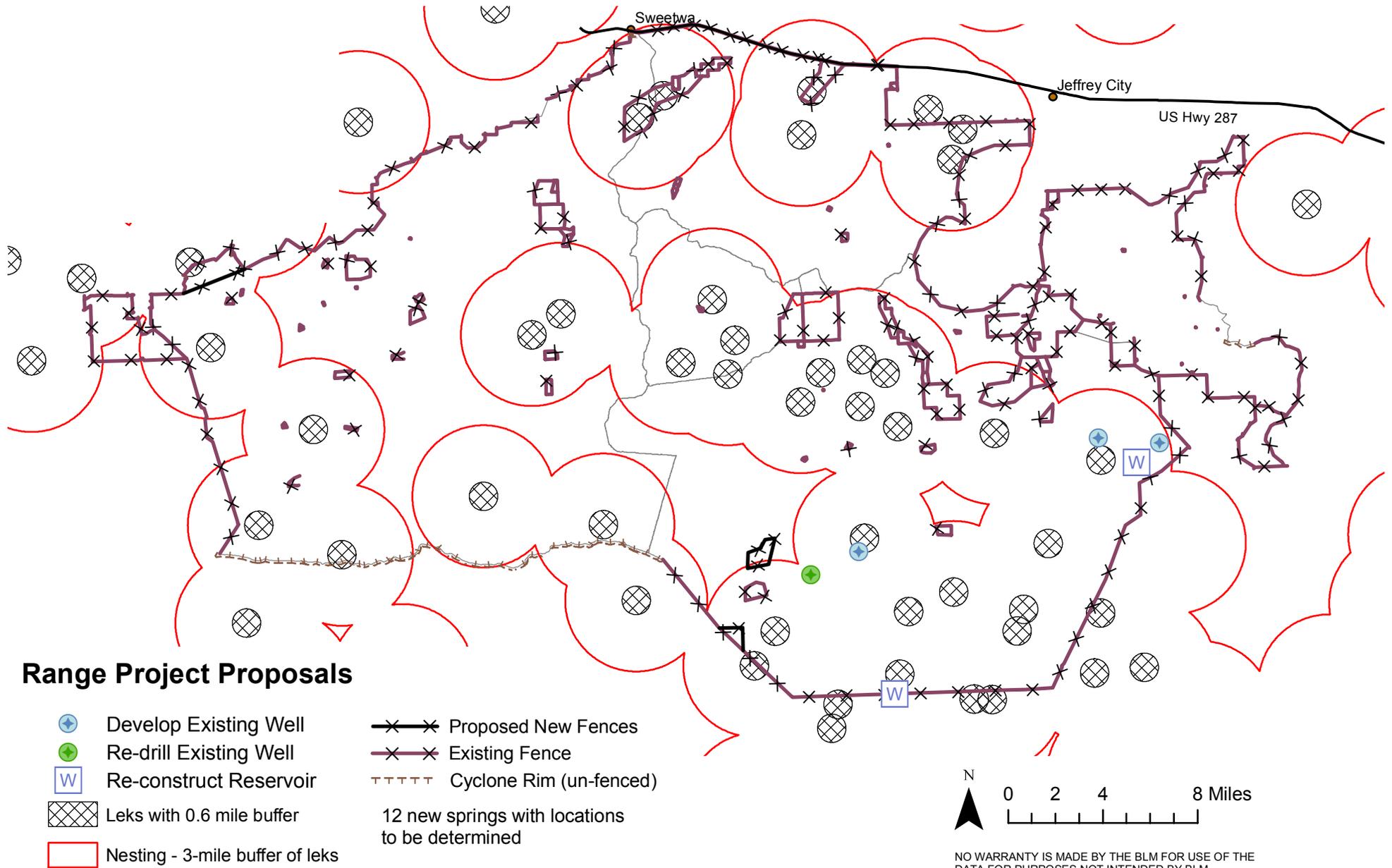
Sage-grouse nesting/early brood-rearing habitat (see Map 2-14 for Alternative One, Map 2-15 for Alternative Two, Map 2-16 for Alternative Three and Map 2-17 for Alternative Four):

- Maintain 15 to 30 percent sagebrush cover with heights of 11 to 32 inches in all suitable sage-grouse nesting/early brood-rearing habitat within a three-mile radius of the perimeter of an identified lek or in identified sage-grouse nesting/early brood-rearing habitat outside the three-mile radius from March 15 to July 15.
- Maintain 6 inches or more of grasses and forbs in all suitable sage-grouse nesting/early brood-rearing habitat within a three-mile radius of the perimeter of an identified lek or in identified sage-grouse nesting/early brood-rearing habitat outside the three-mile radius from March 15 to July 15.
- No surface disturbing or disruptive activities within a three-mile radius of the perimeter of an identified lek or in identified sage-grouse nesting/early brood-rearing habitat outside the 3 mile radius from March 15 to July 15 (this restriction does not include casual use as described by the Code of Federal Regulations).
- Range improvement projects should not be located in areas that are detrimental to nesting/early brood rearing habitat. If this is not possible, these projects should be located in areas that are deemed to be the least detrimental to these habitats.
- Range improvement projects located outside suitable sage-grouse nesting/early brood-rearing habitat must be mitigated to prevent excessive predation on breeding or nesting/brood rearing sage-grouse from perching raptors.

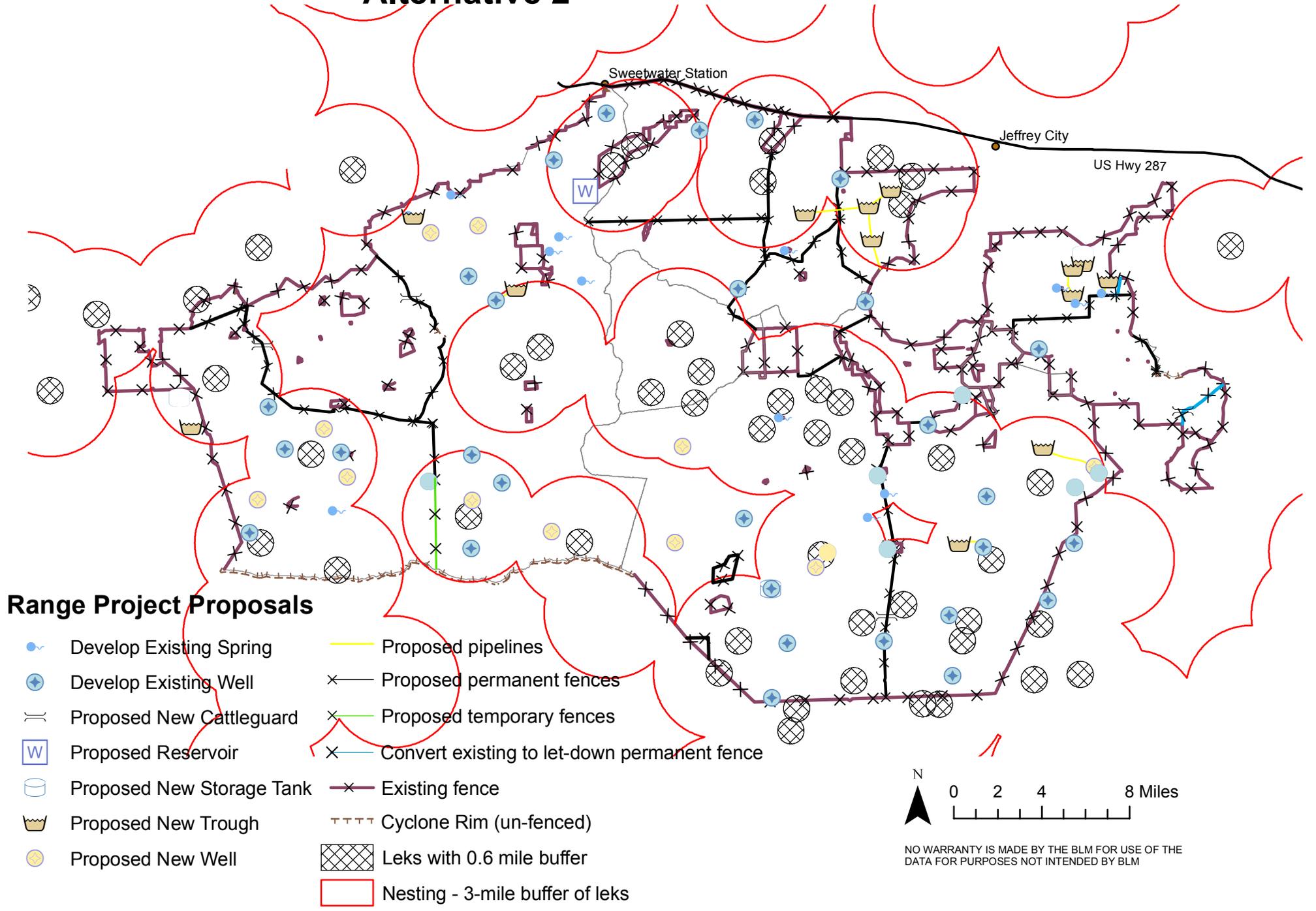
Sage-grouse winter concentration areas (see Map 2-18):

- No vegetation manipulation in identified winter concentration areas.
- No surface disturbing and/or disruptive activities in identified winter concentration areas from November 15 to March 14 (this restriction does not include casual use as described by the Code of Federal Regulations).

Map 2-14: Sage-grouse Leks and Range Project Proposals Alternative 1



Map 2-15: Sage-grouse Leks and Range Project Proposals Alternative 2



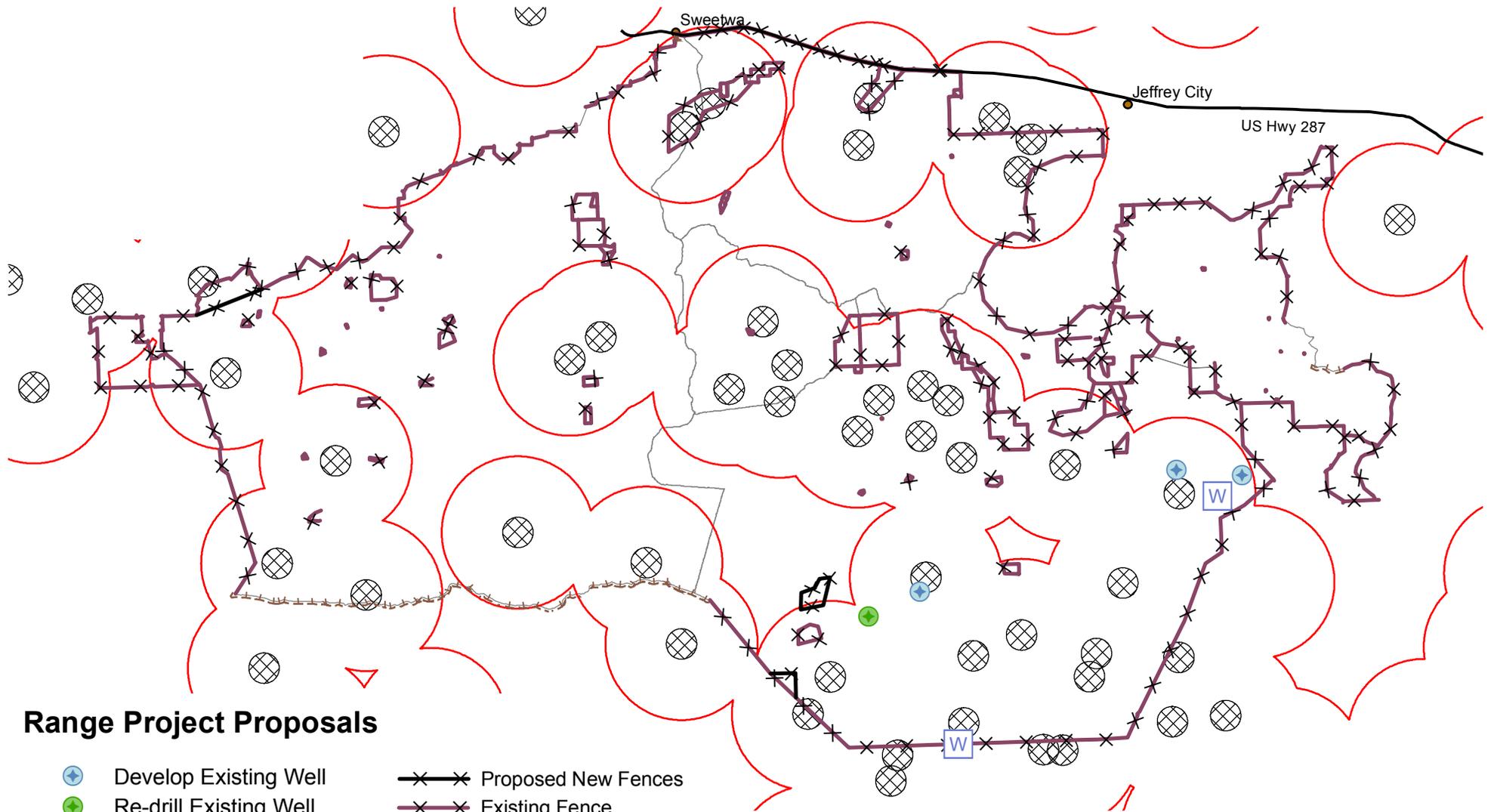
Range Project Proposals

- Develop Existing Spring
- Develop Existing Well
- Proposed New Cattleguard
- Proposed Reservoir
- Proposed New Storage Tank
- Proposed New Trough
- Proposed New Well
- Proposed pipelines
- Proposed permanent fences
- Proposed temporary fences
- Convert existing to let-down permanent fence
- Existing fence
- Cyclone Rim (un-fenced)
- Leks with 0.6 mile buffer
- Nesting - 3-mile buffer of leks



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Map 2-16: Sage-grouse Leks and Range Project Proposals Alternative 3



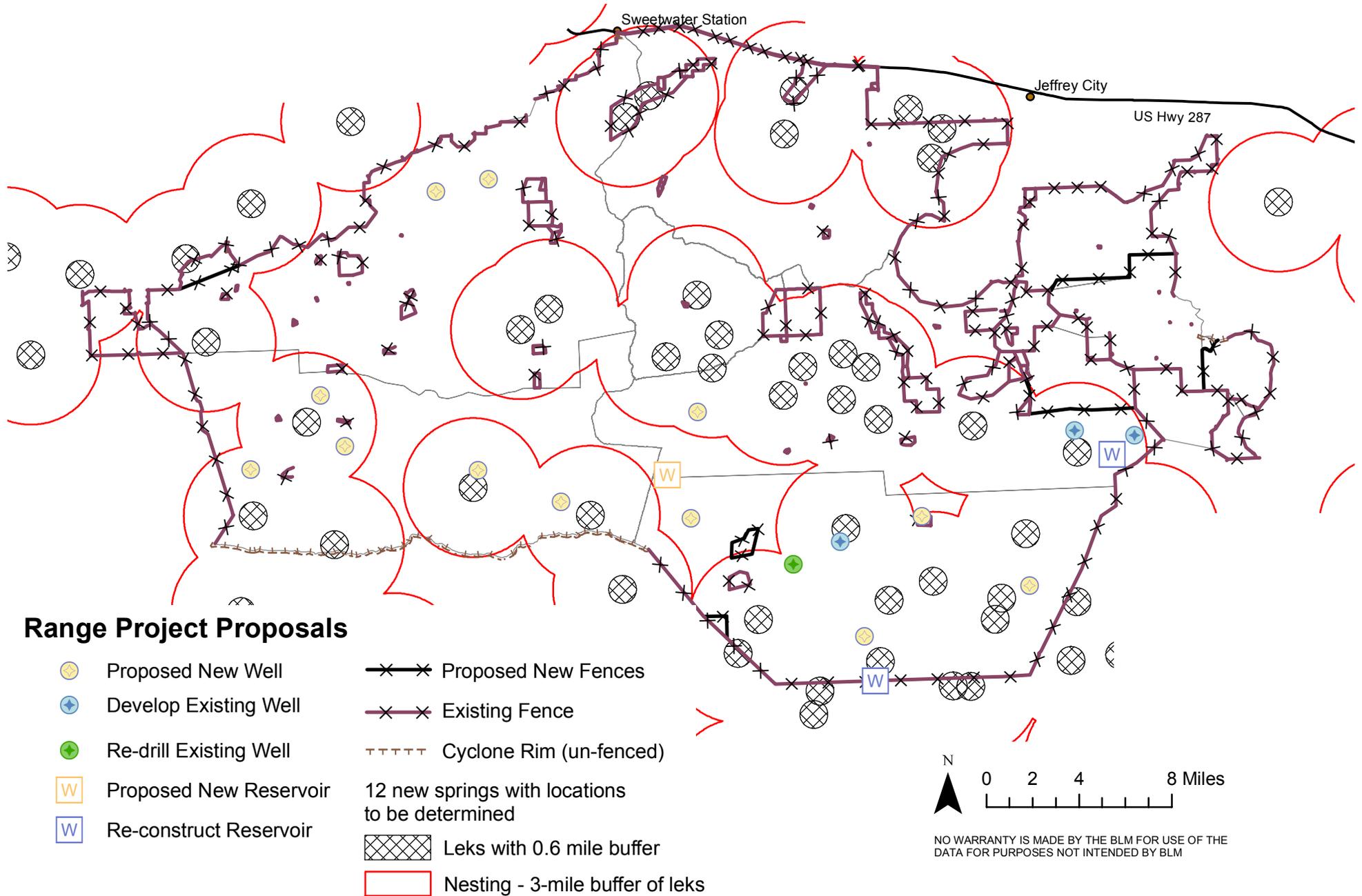
Range Project Proposals

- | | | | |
|---|---------------------------------|---|--|
|  | Develop Existing Well |  | Proposed New Fences |
|  | Re-drill Existing Well |  | Existing Fence |
|  | Re-construct Reservoir |  | Cyclone Rim (un-fenced) |
|  | Leks with 0.6 mile buffer | | 12 new springs with locations to be determined |
|  | Nesting - 3-mile buffer of leks | | |

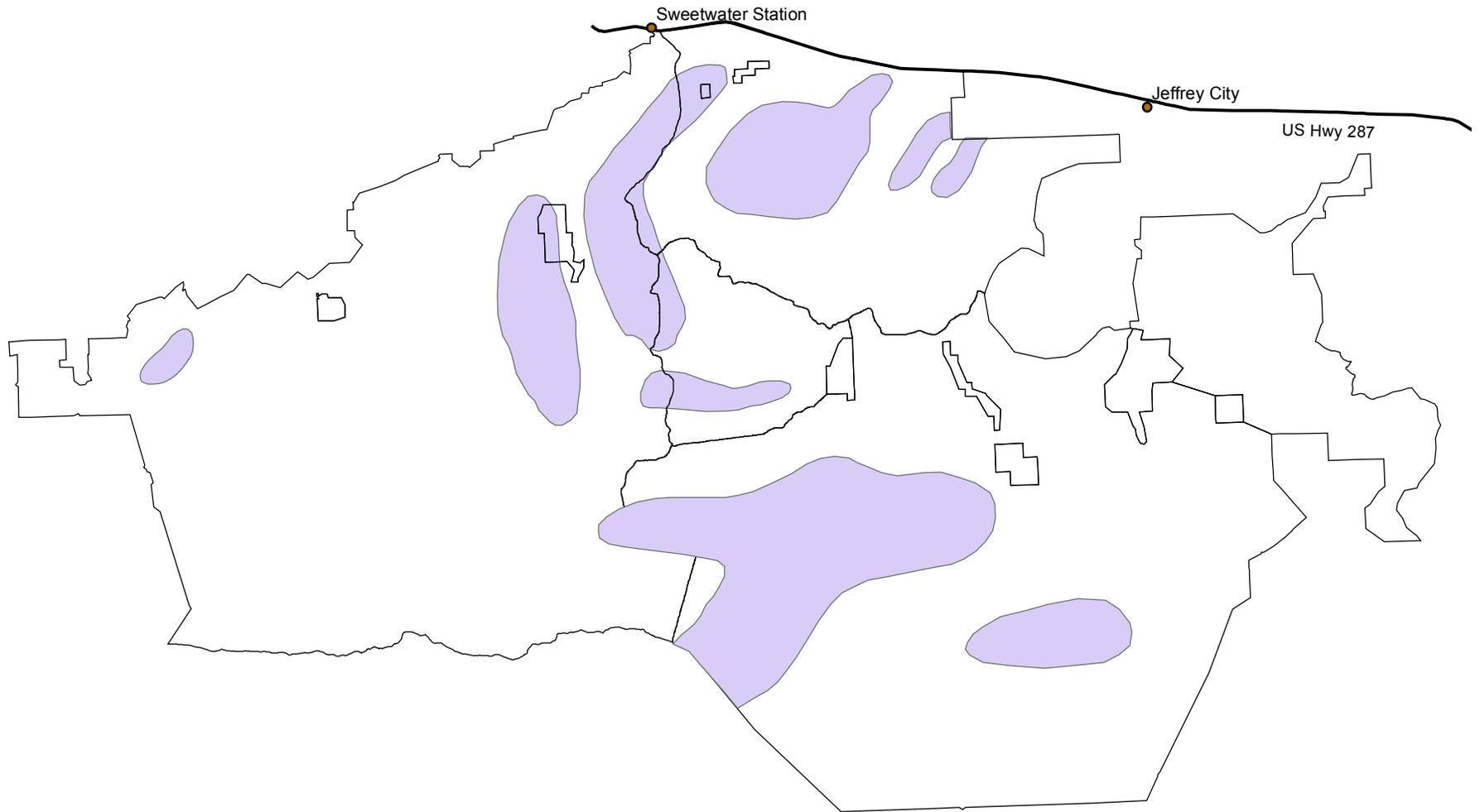


NO WARRANTY IS MADE BY THE BLM FOR USE OF THE DATA FOR PURPOSES NOT INTENDED BY BLM

Map 2-17: Sage-grouse Leks and Range Project Proposals Alternative 4



Map 2-18: Greater Sage-Grouse Wintering Habitat



 Greater Sage-Grouse Winter Habitat



0 2 4 8 Miles

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Chapter 3

Affected Environment

AFFECTED ENVIRONMENT

INTRODUCTION

This chapter describes existing conditions of cultural, physical, biological, and socioeconomic resources in the Green Mountain Common Allotment. Past environmental analyses have revealed that the following critical elements of the human environment are either not present in the GMCA allotment or will not be affected: air quality, sole-source drinking water, prime or unique farmlands, hazardous/solid wastes, and environmental justice. In addition to the above, the following elements are also not affected: forest management, fire management, lands and realty, minerals, paleontological resources, transportation, public health and safety, and noise.

GENERAL SETTING

Location

Green Mountain Common Allotment is located south of the Sweetwater River from the Rock Springs Field Office boundary to Sweetwater Station and South of U.S. Highway 287 from Sweetwater Station to Jeffrey City. The allotment lies within the following boundary: Townships 25-27 North, and Ranges 92-98 West (See Map 1-1).

The allotment is composed of a mixture of public, private, and state lands (lands managed by the Office of State Lands and Investments). Private and state lands are scattered throughout the allotment. The private and some state lands are generally located adjacent to water courses or springs. Many parcels of private and state lands within the external boundaries of the allotment have been fenced separately from the allotment. These in-holdings are not considered part of the allotment. Table 3-1 describes the amount of acres by ownership, AUMs, and percent of AUMs within the GMCA:

Table 3-1. Total Acres with Ownership within the GMCA

Land Status	Acres	AUMs	Percent of AUMs
Public	468,407	47,729	86
State	35,058	4,995	9
Private	18,825	3,024	5
Totals:	522,290	55,748	100

The total numbers of acres are approximate, and are based on information generated through the BLM's Geographic Information System (GIS). The BLM does not guarantee the total acreage to be definitively accurate.

Topography and Elevation

General topography in this allotment varies from flatlands to mountains with drainages and rolling hills throughout. Elevations range from 6,361 feet near Cottonwood Creek in the northeast corner of the allotment to 9,072 feet at Sagebrush Park on Green Mountain. Green Mountain and Crooks Mountain lie across the allotment in an east/west direction.

Climate

With the exception of Green Mountain and Crooks Mountain, the climate of this area is semiarid cold desert. The mountains have a subhumid continental climate.

Temperatures can range from winter lows of almost -50 degrees Fahrenheit to summertime highs of in excess of 100 degrees. Annual air temperatures on the sagebrush-covered rangelands averages 33 to 45 degrees Fahrenheit, and, on forested mountain areas, 33 to 38 degrees. South Pass City, which is located about ten miles west of this allotment, has a five years in ten last freeze date of June 26, and a five years in ten first freeze date of August 12. About ten miles east of the allotment, Muddy Gap has a five years in ten last freeze date of May 29 and a first freeze date of September 16, a roughly two month longer growing season than South Pass City's.

Long-term average annual precipitation varies throughout the allotment, with 4.93 inches at Lost Creek Reservoir,

5.62 inches at Picket Lake, 6.23 inches at Bison Basin, 8.50 inches (1960-2007) at the Sweetwater Enclosure (along the Happy Springs Road), and 18.93 inches on Green Mountain. As can be seen from this data, the lowest precipitation occurs in the Great Divide Basin and the most on Green Mountain. Half of this precipitation occurs in the period between April and June, with a secondary peak in the fall. Most of the precipitation occurs as snow.

In the period between 1985 and 1995, the Sweetwater Enclosure rain gauge recorded three years (1992, 1993, and 1995) of above-average moisture and eight years with below-average moisture. The long-term average (1960-1984) annual precipitation for the period was 9.80 inches. The average annual precipitation for the period from 1985 through 1995 was 9.05 inches. The year 1995 was the wettest year in the period with 13.75 inches of moisture. The driest year was 1990 with 5.35 inches of moisture; 1994 was the second driest year of this period with only 6.49 inches.

In the period between 1996 and 2007, the Sweetwater Enclosure rain gauge recorded three years (1997, 1998, and 2004) of above-average moisture and nine years with below-average moisture. The long-term average (1960-1995) annual precipitation for the period ending in 1995 was 8.95 inches. The average annual precipitation for the period from 1996 through 2007 was 7.14 inches. The year 1997 was the wettest year in the period with 9.27 inches of moisture. The driest year was 2006 with 3.30 inches of moisture; 2002 was the second driest year of this period with only 5.69 inches.

In the period between 1999 and 2007, the Sweetwater Enclosure rain gauge recorded one year (2004) of above-average moisture and eight years with below-average moisture. The long-term average (1960-1998) annual precipitation for the period ending in 1998 was 8.90 inches. The average annual precipitation for the period from 1999 through 2007 was 6.74 inches. The year 2004 was the wettest year in the period with 8.59 inches of moisture. The driest year was 2006 with 3.30 inches of moisture; 2002 was the second driest year of this period with only 5.69 inches.

It is evident from this brief analysis of the Sweetwater Enclosure rain gauge data that during the last nine years (1999-2007) precipitation in this portion of the GMCA has been considerably below the long term average.

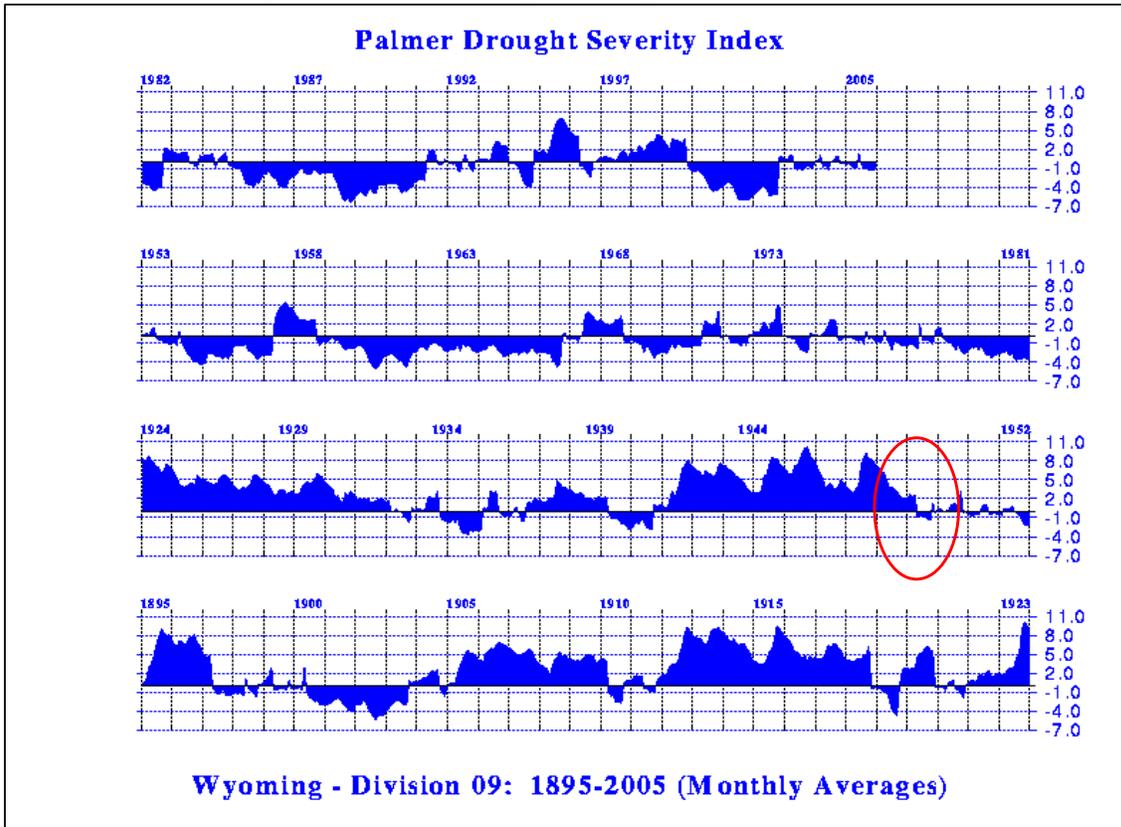
Climatic Conditions Affecting the GMCA

The present drought that the area is experiencing began in about 2000. The severity of recent dry conditions is unprecedented. Present native vegetation production has been substantially decreased in these years. This is also reflected in the voluntary and negotiated non-use, and decreased levels of use, by livestock operators, over this period.

The Palmer Drought Severity Index (PDSI, known operationally as the Palmer Drought Index (PDI)) attempts to measure the duration and intensity of the long-term drought-inducing circulation patterns (see Figure 3-1, below). Long-term drought is cumulative, so the intensity of drought during the current month is dependent on the current weather patterns plus the cumulative patterns of previous months. Since weather patterns can change almost literally overnight from a long-term drought pattern to a long-term wet pattern, the PDSI (PDI) can respond fairly rapidly.

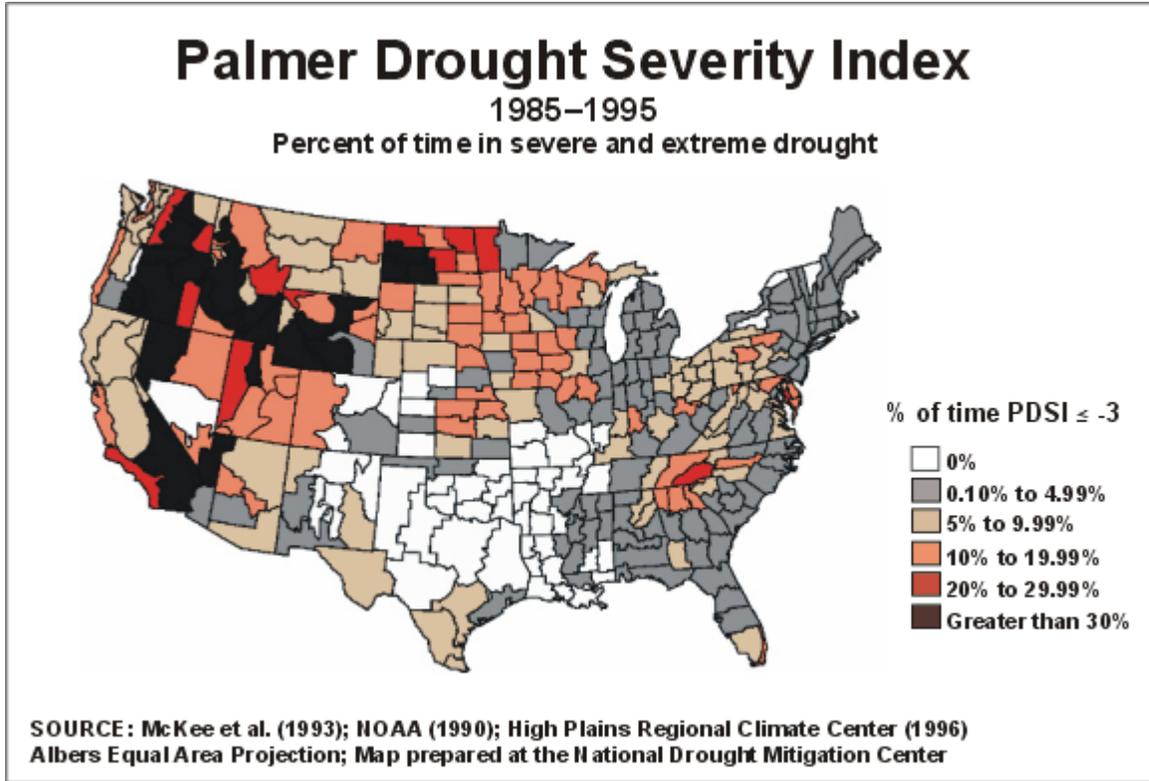
As can be seen in the PDSI figure below, the first fifty years of the last century were wetter, on average, than those of the last half.

Figure 3-1. Palmer Drought Severity Index from 1895-2005



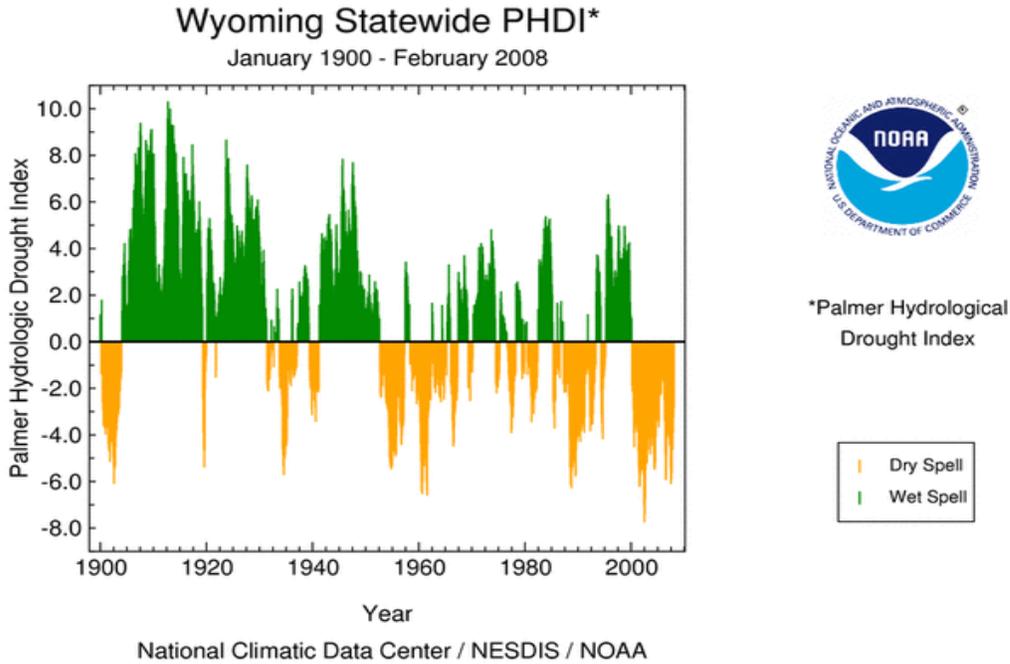
In the PDSI map shown below, the percent of time the area encompassing the GMCA has been in severe and extreme drought has risen to greater than thirty percent in recent years. Although the map only dates through 1995, the recent drought has extended through 2007 and has affected most of the area within the GMCA.

Figure 3-2. Palmer Drought Severity Index (PDSI) from 1895-2005



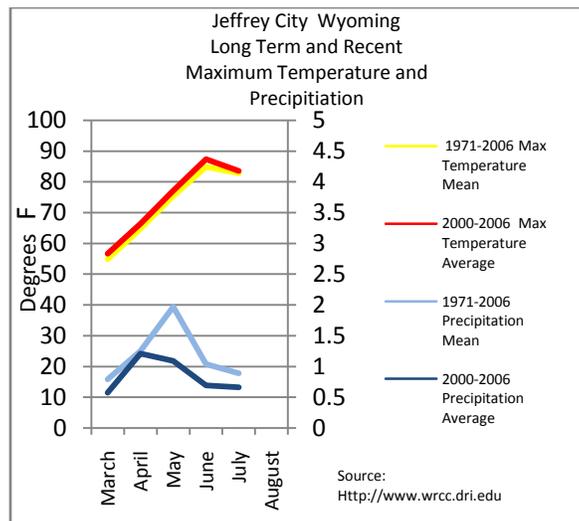
The graph below depicts the hydrological impacts of drought (e.g., reservoir levels, groundwater levels, etc.). As these impacts take longer to develop, it takes longer to recover from them. The Palmer Hydrological Drought Index (PHDI), another long-term drought index, was developed to quantify these hydrological effects. The PHDI responds more slowly to changing conditions than the PDSI (PDI).

Figure 3.3. Wyoming Statewide Palmer Hydrological Drought Index



Below are plotted the temperatures and precipitation for Jeffrey City during the period 2000 through 2006. As can be seen, temperatures for this period have been one to three degrees higher and critical spring precipitation has been consistently below the long term average.

Figure 3-4. Long-Term and Recent Maximum Temperature and Precipitation Data



AFFECTED RESOURCES AND LAND USES

SOIL AND WATER RESOURCES

Soil Resources

The GMCA contains diverse kinds of soils, from cold, sub-humid mountain soils to warm and cool, semiarid soils on dunes (see Map 3-1).

Single and multi-year droughts are not uncommon. Growing seasons are generally short, with a geographic tendency to become longer from west to east. Table 3-2 presents freeze date information for two locations just over the western and eastern boundaries of the allotment.

The bulk of annual precipitation occurs in the spring, typically beginning in late March, peaking in May, and finally declining rapidly in June. A minor but important second peak occurs during the fall period, September through November. This fall moisture can initiate a second period of growth for cool-season grasses, but more importantly, it will ensure a good frost seal for the soils. This pre-wetting seal allows for the deep permeation of spring precipitation into the soil profile for use by the more desirable, deeper-rooted native grasses and shrubs. Storing moisture deep in the soil profile will ensure its availability for later use. These are the same reasons farmers and ranchers irrigate fields in the fall after harvest, and also why surge irrigation is used to slowly wet a field on a gradient from the highest end to the lowest. This pre-wetting of the soil ensures that water infiltrates into the soil instead of running off as waste and/or leading to erosion. Figures 3-5 and 3-6 illustrate the climate parameters of temperature and precipitation at Jeffrey City.

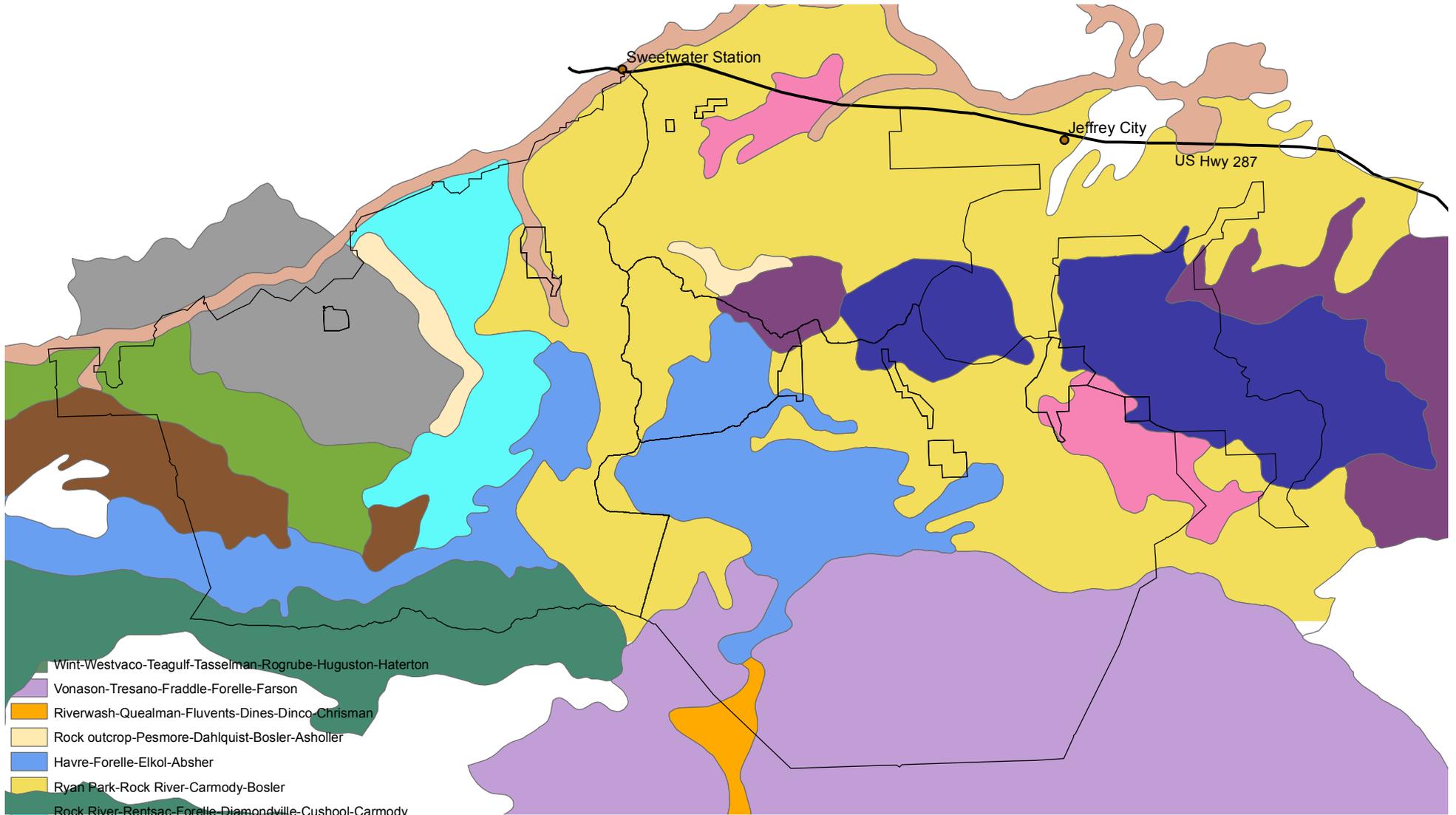
Soils in the western portion of the allotment are commonly underlain by plutonic granitic rocks with mafic intrusions. This portion of the allotment contains the most rock outcrops. Elevations in this area range from 7,000 to 8,500 feet. Slopes vary from nearly level to steep (zero to 65 percent slope). Soils are well-drained, very shallow (less than 10 inches) to moderately deep (20 to 40 inches), and are loamy or gravelly/loamy in texture. These soils are mostly associated with hills, ridges, escarpments, fan aprons, and pediments. Numerous seeps, springs, and wet meadows can be found here, unlike the majority of the allotment (except for the Green Mountains). Water erosion exists as the dominant form of erosion in this area. The annual precipitation in this part of the allotment is 10 to 14 inches, but effective precipitation is lower due to desiccating winds. The growing season remains short, with 60 to 90 frost-free days.

South of Cyclone Rim, the soils have formed in a Wasatch Formation member that is comprised of variegated claystones and lenticular sandstones, some of which may be conglomeritic. Elevations in this area range from 6,300 to 7,500 feet. Slopes vary from nearly level and gently sloping to very steep. These soils are generally well-drained and very deep (greater than 60 inches). Soil textures are loamy, and these soils commonly occur on floodplains, terraces, toe slopes, and fan aprons. Here, both wind and water are effective agents of erosion. The annual precipitation is seven to 14 inches, but effective precipitation is significantly less. The frost-free growing season is 80 to 110 days.

Green Mountain and Crooks Mountain are covered by a thick layer of giant boulder conglomerate; as a result, many of the soils here possess a large percentage of coarse fragments (i.e., gravels, cobbles, stones, and boulders). Elevations range from 7,500 to about 9,000 feet. Slopes typically vary from nearly level to very steep (zero to 75 percent slope). Soils here are well-drained, but can be poorly drained in the less-sloping areas on top of the mountains. Textures vary from cobbly loam, loamy, or gravelly loam. Water erosion is the dominant form of erosion on Green Mountain. Annual precipitation on the tops of these mountains is 18 to 22 inches, and the frost-free period ranges from 40 to 60 days.

To the south of Green Mountain, the Battle Spring Formation gives rise to well-drained loamy, gravelly, and sandy-textured soils that range in depth from shallow (less than 20 inches) to very deep. They occur on nearly level to steep and very steep slopes. These soils formed on terraces, toe slopes, fan aprons, hills, ridges, and sand dunes. Wind erosion is the dominant form of erosion in the dune areas. West of the dunes, both wind and water are important agents of erosion. Elevations in this area generally range from 5,700 to 8,000 feet. The annual

Map 3-1: General Soil Association Units - USDA NRCS Wyoming 2006



- Wint-Westvaco-Teagulf-Tasselmann-Rogrube-Huguston-Haterton
- Vonason-Tresano-Fraddle-Forelle-Farson
- Riverwash-Quealman-Fluvents-Dines-Dinco-Chrisman
- Rock outcrop-Pesmore-Dahlquist-Bosler-Asholler
- Havre-Forelle-Elkol-Absher
- Ryan Park-Rock River-Carmody-Bosler
- Rock River-Rentsac-Forelle-Diamondville-Cushool-Carmody
- Rock River-Milvar-Milren-Dahlquist
- Venapass-Silas-Lander variant-Lander
- Zeomont-Ryark-Ryan Park
- Youga-Quander
- Lymanson-Irigul-Hoodle
- Rock outcrop-Lymanson-Hoodle-Gelkie
- Rock outcrop-Cryluha-Coutis-Conpeak

This map was derived from USDA-NRCS STATSGO general soils map information and is used here to illustrate the variation in soil in the GMCA. Map unit descriptions have not yet been written by USDA NRCS for these map units. Information on individual soil series can be found in the USDA NRCS Fremont County East Part and the Dubois Area soil Survey and on the internet at: <http://soils.usda.gov/technical/classification/osd/index.html>.



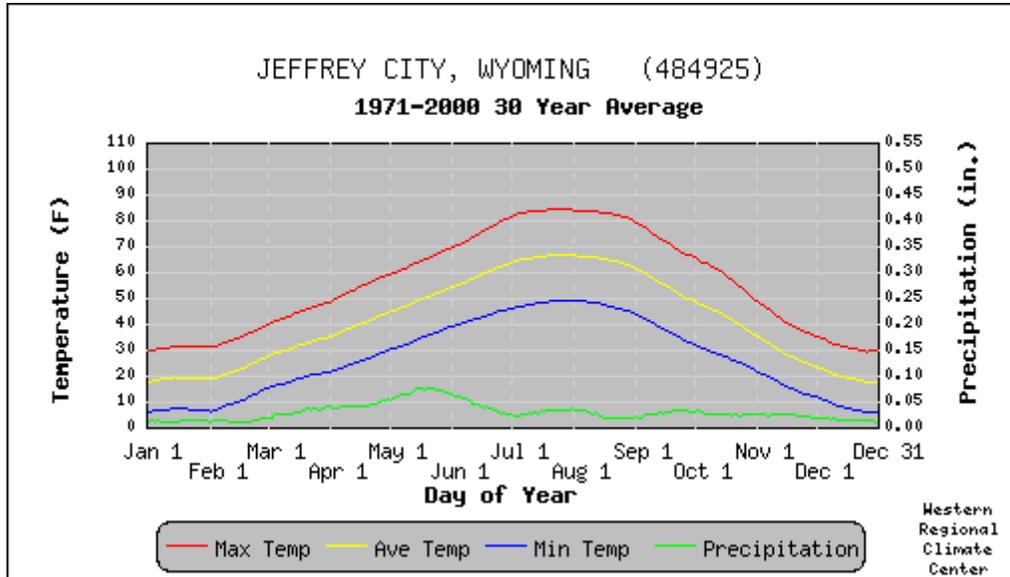
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Table 3-2. Freeze Dates in Spring and Fall Recorded at South Pass City and Muddy Gap

Probability	Temperature		
	24°F or lower	28°F or lower	32°F or lower
SOUTH PASS CITY*			
<i>Last freezing temperature in the period January through June:</i>			
1 year in 10 later than--	June 27	July 3	June 30
2 years in 10 later than--	June 30	June 28	June 29
5 years in 10 later than --	June 7	June 18	June 26
<i>First freezing temperature in the period August through December:</i>			
1 year in 10 earlier than--	Aug. 16	Aug. 2	Aug. 27
2 years in 10 earlier than--	Aug. 23	Aug. 9	Aug. 1
5 years in 10 earlier than --	Aug. 4	Aug. 23	Aug. 12
MUDDY GAP*			
<i>Last freezing temperature in the period January through June:</i>			
1 year in 10 later than--	May 10	May 28	June 15
2 years in 10 later than--	May 6	May 23	June 9
5 years in 10 later than--	Apr. 28	May 13	May 29
<i>First freezing temperature in the period August through December:</i>			
1 year in 10 earlier than--	Sept. 18	Sept. 10	Sept. 5
2 years in 10 earlier than --	Sept. 25	Sept. 15	Sept. 9
5 years in 10 earlier than--	Oct. 7	Sept. 25	Sept. 16

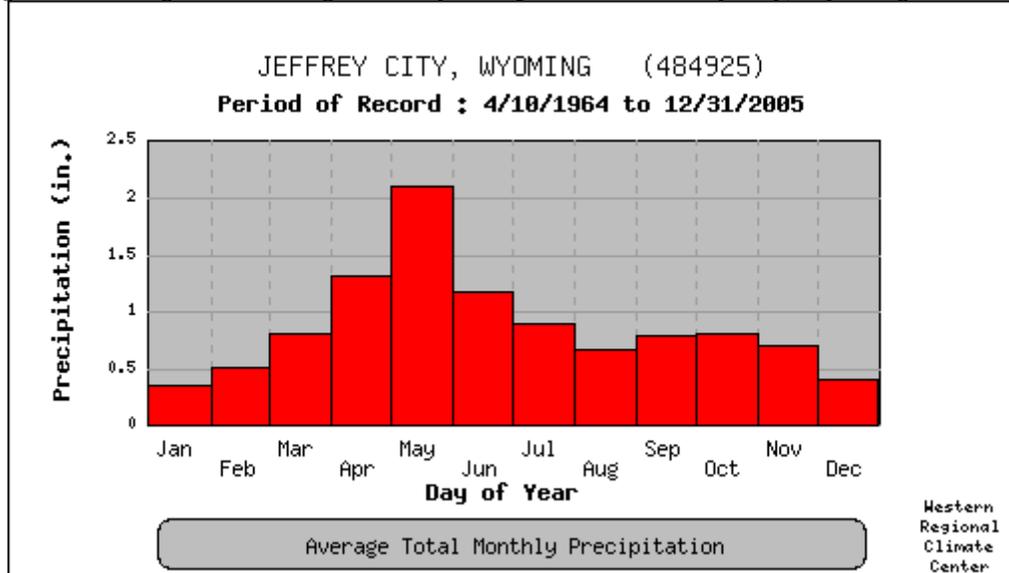
* The period of record is as follows: South Pass City, 1951-81 and Muddy Gap 1950-90. (From the USDA NRCS Soil Survey of Fremont County, East Part, and the Dubois Area, Wyoming, 1993.)

**Figure 3-5. Long-Term Temperature and Precipitation Data for Jeffrey City, Wyoming
(1971 - 2000 Temperature and Precipitation)**



Data is smoothed using a 29-day running average.

- Max. Temp. is the average of all daily maximum temperatures recorded for the day of the year between the years 1971 and 2000.
- Ave. Temp. is the average of all daily average temperatures recorded for the day of the year between the years 1971 and 2000.
- Min. Temp. is the average of all daily minimum temperatures recorded for the day of the year between the years 1971 and 2000.
- Precipitation is the average of all daily total precipitation recorded for the day of the year between the years 1971 and 2000.

Figure 3-6. Long-Term Average Monthly Precipitation for Jeffrey City, Wyoming (1964-2005)

■ - Average precipitation recorded for the month.

precipitation for this part of the allotment is about 10 to 14 inches. The frost-free period is 80 to 110 days. This southeastern area has the longest frost-free period in the allotment.

Relevant historical background information can be found in the BLM's Phase 1 Watershed Conservation and Development (WC&D) inventory, conducted in the mid-1970s. Two significant kinds of information from this period are ground cover estimates and erosion condition classes.

Good upland watershed condition is necessary for the maintenance of healthy lowlands and acceptable water quality, and also keeps both wind and water erosion at levels that permit soil formation. The amount of bare ground and, conversely, vegetation present is critical in keeping erosion to tolerable levels for the maintenance of soil productivity. Rill and gully erosion are typically the dominant forms of water erosion in this region. Sufficient amounts of ground cover in the uplands protect against rill and gully formation.

Phase 1 WC&D inventory, located in the Lander Field Office files, contains raw transect data for the GMCA. As can be seen from this data, most of the transects recorded have bare ground estimates for the tall sagebrush type (number 041) and low sagebrush type (number 042) of less than 35 percent. Vegetative cover estimates range roughly from 20 to 45 percent, comparable to the vegetative cover estimates given in the United States Department of Agriculture-Natural Resource Conservation Service (USDA-NRCS) Range Site Guides. The Sandy, Loamy, and Clayey range sites in the 10- to 14-inch Precipitation Zone High Plains Southeast, seven- to nine-inch Precipitation Zone Green River and Great Divide Basin, and 10- to 14-inch Precipitation Zone Foothills and Basins West Major Land Resource Areas (MLRAs) comprise the majority of the acreage in the GMCA.

The Soil Surface Factor (SSF) figures in the Lander Field Office files show soil condition classes recorded at the time of the Phase 1 WC&D inventory. These were computed by assigning values to seven soil surface factors (SSF) and adding them for a total score. That number then determined which condition class the investigated site fit into: Stable 0-20; Slight 21-40; Moderate 41-60; Critical 61-80; or Severe 81-100. Those condition classes are compared to projected future condition classes under different management scenarios. As can be seen, little change was expected to occur in the uplands with or without management changes.

From the Phase 1 WC&D inventory, one could conclude that upland erosion was at acceptable levels during the time of the inventory. The consensus of BLM personnel who spend much time in this allotment is that conditions have not changed much in the uplands since the time of the Phase 1 WC&D inventory.

The SSF alone does not tell the whole erosion story, as lowland sites were not included in the Phase 1 WC&D inventory. In some areas, like this allotment, where rill and gully erosion are the predominant forms of erosion by water, some researchers have found that approximately 75 percent of the sediment reaching a basin outlet can be derived from channel erosion and gully erosion (Trimble, 1974; Trimble, 1976; Trimble, 1981; Heusch, 1980). Thus, most of the sediment moving through the lowland systems is generated in those lowlands, not from the uplands. This sediment can still adversely affect water quality and fish habitat.

Water Resources

A general overview of water quality and availability can be found in the Affected Environment sections of the Green Mountain Grazing EIS (1982) and the Lander RMP (1986). The first of these documents contains a table that presents water consumption by large grazing animals in the Green Mountain Grazing EIS area. About 172 acre feet per year were calculated to be consumed; for the 300 reservoirs in the EIS area, about 1,620 acre feet of water are lost through evaporation. Both documents state that most of the perennial streams have good water quality. Both documents describe fecal coliform, suspended sediment, and total dissolved solids as being of special concern, as they would be the most sensitive detectors of poor water quality resulting from adverse environmental impacts. Also, see Section 3.3.6.5, Affected Environment; Special Status Species, for a brief discussion of the Platte River Depletion allowance, which is primarily concerned with threatened and endangered species conservation.

As the State of Wyoming biennially updates the State Water Quality Assessment Report, also known as the 305(b) Report, and the Impaired Waterbody List, also known as the 303(d) List, water quality standards and water quality classification changes would be incorporated into the management of the allotment.

There are provisions of the Clean Water Act that deal with instituting measures (i.e., Best Management Practices) to improve the water quality of streams that are known to not meet the needs of designated beneficial uses and/or violate surface water quality standards. These BMPs are developed with State of Wyoming oversight. Further, Executive Order 11752, December 17, 1973, mandates that federal agencies shall provide national leadership to protect and enhance the quality of air, water, and land resources through compliance with applicable federal, state, interstate, and local pollution standards (BLM Manual 7200.03.B.4). These streams can be found on the 2006 WDEQ Impaired Waterbody List, also known as the 303(d) list. There are several subsections to the 303(d) list:

- 1) “Impaired waterbodies” are those streams which have been subjected to a state’s stream assessment process and found to not be meeting water quality standards/designated beneficial uses.
- 2) “Waterbodies to be monitored” are those streams which have been nominated to the impaired waterbodies list in the past, but for which there is not sufficient information to make an assessment at this time without further monitoring studies being conducted. All such waterbodies will be monitored and assessed over the next several years by the WDEQ.
- 3) “Waterbodies to be delisted” are those waterbodies previously nominated to the past 303(d) lists for which sufficient information exists for an assessment of non-impairment/meeting state water quality standards to be made.

No impaired waterbodies occur in the GMCA at this time. Crooks Creek is listed as an impaired waterbody for oil and grease contamination just outside the GMCA boundary.

According to the 305(b) Report of 2006, “Ambient monitoring of Crooks Creek, a tributary of the Sweetwater near Jeffrey City, revealed a significant amount of oil in sediments, a violation of water quality standards. The source of oil is unknown at this time, but this stream is a high priority targeted water on Table A of the 303(d) (Impaired Waterbody) list, and is scheduled for TMDL development” (p. 54).

Several streams do occur on WDEQ’s list of “waterbodies to be monitored” on the BLM public lands: 4.97 miles of West Cottonwood Creek (waterbody ID WYNP10180006-558-1), 3.23 miles of the West Fork Middle Cottonwood Creek (waterbody ID WYNP10180006-215-2), and 3.73 miles of Mormon Creek (waterbody ID WYW10180006-549-1). The status of these and several other streams can be seen in Table 3-3.

Table 3-3. Status of WDEQ Stream Monitoring (GMCA)

Name	Waterbody ID	Class	Year Scheduled	Year Monitored	Decision
Cottonwood Creek	WYNP10180006215-2	2AB	1999	2000	
Cottonwood Creek	WYNP10180006558-1	2AB	1999	2000	M-2005
Willow Creek	WYNP10180006	2AB	1999	2000	
Mormon Creek	WYNP10180006-549-1	2AB	1999	2000	M-2000, M-2003, M-2004,
Sweetwater River from junction with Alkali Creek and upstream	WYNP10180006				Delisted from impaired status in the late 1990s.
Granite Creek	WYNP1010006			2000	M-2005
Crooks Creek From: T28N, R92W Sec. 18 SWNE and downstream.	WYNP10180006	2AB			I-1998
M= Additional monitoring needed					

Surface waters of the State of Wyoming are placed, by WDEQ, into subclasses under one of the appropriate four classes of water quality:

- 1) **Class 1** (most stringent standards) waters are those waters in which no further degradation of water quality will be allowed. In this allotment, portions of the Sweetwater River above its confluence with Alkali Creek and any tributaries that are not designated differently are Class 1 waters (see Appendix 7) for the full WDEQ definitions of the various classes of waters in the state).
- 2) **Class 2** waters are waters other than those designated as Class 1 that presently support, or have the potential to support, game fish or drinking water supplies.
- 3) **Class 3** waters are waters other than those designated as Class 1 that are intermittent, ephemeral, or isolated waters that do not have the potential to support fish. These waters do provide support for invertebrates, amphibians, or other flora and fauna which inhabit waters of the state at some stage in their life cycles.
- 4) **Class 4** waters are waters other than those designated as Class 1, where it has been determined that aquatic uses are not attainable pursuant to provisions of Section 33 of these regulations (WDEQ Water Quality Rules and Regulations, Chapter 1, Wyoming Surface Water Quality Standards, April 25, 2007). Uses designated on Class 4 waters include recreation, wildlife, industry, agriculture, and scenic value. Ditches and canals also have this designation.

The Class 1 (most stringent standards) waters in the allotment are those portions of the Sweetwater River above its confluence with Alkali Creek and any tributaries that are not designated differently. A list containing all the waterbodies as classified in the 1990 WDEQ Water Quality Rules and Regulations, Chapter I, is on file in the Lander Field Office. Also located in the Lander Field Office are "those surface waters not designated as Class 1, but whose quality is better than these standards, shall be maintained at that higher standard" (as per WDEQ Water Quality Rules and Regulations: Chapter I, Section 8. Anti-degradation).

Suspended sediment is the most serious surface water pollutant in the allotment. Sediment yield is highest in the GMCA during the spring and summer, when runoff occurs in direct response to spring snowmelt and summer rainfall. Increases in sediment yield will also increase levels of total dissolved solids (TDS), which can be considered synonymous with salinity.

In July of 2004, a list of streams with Proper Functioning Condition (PFC) ratings of Non-Functional, Functional-at-Risk with a downward or no apparent trend, was submitted to WDEQ for the entire Sweetwater watershed in consideration of future plans for water quality/beneficial use support monitoring. A copy of this list is given in Appendix 8.

VEGETATION RESOURCES

General

The GMCA vegetation types consist of meadow, grass, sagebrush, mountain shrubs, conifer, and deciduous trees. Wyoming big sagebrush is the dominant shrub; however, understory species composition is varied and can be differentiated by slope, aspect, and soil properties. The major meadow plants consist of various sedges and rushes. Grass plants on the upland range communities consist of western wheatgrass, bluebunch wheatgrass, threadleaf sedge, prairie junegrass, and needle-and-thread grass.

The conifer community type varies from discontinuous juniper stands at lower elevations to closed canopy lodgepole and mixed lodgepole-spruce stands at higher elevations. The deciduous tree type is composed of willows and cottonwoods along the perennial creeks at lower elevations and shifts to water birch and aspen at higher elevations.

The vegetation for the GMCA is described in more detail in the Green Mountain Grazing EIS (1982), on pages 29-39.

Table 3-4, Forage Condition and Apparent Trend Summary, and Table 3-5, Forage Condition and Apparent Trend Summary, illustrates the most recent assessment of the forage condition and apparent trend in forage condition (resource value rating) on the GMCA. As previously discussed, this data was collected from two different allotment planning efforts conducted in 1975-76 for the old Seven Lakes Allotment (now 40 percent of the total allotment) and in 1977-78 for the old Green Mountain Allotment (now 60 percent of the total allotment).

**Table 3-4. Forage Condition and Apparent Trend Summary¹
Forage Condition (%Acres)**

Allotment (Year)	Good	Fair	Poor	Unsampled
Old Green Mountain (1978)	47%	36%	2%	15%
Old Seven Lakes (1976)*	7%	88%	5%	0%
Old Seven Lakes (1976)**	6%	89%	5%	0%

*Cattle Forage Condition

**Sheep Forage Condition

Table 3-5. Apparent Trend in Forage/Soil Surface Condition (%Acres)¹

Allotment (Year)	Improving	Static	Declining	Unsampled
Old Green Mountain (1978)	66%	17%	1%	16%
Old Seven Lakes (1976)	2%	96%	2%	0%

¹Data obtained from 1976 BLM Seven Lakes Planning Unit Resource Analysis and 1978 BLM Sweetwater Planning Unit Resource Analysis (See Appendix 12).

The most recent allotment-wide description of rangeland conditions and trends can be found on pages 260-276 of the Range Management Unit Resource Analysis (URA) Step III for the Sweetwater Planning Unit. (See Appendix 6) Seven Lakes Incommon Allotment).

2002 Evaluation Update

Introduction

In August 1999, eight permanently located point/line intercept monitoring transects were established by Lander BLM range and wildlife staff. Six of the transects were located within the anticipated service areas of six wells that were drilled by a BLM contractor during the summer and fall of 1999. The purpose of these transects was to evaluate the impact of livestock grazing on ground cover and sage grouse nesting habitat, following changes in the grazing distribution as a result of new water sources. These transects have not been reread since their establishment. Two transects were relocated at sites where temporary step-point transects (Wyoming Integrated Pace Transect Method) were conducted in November 1976 by Rawlins BLM range staff. These step-point transects were originally conducted to collect base line vegetative, watershed, and wildlife data to identify any changes in trend and degree of change in range condition within the Seven Lakes Grazing EIS area.

Within the Arapahoe Use Area, four point/line intercept transects were established within the Eagles Nest Draw Pasture and one transect each was located in the Lost Creek and Bare Ring Butte Pastures. The remaining two transects were located in the Warm Springs Pasture of the Happy Springs Use Area and the Alkali Creek Sheep Use Area.

Evaluation

The Ground Cover Summary Table (Appendix 18) summarizes the percent ground-level cover for all eight of the point intercept transects. The data indicate that there is sufficient ground cover, primarily litter, to protect the soil surface from water and wind erosion at these sites representing approximately 32,000 acres of upland rangeland. Two transects near the County Line Well and Fremont Reservoir measured relatively high levels of bare ground at 34% and 33 % respectively. However, the remaining six transects measured relatively low bare ground that ranged from 8% to 20%. Point-intercept data indicate ground cover at these eight sites ranges from 66% to 92% which research has shown to be sufficient to limit water and wind erosion. The Percent Species Composition Table (also Appendix 18) summarizes percent species composition and the rangeland similarity index, formerly called range condition class, for the eight transect areas. The rangeland similarity index (RSI) is defined as "the present state of vegetation and soil protection of an ecological site in relation to the historic climax plant community for the site" (SRM 1998). The RSI ranges from 50% (mid-seral) to 70% (late-seral) of the historic climax plant community for these sites.

The Rangeland Standards-Conformance Review Summary completed on July 23, 1999, summarizes the remainder of the current data, and concludes for Standard No. 3 that "at the present time, the status of approximately 55-57 percent (285-295,000 acres) of the upland ecological (range) sites is unknown. Upland erosion condition, vegetative cover, and desired plant community are three primary indicators that will be collected and developed. Allotment field inspections will be conducted and monitoring studies will be established during 1999 to complete the conformance determination."

Allotment field inspections have been conducted every year to assess utilization patterns and conduct livestock use supervision. Eight upland range monitoring studies were established in 1999. However, due to limited range and wildlife personnel, there has not been enough upland monitoring studies or field assessments conducted to complete the conformance determination at this time. Over 80 field assessments were conducted in 1958 and 1964 on the "old" Green Mountain Common Allotment (GMCA) to determine vegetative and soil conditions for the adjudication range survey. Over 160 field assessments (transects) were conducted in 1976-77 on the "old" GMCA to inventory range and watershed conditions for the Green Mountain Grazing EIS planning effort. We estimate that approximately 125-130 permanently located upland monitoring transects/assessments are needed to properly determine current rangeland health and trends in vegetative and soil conditions. With this required intensity of monitoring and assessment (one transect for every 4,000 acres) the conformance determination may be completed in time for the next evaluation scheduled for winter 2009-2010.

The East Fremont County Soil Survey is now available in digital form. The remaining 117-122 permanently located upland monitoring transects/assessments will need to be located using a technique called allotment stratification which requires that the ecological (range) sites be correlated with the soil survey. This process would begin next winter and continue until completed.

Summary

Initial data, from eight point intercept transects representing approximately 32,000 acres of upland rangeland,

indicate that there is sufficient ground cover, primarily litter, to protect the soil surface from water and wind erosion prior to completion of water wells that were drilled within ½ to one mile from the transects. The range similarity index for these eight sites ranges from mid-seral to late-seral of the historic climax plant community for these sites. These upland sites are probably meeting the standard. The remainder of the revised unknown category, 253-263,000 acres, cannot be evaluated at this time, due to the limited amount of vegetative information that has been collected since 1999. Additional information is needed for the remaining portion of the upland range to be fully evaluated prior to the next evaluation, scheduled for winter 2009-2010.

Conclusion

Do current upland rangeland resource conditions in the allotment meet the standard? Several partial answers to this question can be provided at this time. Given the landscape scale of the GMCA, there is an enormous variation in upland rangeland conditions. Based on the best available information summarized above, which is somewhat dated, the following general conclusions have been reached:

1. The upland ecological (range) sites immediately adjacent to riparian areas are not meeting the standard. At the present time, this acreage has been estimated at 3-5 percent (15-25,000 acres) of the GMCA.
2. Approximately 46 percent (239,000 acres) of the upland ecological (range) sites are probably meeting the standard.
3. At the present time, the status of approximately 49-51 percent (253-263,000) of the upland ecological (range) sites is unknown.
4. Upland erosion condition, vegetative cover, and desired plant community are three primary indicators that need to be collected and developed. Allotment field inspections will be conducted and monitoring studies need to be established to complete the conformance determination.

Forage Production

The soils of the GMCA north of the Great Divide Basin support a variety of ecological (range) sites. The most extensive are the Shallow Sandy and Shallow Loamy range sites which, if in excellent condition, in favorable years produce 1,200 lbs. of air dry forage (medium years-900 lbs./unfavorable years-700 lbs.). Sandy range sites, in excellent condition, can produce 1,500 lbs. (medium years-1,200 lbs. /unfavorable years-700 lbs.). Loamy range sites average 100 pounds less per year category.

The Great Divide Basin Shallow Sandy and Shallow Loamy range sites, in excellent condition, should both produce 450 lbs. air dry forage in favorable years (medium years-350 lbs. /unfavorable years 200 lbs.). Sandy and Loamy range sites in excellent condition should both produce 700 lbs. (medium years-500 lbs. /unfavorable years-300 lbs.).

The slopes of Green Mountain support Loamy and Coarse upland range sites. Loamy range sites, in excellent condition, should produce 2,000 lbs. of air dry forage in favorable years (medium years 1,500 lbs. /unfavorable years-800 lbs.). Coarse upland range sites should produce 1,700 lbs. (medium years-1,300 lbs. /unfavorable years-800 lbs.). Table 3-6 summarizes the current and potential vegetation production for the 7"-9" Green River and Great Divide Basins and the 10"-14" High Plains Southeast range site zones.

**Table 3-6. Current and Potential Vegetation Production
(Pounds of Production per Acre per Year by Range Site)**

7"-9" Green River & Great Divide Basins MLRA	Upland Sites			Meadow/Riparian Sites		
	Shrubs	Forbs	Grasses	Shrubs	Forbs	Grasses
Average Current Production	165	55	80	195	10	220
Potential Production ²	70-100	20-50	110-350	210-675	70-450	420-3,375
10"-14" High Plains Southeast MLRA	Upland Sites			Meadow/Riparian Sites		
	Shrubs	Forbs	Grasses	Shrubs	Forbs	Grasses
Average Current Production	265	50	175	70	410	1800
Potential Production ²	110-180	90-110	630-800	300-690	230-500	1,380-4,000

¹Average current production for the 10"-14" High Plains Southeast MLRA from the 1979-80 Green Mountain Weight Estimate Range Survey (Source: NRCS Ecological (Range) Site Descriptions)

²Production potential varies from site to site.

Table 3-7, Selected GMCA Ecological Sites, lists ten of the most important ecological sites within the allotment (See Appendix 20). They represent over 76 percent of the GMCA. The public land acres are derived from the East Fremont County Soil Survey and the Wyoming General Soils Map (Sweetwater County). Also, shown are the suggested stocking rates in surface acres per AUM for the high (good) seral and mid (fair) seral condition classes. These stocking rates are important in evaluating the proposed management actions for each alternative discussed in Chapter Two. The (10-14 SE) is the 10-14" High Plains Southeast Major Land Resource Area (MLRA) and (7-9 GR) is the 7"-9" Green River and Great Divide Basins MLRA.

Table 3-7. Selected GMCA Ecological Sites

Ecological Site Name (MLRA)	Total Public GMCA Acres	Total GMCA Percent	Acres/AUM High Seral (Good) Condition	Acres/AUM Mid Seral (Fair) Condition
Gravelly (10-14 SE)	25,150	5.37	8.3	20.0
Loamy (10-14 SE)	27,433	5.86	3.0	5.0
Loamy Overflow (10-14 SE)	27,875	5.95	2.0	4.0
Sandy (10-14 SE)	141,242	30.17	3.0	5.0
Shallow Loamy (10-14 SE)	37,738	8.06	5.9	10.0
Shallow Sandy (10-14 SE)	23,481	5.01	5.9	10.0
Subirrigated (10-14 SE)	41	0.01	0.67	0.40
Wetland (10-14 SE)	817	0.17	0.67	1.0
SUBTOTALS	283,777	60.60		
Loamy (7-9 GR)	43,202	9.23	5.9	10.0
Sandy (7-9 GR)	31,293	6.68	5.9	10.0
SUBTOTALS	74,495	15.91		
TOTALS	358,272	76.51		

The percentage of allotment production is shown in Table 3-8. The production figures were determined from weight estimate range surveys conducted in 1975-76 (See Appendix 15) for the former Seven Lakes Allotment

(approximately 40 percent of the GMCA) and 1979-80 (See Appendix 14) for the former Green Mountain Common Allotment (approximately 60 percent of the GMCA).

Table 3-8. Present Allotment Production

PRESENT TOTAL PRODUCTION OF VEGETATION (Pounds Air Dry)	PLANNING AREA/RANGE SURVEY
32,782,058	Green Mountain/1979-80 Survey
10,960,560	Seven Lakes/1975-76 Survey
43,742,618	TOTAL SUPPLY

The potential consumptive forage use for the GMCA is shown in Table 3-9. This table lists the necessary pounds of forage by grazing animal to support full grazing preference for cattle and sheep, the maximum appropriate management level (AML) for wild horses, and the current WGFD population objectives for big game.

The maximum consumptive forage use of forage by livestock, wild horses, and big game animals could result in overgrazing of 1,805 AUMs (-3 percent) in an allotment producing about 56,000 AUMs of forage within the approximately 522, 290 acres. This would occur if all the grazing permittees were allowed to make full use of their grazing preference.

Table 3-9. Potential Consumptive Use

FORAGE DEMAND (Pounds Air Dry)	AUMs	GRAZING ANIMAL
5,776,773	N/A	Wildlife (Big Game)
2,775,600	3,550	Wild Horses
8,588,250	11,451	Sheep
28,009,800	35,910	Cattle
45,150,423		Total Demand
-1,407,805	-1,805	Forage Deficit

Noxious Weeds

The BLM Lander Field Office annually contracts with the Fremont County Weed and Pest Control District for control (i.e., inventory, spraying, releasing insect vectors, and monitoring) of weeds on BLM-administered lands (See Appendix 3 for Descriptions and Specifications for Chemical Spraying and Release of Biological Control Agents). This is done as a cooperative effort with private landowners who are engaged in weed control programs on their own lands. Without these precautionary actions, untreated federal lands could serve as a seed source of weeds for invading private lands that have weed control programs.

The Fremont County portion of the allotment also lies within the Popo Agie Weed Management Area (PAWMA), the boundaries of which correspond to those of the Popo Agie Conservation District, which in this area is the county line. The PAWMA is a group of local, state, and federal agencies that work through a Memorandum of Understanding with the Fremont County Weed and Pest District to assist the landowners in the area with controlling noxious weeds.

Private companies also control weeds around facilities in keeping fire and work hazards down. Only properly licensed commercial applicators are allowed to apply pesticides on BLM-administered public lands. Appendix 3, section "Pesticide Use," describes the necessary procedures for private companies and affected interests to control weeds on BLM-administered public lands.

Wyoming state law (W.S. 11-5-101 through 11-5-119) requires landowners to control noxious weed infestations on

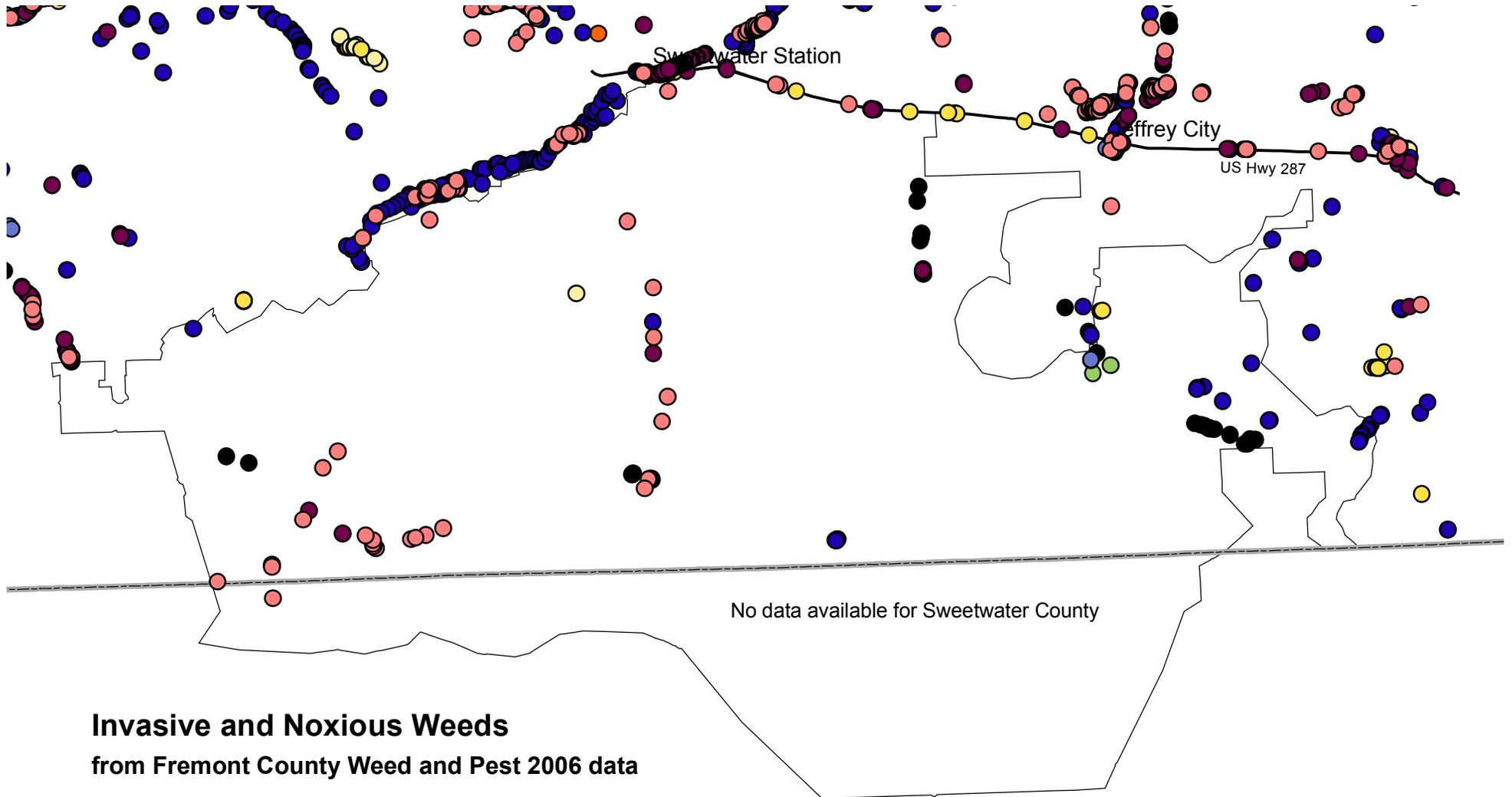
their property, or face penalties that can range from daily fines to quarantine of farm products coming off of noxious weed-infested land.

The following noxious weeds are present in or nearby the GMCA (see Map 3-2):

- **Russian knapweed (*Centaurea repens*)** occurs primarily in the western half of the allotment along the Bison Basin road, the far southwest portion of the allotment associated with the lakes, and along the Sweetwater River just outside the allotment. The U.S. Highway 287 right-of-way also has Russian knapweed within it.
- **Perennial pepperweed (*Lepidium latifolium*)**, or whitetop, occurs sporadically along the Sweetwater River outside the allotment.
- **Canada thistle (*Cirsium arvense*)** occurs sparsely along some roads and riparian areas.
- **Spotted knapweed (*Centaurea maculosa*)** occurs in the U.S. Highway 287 right-of-way, the Sweetwater River just southwest of Sweetwater Station, and some of the drainages and land rehabilitation projects on Green Mountain.
- **Leafy spurge (*Euphorbia esula*)** is found along Alkali Creek, just outside the allotment along the Sweetwater River at the far western reaches of the GMCA, and near Split Rock in both Fremont and Natrona Counties.
- **Diffuse knapweed (*Centaurea diffusa*)** is found in the Cooper Creek and Willow Creek drainages on the northeast slopes of Green Mountain.
- **Musk thistle (*Carduus nutans*)** is distributed along the U.S. Highway 287 right-of-way and on Crooks Creek, just inside the GMCA boundary.
- **Tamarisk (*Tamarix spp.*) or Saltcedar** has been treated near Sweetwater Station and occurs at Lost Creek Reservoir in the Great Divide Basin.
- **Hoary cress (*Cardaria draba* and *C. pubescens*)** is found along the Sweetwater River and U.S. Highway 287 right-of-way, and several roads in the central and western portions of the allotment.
- **Plumeless thistle (*Carduus acanthoides*)** has been found on well pads and roads on Green Mountain.
- **Russian olive (*Elaeagnus angustifolia*)** occurs outside the allotment along the Sweetwater River just north of Sweetwater Station, and also inside the allotment boundary along Crooks Creek.
- **Field bindweed** is found just outside the allotment near Sweetwater Station.
- **Quackgrass** occurs along the Sweetwater River just outside the northwestern boundary of the allotment.
- **Black henbane (*Hyoscyamus niger*)** is not a State of Wyoming-designated noxious weed, but it is a poisonous weed of concern associated with oilfield roads in the Happy Spring oilfield area, the Uranium mine road along the side of Green Mountain, and the Three Forks-Atlantic City Road. It is also found on disturbed ground and pipeline rights-of-way.

Though not designated as noxious by the state, weedy annuals like cheat grass (*Bromus tectorum*), halogeton (*Halogeton glomeratus*), and Russian thistle (*Salsola tragus*), and the biennial black henbane (*Hyoscyamus niger*), are quick to invade disturbed soils in the allotment, and can hinder rehabilitation efforts. Two of these weeds are poisonous, and only the cheatgrass is of very limited forage use for grazing animals.

Map 3-2: Invasive and Noxious Weeds



Invasive and Noxious Weeds from Fremont County Weed and Pest 2006 data

- | | |
|---|---|
| ● Russian knapweed | ● Field bindweed |
| ● Whitetop | ● Black henbane |
| ● Musk thistle | ● Russian olive |
| ● Spotted knapweed | ● Quackgrass |
| ● Canada thistle | ● Leafy spurge |
| ● Saltcedar | |



0 2 4 8 Miles

NO WARRANTY IS MADE BY THE BLM FOR USE OF THE DATA FOR PURPOSES NOT INTENDED BY BLM.

WO IM 2006-073 Weed-Free Seed Use on Lands Administered by the BLM, which sets a limit of zero percent for noxious weed seed in seed purchased for use on bureau-administered lands.

All pesticide programs are carried out in accordance with federal and state regulations. Weed control in the Lander Field Office is consistent with the current EA for the Lander Resource Area for Noxious Weed Control (WY050-EA3-048), which is tiered to the Northwest Area Noxious Weed Control Program FEIS, 1985, its Supplement, 1986, and the Vegetation Treatment on BLM Lands in Thirteen Western States FEIS, 1991. It is also in conformance with the Lander RMP/Final EIS (RMP/FEIS) of 1986. On page nine of the Grazing Supplement to the RMP/FEIS is given a section on weed and pest control which presents the program. The RMP/FEIS's Record of Decision (ROD) also provides for livestock grazing and wildlife habitat maintenance and improvement actions (see page nine of the RMP's ROD).

The BLM has historically supported efforts of its own internal programs and those of our partners in local and state governments to establish weed-free forage states, areas, and counties. The 1996 BLM Partners against Weeds Action Plan states, on page 11, that BLM would, "develop and enforce policy designed to ensure seed, seed mixtures, hays, grains, and straws are free of weed seed".

The Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701-1712) requires BLM to manage public lands according to the principles of multiple use and sustained yield. These principles are further qualified in the Act by the Statutory Duty that BLM prevent unnecessary degradation of the public lands. The Public Rangelands Improvement Act of 1978 (43 U.S.C. 1901 et seq.) requires the BLM to manage, maintain, and improve the public lands suitable for livestock grazing so that they become as productive as feasible. Several other federal laws authorize and direct weed control on federal lands: the Federal Noxious Weed Control Act of 1974-as amended 1990 (7 U.S.C. 2801-2813), as amended by Sec. 15, Management of Undesirable Plants on Federal Lands, 1990; and the Carson-Foley Act of 1968 (PL 90-583). Other authority is found in Executive Orders 11987, Exotic Organisms and 13112, Invasive Species; and Departmental Manual Parts 609 and 517. Of special note is Executive Order 13112 Invasive Species, in that it directs federal agencies, under Section 2, to:

... not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere unless, pursuant to guidelines that it has prescribed, the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions.

Soon after the aforementioned Executive Order was released, BLM Washington Instruction Memorandum No. 1999-076, BLM Policy on the Use of Certified Weed-Free Hay, Straw, and Mulch on BLM Lands stated that "The BLM policy for States that do have certification programs in place (and Wyoming does) is to develop rules and regulations requiring the use of certified weed-free products on all public lands within that State".

Further, management priorities listed in the BLM Manual Section 9015, Integrated Weed Management, include the following on weed-free forage:

"Ensure that seed purchased and planted on BLM lands is free of noxious weed seeds and at least meets State seed standards. (Examples are forage, fire rehabilitation, browse, ground cover, tree seeds, mining disturbance, and oil and gas disturbance.) Where States have enacted legislation and have an active program to make weed-free forage available, ensure guidance restricting the transport of feed, hay, straw, or mulch which is not certified as weed-free."

As mentioned in the preceding paragraph, noxious weed-free seed is also required when reseeding BLM administered public lands. To this end, the bureau released a policy memo, W.O IM No. 2006-073, Weed-Free Seed Use on Lands Administered by the Bureau of Land Management in late January of 2006 which states "All [BLM] Field Offices are required to use seed on public lands that contain no noxious weed seed and meets certified seed quality". This IM details the standard allowable percentages for "other crop" and "secondary weed" seed.

Currently, BLM LFO Minerals and Recreation Programs-authorized activities are required to use noxious weed-free straw and hay for forage, storm water runoff control, and land rehabilitation uses.

The GMCA remains relatively free of noxious weed species. The few noxious weeds that do infest roads and trails on Green Mountain include the following: spotted knapweed, diffuse knapweed, and plumeless thistle. Also, black henbane is a poisonous plant that is spreading along roads and pipeline rights-of-way. These plant pests are being treated cooperatively by the Fremont County Weed and Pest district, as well as by several mineral development companies in the area.

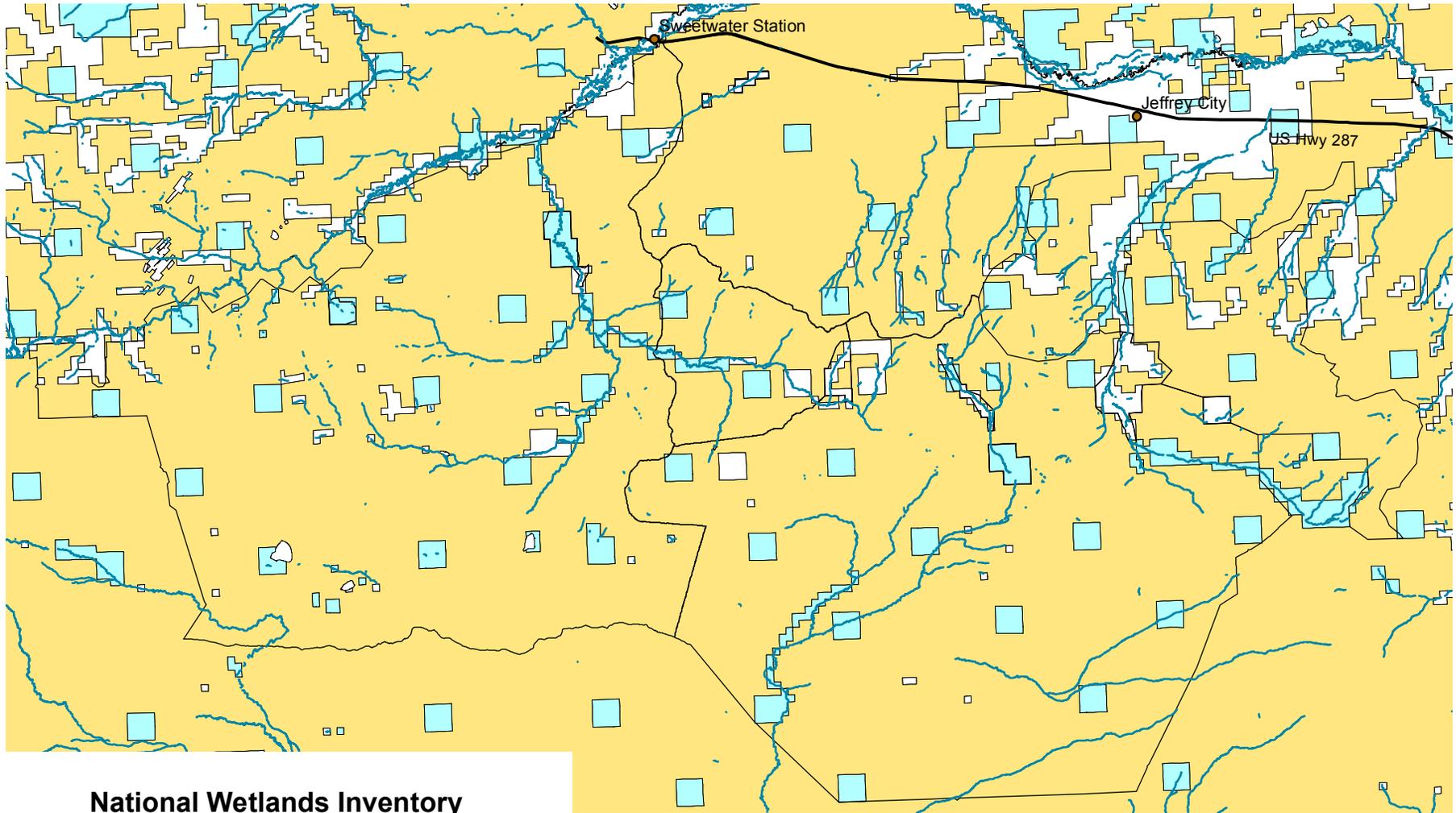
The Fremont County Weed and Pest District has established continuous survey, or inventory, of all lands in the county. Currently, it is planned that all parts of the county will be surveyed at least once every 10 years. This will yield valuable information on the effectiveness of various weed control strategies, weed spread, and invasion by new species.

Wetland-Riparian Vegetation

Wetland-riparian areas make up less than one-half of one percent of the vegetation types in the allotment, yet provide the greatest vegetative production per acre. These areas also receive the heaviest use by livestock, wild horses, and wildlife because of their high-quality forage and proximity to water. The GMCA's wetland-riparian vegetation can be divided into two basic subtypes. The first subtype generally consists of an overstory of cottonwood, willows, water birch, chokecherry, or aspen, with an understory of grasses, sedges, or rushes. The second basic subtype consists of wetland-riparian vegetation that lacks an overstory of trees or shrubs and consists mostly of rushes and sedges. A more complete description of plant species occurring in these riparian areas can be found in the Green Mountain Grazing EIS, Table 2-4.

In 1987, the U.S. Fish and Wildlife Service utilized aerial photo interpretation to complete a National Wetlands Inventory (NWI) for the allotment. This NWI method described ecological taxa, arranged them in a system useful to resource managers, furnished units for mapping, and provided uniformity of concepts and terms. Because wetlands are defined by plants, soils, and frequency of flooding, and were summarized by length and area in this inventory, three wetland habitat systems were identified in the GMCA; they are riverine (river-like), palustrine (marsh-like), and lacustrine (lake-like) habitats. This inventory also provided a breakdown of ownership of wetlands in the allotment when combined with Geographic Information Systems land ownership themes. Map 3-3 identifies the location of wetlands in the allotment. Table 3-10 depicts the ownership of public, state, and private wetlands within the allotment. See the Glossary for the definition of wetlands.

Map 3-3: Wetlands



National Wetlands Inventory

— Riparian areas

Surface Ownership

■ Bureau of Land Management

■ Private

■ State



0 2 4 8 Miles

NO WARRANTY IS MADE BY THE BLM FOR USE OF THE DATA FOR PURPOSES NOT INTENDED BY BLM.

Table 3-10. GMCA National Wetlands Inventory (NWI)

LENGTH

Miles	Ownership	Percentage
47.23	BLM Admin. Public	62.56
14.82	Private	19.63
13.45	State	17.81
75.50	TOTAL	100.00

AREA

	Acres	Percentage
BLM Admin. Public	717.04	74.23
Private	119.65	12.39
State	129.21	13.38
Total	965.90	100.00

The BLM's PFC assessment of riparian habitats (1994 through 2001) on public lands within the allotment identified 90.8 miles of lotic riparian habitat and 1,564 acres of lentic riparian habitat. This assessment determined that 11.34 miles of lotic riparian habitat (12.5 percent) and 352 acres of lentic habitat (22.5 percent) were in proper functioning condition (please refer to the Glossary for definition of Lotic and Lentic). The remaining 79.42 miles (87.5 percent) of lotic riparian habitats and 1,212 acres of lentic riparian habitat (77.5 percent) were determined to be Non-Functional or Functional-at-Risk with a downward or unknown trend. Table 3-11 summarizes the amount of riparian acres and miles by assessment rating. Appendix 8 identifies the individual riparian areas and the acres and/or miles of habitat that are in PFC, Functional-at-Risk, or Non-Functional in the allotment. See the Glossary for the definition of riparian areas.

**Table 3-11. Proper Functioning Condition Assessment¹
Green Mountain Common Allotment**

	Proper Functioning Condition		Functional-at-Risk		Non-Functional	
	Total	Percent	Total	Percent	Total	Percent
Lentic Acres (Standing Water)	352.38	22.5	1018.86	65.1	193.03	12.4
Lotic Miles (Running Water)	11.34	12.5	55.77	61.4	23.65	26.1
Lotic Acres (Running Water)	42.58	8.1	448.68	85.1	36.13	6

¹Total Riparian Acres – 2092 (includes 90.8 miles of lotic habitat).

Grazing activities affect riparian habitats by altering, reducing, or removing vegetation, and by actually eliminating riparian habitats through channel widening, channel aggrading, or by lowering the water table (Platts 1991, Milchunas and Lauenroth 1993, Fleischner 1994). Current riparian habitats in the GMCA generally exist in a low seral stage. These riparian habitats are not only far from their potential extent, but are also shrinking in size as water tables drop and upland plant species encroach. Riparian habitats that have potential for woody shrubs, such as willow, have poor age class distribution or less than desirable species composition. Most of the lotic and lentic riparian habitats exhibit plants that have poor vigor as a result of season-long grazing. These habitats also exhibit impacted stream banks due to trampling and trailing by both livestock and wild horses.

LIVESTOCK GRAZING AND RANGELAND HEALTH STANDARDS

General

The GMCA has 16 livestock operators (see Appendix 5 for a list of the operators) who hold 19 grazing permits. Cattle and sheep are both grazed in the allotment, with a total grazing preference of 47,361 AUMs of which 11,451 are sheep AUMs. The season of use varies by operator, with use for cattle being from May 1 through December 31, and sheep from May 1 to November 30.

Utilization varies throughout the allotment with light to moderate use on the upland range and moderate to heavy use along the riparian zones. Numerous water developments have been constructed over the past ten years, however water continues to be needed to improve livestock distribution on the allotment and increase use of the upland range sites.

The GMCA was categorized in the Green Mountain Grazing EIS as a moderate priority Category I allotment. The following factors were used in the categorization of this allotment:

- Vegetative production is not satisfactory.
- Forage competition between grazing animals.
- Distribution of grazing animals is not satisfactory.
- Turnout dates are not consistent with range readiness.
- Conflicts with other land uses.
- Potential for positive economic return on public investments.

Rangeland Health Evaluation

The December 16, 2002 GMCA Evaluation documented several instances where BLM and the grazing permittees were not making significant progress toward meeting the 15 management goals and objectives described under

Chapter One of this document. In addition, the update of the conformance review for Standards for Healthy Rangelands showed that we were not meeting nor making significant progress toward meeting some of the standards, e.g. the standards for riparian areas and habitats for native species. The following discussion summarizes the major findings and conclusions from the update of the conformance review for Standards for Healthy Rangelands.

STANDARD ONE (Upland Soils)

Within the potential of the ecological site (soil type, landform, climate, and geology) soils are stable and allow for optimal plant growth and minimal surface runoff.

Conclusions

To answer Standard One it is necessary to address this standard relative to:

- Riparian areas and their immediately adjacent uplands where the PFC inventory has recently documented conditions: Based on the above discussion under the Current Situation, the standard is not met.
- Evident degradation (i.e., accelerated erosion) of the roads and trails, primarily on Green Mountain, Crooks Mountain, and in the Crooks Gap: For the roads, trails, and similarly disturbed areas impacted by accelerated erosion, the standard is not met.
- Upland soil conditions over the rest of the allotment.

Can we expect to change plant species composition in the uplands in a reasonable time-frame? Has this site's ability to improve by non-mechanical/fire/ chemical methods been severely impaired or lost? Is this the kind of production and species mix that we will use for our desired plant community (DPC)? Has a lesser state of existence been achieved over the past century where we have a site that is able to sustain itself, but is significantly less productive as it could be if plant growth were optimal; if optimal is defined as excellent range condition or some other desired plant community?

The above questions must be answered to determine whether or not this standard is being met for the uplands in general. Such a general conclusion can only be reached by examining many specific sites and ascertaining the trend of erosion and vegetation since 1978. A statement expressing a great deal of certainty in regards to current conditions of the uplands is not possible. There are indications of past degradation and predicted trends of worsening erosion following the uncontrolled season-long grazing that has occurred since the Unit Resource Analysis (URA) was completed. Therefore, the conclusion for this largest portion of the uplands is unknown.

STANDARD TWO (Riparian and Wetland Vegetation)

Riparian and wetland vegetation has structural, age and species diversity characteristic of the stage of channel succession and is resilient and capable of recovering from natural and human disturbance in order to provide forage and cover, capture sediment, dissipate energy, and provide for ground water recharge.

Conclusions

Prior to initiation of grazing management strategies to improve riparian habitat conditions during the summer of 1999, PFC assessments, frequency transects, willow transects, photographs, and professional observation indicated that riparian habitats were mostly in low seral stages and were not producing near their potential. Monitoring from 1999 to 2001 following initiation of grazing practices to improve riparian habitat conditions indicates that:

- Adequate regrowth of riparian vegetation to promote reproduction and improve vigor of desirable species did not occur following grazing,
- residual stubble height of riparian vegetation remains below adequate levels for soil stabilization and structure for species diversity (see Standard No. 4),
- bare ground is higher than expected in riparian areas, indicating below adequate levels of cover for soil stabilization,
- there are high amounts of litter to live vegetation in riparian areas, indicating heavy utilization of riparian vegetation inhibiting riparian recovery,
- there are high amounts of upland species occurring in riparian habitats, indicating drying of riparian habitats,
- vigor of young and mature willows remained poor throughout the period,

- canopy cover remained constant throughout the period, and
- willows density remained nearly constant throughout the period of 1997 to 2000; in 2001 willow density improved at the transects, apparently responding to the August/early September removal of livestock.

Based on the items identified above, Standard No. 2 is not being met, nor is there significant progress towards meeting the standard, because present management is not providing sufficient rest and recovery time. Even with the deferred rotation system, there has been essentially season long grazing on most riparian areas, resulting in heavy and severe utilization.

STANDARD THREE (Upland Vegetation)

Upland vegetation on each ecological site consists of plant communities appropriate to the site which are resilient, diverse, and able to recover from natural and human disturbance.

Conclusions

Do current upland rangeland resource conditions in the allotment meet the standard? Several partial answers to this question can be provided at this time. Given the landscape scale of the GMCA, there is an enormous variation in upland rangeland conditions. Based on the best available information, which is somewhat dated, the following general conclusions have been reached:

- The upland ecological (range) sites immediately adjacent to riparian areas are not meeting the standard. At the present time, this acreage has been estimated at 3-5 percent (15-25,000 acres) of the GMCA.
- Approximately 46 percent (239,000 acres) of the upland ecological (range) sites are probably meeting the standard.
- At the present time, the status of approximately 49-51 percent (253-263,000) of the upland ecological (range) sites is unknown.
- Upland erosion condition, vegetative cover, and desired plant community are three primary indicators that will be collected and developed. Allotment field inspections will be conducted and monitoring studies will be established, beginning in 2002, to complete the conformance determination.

STANDARD FOUR (Diverse Plant and Animal Habitat)

Rangelands are capable of sustaining viable populations and a diversity of native plant and animal species appropriate to the habitat. Habitats that support or could support threatened species, endangered species, species of special concern, or sensitive species will be maintained or enhanced.

Conclusions

Review of data and observations by resource specialists continue to indicate that critical public land acreage within the allotment does not support healthy and diverse riparian and upland plant communities as described under standards No. 2 and No. 3. These critical habitats provide for the highest diversity for both plants and animals. Woody riparian habitats such as cottonwood, aspen, willow, and water birch are not currently successfully reproducing themselves. Seedling and young age classes of these plant species are currently missing from the current habitats. This is reflected in less dense stands and stands that lack structural diversity. The reduction of density and structure (height) of these habitats is negatively impacting many species of non-game wildlife, such as neotropical migratory birds that are dependent on these habitats. Many riparian habitats are being reduced in size, due to the encroachment of upland plant species, loss of organic matter, reduced structure, and lowering of water tables.

These habitats provide the greatest bird and mammal diversity, due to the presence of water and structural diversity of vegetation. The deterioration of these habitats appears to be reducing non-game populations.

The high use levels in herbaceous riparian vegetation and upland herbaceous vegetation that results in reduced residual cover of herbaceous vegetation within one-half mile to one mile of water sources is also contributing to the current depressed (not robust) sage-grouse populations in the allotment. Sage-grouse are dependent upon herbaceous cover under and around individual sagebrush plants to hide their nests from predation. Sage-grouse late brood rearing habitat is also impacted by the poor condition of riparian habitats. This is also the case with nesting neotropical bird species.

The current habitats will support the federally threatened or endangered species that are known to occur in the allotment. The Wyoming Game and Fish Department (WGFD) have not indicated any other wildlife populations that are not self-sustaining. For big game species, the WGFD sets big game herd unit objectives at levels which

habitats can support and populations can maintain. Mule deer herds which utilize the allotment have been unable to reach or move toward population objectives since the winter of 1992-1993. Poor productivity of fawns, possibly as the result of poor habitat conditions may have resulted in these species from reaching population objectives. The poor habitat conditions are the result of drought that has generally occurred throughout the area for the past three years, along with a combination with heavy use by livestock of riparian habitats and adjacent upland habitats which are used by deer for fawning.

According to PFC inventory information and professional observations made in the allotment, Canada thistle is present on degraded wetlands and riparian areas. Canada thistle is a State of Wyoming designated noxious weed. A secondary noxious weed of concern locally is black henbane which is present along some of the roads.

STANDARD FIVE (Water Quality)

Water quality meets State standards.

Conclusions

Except for Crooks Creek, water resource conditions are rated as unknown. This is in keeping with BLM State of Wyoming guidance, as outlined in BLM Instruction Memorandum No. WY-98-061; until a monitoring list of streams has been assessed by the WDEQ, this standard is rated as unknown. We had several streams on WDEQ's monitoring list (W. Fork Cottonwood Creek, W. Fork Cottonwood Middle Creek, and Mormon Creek) that have had Beneficial Use Reconnaissance Project (BURP) monitoring completed, but they have not yet been fully assessed.

The only way to determine if this standard is being met is through monitoring suspected water bodies as they come to our attention. The priority monitoring list of streams has now been completed state-wide, and WDEQ will be able to investigate suspect water bodies; usually within five years of submittal (personal communication, Chuck Harnish, WYDEQ). BLM PFC inventory information is recognized as credible data to warrant further investigation with BURP monitoring. Those water bodies rated by the PFC inventory as Not Functioning, Functioning-at-Risk with a downward trend, or Functioning-at-Risk with an unknown trend, will be submitted in a letter to WDEQ by this summer.

Crooks Creek is the only GMC stream to appear on the 2002 draft list of waters with water quality impairments requiring a Total Maximum Daily Load (TMDL) allocation plan; the given cause of impairment is due to oil deposits. The TMDL for Crooks Creek will be a point source TMDL and deal with discharge issues at the Crooks Gap oilfield (personal communication with WDEQ's Jack Smith, 2001). As of now, until WDEQ completes assessments of water quality for the above mentioned streams, the water quality for streams in the GMCA is unknown.

STANDARD SIX (Air Quality)

Air quality meets State standards.

Conclusions

No known violations of state air quality standards have been documented for this area according to WDEQ's findings in the publication "Wyoming's Air Quality - Ambient Air Monitoring Data for 2000". Except for the city of Sheridan, all other areas in Wyoming where WDEQ has air monitoring stations are reporting levels below the applicable National Ambient Air Quality Standards. (See attached letter from WDEQ's Robert Schick, dated October 15, 2001.)

WILDLIFE/FISHERIES HABITAT AND SPECIAL STATUS SPECIES

Nongame Wildlife

Many species of nongame mammals, birds, reptiles, and amphibians are found throughout the GMCA, in a wide variety of habitats. The Gas Hills and Divide Standard Wildlife Habitat Types describe these habitats and what species are expected to occur in each habitat within the allotment. This information is available in the Lander Field Office.

The abundance and species diversity of nongame wildlife is greatest in habitat types with high diversity in structure (height of vegetation) and species of vegetation. Such habitat types include wetland-riparian, aspen, limber pine, and mountain shrubland.

The presence of surface water notably contributes to habitat value. Wetland-riparian habitat types, which occupy less than one-half of one percent of the allotment, are of greatest importance for nongame wildlife. More species of breeding birds are found in riparian habitats than the more extensive surrounding uplands (Ohmart and Anderson 1986, Knoph et al. 1988, Saab and Groves 1992). Table 3-10 provides an estimate of total acreage of wetland habitat in the allotment from National Wetlands Inventory data. Map 3-3 identifies the locations of wetlands in the allotment.

Ground-nesting and shrub-nesting bird species are the most susceptible to disturbances created by livestock grazing (Saab 1996). Past season-long livestock and wild horse grazing has removed vegetation, altered vegetation structure in riparian habitats, and substantially reduced habitat suitability for many species in the allotment. Nongame wildlife abundance and species diversity is well below potential on most wetland-riparian habitat types in the allotment.

Game Birds

- **Sage-grouse** (see Special Status Species)
- **Blue grouse** are found in higher elevations of the GMCA. Areas characterized by woodland and mountain shrubland habitats are preferred on Crooks and Green Mountains are preferred. Blue grouse are dependent on the edges in these habitats. Herbaceous understory vegetation provides important nesting and brood-rearing cover. Past livestock and wild horse grazing and trampling of nesting and brood-rearing cover have adversely affected habitat conditions.
- **Waterfowl** populations within the GMCA vary greatly from year to year, depending on the availability of water in the allotment (precipitation-dependent). Wetland-riparian habitat provides nesting and brood-rearing areas for most waterfowl species occurring within the allotment on public land. Past livestock and wild horse grazing and trampling of wetland-riparian habitats have significantly reduced the suitability of these areas for waterfowl production.

Big Game

Elk

Portions of four WGFD elk herd units occur in the GMCA. Table 3-12 identifies the elk herd units occurring in the allotment, the WGFD population objective, the 2005 population estimate, the five-year population average, and forage demand in the allotment for each herd unit.

Elk habitat and seasonal ranges and acreages are shown on Map 3-4 and Table 3-13 for the allotment. The Shamrock Elk Herd Unit occurs in the southeastern portion of the allotment, but no occupied habitat occurs in this portion of the allotment. The Green Mountain Elk Herd Unit encompasses Green Mountain, Crooks Mountain, and the sagebrush/grass habitats around those mountains. The Steamboat Elk Herd Unit occurs in the western one-third of the allotment (west of the Bison Basin Road). Historically, approximately 30 elk traveled extensively throughout this area, generally centering near Cyclone Rim. The South Wind River Elk Herd Unit occurs only in a small portion on the allotment north of the Sweetwater River. In the past, approximately 50 elk inhabited this area in the Sweetwater River Canyon. During recent years, up to 400 elk have been observed in this portion of the allotment during the late fall, winter, and early spring. These elk are believed to be migrating from the Wind River Mountains to the west. Elk populations of the Green Mountain, Steamboat, and South Wind River herd units have exceeded population objectives for the past five years. For further discussions of elk habitat, movements, and food habitats, refer to the Affected Environment chapter of the Green Mountain Grazing EIS.

Mule Deer

Portions of four WGFD mule deer herd units occur in the GMCA. Table 3-12 identifies the mule deer herd units occurring in the allotment, the WGFD population objective, the 2005 population estimate, the five-year population average, and forage demand in the allotment for each herd unit.

Mule deer habitat and seasonal ranges and acreages are shown on Map 3-5 and Table 3-13 for the allotment. Habitats preferred by mule deer in the allotment include woody riparian, shrubland, juniper woodland, and aspen habitats. These habitats typically have adequate cover and extensive stands of browse species available. During

Table 3-12. Big Game Herd Units¹

HERD UNIT	WGFD HERD OBJECTIVE	5-YEAR HERD POPULATION ESTIMATE	5-YEAR HERD POPULATION AVERAGE	ANIMAL MONTHS NEEDED AT OBJECTIVE ²	POUNDS OF FORAGE
Beaver Rim Antelope (H.A. 65)	25,000	26,730	21,974	5,736	424,464
Red Desert Antelope (H.A. 60, 61, 64)	15,000	11,933	14,454	15,847	1,172,678
Sublette Antelope (H.A. 107)	48,000	47,900	43,340	0 ³	0
South Wind River Mule Deer (H.A. 95)	13,000	10,275	7,662	10,243	1,055,029
Chain Lakes Mule Deer (H.A. 98)	No occupied habitat occurs in allotment	-----	-----	-----	-----
Sweetwater Mule Deer (H.A. 96)	6,000	5,854	3,993	12,168	1,253,304
Steamboat Mule Deer (H.A. 131)	4,000	4,000	3,500	0 ⁴	0
Green Mountain Elk (H.A. 24)	500	1,400	1,373	2,865	1,071,510
Shamrock Elk (H.A. 118)	No occupied habitat occurs in allotment	-----	-----	-----	-----
Steamboat Elk (H.A. 100)	500	1,420	1,562	270	100,980
South Wind River Elk (H.A. 25)	3,300	4,063	3,742	See entry below	See entry below
South Wind River Elk or Steamboat Elk (South of Sweetwater River) ⁵	No objective	400	None	1,600	598,400

Footnotes for Table 3-12

1. The Lander RMP states that forage will be provided to meet the wildlife population objectives by herd units as outlined in the Wyoming Game and Fish Department Strategic Plan. The current herd objectives are identified in the following table. The GMCA makes up only a portion of all of these herd units for these big game species. Based on seasonal range acreages, historical wildlife use of the area, aerial monitoring and observations from WGFD and BLM biologists, the BLM determined the approximate wildlife use by species for the GMCA. Determining approximate wildlife numbers on a certain confined area is difficult at best, and these figures will continually be adjusted through the review process of this plan as better information and current habitat needs are identified.

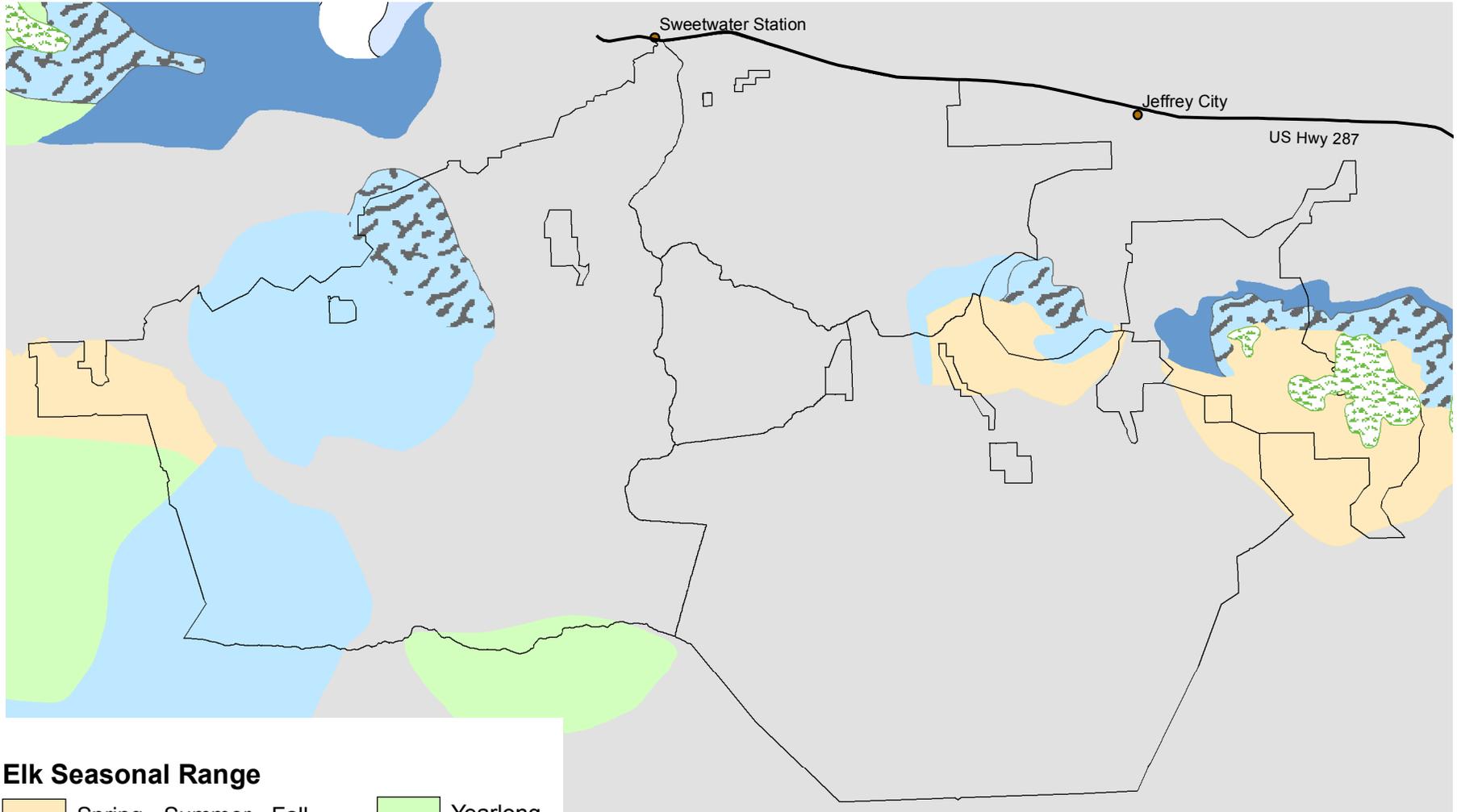
2. Animal months are based on the pounds of forage an individual of each species requires to sustain itself for one month: antelope-74, mule deer-103, elk-374, moose-652

3. Only 454 acres of this herd unit occurs within the GMCA.

4. Only 781 acres of this herd unit occur within the GMCA.

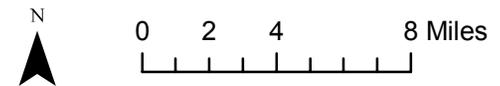
5. The area identified is located in the Antelope Hills. The Antelope Hills area of the GMCA is presently within the Steamboat elk herd area. Recently, larger numbers of elk have begun to use this area during the winter period. Biologists believe that these elk are from the South Wind River elk herd, and are changing their seasonal movements to an area where there is available forage and relatively isolated habitats away from human disturbance during the winter period. The South Wind River elk herd is presently over the objective of 3,300 animals. If elk continue to use this area over the next several years, changes in elk herd unit boundaries and seasonal habitats would be made.

Map 3-4: Elk Seasonal Range



Elk Seasonal Range

- | | |
|---|--|
|  Spring - Summer - Fall |  Yearlong |
|  Winter Yearlong |  Winter |
|  Severe Winter Relief |  Out |
|  Crucial Winter Yearlong |  Birthing |

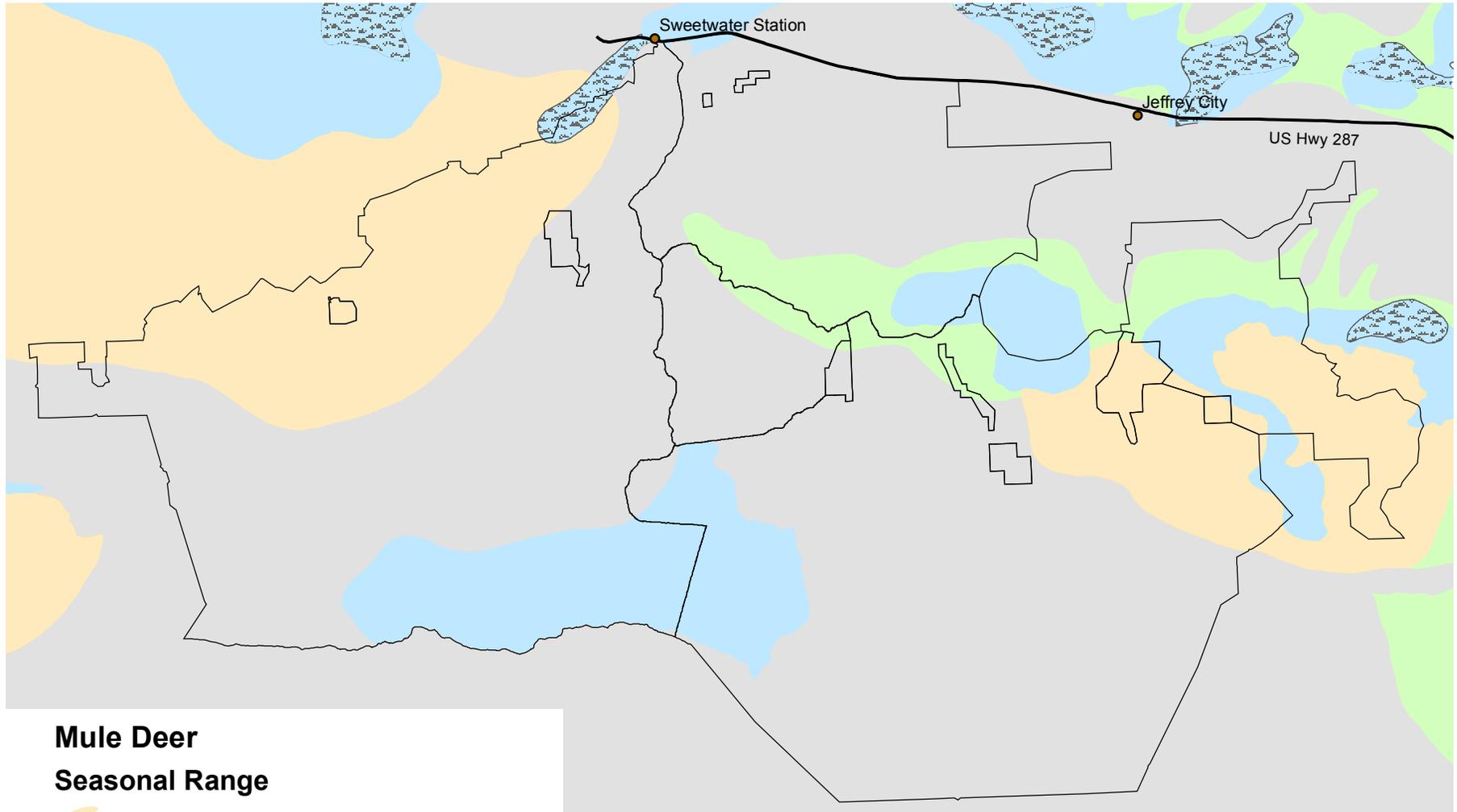


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Table 3-13. Big Game Seasonal Habitat Acreages (GMCA)

HERD NAME	CRUCIAL WINTER/YEARLONG	WINTER	WINTER/YEARLONG	SPRING/SUMMER/FALL	YEARLONG
Beaver Rim Antelope (H.A. 65)	15,006	0	42,491	45,477	0
Red Desert Antelope (H.A. 60, 61, 64)	0	0	20,790	382,185	0
Sublette Antelope (H.A. 107)	0	0	0	454	0
South Wind River Mule Deer (H.A. 95)	1,023	0	45,729	55,147	0
Chain Lakes Mule Deer (H.A. 98)	0	0	0	0	0
Sweetwater Mule Deer (H.A. 96)	0	0	15,615	37,741	28,026
Steamboat Mule Deer (H.A. 430)	0	0	781	0	0
Green Mountain Elk (H.A. 24)	2,930	3,796	1,910	29,651	0
Shamrock Elk (H.A. 118)	0	0	0	0	0
Steamboat Elk (H.A. 100)	0	9,652	19,843	60,786	0
South Wind River Elk (H.A. 25)	0	0	0	0	0
Lander Moose (H.A. 2,39)	523	0	128	37,887	0

Map 3-5: Mule Deer Seasonal Range



Mule Deer Seasonal Range

-  Spring - Summer - Fall
-  Winter Yearlong
-  Yearlong
-  Crucial Winter Yearlong
-  Out



0 2 4 8 Miles

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severe winters, deer are restricted to areas where cover and browse are still relatively accessible. On many deer winter ranges, riparian habitats provide the only available cover and most of the available forage. These riparian habitats also provide important forage and fawning areas during the spring and summer. Forage competition between livestock, wild horses, and elk in these riparian habitats has reduced the amount of forage available to deer. Mule deer population estimates for the Sweetwater, Steamboat, and South Wind River herd units have been below objective for a number of years. For further discussions on mule deer habitat, movements, and food habitats, refer to the Affected Environment chapter of the Green Mountain Grazing EIS.

Pronghorn Antelope

Portions of three WGFD pronghorn antelope herd units occur in the GMCA. Table 3-12 identifies the pronghorn antelope herd units occurring in the allotment, the WGFD population objective, the 2005 population estimate, the five-year population average, and forage demand in the allotment for each herd unit.

Pronghorn habitat and seasonal ranges and acreages are shown on Map 3-6 and Table 3-13 for the allotment. The Red Desert Pronghorn Herd Unit utilizes the largest proportion of the allotment during the spring, summer, and fall period. Pronghorn generally migrate south out of the allotment as a result of snow and colder temperatures. During most winters, a reduced number of antelope can be found along the southern boundary of the allotment from the Rocky Crossing Road to Eagles Nest Draw. The Beaver Rim Pronghorn Herd Unit occurs in the northern one-fourth of the allotment, which extends from the mouth of Alkali Creek along the Crooks Mountain divide to the area immediately southwest of Jeffrey City. Antelope movements in this herd unit are generally from south and west to northeast, with pronghorn wintering in the vicinity of Ice Slough and outside of the allotment to the east. A small portion of habitat of the Sublette Pronghorn Herd Unit (about 300 acres) occurs in the extreme western portion of the allotment, where pronghorn occur during the spring, summer, and fall. The five-year average estimated population for all herds is currently below population objectives, as a result of the cumulative impacts from long-term summer drought, which began in the late 1980s and persisted through the mid-1990s. The drought has dramatically reduced fawn survival, yearling recruitment, and, ultimately, herd size for these populations. The severe winter of 1992-93 also negatively impacted these populations. For further discussions of pronghorn habitat, movements, and food habitats, refer to the Affected Environment chapter of the Green Mountain Grazing EIS.

Moose

A portion of the Lander Moose Herd Unit occurs in the GMCA. Table 3-12 identifies the herd unit, the WGFD population objective, the 2005 population estimate, the five-year population average, and forage demand in the allotment for the herd unit.

Moose habitat and seasonal ranges and acreages are shown on Map 3-7 and Table 3-13 for the allotment. Moose habitat in the allotment generally occurs in forested or riparian habitats containing willow, cottonwood, or aspen species. Although moose occur in the allotment yearlong, the greatest numbers enter the allotment from the west as they migrate away from the Shoshone National Forest due to deep snow. Preferred forage for moose is willow, aspen, and other vegetative growth common to riparian habitats. Forage competition among other animals, including livestock, has adversely impacted the availability of forage and cover for moose. For further discussions of moose habitat, movements, and food habitats, refer to the Affected Environment chapter of the Green Mountain Grazing EIS.

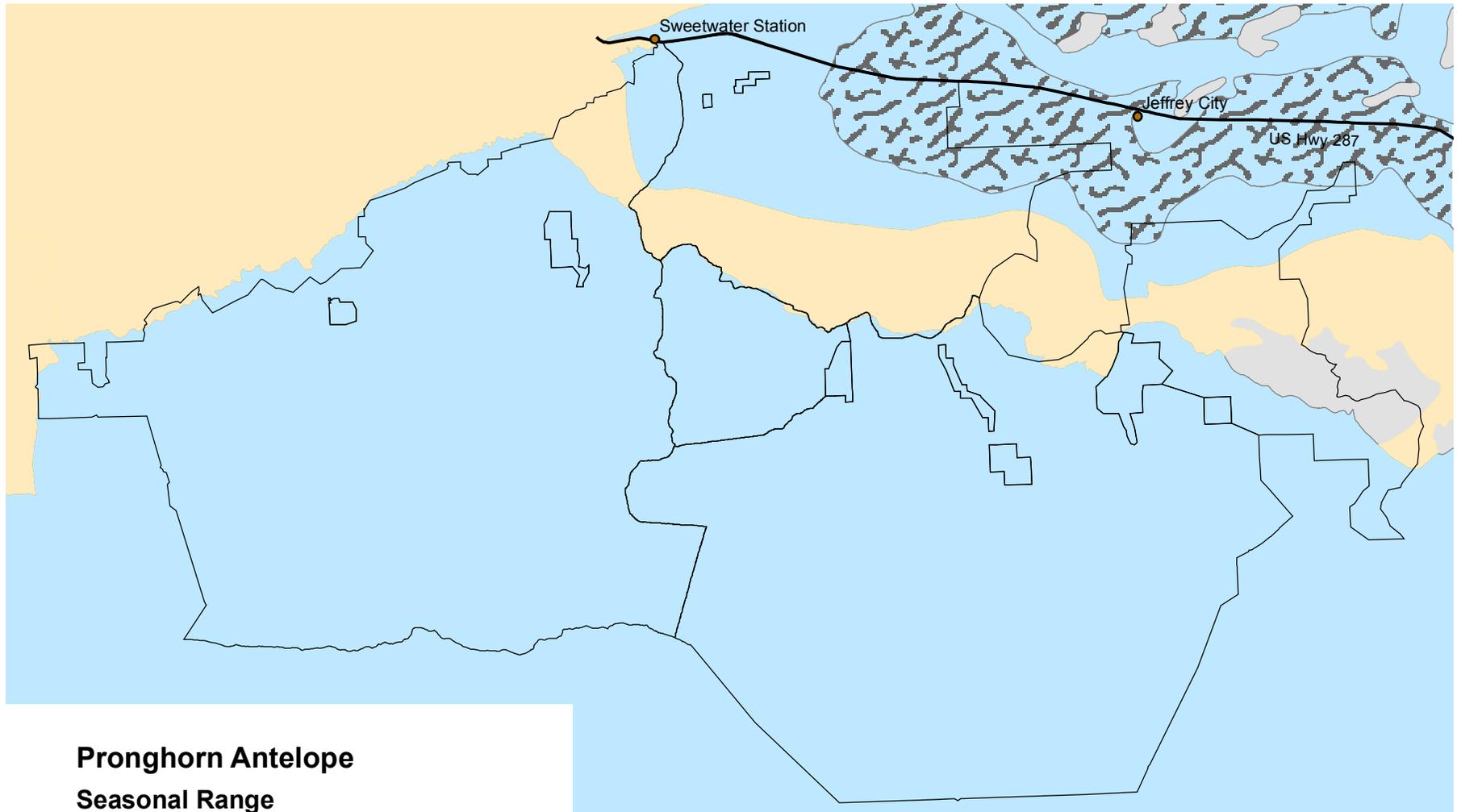
Fisheries

A variety of game and nongame fish species occur in the Sweetwater River and streams in the allotment. These include rainbow trout, cutthroat trout, brown trout, brook trout, white sucker, longnose sucker, mountain sucker, creek chub, lake chub, longnose dace, and fathead minnow.

The Sweetwater River and Crooks Creek are classified by the WGFD as Class 3 trout streams, which are identified as important fisheries on a regional basis within the State. The following streams are classified by the WGFD as Class 4 trout streams, which are important fisheries on a local basis: Sheep Creek, Cottonwood Creek (and tributaries), Willow Creek (near Green Mountain), Alkali Creek, Sulphur Creek, Mormon Creek, and Willow Creek.

Fisheries within the allotment have been affected by stream bank erosion, lack of woody shrub regeneration, and lack of herbaceous bank cover. Sediment adversely affects trout by silting in spawning gravel, smothering trout eggs after they are deposited, and filling in cracks between gravel and cobble where young trout overwinter. Eroded streambanks also offer little cover for trout. Reductions in willow and herbaceous cover along streams reduce water

Map 3-6: Pronghorn Antelope Seasonal Range



Pronghorn Antelope Seasonal Range

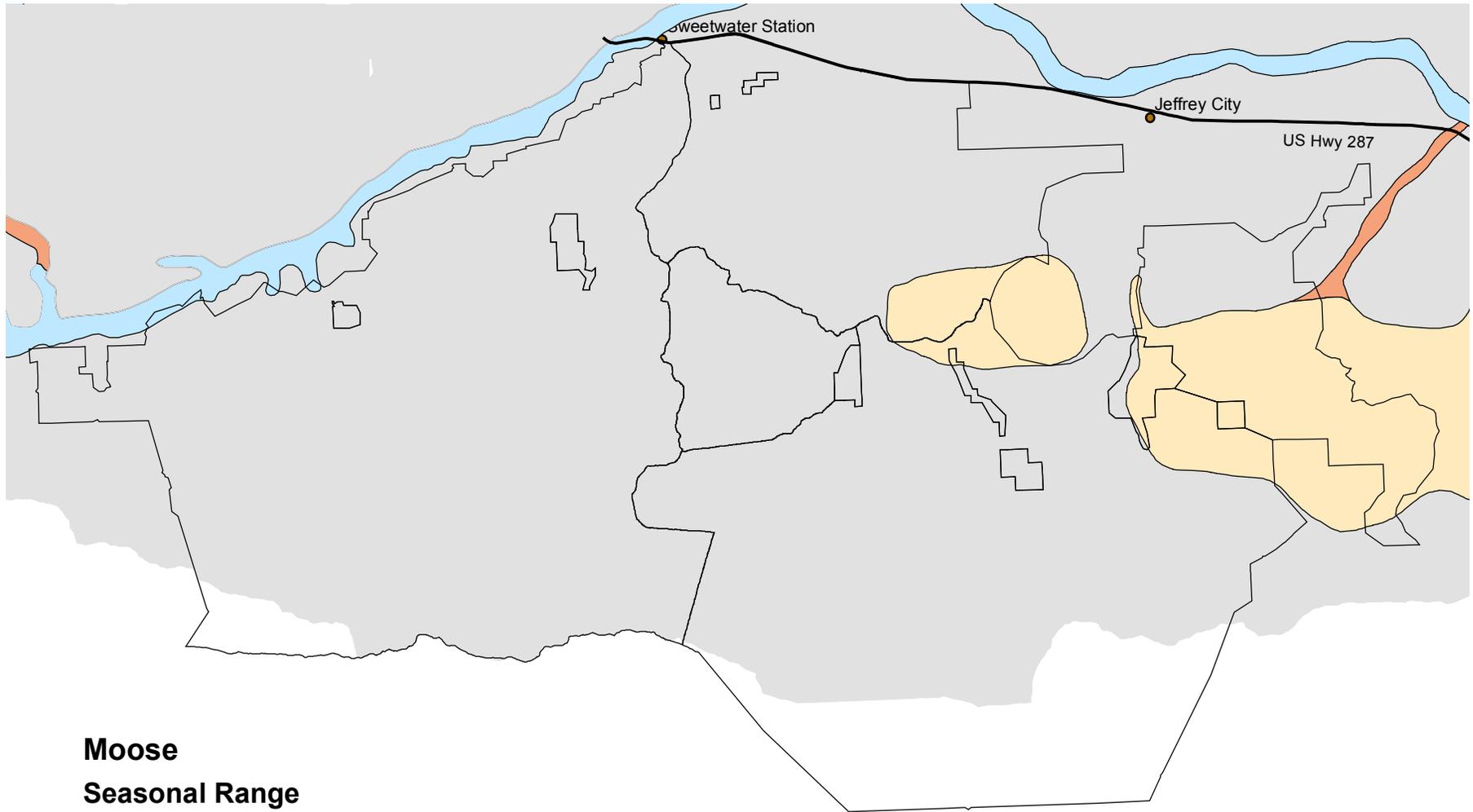
-  Spring-Summer-Fall
-  Winter Yearlong
-  Crucial Winter Yearlong
-  Out



0 2 4 8 Miles

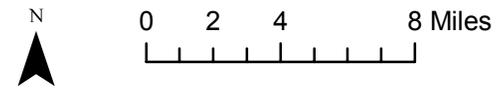
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Map 3-7: Moose Seasonal Range



Moose Seasonal Range

-  Spring - Summer - Fall
-  Winter Yearlong
-  Crucial Winter Yearlong
-  Out



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surface shading, which causes an increase in water temperature that adversely affects fish populations. Reduced shrub and herbaceous cover also minimize available cover for fish.

Special Status Species

Special status species include those plant and animal species that are 1) currently listed (or are candidates for listing) as threatened or endangered (T&E) under provisions of the Endangered Species Act (ESA), 2) designated as sensitive by the Wyoming BLM State Director, or 3) protected under the Migratory Bird Treaty Act. The Lander Field Office includes potential habitat for five T&E species and forty sensitive species (see Tables 3-14 and 3-15). This designation also includes consideration for Platte River water depletion that may affect listed species downstream, as well as critical habitat for the desert yellowhead plant (*Yermo xanthocephalus*).

Section 7 of the ESA requires that the BLM, as a federal agency, work to conserve any species listed as threatened or endangered. This is accomplished by consulting with the U.S. Fish and Wildlife Service (USFWS) concerning projects that might adversely affect such species, and by protecting such species or their habitat from harm. The BLM Manual 6840 (Policy and Guidance for Special Status Species Management) requires the BLM to conserve sensitive species and their habitats, so as to prevent them from becoming listed under the provisions of the ESA.

Threatened or Endangered Species

Table 3-14 lists the federally designated threatened and endangered species that are known to occur within the Lander Field Office, or for which potential habitat occurs within the LFO. There are currently no T&E candidate species considered within the LFO.

Table 3-14. Federally Listed Threatened or Endangered Species

Listed species Common Name	Scientific Name	Habitat
Canada lynx (T)	<i>Lynx Canadensis</i>	Cool, moist coniferous forests with cold, snowy winters and abundant snowshoe hares.
Black-footed ferret (E)	<i>Mustela nigripes</i>	Restricted entirely to extensive prairie dog colonies.
Ute ladies’-tresses (T)	<i>Spiranthes diluvialis</i>	Moist peat, sand, silt, or gravel soils near wet meadows, springs, lakes, ponds, or perennial streams.
Blowout penstemon (E)	<i>Penstemon haydenii</i>	Sparsely vegetated, early successional sand dunes and blowout depressions created by wind.
Desert yellowhead (T)	<i>Yermo xanthocephalus</i>	Barren slopes and ridges on outcrops of white, silty clay or Miocene sandstones of the Split Rock formation.
Critical habitat for desert yellowhead	<i>Yermo xanthocephalus</i>	A specific area within the Lander Field Office that has been designated as essential to the conservation of the desert yellowhead.
Platte River water depletion (T&E)	<i>Various species downstream of the Lander Field Office</i>	Riverine and wetland habitats used by various federally-listed species in the Platte River drainage downstream from the Lander Field Office.

- **Canada lynx** – Suitable habitat for the Canada lynx does not exist in the GMCA, and no part of the allotment is within a lynx analysis unit (LAU). This species will not be considered further in this document.
- **Black-footed ferret** – Most of the LFO (including the GMCA) has been block-cleared by the USFWS as being unsuitable for black-footed ferret reintroduction primarily because of a lack of extensive prairie dog colonies. The ferret will not be considered further in this document.
- **Ute ladies’-tresses** – This species has not been documented in the LFO. However, because suitable habitat does exist in the GMCA, it will be further considered in Chapter 4 of this document.
- **Blowout penstemon** – This species has not been documented in the LFO. However, because suitable

habitat does exist in the GMCA, it will be further considered in Chapter 4 of this document.

- **Desert yellowhead** – This species is known from a single occurrence several miles north of the GMCA. To date, numerous surveys have failed to identify additional populations in other locations with similar habitat. This species will not be considered further in this document.
- **Critical habitat for desert yellowhead** – Designated critical habitat for the desert yellowhead does not occur within the GMCA.
- **Platte River depletion** – Activities (i.e. water developments) that may deplete the Sweetwater River drainage and thereby reduce water availability to listed species downstream from the LFO will be considered in Chapter 4 of this document.

BLM Sensitive Species

Because the GMCA is so large and contains such a diversity of habitat types, most of the BLM State Sensitive Species can either be found or have the potential to occur on the allotment. Table 3-15 lists all those sensitive species for which suitable habitat exists within the LFO.

Table 3-15. Sensitive Species List (BLM)

MAMMALS		
Dwarf shrew	<i>Sorex nanus</i>	Mountain foothill shrub; grasslands
Long-eared Myotis	<i>Myotis evotis</i>	Conifer and deciduous forests; caves and mines
Spotted bat	<i>Euderma maculatum</i>	Cliffs over perennial water; basin-prairie shrub
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	Forests; basin-prairie shrub; caves and mines
White-tailed prairie dog	<i>Cynomys leucurus</i>	Basin-prairie shrub; grasslands
Swift fox	<i>Vulpes velox</i>	Grasslands
Pygmy rabbit	<i>Brachylagus idahoensis</i>	Basin-prairie and riparian shrub
Grizzly bear	<i>Ursus arctos</i>	Conifer and deciduous forests
Gray wolf	<i>Canis lupus irremotus</i>	General habitats providing abundant ungulate prey, secluded denning and rendezvous sites, and relatively little human activity.
BIRDS		
Bald eagle	<i>Haliaeetus leucocephalus</i>	Lakes, rivers, and other water bodies suitable for foraging near large trees necessary for nesting and roosting
White-faced ibis	<i>Plegadis chihi</i>	Marshes and wet meadows
Mountain plover	<i>Charadrius montanus</i>	Short grass prairie/sparse vegetation
Trumpeter swan	<i>Cygnus buccinator</i>	Lakes, ponds, and rivers
Northern goshawk	<i>Accipiter</i>	Conifer and deciduous forests
Ferruginous hawk	<i>Buteo regalis</i>	Basin-prairie shrub; grasslands; rock outcrops
Peregrine falcon	<i>Falco peregrinus</i>	Tall cliffs
Greater sage-grouse	<i>Centrocercus urophasianus</i>	Basin-prairie and mountain-foothill shrub
Long-billed curlew	<i>Numenius americanus</i>	Grasslands and plains; foothills; wet meadows
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	Open woodlands; streamside willow and alder groves
Burrowing owl	<i>Athene cunicularia</i>	Grasslands; basin-prairie shrub
Sage thrasher	<i>Oreoscoptes montanus</i>	Basin-prairie and mountain-foothill shrub
Loggerhead shrike	<i>Lanius ludovicianus</i>	Basin-prairie and mountain-foothill shrub
Brewer's sparrow	<i>Spizella breweri</i>	Basin-prairie shrub
Sage sparrow	<i>Amphispiza billineata</i>	Basin-prairie and mountain-foothill shrub
Baird's sparrow	<i>Ammodramus bairdii</i>	Grasslands and weedy fields
FISH		
Yellowstone cutthroat	<i>Oncorhynchus clarki bouvieri</i>	Yellowstone drainage; small mountain streams; large rivers

AMPHIBIANS		
Northern leopard frog	<i>Rana pipiens</i>	Beaver ponds; permanent water in plains and foothills
Great Basin spadefoot	<i>Spea intermontana</i>	Spring seeps; permanent and temporary waters
Boreal toad (Northern Rocky Mtn. population)	<i>Bufo boreas boreas</i>	Pond margins; wet meadows; riparian areas
Spotted frog	<i>Ranus pretiosa (lutiventris)</i>	Ponds and sloughs; small streams
PLANTS		
Meadow pussytoes	<i>Antennaria arcuata</i>	Moist, hummucky meadows, seeps, or springs surrounded by sage/grasslands at 4,950 – 7,900 ft.
Porter’s sagebrush	<i>Artemisia porteri</i>	Sparsely vegetated badlands of ashly or tufaceous mudstone and clay slopes at 5,300 – 6,500 ft.
Dubois milkvetch	<i>Astragalus gilviflorus var. purpureus</i>	Barren shale, badlands, limestone and redbed slopes and ridges at 6,900 – 8,800 ft.
Nelson’s milkvetch	<i>Astragalus nelsonius</i>	Alkaline clay flats, shale bluffs and gullies, pebbly slopes, and volcanic cinders in sparsely-vegetated sagebrush, juniper, and cushion plant communities at 5,200 – 7,600 ft.
Cedar Rim thistle	<i>Cirsium aridum</i>	Barren, chalky hills, gravelly slopes and fine-textured, sandy-shaley draws at 6,700-7,200 ft.
Owl Creek miner’s candle	<i>Cryptantha subcapitata</i>	Sandy-gravelly slopes and desert ridges on sandstones of the Wind River formation at 4,700 – 6,000 ft.
Fremont bladderpod	<i>Lesquerella fremontii</i>	Rocky, limestone slopes and ridges at 7,000 – 9,000 ft.
Beaver Rim phlox	<i>Phlox pungens</i>	Sparsely vegetated slopes on sandstone, siltstone, or limestone substrates at 6,000 – 7,400 ft.
Rocky Mountain twinpod Persistent sepal yellowcress	<i>Physaria saximontana var. saximontana</i>	Sparsely vegetated, rocky slopes of limestone, sandstone, or clay at 5,6000 – 8,300 ft
Persistent sepal yellowcress	<i>Rorippa calycina</i>	Riverbanks and shorelines, usually on sandy soils near high water line
Shoshonea	<i>Shoshonea pulvinata</i>	Shallow, stony, calcareous soils of exposed limestone outcrops, ridgetops, and talus slopes at 5,900 – 9,200 ft.
Barneby’s clover	<i>Trifolium barnebyi</i>	Ledges, crevices, and seams on reddish-cream Nugget sandstone outcrops at 5,600 – 6,700 ft.

- **Dwarf shrew** – This tiny, secretive mammal is known from a relative few specimens throughout Wyoming. Although no occurrence has been documented in the GMCA, this species has been found in nearby Sweetwater County. It is known to use a wide variety of habitats and likely occurs within the

allotment.

- **Long-eared myotis bat** – This species is known to primarily inhabit coniferous forests and woodlands, and is also known to forage above water in these environments. Although not documented in the GMCA, suitable habitat exists on Green and Crooks Mountains.
- **Spotted bat** – Although its range includes much of the GMCA, this species is known to roost in cliff crevices near perennial water, a habitat type that is rare in the allotment.
- **Townsend's big-eared bat** – Unlike the long-eared myotis and spotted bats which may roost in tree snags and use parts of the GMCA seasonally, the Townsend's big-eared bat requires caves or mine shafts throughout its life cycle (Gruver and Keinath, 2003). No natural caves are known to occur in the GMCA, and all remaining mine portals have been sealed. This species is unlikely to occur in the GMCA and will not be considered as part of the affected environment.
- **White-tailed prairie dog** – This species occurs throughout the GMCA in shrubsteppe/grassland habitats. These occurrences vary in size from individual burrows to colonies that may cover several acres.

Once abundant across Wyoming, the white-tailed prairie dog has long been considered a pest by the agricultural industry, and its numbers have been reduced by poisoning, recreational shooting, destruction of habitat, and disease (Keinath, 2004). Because of continued persecution and declining populations, the USFWS was petitioned as recently as 2002 to list the species as threatened under the provisions of the ESA.

- **Swift fox** – This species has historically occupied short or mixed grass prairies on level to moderately rolling terrain in the Great Plains. The WGFD reports that recent studies and anecdotal information suggests that the swift fox is capable of inhabiting, surviving, and reproducing in sagebrush/grassland habitats. Populations of swift fox are probably low in the allotment; however, undocumented sightings in the allotment and in nearby allotments have been reported.
- **Pygmy rabbit** – This smallest of all North American rabbit species inhabits tall, dense sagebrush and has been documented at several locations across the GMCA.
- **Grizzly bear** – Although this large omnivore is highly adaptable to a variety of habitats and food sources, it generally requires extensive forested habitat that is relatively undisturbed by human activity. Such forested habitat in the GMCA would only occur on Green or Crooks Mountains, and these areas have extensive road systems that are used throughout much of the year by recreationists, livestock operators, and energy development workers. Therefore, suitable habitat for the grizzly bear is unavailable in the GMCA, and this species will not be considered in the affected environment.
- **Gray wolf** – This species was recently removed from the T&E list and currently has dual status in Wyoming (both as a trophy game animal and as a predator) depending upon the location of occurrence. This species is designated as a predator in the GMCA and is not likely to ever become established there. Consequently, it will not be considered further in Chapter 4 of this document.
- **Bald eagle** – Recently removed from the T&E list, this species requires relatively large water bodies (i.e. large rivers, lakes, etc.) for foraging near large trees, for nesting, and for roosting. Such habitat is unavailable in the GMCA. Consequently, this species will not be considered further in this analysis.
- **White-faced ibis** – This species requires large lakes or wetland areas in which to breed, and large quantities of emergent vegetation on which forage (Dark-Smilely and Keinath, 2003). This type of habitat does not exist within the GMCA. Consequently, this species will not be considered in the affected environment.
- **Mountain plover** – This species is known to breed and raise young in the allotment during the spring,

summer, and early fall. Plovers are generally found in habitats that have little or no vegetation structure such as grasslands, alkali flats, or low shrubs (i.e., saltbush). Plovers may nest on sites where vegetation is sparse to bare or closely-cropped.

- **Trumpeter swan** – Although this species may occasionally stopover at Picket or Scotty Lakes in the southwestern part of the GMCA, they require relatively large water bodies (over 100 meters across) with shallow margins and aquatic vegetation for breeding habitat (Travsky & Beauvais, 2004). This type of habitat does not exist within the GMCA. Consequently, this species will not be considered in the affected environment.
- **Northern goshawk** – The typical habitat for this species is a mixture of conifer and deciduous woodlands (i.e. lodgepole pine and aspen). Such habitat is readily available within the GMCA on Green and Crooks Mountains.
- **Ferruginous hawk** – This species requires open, shrubsteppe, and grassland habitats which are available throughout most of the GMCA. It has been documented foraging and nesting in numerous locations within the allotment.
- **Peregrine falcon** – There are currently no known nesting sites by this species in the GMCA. However, a limited amount of suitable habitat may occur within the allotment.
- **Greater sage-grouse** – It is arguable that this is the species of greatest concern in the Lander Field Office at the present time because of repeated efforts to have it federally listed. These birds are solely dependent upon sagebrush for food and cover from October to April. Map 2-6 shows important known wintering areas within the allotment. Courtship occurs on strutting grounds from March to May. Recent studies have shown that about two-thirds of the hens will nest within three miles of the lek at which they mated, and the remainder will nest within 15 miles (WY Sage-grouse Conservation Plan, 2003). Thirty-seven known strutting/nesting complexes occur within the allotment or overlapping portions of the allotment. Map 2-5 shows the locations of these strutting/nesting complexes. From June through September, sage-grouse are usually found near wetland-riparian habitats, where succulent forage, water, and insect food are normally available. The general trend of sage-grouse populations within the allotment is downward over the past 20 years. This downward trend is thought to be caused by drought, past livestock grazing practices, predation, and habitat fragmentation from energy development, utilities construction, etc. Livestock grazing has impacted sage-grouse in the allotment by the removal of herbaceous plants (grasses and forbs) that occur around the base of sagebrush plants. The removal of these plants permits predators to prey upon sage-grouse eggs by reducing the hiding cover around the nest. Livestock grazing practices have also impacted sage-grouse by reducing habitat quality in riparian habitats used for brood rearing. Continual livestock grazing during the growing season has caused nearly all riparian habitats in the allotment to be in a low seral stage. These low seral riparian vegetation stages do not support the vegetative cover to hide sage-grouse from predators or to provide insect populations required for raising sage-grouse chicks. Energy exploration and development within the GMCA further impacts sage-grouse habitat through direct loss to road and well pad construction and fragmentation by roads, pipelines, and utilities. Further discussion on sage grouse life history and habitat needs can be found in Appendix 9.
- **Long-billed curlew** – Suitable habitat, though not plentiful in the GMCA, does exist, especially in the vicinity of Scotty and McKay Lakes.
- **Yellow-billed cuckoo** – In Wyoming, this species is generally found along relatively large watercourses (i.e. Bighorn, Powder, North Platte, etc.) in dense, closed canopy stands of cottonwood and willow (Bennett & Keinath, 2003). Such habitat is non-existent the GMCA. This species will not be considered in the affected environment.
- **Burrowing owl** – This small owl species requires readily available burrows (typically prairie dog) for nesting, roosting, and cover. This type of habitat is available throughout much of the allotment.

- **Sage thrasher, Brewer's sparrow, and sage sparrow** – These species are all considered sagebrush obligates whose habitat could be impacted by livestock grazing practices. Suitable habitat occurs throughout the allotment.
- **Loggerhead shrike** – Although this species occurs throughout North America, in Wyoming it is generally associated with dense patches of sagebrush - which it uses for nesting - intermixed with open, grassy areas for foraging. Such habitat is found throughout much of the GMCA.
- **Baird's sparrow** – This species generally prefers open grasslands and overgrown fields with taller, denser grasses (Luce and Keinath, 2003). This habitat type is not plentiful in the GMCA, but it may exist in some areas such as sloughs or riparian pastures.
- **Yellowstone cutthroat trout** – This species is endemic to the Yellowstone River drainage. Since no part of the GMCA is located in that drainage, it will not be considered in the affected environment.
- **Northern leopard frog, Great Basin spadefoot, boreal toad, and spotted frog** – These amphibian species generally require some type of riparian habitat (ponds, wet meadows, seeps, etc.) to complete their life cycle. Habitat of this type is found throughout the GMCA and is often heavily impacted from grazing by livestock and wild horses.
- **Meadow pussytoes** - This plant species occurs in riparian habitats in the western portion of the allotment in the Antelope Hills/Picket Lake Use Area. Meadow pussytoes is found at or near the top of hummocks, and also in locations that receive higher solar radiation in riparian areas that are in low to mid-seral stages. These locations provide a micro-habitat that appears to permit the plant to out-compete other riparian plant species that require slightly moister sites. These micro-sites also provide for increased solar radiation that appears to be required for meadow pussytoes. These hummocks have been produced by trampling of livestock, wild horses, and, to a lesser extent, by wildlife.
- **Porter's sagebrush** – Although not documented in the GMCA, the Wyoming Natural Diversity Database (WYNDD) computer model indicates that suitable habitat may exist for this species within the allotment.
- **Dubois milkvetch** – This plant species is endemic only to badland habitat found near Dubois, Wyoming (Ladyman, 2004). It has never been documented in the GMCA, and therefore will not be considered as part of the affected environment.
- **Nelson's milkvetch** – Although not documented in the GMCA, the WYNDD model indicates that suitable habitat may exist for this species within the allotment.
- **Cedar Rim thistle** – Although not specifically documented in the GMCA, the WYNDD model indicates that suitable habitat may exist for this species within the allotment.
- **Owl Creek miner's candle** – This species is known only from the Owl Creek and Bridger Mountains (Fertig, 2000), and suitable habitat is not shown to exist by the WYNDD model within the GMCA. It will not be considered as part of the affected environment.
- **Fremont's bladderpod** – The LFO has no documentation of occurrence by this species in the GMCA. However, the WYNDD model indicates that suitable habitat may occur in the allotment.
- **Beaver Rim phlox** – This species is typically known from several locations north of the GMCA, but is not actually documented on the allotment. However, the WYNDD computer model indicates the likelihood of suitable habitat.
- **Rocky Mountain twinpod** – Also known from occurrences in the Beaver Rim area north of the GMCA, this species has not been documented by the LFO on the allotment. However, the WYNDD computer

model indicates the likelihood of suitable habitat.

- **Persistent sepal yellowcress** – This species requires the moist soils that would be found around the banks of streams, stock watering ponds, etc. Although not documented within the GMCA, habitat of this type certainly does exist there in numerous places.
- **Shoshonea** – According to LFO occurrence records, this species has only been documented in the Owl Creek Mountains in this field office. However, the WYNDD computer model does indicate a small amount of suitable habitat in the GMCA.
- **Barneby's clover** – This species is considered endemic only to Nugget sandstone outcrops of the southeast Wind River Mountains (Fertig, 2000). The WYNDD computer model does not indicate any likelihood of suitable habitat in the GMCA. Consequently, it will not be considered in the affected environment.

Having eliminated those species for which no suitable habitat exists in the GMCA, the following Special Status Species (as seen in Table 3-16) will be considered further in Chapter Four, Environmental Consequences analysis:

Table 3-16. Special Status Species in the Affected Environment

<i>Species</i>	<i>Status</i>
<i>Ute ladies' tresses</i>	Threatened
<i>Blowout penstemon</i>	Endangered
<i>Platte River depletion</i>	Threatened and Endangered (downstream)
<i>Long-eared Myotis</i>	BLM Sensitive
<i>Spotted bat</i>	BLM Sensitive
<i>White-tailed prairie dog</i>	BLM Sensitive
<i>Swift fox</i>	BLM Sensitive
<i>Pygmy rabbit</i>	BLM Sensitive
<i>Mountain plover</i>	BLM Sensitive
<i>Northern goshawk</i>	BLM Sensitive
<i>Ferruginous hawk</i>	BLM Sensitive
<i>Peregrine falcon</i>	BLM Sensitive
<i>Greater sage-grouse</i>	BLM Sensitive
<i>Long-billed curlew</i>	BLM Sensitive
<i>Burrowing owl</i>	BLM Sensitive
<i>Sage thrasher</i>	BLM Sensitive
<i>Loggerhead shrike</i>	BLM Sensitive
<i>Brewer's sparrow</i>	BLM Sensitive
<i>Sage sparrow</i>	BLM Sensitive
<i>Baird's sparrow</i>	BLM Sensitive
<i>Northern leopard frog</i>	BLM Sensitive
<i>Great Basin spadefoot</i>	BLM Sensitive
<i>Boreal toad (Northern Rocky Mountain population)</i>	BLM Sensitive
<i>Spotted frog</i>	BLM Sensitive
<i>Meadow pussytoes</i>	BLM Sensitive
<i>Porter's sagebrush</i>	BLM Sensitive
<i>Nelson's milkvetch</i>	BLM Sensitive
<i>Cedar Rim thistle</i>	BLM Sensitive
<i>Fremont bladderpod</i>	BLM Sensitive
<i>Beaver Rim phlox</i>	BLM Sensitive
<i>Rocky Mountain twinpod</i>	BLM Sensitive
<i>Persistent sepal yellowcress</i>	BLM Sensitive
<i>Shoshonea</i>	BLM Sensitive

WILD HORSES

General Information

An estimated 250 wild, free-roaming horses inhabit the GMCA in three different herd management areas (HMAs) (see Map 3-8). The following table shows current wild horse inventory information and Appropriate Management Levels (AML) for the allotment by HMA.

Table 3-17. GMCA Wild Horse Inventory and AML by Herd Management Areas

HMA	Current Number of Horses	AML
Green Mountain	100*	170-300
Crooks Mountain	85*	65-100
Antelope Hills/Cyclone Rim	65	65-82

* These numbers represent a portion of the AML found within the GMCA under normal environmental conditions. At any given time this number may be more or less.

These animals breed in the summer and fall. Their numbers increase by about 15-20 percent annually. Recent drought conditions have allowed almost year-round breeding, with colts being observed in almost every month of the year.

The horses appear to be in excellent health. Injured, sick, or emaciated wild horses are rarely seen. Because the GMCA is relatively remote and unvisited, the wild horses can generally be viewed in a very natural setting. The horses are not greatly alarmed by visitors and can usually be approached to within a few hundred yards.

Habitat

Crucial winter habitat exists in the Green Mountain HMA in the vicinity of Crooks Creek, east of Whiskey Peak, and North of the Green Mountain. Crucial winter habitat exists in the Crooks Mountain HMA in the vicinity of Ice Slough, and also in the Antelope Hills HMA in the vicinity of Picket Lake. Also, a summer concentration area has been identified in the Soap Holes vicinity of the Crooks Mountain HMA. The areas of horse use are somewhat dependent upon water availability, although it is not uncommon to see wild horses more than five miles from water. Most movement to and from water occurs in the early mornings and late evenings. In late summer when water supplies are limited, herd movements are also limited. The bands prefer to feed on upland areas that provide a good field of vision for escape. In the winter, the horses are often found in groups of two to five horses on exposed ridges which are blown free of snow.

Distribution and Movement

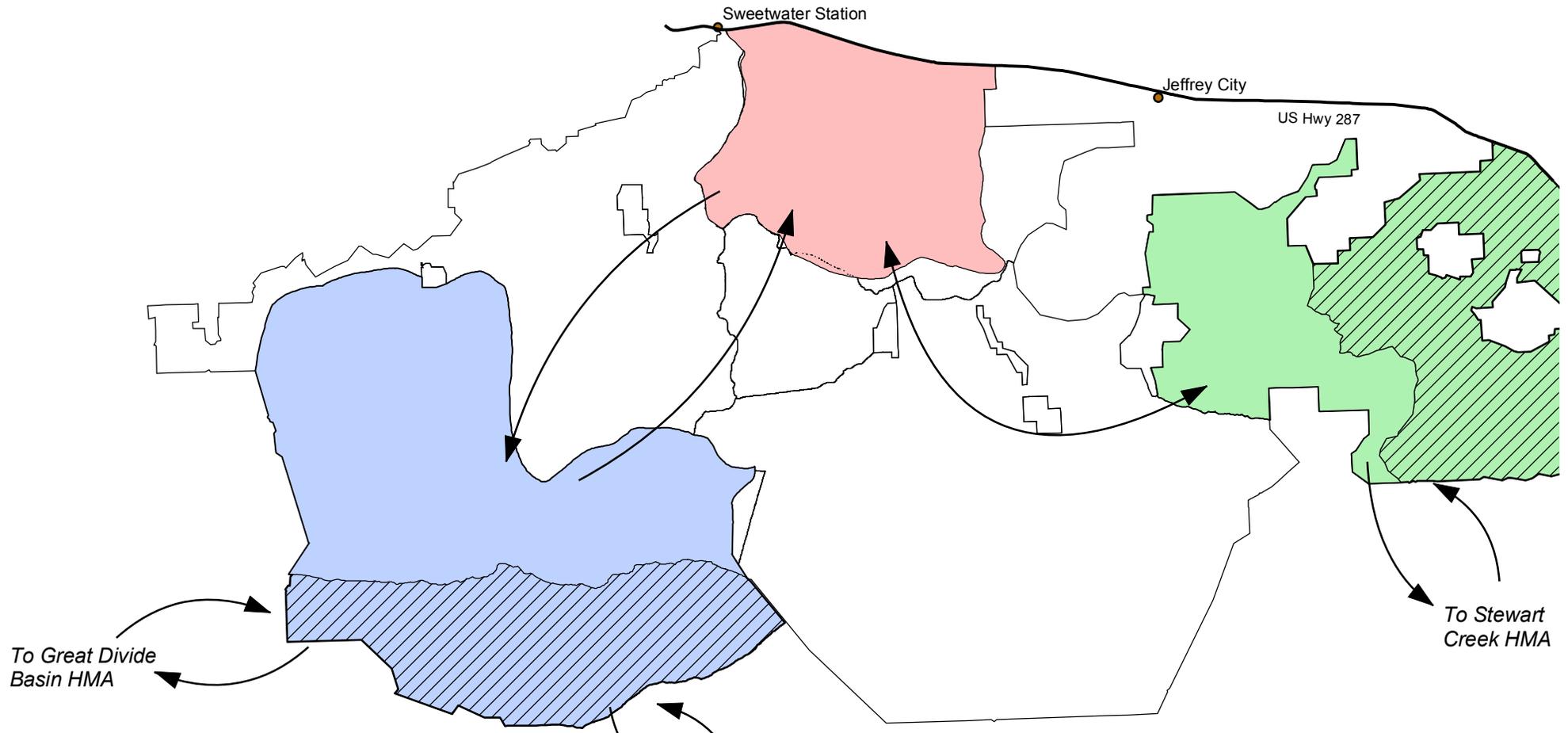
Because of the open spaces in the GMCA, the wild horses are indeed free-roaming. They are scattered throughout the HMAs within the allotment and use public, state, and private lands in the HMAs. Movement within the general distribution areas is normally confined to a seven- to ten-square mile area in which animals forage and water.

The horses move between HMAs, and can therefore be found in the travel zones between those HMAs. Horses from the Green Mountain HMA mix with horses from the Crooks Mountain and Stewart Creek HMAs. Horses from the Crooks Mountain HMA mix with the horses from the Green Mountain, Stewart Creek Antelope Hills/Cyclone Rim, and Lost Creek HMAs. Horses from the Antelope Hills/Cyclone Rim HMA mix with horses from the Crooks Mountain, Lost Creek, and Great Divide Basin HMAs. This movement provides for continued genetic health within the herd management areas by way of gene exchange among other herds.

Viewing and Visitor Days

It is estimated that the viewing of wild horses and the estimated visitor days of this specific activity has increased in recent years. In the BLM Rock Springs Office, the White Mountain HMA has an advertised wild horse scenic loop of 25 miles, beginning north of Rock Springs and ending at Interstate 80 on the outskirts of the city of Green River. Visitor use days for this marketed and advertised loop for the last three years (2005, 2006, and 2007) have averaged 32,800 visitor days. The three HMAs within the Green Mountain Common Allotment are not advertised and marketed as wild horse scenic routes. They are not located near an interstate highway; however, they are on a major route to Yellowstone National Park. Based on field contacts, office inquiries, and a number of telephone conversations, it is estimated that these three HMAs combined receive about 1/100th of the visits received at the White Mountain HMA. This would be about 492 visitor days per year over the same period. It can also be assumed that the growth potential for any one of the HMAs within the GMCA would be the same as the White Mountain

Map 3-8: Wild Horse Herd Management Areas



WILD HORSE HERD MANAGEMENT AREAS

-  ANTELOPE HILLS: 60-82 AML
-  CROOKS MOUNTAIN: 65-100 AML
-  GREEN MOUNTAIN: 170-300 AML
-  HERD AREA OUTSIDE GREEN MOUNTAIN COMMON
-  INTERCHANGE TRAVEL ZONES



0 2 4 6 8 Miles

NO WARRANTY IS MADE BY THE BLM FOR USE OF THE DATA FOR PURPOSES NOT INTENDED BY BLM.

HMA, were the herd areas within the GMCA marketed and advertised by the BLM.

Herd Genetics

The horses in the Green Mountain and Crooks Mountain HMAs display mixed-breed genetics and characters, with genetic markers that are genetically tied to several different breeds. The Antelope Hills/Cyclone Rim HMA has genetic markers that would reflect a similarity for the New World Spanish horse breeds. The genetic similarity to this group is relatively high for a mustang herd. In conclusion, the data support a strong Spanish heritage for this herd, but there is likely some other blood type within the group. The Antelope Hills portion of the herd shows a number of markers that are suggestive of Spanish blood; however, the overall similarity remains greater with the North American breeds, while the Spanish breed similarity is relatively moderate. Although one cannot rule out Spanish heritage, it does not appear to be the main component of this herd.

CULTURAL RESOURCES

Prehistoric

The GMCA lies on the fringes of the Northwestern Plains Culture Area (Frison 1991) and the western Wyoming Basin Culture Area (Metcalf 1987). Although not much archeological work has been done in the GMCA, it appears that Metcalf's cultural sequence is more suited to this area.

In general, prehistoric inhabitants of the GMCA utilized a consistent, long-lasting cultural tradition of hunting and gathering. This tradition lasted for over 11,000 years with remarkably little variation. Big and small game hunting was an important activity, and nomadic, small hunting and foraging groups were common inhabitants or visitors to the area.

The prehistory of the region can be divided into four broad periods: the Paleo-Indian Period, the Archaic Period, the Late Prehistoric Period, and the Protohistoric Period. The Archaic and Late Prehistoric periods are further divided into six culture historic phases. The Archaic period has four phases (the Great Divide, Opal, Pine Spring, and Deadman Wash phases) and the Late Prehistoric period has two phases (the Uinta and Firehole phases).

The Paleo-Indian Period began around 11,500 years ago, lasted until around 8,500 years ago, and was characterized by big game hunting and foraging. In the earlier parts of the period, large, now-extinct Pleistocene fauna were hunted, with spears being the most common hunting implements.

The Archaic Period was from around 8,500 years ago until about 1,800 years ago. This period was characterized by a shift from larger to smaller game hunting and an increase in the gathering and use of plant foods. This long-lasting phase included the adoption of the atlatl (spear thrower) and smaller darts as hunting implements.

The Late Prehistoric Period started around 1,800 years ago and lasted until about 250 years ago. It began with the introduction of several innovations, including pottery and the bow and arrow. The Late Prehistoric ended when Euro-American influences first began affecting the traditions of the indigenous cultures.

The Protohistoric Period was the time period when Euro-American influences were being incorporated into the indigenous cultures, but before actual contact with Euro-Americans was recorded. This period started around 250 years ago and ended about 180 years ago. Intense changes in the indigenous cultures occurred due to the influences of new resources (primarily horses, guns, and metals), as well as new trading networks and diseases.

Prehistoric sites are commonly found throughout the GMCA. Sites dating to the Paleo-Indian Period and Protohistoric Period are rare, but the other periods are well represented. The locations of these sites are associated with water sources, availability of food plants, game availability, material availability, and climatic characteristics. Known and suspected high-density prehistoric site areas fall along the Sweetwater River, near permanently or seasonally watered creek drainages, and around springs. Other areas of high site density include sand-covered landscapes around Crooks Creek and the sandy stretches of land from around Sweetwater Station to east of Ice Slough. It also appears that the lands in the southwest part of the GMCA were favored by bison and other big game hunters in prehistoric times, but this hypothesis remains untested.

Due to the large size of the GMCA, only a small percentage of the allotment has been inventoried for cultural resources. At present, eleven prehistoric cultural resource sites are known to be undergoing distress from past and current grazing-related effects. Livestock trampling and congregation causes impacts to sites through displacement of artifacts, destruction of features, and erosion. This in turn leads to loss of site information, context, and integrity. Sites known to be suffering effects from grazing include prehistoric campsites near springs (sites 48FR270, 48FR6100, 48FR6199, 48SW14319), along semi-permanent creeks (48FR414, 48FR1938, 48SW4882), along permanent creeks (48FR482), near lakes (48FR1908), and along ephemeral drainages (48FR3575 and an unnumbered site near Ice Slough).

Projections of undiscovered prehistoric sites along riparian zones within the GMCA have been developed. These projections estimate that approximately 600 not-yet-discovered prehistoric sites should be present along riparian zones within the GMCA. Most of these sites are postulated to be suffering from grazing-related effects.

Historic

The GMCA as a whole is rich in historic events and remains. Big game resources, extensive grasslands, the Sweetwater River, and South Pass, which provided a route over the Rocky Mountains, all contributed to early and continued use of the area by fur trappers, hunters, emigrants, livestock operators, and settlers.

The historic period in the GMCA can probably be said to have started when a party of Astorian fur trade explorers traveled through the area in 1812. But it wasn't until 1824 that a group of fur traders re-entered the area and advertised that an overland passage over the continent at South Pass was possible.

From the mid-1820s to around 1840, this part of Wyoming was explored and exploited mostly by fur trappers interested in procuring beaver and other pelts for sale in the U.S. and overseas. Together with government and other explorers, they discovered and mapped routes to the Far West.

In 1841, the first wagon trains traveled over what was to become the Oregon, Mormon, and California emigrant trails. Segments of these trails ran through the GMCA. The emigrants utilized South Pass, just west of the GMCA, to cross the continental divide, proving that those families with proper supplies and planning could successfully travel overland to the Far West.

The emigrant trail period lasted until 1868, when the transcontinental railroad was built through Wyoming. At the same time, a gold rush began on the south end of the Wind River Mountains, and settlement began in this portion of Wyoming.

Cattle ranching proved feasible beginning in the 1870s, and by the 1880s ranching had become a major economic activity. The area within the GMCA began to be settled at this time. Slightly later, sheep grazing and production also became a significant activity. Settlement and growth slowly increased from this time onward, spurred on by farming, ranching, and increased mineral exploration and development.

Post-1920 oil and gas exploration and development have occurred on the north and south sides of Crooks Mountain, around Crooks Gap, and at Bison Basin. Post-1950 uranium exploration and development has occurred around Crooks Gap, on Green Mountain, near Bison Basin, and nearby at Jeffrey City, which began as a uranium boom town.

Specific Historic Resources

The most significant historic resources in the GMCA are two different segments of the Oregon/Mormon/California/Pony Express National Historic Trails (OMCPE Trail). These segments are the main OMCPE Trail, and the Seminoe Cutoff (a major variant of the OMCPE Trail). The main OMCPE Trail is considered one trail through much of Wyoming, because all of these trails follow much the same route. The National Park Service and the BLM have long described the OMCPE Trail and its variants in central and western Wyoming as some of the best remains of these National Trails left in the United States. These trails include long stretches of well-preserved ruts, swales, and mostly intact historical settings. A small segment of the main OMCPE Trail runs through the northern tip of the GMCA, and a large segment of the Seminoe Cutoff is located within the northwest portion of the GMCA.

The main OMCPE Trail enters the GMCA where U.S. Highway 287 crosses Ice Slough (T.29N., R.93W., Section 6), and exits GMCA at the Sweetwater River at the historic Sixth Crossing near modern Sweetwater Station (T.29N., R.95W., Section 5). This portion of the Trail has been repeatedly evaluated since the 1980s, and its current overall condition is considered 'good-excellent': it possesses good-excellent integrity of ruts and swales, and mostly good integrity of the historical setting around the OMCPE Trail. In this 12-mile segment of trail, a highway, a small complex of houses and ranches, one upgraded road, and some barbed wire fences have affected the setting. However, those intrusions are infrequent and small enough that they do not affect the overall 'good-excellent' condition of the trail and its settings. Significant sites associated with the main OMCPE Trail within the GMCA include Ice Slough, the Warm Springs Pony Express Station, and 6th Crossing of the Sweetwater River.

Based on an examination of known riparian areas near the main OMCPE Trail, an estimated 0.4 miles of OMCPE Trail runs through riparian zones within the GMCA.

The Seminole Cutoff of the OMCPE Trail begins within the GMCA where it cuts off from the main OMCPE Trail (T.29N., R.95W., Section 1), and exits GMCA near Long Slough (T.28N., R.99W., Section 27) (see Map 3-9). This long stretch of trail (over 30 miles) has also been repeatedly evaluated since the 1980s. Due to differences in condition, several segments have been defined along the Seminole Cutoff within the GMCA. Each segment is described here:

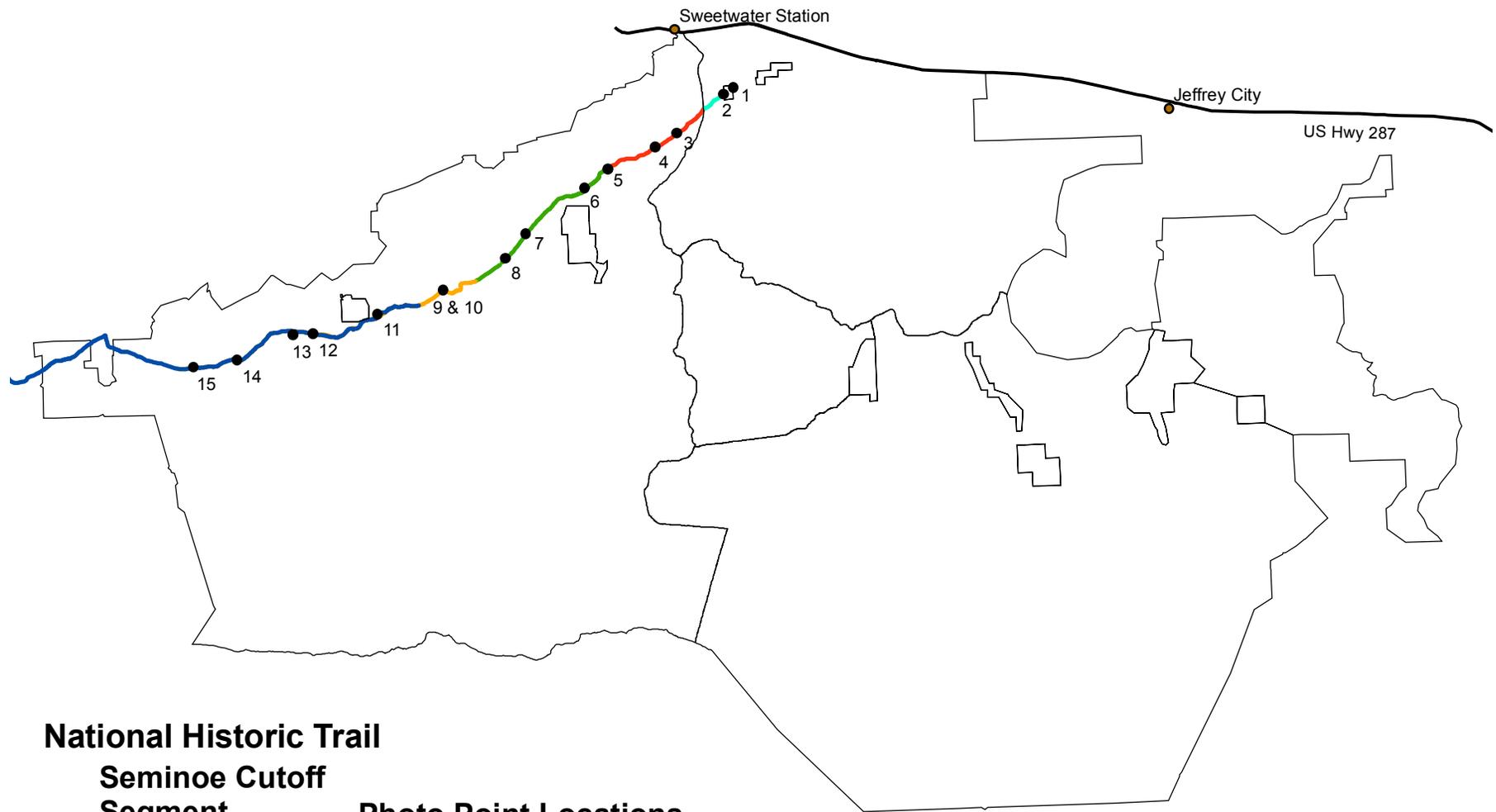
- Segment A starts at the beginning of the Seminole Cutoff and ends at the Bison Basin Road. This 1 ½-mile long segment condition is considered 'good'. Fences and an upgraded road are modern intrusions along this segment, but they are minor enough that they do not affect the overall 'good' condition of the segment and its settings. See photos 1 and 2 for details (Appendix 24).
- Segment B starts at the Bison Basin Road and ends just before the trail descends into the Alkali Creek valley. This 4 ½-mile long segment's condition is considered 'fair-good': the integrity of its ruts and swales is fair, and the integrity of its historical setting ranges from good to fair. Several old, unreclaimed well pads, the AT&T telephone cable, a fence, evidence of blading along the trail, and a few bladed roads are some of the modern impacts to this segment. Although the segment is still considered significant, the impacts along it have resulted in a 'fair-good' rating. See photos 3, 4 and 5 for details (Appendix 24).
- Segment C starts just east of the Alkali Creek valley and ends a little northeast of North Bear Mountain. This six-mile long segment's condition is considered 'good-excellent'. One unreclaimed well pad, the AT&T telephone cable, a windmill, and a trough are the modern impacts visible along this segment, but they are minor enough that they do not affect the overall 'good-excellent' condition of the segment and its settings. See photos 6, 7 and 8 for details (Appendix 24).
- Segment D begins slightly northeast of North Bear Mountain and ends at the 3 Forks-Atlantic City Road. This 11-mile long segment's condition is considered 'excellent': this segment possesses excellent integrity of ruts, and mostly excellent integrity of the historical setting around the trail. The historical and scenic settings along this segment are very good, and very few modern intrusions are present. The AT&T telephone cable scar is nearly healed and is often difficult to see, and other than one regular fence (on state land) and one buck and pole fence, the segment is untouched by modern intrusions until it reaches the 3 Forks-Atlantic City Road. See photos 9, 10, 11, 12, 13, 14 and 15 for details (Appendix 24).
- Segment E starts at the 3 Forks-Atlantic City Road and ends at the GMCA boundary fence near Long Slough. This five-mile long segment's condition is considered 'poor-good': this segment's ruts and swales have been destroyed in several places, and the remaining ruts and settings up to Section 27 have been impacted by the presence of upgraded roads, fences, and corrals. The trail in Section 27, however, has good integrity of ruts, and does not have modern visual intrusions around it; this final portion of trail within this segment is rated as "good".

Significant sites associated with the Seminole Cutoff within the GMCA include the Warm Springs Pony Express Station and the Sarah Thomas gravesite.

Based on an examination of known riparian areas near the Seminole Cutoff, an estimated 0.75 miles of the Cutoff runs through riparian zones within the GMCA.

Another historical resource of significance within the GMCA is the Rawlins-Fort Washakie Stage Trail. This trail

Map 3-9: Seminoe Cutoff Trail Segments



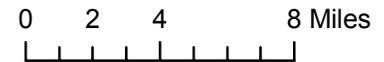
National Historic Trail

Seminoe Cutoff Segment

- A
- B
- C
- D
- E

Photo Point Locations

- Photo number



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was a stage and freight route that connected the Sweetwater Valley, the Wind River Basin, and the fledgling communities of Lander and Fort Washakie with the railroad hub at Rawlins. It was utilized from the 1870s to early 1900s. This National Register-eligible trail is located within the eastern part of the GMCA, and the ruts and historical settings of this trail vary from excellent to poor.

The Rawlins-Fort Washakie Stage Trail enters the GMCA near Crooks Creek (T.27N., R.91W., Section 31), and runs within the allotment for about nine miles until it exits near Crooks Gap (T.28N., R.92W., Section 20). It reenters GMCA for about a mile near O'Brian Creek (T.29N., R.92W., Section 19). These segments of trail (approximately ten miles) have also been repeatedly evaluated since the 1980s. Due to differences in condition, several segments have been defined along the Rawlins-Fort Washakie Stage Trail within the GMCA. Each segment is described below and identified on Map 3-10.

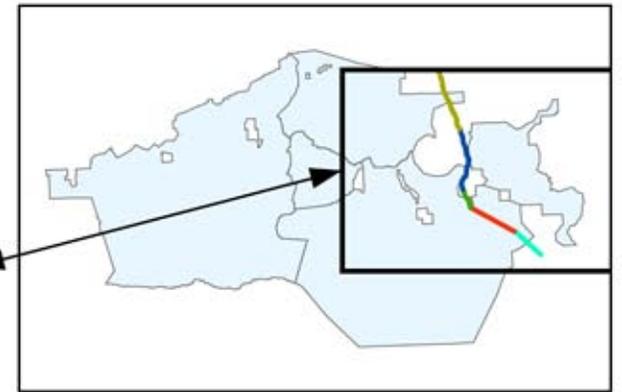
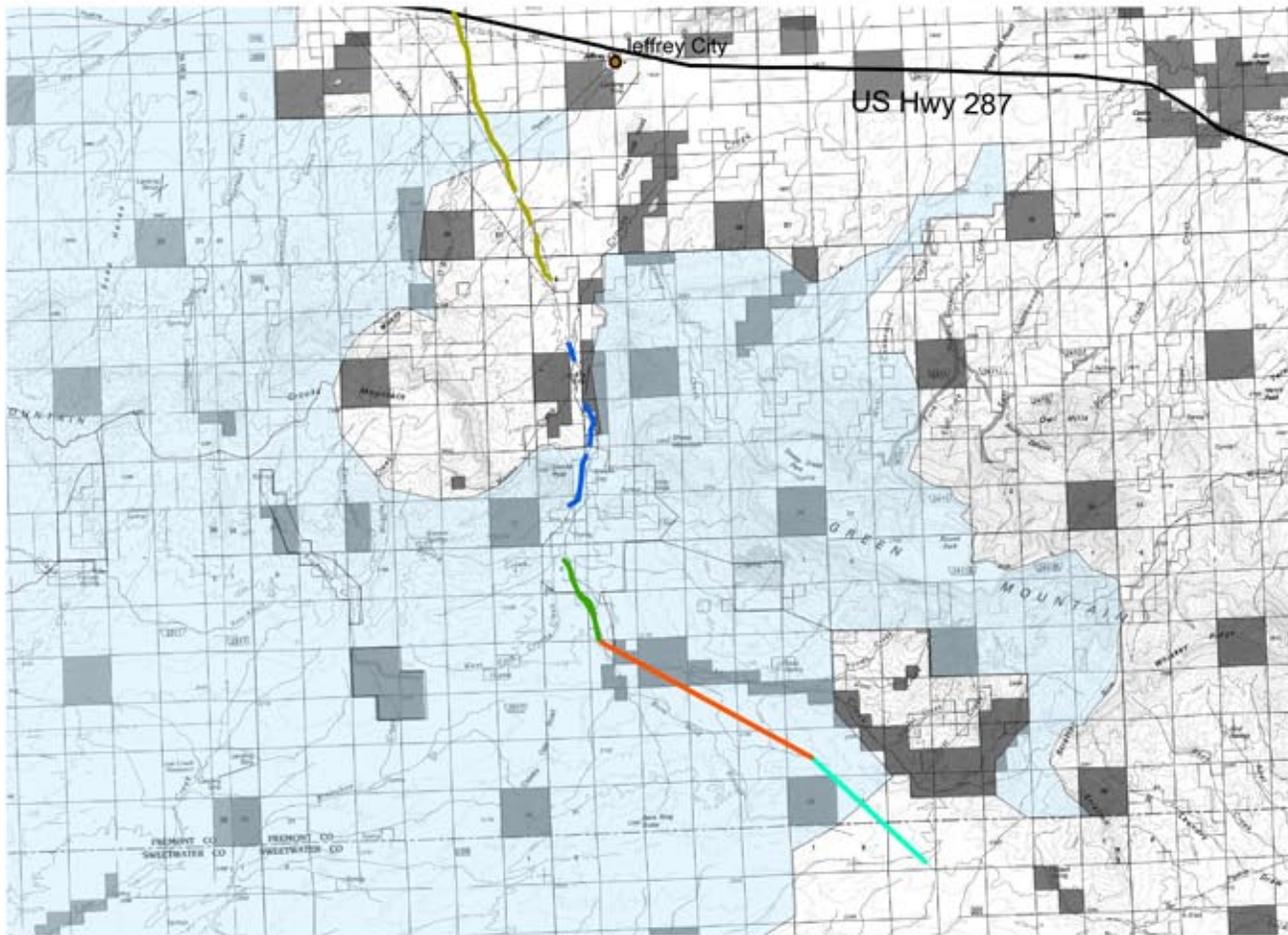
- Segment A begins where the trail enters the GMCA and ends soon after the vicinity of a major pipeline corridor that runs to Bairoil. This one-mile long segment's condition is considered 'poor': this segment's ruts and swales have been destroyed in several places, and the remaining ruts and settings have been impacted by the presence of upgraded roads, pipelines, power lines, and/or mining scars.
- Segment B starts after the Bairoil pipeline corridor disappears from view and ends at the Frontier/Exxon pipeline corridor crossing. This 5 ½-mile long segment's condition is considered 'good-fair': the integrity of its ruts and swales is good-excellent, and the integrity of its historical setting ranges from good to fair. One reclaimed well pad, an artesian well, fences, and far-off mining scars on Green Mountain are some of the modern impacts to this segment.
- Segment C starts at the Frontier/Exxon pipeline corridor and ends at the Crooks Gap-Wamsutter County Road. This 1 ½-mile long segment's condition is considered 'fair'. The nearby county road, fences, power lines, pipelines, and both close and far-off mining scars on Green Mountain are some of the modern impacts to this segment.
- Segment D starts at the Crooks Gap-Wamsutter County Road and ends near Crooks Gap. This 2 ½-mile long segment's condition is considered "poor" due to numerous modern intrusions.
- Segment E starts south of O'Brian Creek where the trail crosses the Section 19/30 boundary (T. T.29N., R.92W.), ends north of O'Brian Creek where the trail crosses the Section 18/19 boundary. This 1 mile segment is considered 'good'. The ruts and swales of the trail are in good shape, and the trail's historical setting is mostly good. A nearby pipeline parallels the trail, but is mostly not visible.
- Past grazing-related actions have caused adverse effects (as defined in the NHPA and Wyoming State Protocol) to the OMCPE Trail, its associated sites, and the Rawlins-Fort Washakie Stage Trail. Impacts have mainly come from the three following factors: 1) heavy grazing where trails run through riparian areas; 2) the introduction of new fences near the trails; and 3) the introduction of new water developments near the trails.
- Heavy grazing in trail riparian areas have caused adverse effects (as defined in the NHPA and Wyoming State Protocol) through direct damage to the historic trails and associated sites, as well as degradation of the trails' historical settings. Damage to trail ruts has been documented.
- Fences have degraded the historic trails through introduction of modern elements into the historical settings of the trails and their associated sites. However, for certain recent fencing projects (e.g., the Ice Slough Riparian Fence and the Warm Springs Riparian Fence), these impacts have been offset because the fencing projects have also reduced grazing pressures within those riparian areas, thus improving the overall historical settings of the trails and associated sites.

Water development projects have also directly and indirectly damaged the historic trails, associated sites, and their historical settings. Water developments have damaged and injected modern elements into historical areas. These developments have also attracted livestock, in turn increasing trampling and congregation near the trails. Fortunately, these projects have been few in number and have not had a major effect on the affected trails, sites, or their settings.

Native American Spiritual/Traditional/Sacred Sites

The GMCA lies within the lands used by several different tribes in historical and modern times. These tribes include the Eastern Shoshone, the Crow, the Northern Arapaho, the Northern Ute, and the Northern Cheyenne,

Map 3-10: Rawlins - Ft. Washakie Trail Segments



Rawlins - Ft. Washakie Trail Segment

- A
- B
- C
- D
- E

Green Mountain Common Allotment



0 2 4 8 Miles

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among others. Certain cultural resource sites are important to the tribes in terms of their religious and traditional qualities. These sites can include burials, medicine wheels, rock art sites, cairns, alignments, stone circles, etc. There are several known sites of this type in the GMCA, and undoubtedly more will be discovered in the future.

RECREATION, VISUAL RESOURCES AND OPEN SPACE

The conceptual framework for recreation considers four linear tiers to the recreation environment. These four tiers are inputs (specific recreation management actions) that then interact with the system structure or recreation settings (prescribed and existing) which produce primary outputs in the form of activity, experience, and benefit opportunities. The final tier of this framework is customer realization of experiences and benefits (or outcomes) through the on-site use of the available opportunities. While a recreation program specifically undergoes management actions to target or provide opportunities for these experiences and benefits, other programs (e.g. range management) constitute an indirect input that interacts with this framework; this interaction can occur along every tier of the framework but is typically strongest at the setting level (Driver et al 1991). The settings tier of the framework is integral in that it “not only affects the next level of outputs (e.g. experiences and benefits), “but also helps to define what type of activities might occur in an area” (Pierskalla et. al., 2004). It is important to note that the recreation setting of an area cannot be attributed directly to one specific experience or subsequent benefit; rather, more important to the recreationist - and a direct product of the area’s setting - is the gestalt (or package) of experiences and benefits (Moore and Driver 2005). Moore and Driver (2005) further define the experience and benefits gestalt as “The group of most satisfying/gratifying/beneficial experiences that denote a total synergistic experience greater than the sum of its parts.”

Typically the relationships between the various recreational experiences and benefits both on-site and off-site are linked by a causality relationship termed the "Benefit Chain of Causality" (BCOC) (BLM 2004). The extent of these benefits typically flows from individuals to communities, environments and economies (BLM 2005).

The concept discussed above is often referred to as the beneficial outcomes approach to leisure or benefits based recreation management. IM 2006-60 affirms BLM’s corporate commitment to change its framework and emphasis to benefits-based recreation management. The IM states that until Land Use Plans incorporating agency policy on benefits based recreation management have been approved—and for completed land use plans which do not incorporate the above mentioned policies the BLM will assess and evaluate the effects of proposed projects in Special Recreation Management Areas on activities, experiences, beneficial outcomes, and recreation setting character to ensure consistency with benefits-based management concepts. Since the 1987 Lander RMP allocated Special Recreation Management Areas (SRMAs) numerous changes have occurred locally, regionally, and nationally on public lands. As a result the potential for new SRMAs in the GMCA area exists; therefore the preceding analysis will utilize the benefits-based management framework to a) characterize the existing recreation environment, and b) disclose potential impacts, identify stressors, and develop mitigation to alleviate or reduce impacts to the recreation resource resulting from the various AMP alternatives.

Recreation Setting of the GMCA

The BLM now describes the recreational setting across three main factors: 1) the character of the natural landscape (Physical Setting), 2) the character of recreation and tourism use (Social Setting), and 3) how public land agencies, county commissioners, private sector service providers, and open space managers care for the area and manage public use (Administrative Setting). These variables combine as descriptors of the recreation environment that can then be placed across a spectrum of 6 overall recreation settings. The 6 overall recreation settings spanning from least developed to most developed are: primitive (or pristine), back country, middle country, front country, rural, and urban. The BLM typically does not manage for urban settings. This BLM specific methodology for describing the recreation setting builds (in a recreationist friendly manner) on the historic Recreation Opportunity Spectrum concept and has been termed the natural resource recreation setting. Appendix 25 demonstrates this spectrum concept as well as the existing GMCA recreation setting range, existing condition and trend.

The Green Mountain Common Allotment provides opportunities for the local, national, and international public to experience public lands in a variety of settings and environments. Dominant recreation activities within the allotment include hunting, fishing, camping, hiking, horseback riding, wildlife/wild horse viewing, and driving for pleasure. Maps 3-11, 3-12, and 3-13, respectively, display the existing physical, social, and administrative

recreation settings of the Green Mountain Common Allotment. Of particular interest to a large portion of GMCA visitors is the open, undeveloped nature of the landscape.

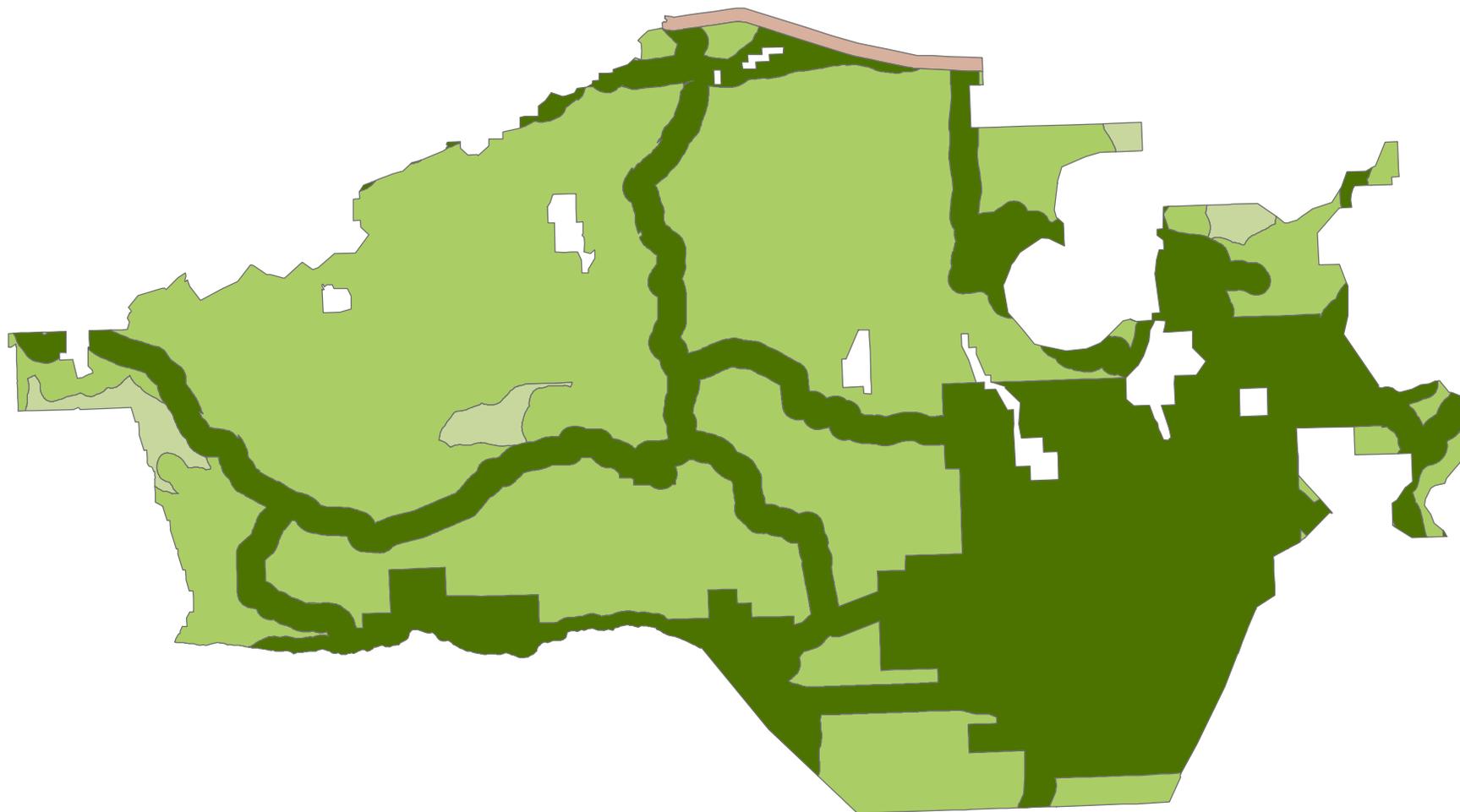
GMCA Physical Setting: Range, Existing Condition, and Trends

The physical setting of the GMCA ranges from back country to rural. The dominant physical setting in the allotment is middle country. Areas containing this setting are the main focus of recreationists on the allotment. The back country areas in the allotment comprise a small portion of the available recreation setting. Since these settings are available on a very low level (field office wide), recreationist demand for these areas is high. In addition these areas are highly susceptible to change and alteration, meaning stressors that impact these settings tend to drastically shift these settings toward a more developed setting.

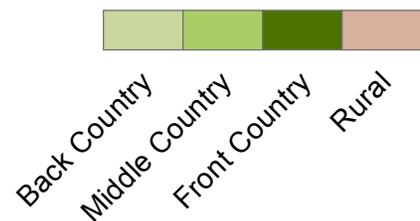
The physical recreation setting on the GMCA is demonstrating an urbanizing trend, or movement toward more modified recreation settings. This trend shows reductions in the availability of back country and middle country settings while front country physical settings increase. Front country and rural areas provide for drastically different recreation activities, experiences, and benefit opportunities than areas providing back country and middle country settings. In addition, these settings are available closer to urban centers; therefore recreationists do not need to travel to places (like the GMCA) to experience these settings.

Finally, front country and rural settings are less susceptible to increased change for the simple fact that they already represent a modified environment. The physical setting trend documented above is a result of several factors including: 1) new road development/improvement in support of recreation and other resource uses as well as route proliferation due to the rising popularity of OHVs for recreational and industrial uses 2) Increasing occurrences and instances where landscapes are modified to accommodate other resource uses. These modifications include, utility lines, fence lines, stock ponds/water developments, cell phone towers, oil and gas developments etc., and 3) an increase in new recreation facilities to accommodate user demand or reduce visitor impact or conflict.

Map 3-11: Physical Recreation Setting

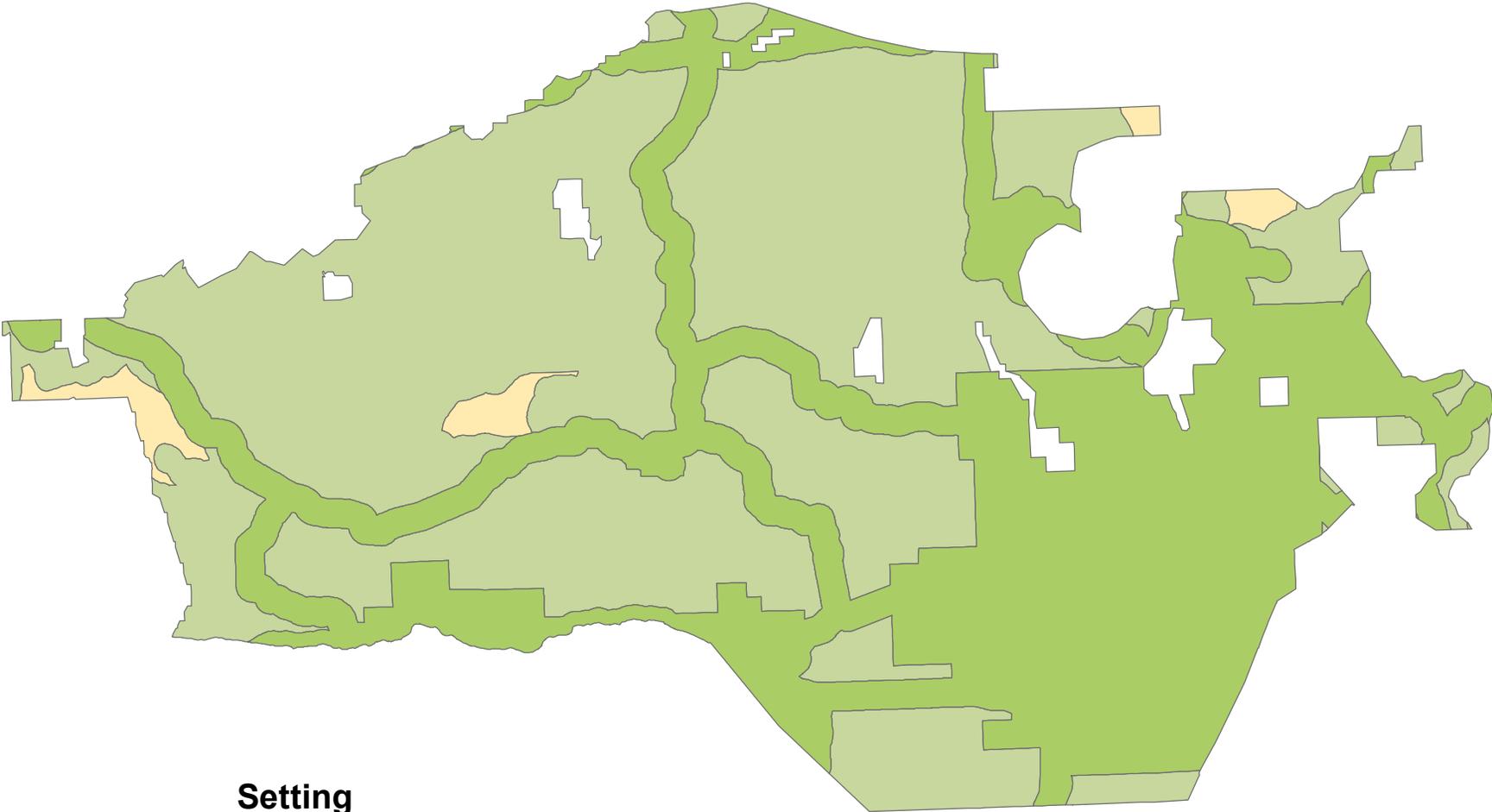


Setting



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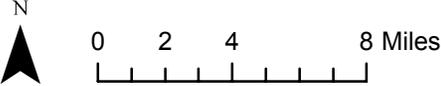
Map 3-12: Social Recreation Setting



Setting

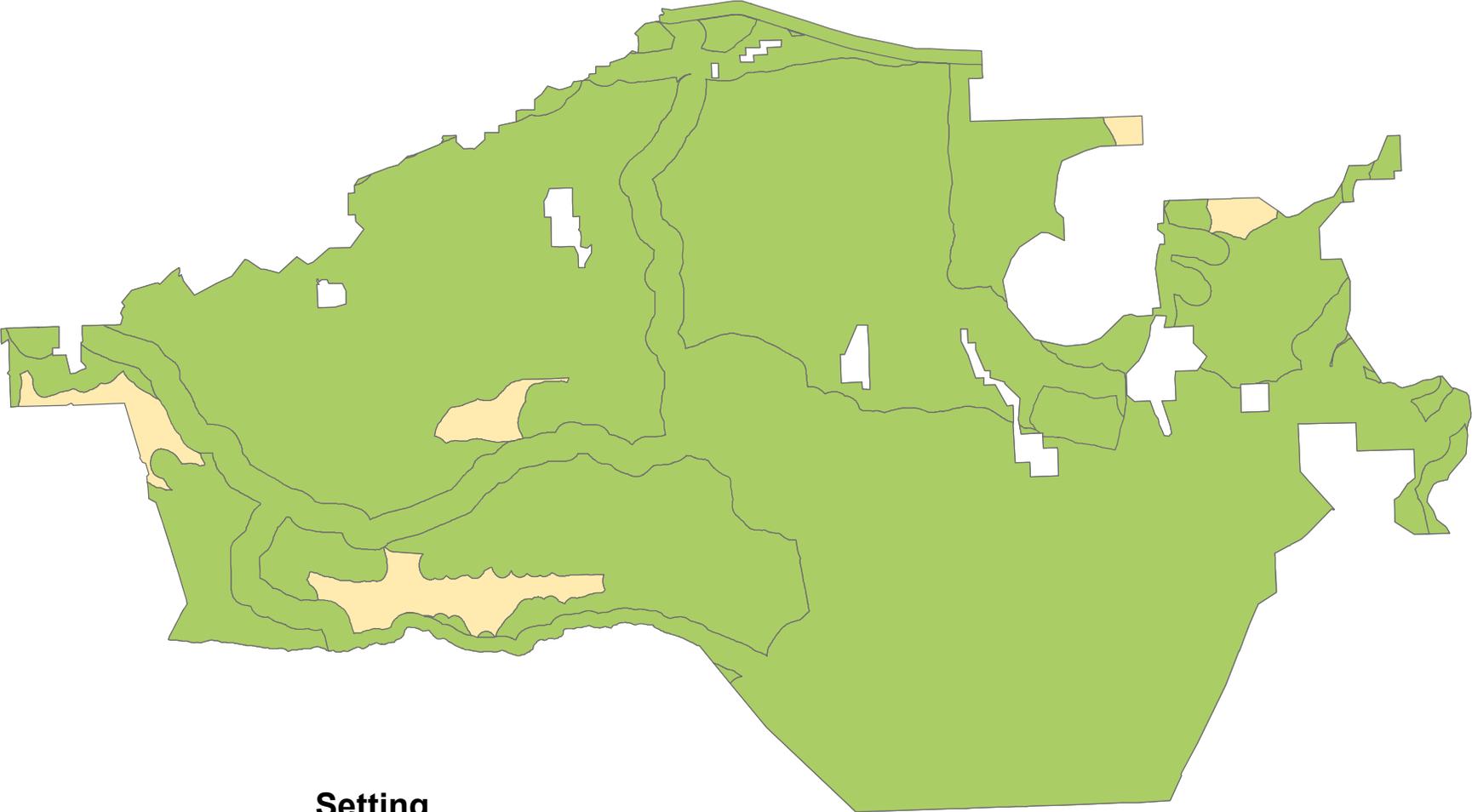


Primitive
Back Country
Middle Country



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Map 3-13: Administrative Recreation Setting



Setting

Linking Primitive to Backcountry

Middle Country



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Table 3-18. GMCA Physical Setting Condition and Trend

	Settings Decreasing in Availability		Increasing
	Least available	Most available	Next most available
Physical Setting Indicator	Back Country	Middle Country	Front Country
Remoteness	More than ½ mile from any road, but not as distant as 3 miles, and no road in site	On or near four-wheel drive roads, but at least ½ mile from all improved roads, though they may be in sight	On or near improved country roads, but at least ½ mile from highways
Naturalness	Natural appearing landscape having modifications not readily noticeable	Natural appearing landscape except for obvious primitive roads	Landscape partially modified by roads, utility lines, fence lines etc. but none overpower natural landscape features
Facilities	Some primitive trails made of native materials such as log bridges and carved wooden signs	Maintained and marked trails, simple trailhead developments, improved signs, and very basic toilets	Improved yet modest, rustic facilities such as campsites, restrooms, trails, and interpretive signs

GMCA Social Setting: Range, Existing Condition, and Trends

The social setting of the GMCA ranges from primitive to rural. The dominant Social setting in the allotment is back country. Areas containing this setting are the main focus of recreationists on the allotment. The primitive social areas in the allotment comprise a small portion of the available recreation setting. Since these settings are available on a very low level (field office wide), recreationist demand for these areas is high. In addition these areas are highly susceptible to change and alteration, meaning stressors that impact these areas tend to drastically shift these settings toward a more developed setting. Overall the GMCA area possesses a social setting that reflects more remote/pristine physical settings (i.e., as access increases, visitor encounters and evidence of use should increase). This means that although physical setting indicators demonstrate a less than primitive setting, socially the allotment provides ample opportunities for isolation and solitude. This could probably be attributed to the area’s travel distance from urban centers and lack of extractive industry interest.

The social recreation setting on the GMCA is demonstrating an urbanizing trend, or movement toward more modified recreation settings. This trend shows reductions in the availability of primitive and back country settings while middle country physical settings are increasing. Overall the social setting of the allotment is slowly changing from an area where ample amounts of isolation and solitude are available to an area that appears slightly busy with recreational and resource use activities increasing. With this increase in use comes a higher instance of visitor evidence. This social setting trend is a result of: 1) increasing planning area population participating in outdoor recreation, 2) increased demand for group activities, 3) increased national recreation interests in the area, and 4) increase popularity of motorized vehicles resulting in increased visibility of evidence of past users. Refer to Table 3-19.

Table 3-19. GMCA Social Setting Condition and Trend

Social Setting Indicator	Settings decreasing in availability		Increasing
	Least available	Most available	Next most available
	Primitive	Back Country	Middle Country
Contacts (with other groups)	Fewer than 3 encounters/day at campsites and fewer than 6 encounters/day on travel routes	3-6 encounters/day off travel routes and 7-15 encounters/day on travel routes	7-14 encounters/day off travel routes and 15-29 encounters/day en route
Group Size	Fewer than or equal to 3 people/group	4-6 people/group	7-12 people/group
Evidence of Use	Only foot prints observed	Footprints plus slight vegetation trampling at campsites & travel routes; litter infrequent	Vehicle tracks and occasional litter and soil erosion, vegetation becoming worn

GMCA Administrative Setting: Range, Existing Condition, and Trends

The administrative setting of the GMCA ranges from primitive to rural. The dominant administrative setting in the allotment is middle country. Areas containing this setting are the main focus of recreationists on the allotment. The linking primitive to back country areas in the allotment comprise a small portion of the available recreation setting. These areas neither demonstrate a strong correlation to primitive or backcountry settings and are therefore somewhere between these two settings. Since these settings are available on a very low level (field office wide), recreationist demand for these areas is high. In addition these areas are highly susceptible to change and alteration, meaning stressors that impact these settings tend to drastically shift these settings toward a more developed setting.

Table 3-20. GMCA Administrative Setting Condition and Trend

Administrative Setting Indicator	Settings Decreasing in Availability		Increasing
	Least available		Most available
	Linking Primitive to Backcountry		Middle Country
Mechanized Use	None whatsoever	Mountain bikes and perhaps other mechanized use, but all is non-motorized	Four wheel drives, all terrain vehicles, dirt bikes, or snowmobiles in addition to non-motorized, mechanized use
Visitor services	None is available onsite	Basic maps, but area personnel seldom available, to provide on-site assistance	Area brochures and maps, plus personnel occasionally present to provide on-site assistance
Management Controls	No visitor controls. No use limits, enforcement presence very rare	Signs at key access points on basic user ethics. enforcement presence rare	Occasional regulatory signing. Motorized use restrictions. random enforcement presence

Unique Situational Attributes

Clark et al. (1979) defined a recreation setting as “the combination of physical, biological, social, and managerial

conditions that give value to a place.” The recreation settings discussed above generalize these factors in order to develop a continuum or spectrum; therefore, consideration of area specific situational attributes (attributes not contained within a setting matrix) will also be considered across the GMCA. One example of a situational attribute within the GMCA is the lack of permanent fences. Currently, the lack of permanent fences within the allotment provides visitors with a physical setting that allows for unencumbered, non-motorized cross country travel of great distances. Sanderson et al (1986) found, that as livestock management intensities (including level of fencing) increased, visitor demand or enticement for an area decreased. Map 3-14 displays this unique situational attribute and its availability within the Lander Field Office. The experiences and benefits opportunities available from this situational attribute and the general setting of the area are distinctive and in short supply (Table 3-21 characterizes the general recreation experience and benefits gestalt of the GMCA).

Table 3-21. Recreation Experiences and Benefits Package Available in the GMCA

Experiences	On Site Benefits	Benefits (On or Off Site Customer)	Benefits (On or Off Site Customer)
Enjoying having easy access to natural landscapes	Individuals: Enhanced awareness and understanding of nature	Environment: Increased awareness and protection of natural environments	Community: Greater Community involvement in recreation and other land use decisions
Enjoying the sensory experience of a natural landscape	Individuals: Greater sensitivity to/awareness of outdoor aesthetics.	Environment: Maintenance of distinctive recreation setting character	Economic: Maintenance of community's distinctive recreation-tourism market niche or character
Feeling good about solitude, being isolated, and independent.	Individuals: Greater sense of adventure	Individuals: Greater self reliance	Economic: Improved local and economic stability

Based on discussions with on site and off site customers it is estimated that these experiences and benefits are generally realized at a moderate (30-60 percent of visitors) level; this could be attributed to the fact that the Lander Field Office does not currently market or directly manage for these experiences and benefits. However, the opportunity to target these experiences and benefits and to develop recreation management actions and inputs to better deliver these experiences and benefits to customers does exist.

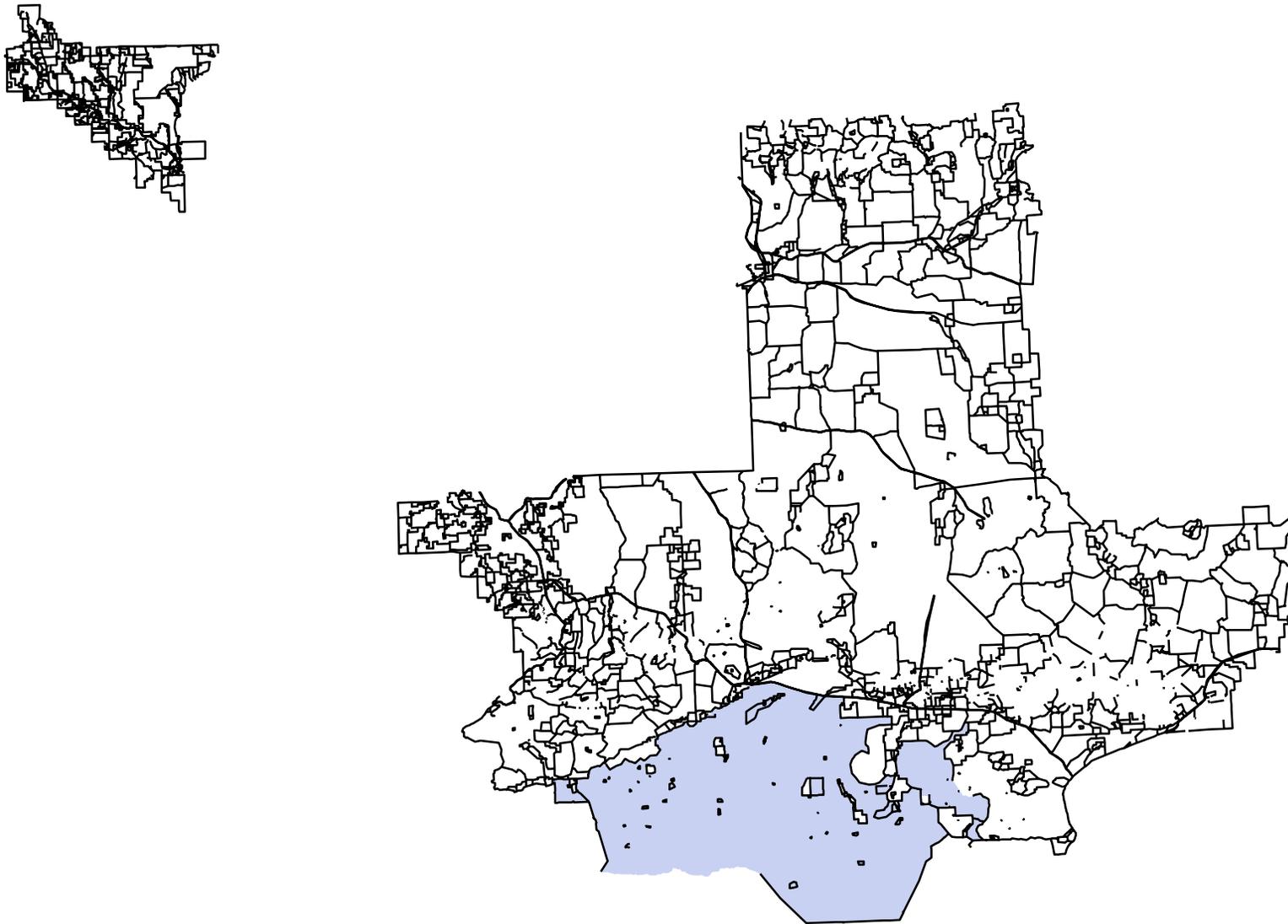
The sheer size of the allotment invariably spans numerous recreation features where recreation program inputs and unique situational attributes produce specific experiences and benefits opportunities to the visitor beyond or above what is generally provided throughout the allotment. The experience and benefit opportunities produced as a result of the features are typically produced in concert with the overall benefits garnered in the allotment; this combination of experience and benefits opportunities represents the allotment’s unique contribution to these recreation features. Therefore, recreation management inputs and other program’s indirect inputs (e.g. range management) within the Green Mountain Common Allotment have both onsite (portions of the feature within GMCA) and offsite (the feature as a whole) impacts on these recreation features.

It is important to note that these features overlap and often share similar portions of the allotment; this is due to contrasting visitor motivations for using the specific feature (e.g. hunters can use the Seminole Cutoff to achieve their desired experiences and benefits while not necessarily directly seeking those available from the historic feature). Two of the areas (National Historic Trail and Continental Divide National Scenic Trail) are allocated as Special Recreation Management Areas; this means that recreation is the management focus within these areas. These areas have similar recreation setting ranges, existing condition, and trends as those documented for the larger allotment

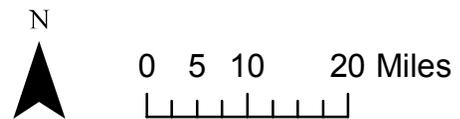
General Public Big Game Hunting Recreation Feature

The GMCA is part of a larger recreation feature that encompasses 75 percent of the field office (1,864,659 million acres) and is comprised of several big game hunting units. Within these big game hunting units, the BLM manages

Map 3-14: Known Fences Within the Lander Field Office



- Existing fences
- Green Mountain Common Allotment



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over 75 percent of the land base; therefore, within this complex the agency is the main provider of big game hunting opportunities. The GMCA comprises 27 percent of this features total area. Importantly, these opportunities are available to all members of the public and provide trophy and subsistence hunting prospects. Table 3-22 below shows the national rank according to the Boone and Crocket Club (Helmer 2002, 2003) of 1) the state, and 2) the GMCA county rank or the counties general level (low, medium, high) of trophy harvests.

Species	Wyoming's National Rank	National County Rank Or General Levels of Trophy Entries		
		Carbon*	Fremont	Sweetwater
Antelope	1	1	4	2
Elk	3	Medium	High	Low
Mule Deer	4	Low	Medium	Medium

* Carbon County is adjacent to the GMCA

Table 3-23 displays the experience and benefits opportunities available to a hunter and host community as a result of this situational attribute, the recreational setting, and resulting activity availability. This larger combination of several big game hunting units (as designated by the Wyoming Game and Fish department) is where the BLM serves as the majority provider (land/habitat manager) of trophy and subsistence hunting activity opportunities. An important aspect or situational attribute of this feature's physical setting is the quality and habitat of big game populations.

Table 3-23. Recreation Experiences and Benefits Package Available in the General Public Big Game Recreation Feature

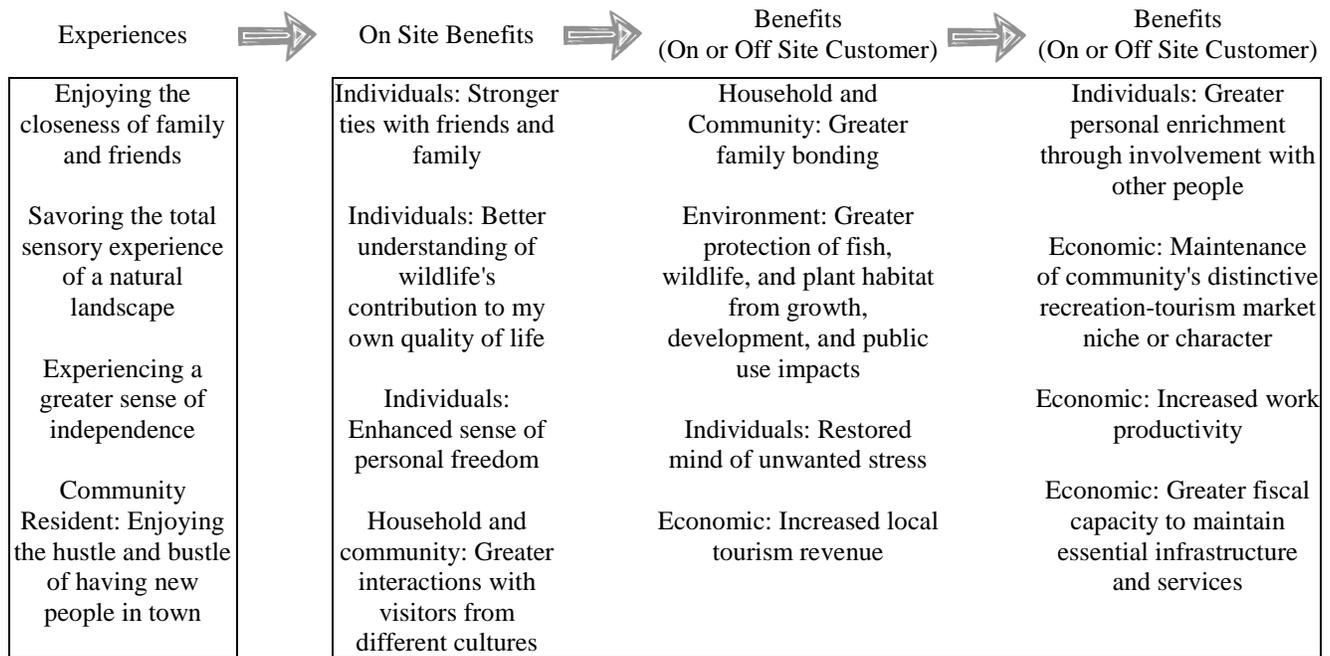


Table 3-24. Recreation Experiences and Benefits Package Available in the CDNST SRMA

Experiences	On Site Benefits	Benefits (On or Off Site Customer)	Benefits (On or Off Site Customer)
Visitors testing their endurance	Individuals: A more holistic sense of wellness	Individuals: Improved Physical fitness and health maintenance	Economic: Reduced health maintenance costs
Contemplating mans relationship with the land	Individuals: Closer relationship with the natural world	Environmental: Increased awareness and protection of natural landscapes	Environmental: Greater retention of distinctive natural landscape features
Enjoying risk-taking adventure	Individuals: Improved competence from being challenged	Individuals: Increased ability to think things through and solve problems	Household and Community: Enhanced Lifestyle
Community/Resident Experience of knowing this attraction is near the community	Individuals: Improved understanding of the community's dependence and impact on public land	Household and Community: Heightened sense of satisfaction with the community	Economic: Increased desirability as a place to live or retire

Green Mountain Recreation Feature

Over the last 50 years, the BLM Lander Field Office and other recreation providers have financed substantial recreation projects into this area, including Cottonwood Campground, Fremont County Campground, Wild Horse Point picnic area/scenic overlook, and road upgrades/maintenance along the mountain’s Loop road. These investments have changed the recreational setting of the area while also increasing the public demand. These setting alterations have produced a set of recreation experiences and benefits opportunities not available in the rest of the allotment. Some of the dominant activities in the area include driving for pleasure, hunting, camping, wild horse/wildlife viewing, and hiking/picnicking. The majority of this area is outside the allotment; however, the portion of the area within the allotment is an important component of the area, and includes the Fremont County Campground and the West Loop Road Area. Table 3-25 below shows the experience and benefit opportunities available from the Green Mountain recreation feature.

Table 3-25. Recreation Experiences and Benefits Package Available in the Green Mountain Recreation Feature

Experiences	On Site Benefits	Benefits (On or Off Site Customer)	Benefits (On or Off Site Customer)
Enjoying meeting new people with similar interests	Individuals: Improved skills for outdoor enjoyment with others	Individuals: Greater personal enrichment through involvement with other people	Household and Community: Reduced social alienation
Enjoying having easy access to natural landscapes	Individual: Greater freedom from urban living	Individuals: Restored mind of unwanted stress	Individuals: Reduced hypertension
Having others nearby who could help you if needed	Individuals: Greater sense of personal security	Household and Community: More informed citizenry about where to go for different kinds of recreation experiences and benefits	Economic: Increased desirability as a place to live or retire
Enjoying having a wide variety of environments and settings within a single recreation area	Individuals: Increased adaptability	Economic: Enhanced ability for visitors to find areas providing wanted recreation experiences and benefits	Economic: Increased local tourism revenue

Continental Divide National Scenic Trail (CDNST) Special Recreation Management Area

This Special Recreation Management Area (DOI BLM 1986) runs through the GMCA allotment for approximately 55 miles of the 74 total CDNST miles managed by the Lander Field Office. The GMCA section of the CDNST traverses a visually unmodified Wyoming Basin Physiographic province creating unique visual and recreational experiences for trail hikers. An important biologic component and situational attribute to the recreation setting and outcome opportunities of the CDNST is the aesthetic and physical condition of non-potable water sources. In addition, the type and level of cattle encounters that occur on or near the CDNST stand to influence visitor experiences and benefits (Mitchell et al 1996). These water sources are critical for sustaining long distance travel across the GMCA section of the trail.

Concern has been voiced by trail hikers who have encountered degraded riparian systems where cattle were allowed to congregate. Since one limiting factor to crossing the GMCA portion of the CDNST is the availability of water, impacts to riparian corridors become more noticeable when recreationists using the trail need to collect quality water for consumption in these high livestock utilization areas. Most water purification methods will remove potentially-harmful bacteria; however, hikers do turn down these tainted water sources out of concern for the appearance and aesthetics of the water. In contrast, existing water sources that have been fenced from livestock along the CDNST provide quality non-potable water to trail hikers as well as enhance surrounding ecological systems. Table 3-24 displays the recreation experiences and benefits opportunities anticipated as a result of current managerial inputs into the trail corridor, the existing situational attributes, and the existing recreation setting.

National Historic Trail Special Recreation Management Area

This Special Recreation Management Area is mostly outside of the GMCA, with an exception to the portion historically known as the Seminole Cutoff. The Seminole Cutoff's (GMCA portion) contribution to the trail's overall recreation settings, experiences and benefits is available in very few places along the entire National Historic Trail Corridor, and is considered an important resource to National Historic Trail-focused recreation. This portion of the trail corridor provides a rare opportunity for public land visitors to view the trail in an unmodified (free of human development and intrusion) setting, where the wagon ruts are readily noticeable and visitor densities are extremely

low. The visual quality of the historic trail is an important situational attribute that contributes to the overall recreation experiences and benefits along the corridor; visually unaltered or nearly unaltered view sheds enhance the recreational opportunities available to recreationists while also instilling a nearly historically-accurate experience (see Table 3-26).

Table 3-26. Recreation Experiences and Benefits Package Available in the NHT SRMA

Experiences	On Site Benefits	Benefits (On or Off Site Customer)	Benefits (On or Off Site Customer)
Learning more about our cultural heritage and history	Individuals: Greater respect for cultural heritage	Individuals: Enlarged sense of wonder	Household and Community: Greater household awareness of and appreciation of our cultural heritage
Community Resident: Sharing our cultural heritage with new people	Individuals: Increased appreciation of area's cultural heritage	Individuals: Improved visitor awareness, learning and appreciation of the areas cultural values	Economic: Increased desirability as a place to live or retire
Community Resident: Communicating our cultural heritage with those already living here	Individuals: Better understanding of communities cultural identity	Environment: Reduced looting and vandalism of historic sites	Environment: Sustainability of community's cultural heritage
Community Resident: Feeling good about the way our cultural heritage is being protected	Individuals: Greater appreciation for my wild land and parkland heritage and how managers care for it	Environment: Better protection of the areas historic structures and archaeological sites	Economic: Maintenance of community's distinctive recreation-tourism market niche or character

Wilderness Study Areas and Wild and Scenic Rivers

The current Sweetwater Canyon Wilderness Study area has also been found to be eligible and suitable for inclusion in the Wild and Scenic River Program. These eligibility and suitability determinations have not been reviewed by the public or included in a resource management plan and are therefore considered to be interim determinations. Pursuant to the Wild and Scenic Rivers Act of 1968, as amended, until the public reviews are completed and final decisions are made on the WSR suitability determinations, no use of the reviewed Bureau of Land Management administered public lands will be authorized which could impair any outstandingly remarkable values they may contain, or would otherwise reduce their tentative classification or destroy their potential suitability for consideration for inclusion in the National Wild and Scenic Rivers System. In order to meet this mandate the BLM developed a set of interim management objectives for the Sweetwater River WSR that included:

“Interim management practices for the public land parcels along the Sweetwater River unit meeting the wild classification will focus on maintaining or enhancing the outstandingly remarkable scenic, recreational, historical, and ecological values and maintaining the relatively primitive, pristine, rugged, and unaltered character of the area. Any activities that would conflict with this objective and any physical visual intrusions on the public lands involved are prohibited.”

Specific recommendations for livestock grazing included: “Increases in active grazing preference on public lands are [in the WSR area] is prohibited. Construction of new range improvements that protect or enhance outstandingly remarkable values and do not adversely impact the wild classification may be allowed.”

The interim management boundary for the Wild and Scenic River is the same area contained within the WSA boundary. In addition the values listed as outstanding/remarkable and the interim management recommendations contained within the interim determinations requires similar assessment and impact threshold determinations as is

required for WSAs. Therefore any discussion pertaining to the WSA from this point forward also applies to the Wild and Scenic interim determinations and management objectives.

Approximately 1,900 acres of the Sweetwater Canyon Wilderness Study area lies within the Green Mountain Common Allotment. This constitutes 20% of the total acreage of the entire WSA; the other portion of the WSA is utilized as a pasture for use by permittees operating in the Silver Creek Common Allotment. The portion of the WSA within the GMCA does not include lands along the Sweetwater River which is considered to be the main feature of the WSA. The portion of the WSA inside of GMCA does however include: a) portions of the WSA recommended (by BLM) to Congress for designation as Wilderness, b) critical tributaries of the Sweetwater River, c) areas within the viewshed of the WSA, and d) areas utilized for recreationists to access and experience the WSAs.

An important distinction between WSAs and Wilderness areas lies in the fact that WSAs are areas that have been found to possess wilderness characteristics. The Wyoming BLM made recommendations to Congress (1991) in regards to which areas met the criteria to be managed as Wilderness. To date, no Wyoming BLM has been designated or released from the Wilderness system by Congress. For a WSA to become Wilderness Congress must designate those lands as such, until Congress acts on these areas BLM is obligated by policy to manage these lands so as not to impair Congress' ability to designate the area as Wilderness. Further guidance on the management of BLM WSAs is dictated by the *Interim Management Policy (IMP) for Lands Under Wilderness Review* (H-8550-1).

The IMP contains policy that specifically applies to livestock grazing as discussed below:

- Grandfathered vs. Non-grandfathered uses- to be a grandfathered (existing use), “the use clearly must have been taking place on the lands as of the date of approval of FLPMA (October 21, 1976)...However, new grazing (e.g., change in numbers, kind, or class of livestock, or season of use), expanding the area authorized for grazing, or new facilities are not grandfathered. The current grazing (numbers, kind, class of livestock, and the season of use) within the GMCA and the Sweetwater Canyon is significantly different from that which occurred in 1976. Based on the IMP the grazing within the WSA is considered to be non-grandfathered or grazing that was not authorized and used during the 1976 grazing season. On October 21, 1976, grazing management was continuous-season long grazing primarily from cattle. This grazing occurred from May 1 until November 1 each year. Occasionally, some sheep grazing occurred within the canyon. Prescribed grazing management systems were not in place until 1997. Since 1999, the prescribed grazing has been deferred-rotation management on the portion of the WSA outside of the riparian management fence (South Sweetwater Fence). Monitoring studies were established in the canyon beginning in 1997. There are no monitoring studies established on the 1900 acres within the GMCA.
- In both grandfathered and non-grandfathered grazing, changes may be allowed in number, kind, or season of use if, following the preparation of an EA (if not adequately addressed in an existing NEPA document), the effects are found to be negligible. Changes cannot cause declining conditions or trend of the vegetation or soil and cannot cause unnecessary or undue degradation of the lands. The assessment of the proposal must include an evaluation of the effects of the following parameters and wilderness values: natural ecological condition of the vegetation, the visual condition of the lands and waters, erosion, changes in the numbers or natural diversity of fish and wildlife, and all wilderness values.
- The standard for establishing and quantifying wilderness values is the condition of the lands at the time the area was designated as a WSA or the current condition, whichever is determined to be in better condition.
- The impact is the change from the required standard identified in the existing condition to the condition anticipated by implementing the proposed increase. Table 3-27 identifies the maximum acceptable impact for each of the required data elements. If the impact to any data element exceeds the standards established in the table, it exceeds the standard of negligible and is significant. A permanent increase may be authorized when five years of monitoring without an adjustment indicates that the impacts have not exceeded the maximum allowable impacts.
- New livestock developments may be approved if they truly enhance wilderness values, and the developments are substantially unnoticeable. New developments must not require motorized access if the

area were designated as wilderness.

Table 3-27. Maximum allowable Impacts

Wilderness Value	Required Data Element	Maximum allowable impacts
A) Visual Resource	A1) Existing Visual Resource	A1) Low Contrast
B) Naturalness and solitude	B1) Level of human activity including use supervision, management, and maintenance B2) Presence and distribution of wildlife B3) Facilities B4) Presence of pristine areas or conditions.	B1) Negligible or no noticeable increase in human activity. B2) Negligible or no noticeable impact or evidence of livestock B3) No additional facilities B4) Negligible or no noticeable impact
C) Planning	C1) Plan objective	C1) Conformance with existing plan
D) Primitive Recreation	D1) Type of recreation opportunities D2) Dependence of opportunities on a natural appearing environment	D1 and D2) No reduction in availability or quality
E) Special Features	E1) Type and quality of special features	E1) Negligible or no noticeable reduction in quality
F) Surface Water	F1 Quality	F1) Federal and/or state standards
G) Vegetation	G1) Ecological Site Inventory G2) Trend from at least two points in time. G3) Utilization by key species. G4) Threatened or endangered plants. G5) Plant vigor G6) Actual use and preference. G7) Climate and precipitation. G8) Historic and existing range management practices.	G1) No lowering in seral condition. G2) 50% utilization of key species or existing plan decision G3 and G4) No negative impact G5) Healthy vigorous plants
H) Wildlife	H1) Threatened or endangered animals H2) Wildlife populations H3) Population estimates H4) Diversity	H1) No negative impact H2) No negative impact H3) No negative impact H4) No negative impact

A1) Visual Resource

The table below characterizes the overall visual landscape of the WSA:

Table 3-28. Overall Visual Landscape of the WSA

	Land/water	Vegetation	Structures
Form	Rolling hills, with steep draws. Irregular rock formations randomly appear across the landscape. River meanders through a sharp canyon corridor. Slopes and cliffs of the canyon corridor appear blocky.	Random clumps of sagebrush on uplands, Irregular forms of willows and riparian grasses in areas containing water. Deciduous trees and conifers add appeal to the landscape. Heavily grazed areas are missing movement component from tall grasses and appear flat.	Primitive two track roads throughout the WSA introduce an unnatural straight line. The existing riparian fence meanders and utilizes topography in a manner that compliments the existing landscape.
Line	Strong distant horizon lines in all direction on top of the canyon rim. Very strong horizon lines dominate viewshed from within the canyon river way	Riparian area vegetation creates a digital contrast line between uplands.	Areas where the fence travels in a nearly straight direction are affected by this symmetry. Small portions of the fence contrast with the existing canyon skyline
Color	Black rocks with brown patches of bare ground. Water appears iridescent blue and adds movement element to landscape.	Sagebrush green/upland grass tan. Riparian area green to dark green. Aspens, willows, and cottonwoods add appealing visual contrast.	Roads have earthen brown tones broken by vegetation. The fence color tends to blend with the existing landscape when viewed from a distance. The level of color contrast i from the fence increases as observer gets closer
Texture	Jagged in rocky areas, smooth to course in others. Water channel appears smooth in some areas course in faster sections.	Smooth to moderately course	

The existing Lander Field Office Resource Management Plan allocated the Sweetwater Canyon WSA as a Class 2 visual management class. New guidance since the land use plan (IM-2000-096) requires the BLM to manage all special areas including WSAs as a Class 1 visual resource. The BLM Visual Resource Contrast Rating Handbook (H-8431-1 Appendix 2) gives further definition to this class in stating:

“The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change [as measured by the contrast rating system] to the characteristic landscape should be very low and will not attract attention.”

A key factor to the visual environment in regards to grazing management in WSAs is healthy looking and tall vegetation, in addition the most cited visitor indicator of improper grazing management is overgrazing and impacted or short vegetation (Johnson et al 1997). Overall the Sweetwater Canyon WSA demonstrates tall vegetation and light grazing practices. The riparian area portions of the WSA currently contained in the GMCA does not contain tall healthy vegetation. In addition WSA visitors to the area could consider these riparian systems to appear overgrazed. All these factors degrade the wilderness experience for WSA visitors.

B) Naturalness and Solitude Value

B1) Human Activity

Recreational activity within the GMCA portions of the WSA is low; however these areas do encompass main access routes to the Sweetwater River (the focal point of the WSA). It is predicted that the GMCA portion of the WSA receives approximately 75-150 recreational visits a year (May-November 15) the majority of these visits are by visitors passing through to get to other places within the WSA. When coupled with visitation associated with use supervision, management, and maintenance (approx. 25-75 visits) the area receives approximately 100-225 visits a year.

B2) Presence and Distribution of Wildlife

The wildlife habitat included in this part of the Sweetwater Canyon WSA is primarily upland, sagebrush steppe incised by Granite, Mormon, and Willow Creeks. As such, it is suitable habitat for sage-grouse nesting and brood rearing and raptor nesting. Potential habitat for the pygmy rabbit also exists in some areas. This entire portion of the WSA that falls within the GMCA is identified as crucial winter range for elk and the riparian areas along the above-mentioned creeks is identified as crucial winter range for moose.

There are currently no known threatened or endangered species or designated critical habitat known to occur in the WSA. Sage-grouse populations in the vicinity, as indicated by lek count, appear to have remained stable in recent years. Potential habitat for the persistent sepal yellowcress exists in the riparian areas although no extensive surveys for its presence have been conducted.

The 2006 big game population estimates developed by the Wyoming Game and Fish Department indicate that the antelope and mule deer populations for those herd areas that include the south side of the WSA are below management objective. Elk, however, are estimated to be substantially above population objective.

As discussed above an indicator to the naturalness and solitude value of wilderness is the presence and distribution of wildlife, conversely the enjoyment of the wildlife value in wilderness is believed to be degraded by livestock impacts. Johnson et al 1997 found that noticeable detractors to recreation experiences resulting from livestock include: manure in camp, livestock near streams and lakes, on or near trails, livestock congregation areas, and manure on trails. Visitors to the areas within the WSA currently contained within the GMCA experience these encounters with livestock on a moderate basis however; these encounters are typically forgotten as one travels from these areas to the less impacted core of the WSA.

B3) Facilities

Currently no recreation facilities exist within the WSA. A riparian fence was built in 1997 in order to provide the canyon with rest and allow for better facilitation of livestock grazing along the Sweetwater River. The fence was designed and constructed in a manner so as not to impair Congress' ability to designate the area as Wilderness, as a result it was sited in a manner that is not visually intrusive. The fence facilitated a five year rest period and more recently an annually controlled grazing period. The construction of the fence rapidly recovered vegetation resources and bank stability along the river. The improved functionality and vegetative recovery in the WSA marked an enhancement in naturalness values.

B4) Presence of Pristine Areas or Conditions

In the Sweetwater Canyon WSA the likelihood of pristine conditions increase as the recreationist/observer travels closer to the interior of the WSA. The physical and administrative recreation setting of the GMCA portion of the WSA indicate a middle country recreation setting while the social setting could be characterized as backcountry. This means that although the area may not possess the most pristine recreation setting character, it does represent an area where the character of recreation use is minimal. The visual resource in the area is nearly pristine with slight modifications from the riparian fence and obvious primitive roads. Based on the above characterizations; pristine areas or conditions are not present within the GMCA portion of the WSA, however, conditions here appear nearly natural and in character with the surrounding landscape.

C) Planning

C1) Existing plans and objectives

All pertinent existing plans for the Sweetwater Canyon WSA are listed in chapter one of this document. No additional area specific or WSA management plan exists for the WSA.

D) Primitive Recreation Values

D1) Type of recreation opportunities

The BLM land use planning handbook defines a recreation opportunity as: “favorable circumstances enabling visitors’ engagement in leisure activity to realize immediate psychological experiences and attain more lasting value and beneficial outcomes” (DOI 2005 pg. Glossary-6). The GMCA portion of the WSA facilitates the attainment of visitor outcomes similar to those documented for the entire allotment. Primary activities in this portion of the WSA are: driving for pleasure, wildlife viewing, hunting, and utilizing the available access to travel to the interior of the WSA to conduct several other sets of activities. The interior of the WSA provides opportunities for visitors to participate in water based activities in a back country setting. The setting provided in the canyon facilitates opportunities for visitors to realize unique (for lands in the Lander Field Office) experiences and benefits.

D2) Dependence of opportunities on a natural appearing environment

The opportunities available in the GMCA portion of the WSA are moderately dependent on a natural appearing environment. The existing slight modifications represent very light visual intrusions into the area and do not cause landscape segmentation (or islands of WSA surrounded by modern intrusions). The only current change to the natural appearing environment is the obvious primitive roads used for access as well as the riparian fence. Moderate changes (as measured by the BLM contrast ratings system) to the natural appearing environment (also known as the characteristic landscape) in this area, could cause degradation of recreation opportunities, and affect overall visitor impressions of the WSA as whole. Visitors who pass a moderate contrast while traveling through the periphery edges may reflect negatively on their entire experience despite the nearly natural appearing environment in the interior (the area within the canyon corridor) of the WSA. In addition opportunities available within the interior of the WSA are highly dependent on a natural appearing environment, therefore changes to the GMCA portion of the WSA that negatively affect the interior (visually or biologically) will degrade the opportunities (especially experiences and benefits) available within the entire WSA.

E) Special Features

E1) Special Features Value

The river canyon corridor and the surrounding riparian area constitute a special feature within the Sweetwater Canyon WSA. The geologic landforms and sharp canyon walls contrast with the surrounding landscape in a manner that adds visual appeal. The landscape contained within the core of the WSA is very unique viewshed to the Wyoming Basin physiographic province. The drastic change in the elevation and availability of water with the canyon corridor combine to provide a high level of biological diversity. The GMCA portion of the WSA does not include lands within the river canyon, however offsite impacts rendered in this area could alter the integrity of the special features discussed above.

F) Surface Water Quality

F1) Surface Water Quality Value

The WSA watershed contains medium textured soils which are commonly underlain by plutonic granitic rocks with mafic intrusions and there are common rock outcrop exposures. Mixed alluvium of many of these soils shows an influence from the local granite. Surface water runoff is generally rated as medium in the USDA Fremont County East Part and the Dubois Area Soil Survey, which means that the loss of water to overland flow does not reduce seriously the supply available for plant growth.

Elevations in this area range from 6,750 to a bit over 7600 feet NGVD. Slopes vary from nearly level to steep (0 to 65 percent slope). Soils are well-drained, very shallow (<10 inches) to moderately-deep (20 to 40 inches) and are loamy, or gravelly and loamy, in texture. These soils are mostly associated with hills, ridges, escarpments, fan aprons, and pediments. Besides the river corridor, there are numerous seeps and springs, and portions of several tributary streams. Water erosion is the dominant form of erosion in this area, though the high, flat upland portions of the WSA, above the Canyon, do exhibit wind scour in the bare soil patches in the short stature sagebrush

communities.

The Class 1 (most stringent standards) waters in the WSA are those portions of the Sweetwater River above its confluence with Alkali Creek and any tributaries that are not designated differently. Class 1 waters are those waters in which no further degradation of water quality will be allowed. The other streams in the WSA (Granite Creek, Willow Creek, Mormon Creek.....) are Class 2AB waters are those known to support game fish populations or spawning and nursery areas at least seasonally and all their perennial tributaries and adjacent wetlands and where a game fishery and drinking water use is otherwise attainable. All Class 2AB waters are designated as cold water game fisheries unless identified as a warm water game fishery by a “ww” notation in the “Wyoming Surface Water Classification List”. Unless it is shown otherwise, these waters are presumed to have sufficient water quality and quantity to support drinking water supplies and are protected for that use. Class 2AB waters are also protected for nongame fisheries, fish consumption, aquatic life other than fish, recreation, wildlife, industry, agriculture and scenic value uses.

G) Vegetation

G1) Ecological Site Inventory

There is no ecological site inventory as such for the Sweetwater Canyon WSA or surrounding lands. However, the 1979-1980 Green Mountain Weight Estimate Range Survey (GMWERS), our most recent and comprehensive data set for vegetation in the area, provides data that can be roughly compared to NRCS Ecological Site Guides and Draft State and Transition models. This data is only slightly valuable to the analysis of effects on the WSA because it only represents vegetative conditions from around the time of the approval of FLMPA and ten years prior to the recommendation of the WSA to Congress. The information does not represent the current condition as required by the Interim Management Policy for Lands Under Wilderness Review.

The 1979-1980 GMWERS provided data over large areas of vegetation types called Site Write-Up Areas or SWAs. The SWAs roughly correspond to ecological sites. The ecological sites which most closely match our SWAs are all 10-14 inch precipitation, High Plains Southeast. These ecological sites include Subirrigated, Loamy Overflow, Loamy, Shallow Loamy and Shallow Igneous. All sites were compared to the Historic Climax Plant Community Stable State and given a condition score based on that comparison. Sites were also compared to Wyoming NRCS Draft State and Transition models to determine if an alternate stable state could better describe the condition and if so, what the likely causal factors or triggers were. According to the National Weather Service Historical Climate Information, Western Regional Climate Center, South Pass City had 13.34 inches of precipitation in 1979. Therefore, productivity was compared to what would be expected in an average year given the condition or stable state.

For a quick overview of vegetative condition in the WSA see the table below. Current conditions as compared to these 28 year old findings will be addressed under Trend.

Table 3-29. Vegetative Condition in Sweetwater Canyon WSA

Ecological Site	% of total WSA acres (within GMCA)	Average Range Condition	% of Expected Productivity	Stable State	Causal Factors (Triggers) Leading to Stable State
Subirrigated	2%	Poor to Low Fair	57 -93%	Kentucky Bluegrass / Forbs	Heavy Continuous Season Long Grazing
Loamy Overflow	3%	Poor to Fair	32%	Western Wheatgrass / Short Bluegrass	Continuous Season Long Grazing
Loamy	59%	Fair to Low Good	30%	Big Sagebrush / Mid Grasses	Continuous Season Long Grazing
Shallow Loamy	36%	Low Fair	66%	n/a*	n/a*
Shallow Igneous	<1%	Low Fair	75%	Big Sagebrush / Rhizomatous Wheatgrass	Heavy Continuous Season Long Grazing

*The SWAs that matched with Shallow Loamy Ecological sites did not correspond well to any of the Stable States described.

G2) Trend From at Least Two Points in Time

Data collected in the 1958 Green Mountain Unit Range Survey can be compared with data from the 1979-1980 Weight Estimate Range Survey. This analysis utilizes portions of the two surveys specific to the WSA to assess vegetative trend. The most obvious comparison is in percent composition by growth form. Another comparison that can be made is in the kind of grass species that are found.

The data shows that there was a shift in plant composition from 1958 to 1970-1980. Bluegrasses were at 33% total composition in 1958 compared to 17% bluegrasses in 1970-1980. An average of 44% grasses, 29% forbs (73% total herbaceous) and 27% shrubs was recorded on upland sites in 1958. In 1979-1980 we find an average of 37% grasses, 12% forbs (49% total herbaceous) and 51% shrubs. We know from looking at State and Transition Models that continuous season long grazing creates a shift first toward bluegrasses then toward shrubs in upland plant communities. These changes represent a downward trend in range condition.

Since 1980, several apparent trend observations have been made by Lander Field Office personnel. These observations vary by location and year depending on proximity to water sources and annual soil moisture conditions. The following conclusions from the 1999 and 2002 Rangeland Health Standards Review are still valid today within the WSA:

- “The upland ecological (range) sites immediately adjacent to riparian areas are not meeting the standard. At the present time, this acreage has been estimated at 3-5 percent (15-25,000 acres) of the GMCA”.
- “Upland vegetation on most (61%) ecological (range) sites consists of plant communities which have deteriorated under past and current grazing management. These sites contain disproportionate amounts of increaser and invader plants which have lowered their resiliency, diversity, and ability to recover from natural and human disturbance. Of the sites within Fremont County, current forage production is approximately 43 percent of their potential production based on the 1993 East Fremont County Soil Survey”.

G3) Utilization by Key Species

No utilization data by key species is available for the WSA. However, utilization at riparian key areas near the WSA ranged from 65 to 85 percent in 2007.

Prescribed use levels are below the threshold for maximum allowable impacts. Prescribed use levels are often exceeded in practice (65 to 85 percent) and therefore to comply with this requirement of the IMP, actual utilization would need to be brought in line with prescribed utilization.

G4) Threatened or endangered plants

There are no known occurrences of any threatened or endangered plant or suitable habitat for any such plant in the Sweetwater Canyon WSA.

G5) Plant Vigor

Plant vigor has been suppressed since the drought began in 2000. In 2003 and 2005 moisture conditions temporarily improved and allowed for near average vegetative production. However, recent field observations continue to show that the height and volume of plant growth has been reduced due to limited soil moisture conditions and heavy grazing on and adjacent to riparian areas.

G6) Actual use and preference

The historical authorized livestock use for GMCA from 1980 through 2006 has averaged 23,811 AUMs which is 50 percent of the permitted 47,361 AUMs. Recent actual livestock grazing use from 1999 through 2006 has averaged 17,370 AUMs which is approximately 37 percent of the permitted 47,361 AUMs. These historical authorized and recent actual use levels approximate to 7,500 AUMs and 5,540 AUMs respectively, for those that have occurred on the Granite Creek-Rocks Pasture which includes the WSA.

G7) Climate and Precipitation

The bulk of annual precipitation occurs in the spring; typically beginning in late March, peaking in May, and declining rapidly during June. A minor, but important second peak occurs during the fall period, September through November. This fall moisture can initiate a second period of growth for cool-season grasses, but more importantly it will insure a good frost seal for the soils so that they are pre-wetted and ready to transmit spring precipitation deep into the soil profile for use by the deeper-rooted more desirable native grasses and shrubs.

The annual precipitation in this part of the allotment is 10 to 14 inches, but effective precipitation is lower due to desiccating winds, and the growing season is short with 60-90 days frost-free.

Wyoming averages severe or extreme drought conditions from 10 % in the eastern plains to more than 20 % of the time over the southwest regions of the state. These percentages are nearly doubled if all drought levels are considered (mild to exceptional).... Between 31% and 45% of the time a meteorological drought is occurring within a climate division and generally between 80% and 90% of the time these events last no longer than 6 months, although below normal precipitation has been known to last up to 16 straight months. All climate divisions having a monthly precipitation deficit at the same time occur about 17% of the time during any dry or wet season. While entire years have precipitation deficits, it is rare that every month during that year has below normal precipitation. Widespread droughts in Wyoming, as determined from stream flow records, were most notable during three periods: 1929-1942, 1948- 1962, and 1976-1982 (page 96 of the Wyoming Climate Atlas).

G8) Historic and Existing Range Management Practices.

The GMCA is a common use allotment covering approximately 522,000 acres in southern Fremont County and portions of Sweetwater County. Sixteen individuals share livestock grazing use within the allotment on 19 grazing permits. Prior to 1999, grazing management in the WSA was continuous-season long grazing primarily from cattle. This grazing occurred from May 1 until November 1 each year. Occasionally, some sheep grazing occurred within the canyon. Prescribed grazing management systems were not in place until 1997. Since 1999, the prescribed grazing has been deferred-rotation management on the portion of the WSA outside of the riparian management fence (South Sweetwater Fence). Monitoring studies were established in the canyon beginning in 1997. There are no monitoring studies established on the 1900 acres within the GMCA.

In 1996, the BLM initiated a large-scale planning effort involving the general public, local government, special

interest groups, and permittees to address the varied and sometimes conflicting uses of the GMCA. This planning effort considered requests to convert the remaining sheep grazing use to cattle grazing and was intended to mitigate the known resource conflicts within the allotment. The planning effort identified a number of management issues and developed a list of goals and objectives to resolve the issues. An analysis documented in an EA (No. WY-050-EA9-039) resulted in the BLM's August 31, 1999 decision for managing livestock grazing on the Green Mountain Common Allotment.

H) Wildlife Value

H1) Threatened or endangered animals

There are no documented occurrences of any federally-listed, threatened or endangered animal species in the Sweetwater Canyon WSA. Suitable habitat exists for the gray wolf but no occupancy has been established to date.

H2) Wildlife populations

Apart from estimated big game populations for a much larger area, no wildlife population data exists for species within the WSA.

H3) Population estimates

For the herd management areas in which the WSA lies, antelope and mule deer populations are currently estimated by the Wyoming Game and Fish Department to be below objective and elk is estimated to be above.

H4) Diversity

Plant and animal species diversity data is not available for the WSA but diversity of habitat type, ranging from riparian to upland sagebrush steppe, suggests that species diversity would be similar to that found in other parts of the GMCA.

Conclusion:

Table 3-30 shows those WSA values that (based on the affected environment discussion above) are not known to exist in the Sweetwater Canyon WSA or values that will not be affected as a result of actions authorized for the GMCA AMP.

Table 3-30. WSA Values Not Occurring In Sweetwater Canyon WSA

WILDERNESS VALUE	JUSTIFICATION
B) Naturalness and Solitude	
B3) Facilities	No new facilities (other than those discussed under the WSA impacts common to all section) are proposed for lands contained within the WSA.
B4) Presence of Pristine Areas or Conditions	No pristine areas are known to exist in the GMCA portion of the WSA and no offsite or indirect impacts are anticipated to these areas that may exist in the interior of the WSA.
C1) Planning	All alternatives are in conformance with existing land use plans and applicable activity plans.
G) Vegetation	
G4) Threatened or Endangered Plants	No known Threatened or Endangered plants exist within the WSA.
H) Wildlife	
H1) Threatened or Endangered animals	No known Threatened or Endangered animals exist within the WSA.

OPEN SPACE

Open space is defined in the Wyoming Open Spaces Initiative Terminology Database as (1) an area of natural landscape essentially undeveloped, such as ridges, streams, natural shorelines, scenic buffer areas, and agricultural lands, or (2) public tracts which are dedicated primarily to pedestrian use, excluding thoroughfare right-of-ways.

In another definition from the Wyoming Open Spaces Initiative, open space is that quality of place that provides people with a sense of freedom; land largely free of residential and industrial development; land which maintains rural character, wildlife habitat, impressive viewscapes, and access to recreation; or land which is in agricultural use, such as ranching or farming.

The treatment of the “open space” issue in the Green Mountain Common Allotment contains an inherently contradictory situation. On the one hand, the existence of open space on private property in the planning area around Green Mountain depends on the continued existence of agricultural lands. According to Taylor (2003) the future of open spaces in Wyoming will depend to a large extent on what happens to agriculture, and whether privately-owned agricultural lands are retained. Factors potentially affecting the retention of agricultural land in Wyoming, according to Taylor, include the aging of Wyoming agricultural operators; the current limited profitability of Wyoming agriculture and/or the availability of higher profits from other lands uses, especially development; the increase in agricultural land prices despite the limited profitability of agriculture; and continued uncertainty about livestock grazing on federal lands.

The continued operation of private agricultural lands appears to depend in no small part on the availability of public lands for grazing, freeing up the home ranch to grow the feed that will sustain livestock during the winter months when grazing is not available.

Indeed, due to a variety of factors including some mentioned by Taylor (the aging of agricultural operators, the limited profitability of agriculture, and the rising cost of fuel and labor) the Green Mountain permittees believe that their financial success depends on the development of fencing and water projects on the Green Mountain Common Allotment. The contradiction within idea is that if fencing and developing the Green Mountain Common Allotment is truly required for the financial success of livestock operators, and their ability to retain private lands in open space, then the protection of open space in one area (private agriculture) will reduce open space in another (on the allotment).

The importance of open space to the people of Wyoming was recently highlighted in the results of a statewide poll sponsored by the Ruckelshaus Institute, the Wyoming Stock Growers Association, and the Wyoming Chapter of The Nature Conservancy. In that poll, a total of 600 Wyoming voters were contacted in May 2007 and were asked to identify the most important conservation and development issues facing the state. The respondents viewed the availability of water, the loss of family farms and ranches, and the fragmentation of natural areas and ranch lands by development, as the most serious conservation issues facing the state. (Hulme, D.G., et al, 2008)

In the survey, 47 percent of Wyoming voters agreed that “loss of family farms and ranches” was an extremely or very serious problem. Forty-four and 31 percent of the respondents, respectively, said that “natural areas and ranch lands being split up by new housing development” and “natural areas and ranch lands being split up by oil and gas development” were also extremely or very serious problems. Among the top state-funded conservation priorities that Wyoming voters would be willing to pay for, the third highest on the list was “preserving wide open spaces and scenic vistas,” with 73 percent of respondents describing that as extremely or very important. The only funding priorities that were higher were (1) keeping more water in the state and (2) maintaining the strength of Wyoming’s agricultural and tourism industries.

On BLM-administered public lands, open space is affected by the number, length, location, and type of fences, whether permanent or temporary, which tend to segment and subdivide the land. Open space is also affected by surface disturbing activities, such as oil field development, mining activity, and the construction of pipelines, power lines, and roads.

In the Green Mountain Common Allotment, open space is reflected in the vastness of the largely undeveloped landscape. The free-roaming wild horse and wildlife populations, along with the large number of recreational choices, such as hunting, backpacking, exploring historic trails, and watching wild horses and wildlife, all create an environment that is increasingly rare throughout the west. The openness also helps maintain a diverse and healthy environment. For example, the lack of fencing allows wild horses to move among herd areas, contributing to the genetic health of the herds. Likewise, the unobstructed movement of big game animals, particularly in a north/south direction, allows the animals to reach critically important seasonal habitats, for forage and cover.

In the past, the BLM attempted to develop projects that were beneficial to livestock operations without significantly impacting open space and the natural character of the allotment. Even so, some individuals who favor recreation and wildlife interests contend that the construction of fences, like those in the Sweetwater Canyon and along Ice Slough, have reduced the open space character of the allotment.

Map 3-14, Known Fences Within the Lander Field Office, is an effective tool for visualizing the lack of fencing in the GMCA compared to other parts of the Lander Field Office. The scarcity of permanent fences within the allotment enables visitors to have relatively unencumbered cross country travel over great distances, by horseback and on foot. In Appendix 24, open space characteristics are evident in photographs taken along the Seminole Cutoff of the Oregon/Mormon/California/Pony Express National Historic Trails. In particular, the trail segment beginning slightly northeast of North Bear Mountain and ending at the Three Forks – Atlantic City Road possesses remarkable open space qualities being either untouched by, or with very few, modern intrusions. See photos 9, 10, 11, 12, 13, 14 and 15.

SOCIOECONOMICS

Study Region

BLM has the capacity, through its decision making responsibilities, to manage resource development in the planning area and influence not only the GMCA permittees but also the overall economy of the region. For the purposes of this analysis, the regional aspect will be Fremont County and will include the communities of Riverton, Lander and Jeffrey City.

The following section is designed to provide a summary of demographic and economic information that focuses on the study area, with the goal of providing the reader with an overall understanding of the historical and existing economic and social considerations. This information will then serve as a backdrop for the impact analysis presented in Chapter 4. The source for the data used in the preparation of this section will be referenced in footnotes to the tables and figures.

Economic Demographics and Activity

Population and Earnings

The population of the study area has grown from 28,406 in 1970 to an estimated 37,163 in July of 2006 (Table 3-31). That represents an increase of about 31% from 1970-2006. Over this time period, the largest increase occurred between 1970 and 1980 where the population increased by nearly 38%. However, the following decade (1980-1990) saw a decline in population of about 14% and then in the period from 1990 to 2000 the population grew almost 7%. And population has continued to grow through 2006 as shown by Table 3-32.

Table 3-31. Personal Income Trends in Fremont County

Line Title - Fremont County	1970 ¹	1980 ¹	1990 ¹	2000 ¹	2005 ¹	7/1/2006 ²
Personal income (\$000)	\$90,911	\$379,991	\$463,210	\$828,792	\$1,065,378	
Population (persons) ²	28,406	39,071	33,565	35,848	36,580	37,163
Per capita personal income (dollars)	\$3,200	\$9,726	\$13,800	\$23,120	\$29,125	

¹Regional Economic Information System (REIS) 1969-2005

² Census Bureau midyear population estimates. Estimates for 2006 reflect county population estimates available as of March 2007

Table 3-32. Population Trends in Fremont County

Line Title - Fremont County	1970 ¹	1980 ¹	1990 ¹	2000 ¹	2005 ¹	7/1/2006 ³
Personal income (\$000) - 2006 dollars ³	\$472,362	\$929,687	\$714,485	\$970,293	\$1,099,745	
Population (persons) ²	28,406	39,071	33,565	35,848	36,580	37,163
Per capita personal income (2006 dollars)	\$16,629	\$23,795	\$21,287	\$27,067	\$30,064	

¹Regional Economic Information System (REIS) 1969-2005

² Census Bureau midyear population estimates. 2006 county population estimates available March 2007

³ CPI, All Items, U.S. Department of Labor (Bureau of Labor Statistics)

Looking at the personal income for the period from 1970-2005 (Table 3-33) indicates that the per capita income measured in 2006 dollars has increased by nearly 81%. While it increased over this period, there were variations in the rate of change by decade. For example, per capita income, measured in 2006 dollars, grew by 43% from 1970-1980 and then actually went down by nearly 11% from 1980 to 1990. The following decade then saw an increase of slightly over 27% followed by an 11% increase from 2000 through 2005, which is only a five year period.

Table 3-33. Personal Income Trends in Fremont County (1970-2005).

Line Title - Fremont County	% Change '70-'80	% Change '80-'90	% Change '90-'00	% Change '00-'05	% Change '70-'05	% Change '05-'06	% Change '70-'06
Personal income (\$000) - 2006 dollars	96.82%	-23.15%	35.80%	13.34%	132.82%		
Population (persons) ²	37.54%	-14.09%	6.80%	2.04%	28.78%	1.59%	30.83%
Per capita personal income (2006 dollars)	43.09%	-10.54%	27.15%	11.07%	80.79%		

The distribution of earnings from 1970 to 2000 is shown in Table 3-34. Table 3-34 is then converted to 2006 dollars using the Consumer Price Index (CPI) and the results are illustrated in Table 3-35. And then Table 3-36 uses the data from Table 3-35 to show the proportion of earnings by sector. The result of these calculations reveals that mining's share of the total was the highest compared to all other sectors in 1970 and then dropped to about 6% by 2000. Farm earnings, on the other hand, accounted for nearly 5.6% in 1970 and by 2000 it had fallen to 1.44% of the total. And by 2000 Government and government enterprises share of total earnings was slightly over 29% and contributed the largest share of earnings compared to all other sectors in Fremont County.

Table 3-34. Distribution of Earning in Fremont County (1979-2000)

Line Title - Fremont County (\$000)¹	1970	1980	1990	2000
Farm earnings	\$4,333	\$2,271	\$9,034	\$7,297
Agricultural services, forestry, fishing & other 7/	\$533	\$808	\$1,616	\$2,590
Mining	\$17,644	\$119,651	\$23,760	\$30,798
Construction	\$10,336	\$28,254	\$23,288	\$55,415
Manufacturing	\$4,487	\$11,450	\$13,366	\$32,957
Transportation and public utilities	\$3,830	\$16,446	\$23,570	\$33,424
Wholesale trade	\$1,499	\$8,142	\$8,693	\$10,565
Retail trade	\$8,970	\$32,314	\$35,522	\$57,077
Finance, insurance, and real estate	\$1,947	\$7,406	\$6,492	\$17,658
Services	\$8,478	\$43,251	\$63,035	\$111,574
Government and government enterprises	\$15,620	\$51,944	\$101,568	\$148,087
Total	\$77,677	\$321,937	\$309,944	\$507,442

Table 3-35. Distribution of Income for Fremont County using 2006 dollars

Line Title - Fremont County (\$000 - 2006\$)²	1970	1980	1990	2000
Farm earnings	\$22,514	\$5,556	\$13,935	\$8,543
Agricultural services, forestry, fishing & other	\$2,769	\$1,977	\$2,493	\$3,032
Mining	\$91,676	\$292,738	\$36,649	\$36,056
Construction	\$53,705	\$69,126	\$35,921	\$64,876
Manufacturing	\$23,314	\$28,014	\$20,617	\$38,584
Transportation and public utilities	\$19,900	\$40,237	\$36,356	\$39,131
Wholesale trade	\$7,789	\$19,920	\$13,409	\$12,369
Retail trade	\$46,607	\$79,059	\$54,791	\$66,822
Finance, insurance, and real estate	\$10,116	\$18,120	\$10,014	\$20,673
Services	\$44,051	\$105,818	\$97,229	\$130,623
Government and government enterprises	\$81,160	\$127,086	\$156,665	\$173,370
Total	\$403,600	\$787,652	\$478,077	\$594,078

¹Regional Economic Information System (REIS), Bureau of Economic Analysis (BEA), RCN-0852, May 2007

²CPI, All Items, U.S. Department of Labor (Bureau of Labor Statistics)

Table 3-36. Proportion of Earnings in Fremont County by Sectors

Line Title - Fremont County (% of Total)	1970	1980	1990	2000
Farm earnings	5.58%	0.71%	2.91%	1.44%
Agricultural services, forestry, fishing & other	0.69%	0.25%	0.52%	0.51%
Mining	22.71%	37.17%	7.67%	6.07%
Construction	13.31%	8.78%	7.51%	10.92%
Manufacturing	5.78%	3.56%	4.31%	6.49%
Transportation and public utilities	4.93%	5.11%	7.60%	6.59%
Wholesale trade	1.93%	2.53%	2.80%	2.08%
Retail trade	11.55%	10.04%	11.46%	11.25%
Finance, insurance, and real estate	2.51%	2.30%	2.09%	3.48%
Services	10.91%	13.43%	20.34%	21.99%
Government and government enterprises	20.11%	16.13%	32.77%	29.18%
Total	100.00%	100.00%	100.00%	100.00%

The definition of sectors used by the BEA changed in 2001. Prior to that time, they used the Standard Industrial Classification (SIC) for defining the economic sectors. Since 2001 they are using a new classification system for defining the economic sectors, which is called the 2002 North American Industry Classification System (NAICS). These two classification systems are not interchangeable so the Fremont County earnings data for 2005 is split out and shown in Tables 3-37 and 3-38.

Table 3-37. Earnings Data for Fremont County (2005)

Line Title - Fremont County (\$000)¹	2005
Farm earnings	10,831
Forestry, fishing, related activities, and other	2,584
Mining	52,893
Construction	53,621
Manufacturing	14,693
Retail Trade	54,225
Transportation and warehousing	20,738
Information	11,610
Finance and insurance	14,156
Real estate and rental and leasing	16,182
Professional and technical services	27,121
Management of companies and enterprises	971
Administrative and waste services	7,013
Arts, entertainment, and recreation	11,889
Accommodation and food services	22,956
Other services, except public administration	21,519
Other (Utilities, Wholesale Trade, Educational services, Health care and social assistance)	95,969
Government and government enterprises	212,964
Total	651,935

Table 3-38. Fremont County Earnings Data

Line Title - Fremont County (\$000 - 2006\$)²	2005
Farm earnings	\$11,180
Forestry, fishing, related activities, and other	\$2,667
Mining	\$54,599
Construction	\$55,351
Manufacturing	\$15,167
Retail Trade	\$55,974
Transportation and warehousing	\$21,407
Information	\$11,985
Finance and insurance	\$14,613
Real estate and rental and leasing	\$16,704
Professional and technical services	\$27,996
Management of companies and enterprises	\$1,002
Administrative and waste services	\$7,239
Arts, entertainment, and recreation	\$12,273
Accommodation and food services	\$23,697
Other services, except public administration	\$22,213
Other (Utilities, Wholesale Trade, Educational services, Health care and social assistance)	\$99,065
Government and government enterprises	\$219,834
Total	\$672,965

¹Regional Economic Information System (REIS), Bureau of Economic Analysis (BEA), RCN-0852, May 2007
²CPI, All Items, U.S. Department of Labor (Bureau of Labor Statistics)

Table 3-39 indicates farm earnings contributed 1.66% of total earnings in 2005. This is up from the 1.44% reported in 2000. But as mentioned above, in 2000 the SIC was used and in 2005 NAICS was used to define the sectors. So the 2000 data in Table 3-36 is not directly comparable to the data illustrated in Table 3-39. It is also noteworthy to point out that government and government enterprises has been the largest contributor to Fremont County earnings since 1990 as shown by both Tables 3-36 and 3-39.

Table 3-39. Total Earning by Sector in Fremont County

Line Title - Fremont County (% of Total)	2005
Farm earnings	1.66%
Forestry, fishing, related activities, and other	0.40%
Mining	8.11%
Construction	8.22%
Manufacturing	2.25%
Retail Trade	8.32%
Transportation and warehousing	3.18%
Information	1.78%
Finance and insurance	2.17%
Real estate and rental and leasing	2.48%
Professional and technical services	4.16%
Management of companies and enterprises	0.15%
Administrative and waste services	1.08%
Arts, entertainment, and recreation	1.82%
Accommodation and food services	3.52%
Other services, except public administration	3.30%
Other (Utilities, Wholesale Trade, Educational services, Health care and social assistance)	14.72%
Government and government enterprises	32.67%
Total	100.00%

Table 3-40 examines the change occurring in farm and nonfarm earnings over the 1970-2005 period. During this timeframe, Farm earnings declined by about 75% from 1970-1980 and then grew by nearly 150% from 1980-1990. It then declined by almost 39% from 1990-2000, grew by nearly 31% from 2000-2005, but has declined by over 50% from 1970 through 2005. Contrasted to farm earnings, nonfarm earnings grew 105% from 1970 to 1980, declined by almost 41% over the next decade, increased by slightly over 26% and during the period from 2000-2005 grew by about 13%. Overall, nonfarm earnings grew by almost 74% from 1970 to 2005.

The growth in non-earned income, which is also often referred to as non-labor income (dividends interest and rent) and transfer payments (payments from governments to individuals such as Medicare, Social Security, unemployment compensation, disability insurance payments and welfare) is becoming an increasingly important source of income throughout the west. As such, it is an important indicator of the changing economies in amenity areas like Fremont County. And based on the desirability of Fremont’s location within the state of Wyoming, one would expect a sizable growth in non earned income. Therefore, for the purposes of this analysis, non earned income was tracked using data from the Economic Profile System (EPS) for Fremont County produced by Headwaters Economics (see www.headwaterseconomics.org).

Table 3-40. Change in Farm and Non-farm Earning in Fremont County (1970-2005)

Line Title - Fremont County (\$000)	1970	1980	1990	2000	2005
Farm earnings	\$4,333	\$2,271	\$9,034	\$7,297	\$10,831
Nonfarm earnings	\$73,344	\$319,666	\$300,910	\$500,145	\$641,104
Total	\$77,677	\$321,937	\$309,944	\$507,442	\$651,935

Line Title - Fremont County (\$000 - 2006\$)	1970	1980	1990	2000	2005
Farm earnings	\$22,514	\$5,556	\$13,935	\$8,543	\$11,180
Nonfarm earnings	\$381,086	\$782,095	\$464,143	\$585,536	\$661,785
	\$403,600	\$787,652	\$478,077	\$594,078	\$672,965

	% Change '70-'05	% Change '70-'80	% Change '80-'90	% Change '90-'00	% Change '00-'05	% Change '70-'05
Farm earnings		-75.32%	150.79%	-38.69%	30.87%	-50.34%
Nonfarm earnings		105.23%	-40.65%	26.15%	13.02%	73.66%
Total		95.16%	-39.30%	24.26%	13.28%	66.74%

Table 3-41 shows the relationship between total personal income and non-labor income for the period beginning in 1970 and extending through 2005. During this time, labor sources of income fell from about 79% of total personal income in 1970 to about 56.5% of total personal income in 2005. However, over this same timeframe, non-labor income went from slightly over 21% of total personal income in 1970 to nearly 43.6% in 2005, which indicates a growing importance of non-earned income in Fremont County.

To further point out the growing importance of non-earned income in Fremont County, total personal income grew by almost 133% from 1970 to 2005. By contrast, non-earned income grew by almost 379.5% during this same time period. So even though total personal income measured in 2005 dollars grew over this 25 year period, the growth in non-earned income outpaced it.

Table 3-41. Relationship Between Total Personal Income and Non-labor Income (1970-2005)

Line Title - Fremont County (\$000 - 2005\$) ¹	1970	1970% of Total	1995	1995% of Total	2005	2005% of Total
Total Personal Income	\$458	100.00%	\$786	100.00%	\$1,065	100.00%
Labor Sources	\$361	78.84%	\$447	56.82%	\$601	56.42%
Non-Labor Sources	\$97	21.16%	\$339	43.18%	\$464	43.58%
<i>Dividends, Interest and Rent</i>	\$61	13.30%	\$176	22.35%	\$239	22.39%
<i>Personal current transfer receipts</i>	\$36	7.87%	\$164	20.82%	\$226	21.19%

¹A Socioeconomic Profile, Fremont County, Headwaters Economics, p. 10

Figure 3-7 further illustrates the importance of non-earned labor income in Fremont County from 1970 to 2005 by illustrating the percentage of total personal income of both labor and non-labor income sources over this same timeframe. By examining Figure 1, one can see that the labor income fell from about 79% of total personal income in 1970 to about 56.5% of total personal income in 2005. But over this same period, non-labor income rose from slightly over 21% of total personal income in 1970 to over 43.5% of total personal income in 2005.

Figure 3-7. Importance of Non-Labor Income in Fremont County

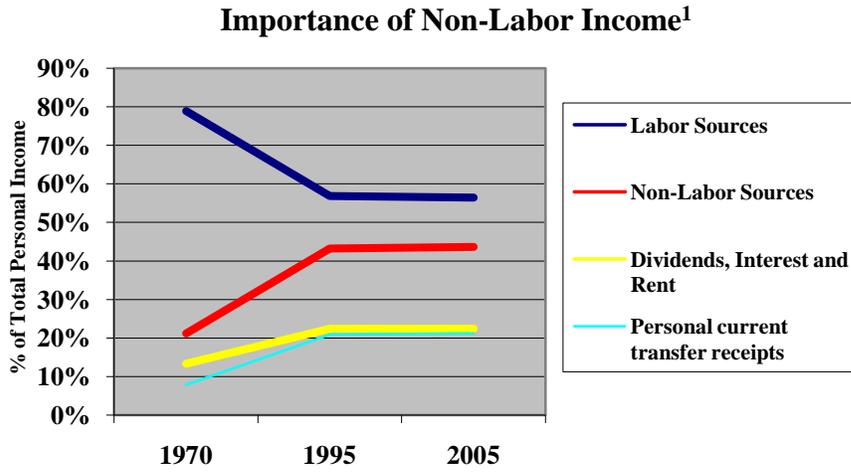
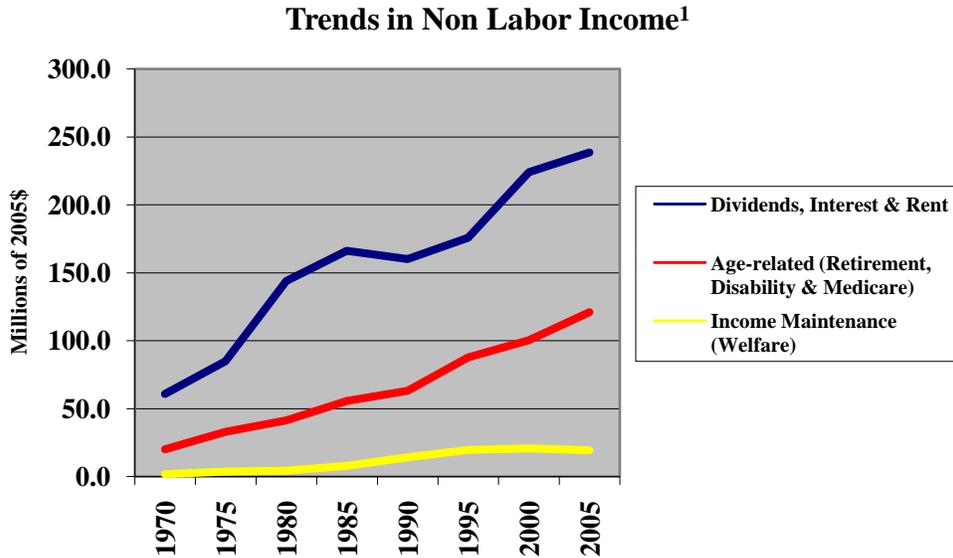


Figure 3-8 shows the trends in non labor income from 1970 to 2005. And during this time, non labor income has showed continued growth. In fact, dividends, interest & rent has grown by slightly over 292% over this timeframe. Retirement, disability & Medicare and welfare have grown by nearly 502% and slightly less than 926%, respectively, over this same period.

Figure 3-8. Trends in Non-Labor Income for Fremont County



¹A Socioeconomic Profile, Fremont County, Headwaters Economics, p: 10

Recreation

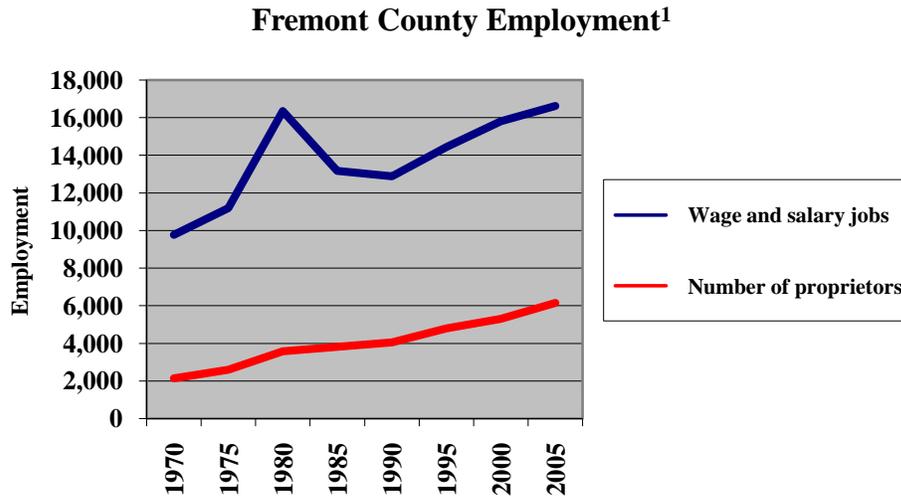
Recreation from the GMCA is also an important contributor to the study region. Based on the benefit cost analysis produced for this document, consumptive and non-consumptive use from the GMCA would annually account for about \$315,000 and \$83,000 respectively in direct expenditures in 2008 measured in 2006 dollars. And based on this analysis, one could conclude that the current annual direct recreation expenditures measured in 2006 dollars would be a little under \$400,000. As a note, this only includes the direct expenditures and does not include the indirect and induced affect that will be analyzed by alternative in Chapter 4 for each of the management alternatives.

Employment

Employment for both wage and salary jobs and the number of proprietors has grown in Fremont County from 1970 to 2005. But the growth has been uneven as shown in Figure 3-9 where wage and salary employment grew by a little over 14.5% from 1970 to 1975 and that growth rate increased to over 46% from 1975-1980 and then declined by almost 20% from 1980 to 1985. Examining the data more closely reveals that the change in wage and salary jobs continued its slide from 1985 to 1987 and over the period of 1985 to 1990 declined a little over 2%. But since 1987, wage and salary jobs have been increasing. And for the period from 1970 to 2005, they have increased by slightly over 70%.

Figure 3-9 also shows the number of proprietors from 1970 to 2005. Contrasted to the growth rate of wage and salary jobs, the number of proprietors continued to grow throughout the period without the major fluctuations displayed by the wage and salary jobs even though there were a few years where there was a decline in the number of proprietors. But each 5 year period beginning in 1970 through 2005 was marked by an increased number of proprietors and overall saw an increase of almost 187%. But it should be noted that in 1970 the number of proprietors constituted about 18% of the total number of jobs and by 2005 that number had increased to almost 27%.

Figure 3-9. Fremont County Employment Numbers (1970-2005)



¹A Socioeconomic Profile, Fremont County, Headwaters Economics, p: 6

Livestock Grazing

The majority of permittees have a long history of grazing domestic livestock in the GMCA and their average use is shown in Table 3-42. It should be noted that many of these operators have structured their operations around grazing on public land. Therefore, changes in the grazing systems that would come about as a result of the management alternatives being analyzed in this EA has the potential to impact their overall operation and also affect their cash flows. But the affect on the operator’s cash flows would depend on whether or not the proposed changes represent a change in use that is different than the historical average use over the last 26 years.

Table 3-42. Percentage of Actual Use by Cattle and Sheep Permittees on the GMCA (1980-2006)

Year	Authorized Active Use	Permitted Use	% of Permitted Use	Authorized Active Cattle Use	Permitted Cattle Use	% of Cattle Permitted Use	Authorized Active Sheep Use	Permitted Sheep Use	% of Sheep Permitted Use
1980	20,814	48,174	43.2%	12,136	36,223	33.5%	8,678	11,951	72.6%
1981	28,224	48,174	58.6%	16,988	36,223	46.9%	11,236	11,951	94.0%
1982	28,953	48,115	60.2%	21,472	36,164	59.4%	7,481	11,951	62.6%
1983	23,563	48,115	49.0%	15,780	36,026	43.8%	7,783	12,089	64.4%
1984	26,990	48,083	56.1%	17,045	35,749	47.7%	9,945	12,334	80.6%
1985	16,225	47,995	33.8%	6,280	35,454	17.7%	9,945	12,541	79.3%
1986	21,263	47,722	44.6%	10,626	35,193	30.2%	10,637	12,529	84.9%
1987	27,789	47,922	58.0%	17,843	35,193	50.7%	9,946	12,729	78.1%
1988	21,453	47,922	44.8%	11,315	35,193	32.2%	10,138	12,729	79.6%
1989	33,353	47,922	69.6%	23,191	35,193	65.9%	10,162	12,729	79.8%
1990	27,016	47,922	56.4%	16,881	35,693	47.3%	10,135	12,229	82.9%
1991	29,069	47,723	60.9%	20,436	35,910	56.9%	8,633	11,813	73.1%
1992	29,222	47,723	61.2%	19,088	35,910	53.2%	10,134	11,813	85.8%
1993	33,885	47,723	71.0%	23,752	35,910	66.1%	10,133	11,813	85.8%
1994	34,903	47,723	73.1%	24,769	35,910	69.0%	10,134	11,813	85.8%
1995	24,144	47,723	50.6%	24,144	35,910	67.2%	0	11,813	0.0%
1996	23,333	47,723	48.9%	23,333	35,910	65.0%	0	11,813	0.0%
1997	24,888	47,723	52.2%	24,078	35,910	67.1%	810	11,813	6.9%
1998	28,844	47,361	60.9%	28,535	35,910	79.5%	309	11,451	2.7%
1999	28,160	47,361	59.5%	22,736	35,910	63.3%	5,424	11,451	47.4%
2000	31,457	47,361	66.4%	25,634	35,910	71.4%	5,823	11,451	50.9%
2001	18,872	47,361	39.8%	14,235	35,910	39.6%	4,637	11,451	40.5%
2002	7,735	47,361	16.3%	6,585	35,910	18.3%	1,150	11,451	10.0%
2003	7,747	47,361	16.4%	6,312	35,910	17.6%	1,435	11,451	12.5%
2004	13,111	47,361	27.7%	11,385	35,910	31.7%	1,726	11,451	15.1%
2005	16,727	47,361	35.3%	12,731	35,910	35.5%	3,996	11,451	34.9%
2006	15,152	47,361	32.0%	11,516	35,910	32.1%	3,636	11,451	31.8%

Table 3-43 is interesting in that it depicts the percentage of permitted use from 1980 through 2006 for both cattle and sheep. During this timeframe there were periods of drought and also periods that more closely represent the long term climatic conditions for the area. Based on discussions with the Lander Field Office, the permittees have suggested the period from 1980-1998 more closely represents the “normal” climatic conditions for the GMCA. And the period from 1999-2006 was marked by a drought. So one would expect authorized use to fall off during the drought, which is reflected in Table 3-42.

Table 3-43. Percentage of Permitted Use on the GMCA (1980-2006)

Item	'80-'98	'99-'06	'80-'06
Cattle			
<i>Average Authorized Use</i>	18,826	13,892	17,364
<i>Average Permitted Use</i>	35,768	35,910	35,810
<i>Average % of Permitted Use</i>	52.6%	38.7%	48.5%
Sheep			
<i>Average Authorized Use</i>	7,697	3,478	6,447
<i>Average Permitted Use</i>	12,100	11,451	11,908
<i>Average % of Permitted Use</i>	63.1%	30.4%	53.4%
Total			
<i>Average Authorized Use</i>	26,523	17,370	23,811
<i>Average Permitted Use</i>	47,868	47,361	47,718
<i>Average % of Permitted Use</i>	55.4%	36.7%	49.9%

The average percentage of permitted use for cattle varies from 52.6% over the period from 1980 to 1998 to 38.7% from 1999-2006. As expected, the lowest average percentage of permitted use was 38.7% and occurred from 1999-2006, which was marked by a drought. The overall average percentage of cattle permitted use for the 26 year period from 1980-2006 is 48.5%.

Sheep average percentage of permitted use was 63.1% from 1980-1998 and dropped to 30.4% of permitted use during the drought period from 1999-2006. Overall, the average percent of sheep permitted use from 1980 through 2006 was 53.4%.

Looking at the total average percentage of permitted use, Table 3-43 indicates the average percentage of permitted use was 55.4% from 1980-1998 and then it fell to 36.7% during the drought from 1999-2006. And the overall average percentage of both cattle and sheep for the 26 year period from 1980 through 2006 was 49.9%. Therefore, overall, the permittees in GMCA averaged about 50 percent of permitted use over the 26 year period from 1980 to 2006.

Tax Revenues

Economic activities on BLM-administered land and mineral estate contribute to the fiscal well-being of local governments, as well as the state and federal governments. The BLM management actions have the potential to affect tax revenues across economic sectors. The following tables are presented to illustrate how Fremont County compares to the rest of the state regarding the assessed valuations and taxes collected statewide.

The data in Table 3-44 illustrates the locally assessed agricultural lands by type of use by county. Table 3-45 shows the total locally assessed valuation by county in conjunction with the components making up that total. The total of all state assessed property is then shown in Table 3-46. The percent of total range lands valuation depicted in Table 3-44 is computed based on both the total locally and state assessed valuation for 2007. The results of that computation is illustrated in Table 3-47, which depicts the relative importance of the assessed valuations of range lands compared to the total locally and state assessed valuation of each county and for the state of Wyoming. But it should be noted that even though the assessed valuation of range lands are relatively low when compared to the local, state and total valuations (Table 3-47), it can be argued that the amount of infrastructure and services required to support these lands are also relatively low.

Table 3-44. Locally Assessed Agricultural Land by Type of Use and County

	Total Irrigated Lands ¹		Total Dry Farm ¹		Total Range Lands ¹		Total Agricultural Lands ¹	
	Acres	Valuation	Acres	Valuation	Acres	Valuation	Acres	Valuation
Albany	74,964	\$1,615,273	0	\$0	1,644,243	\$5,179,463	1,719,207	\$6,794,736
Big Horn	111,421	\$10,537,434	62	\$1,048	201,788	\$1,571,726	313,271	\$12,110,208
Campbell	157	\$12,889	81,187	\$1,240,225	2,091,007	\$6,318,984	2,172,351	\$7,572,098
Carbon	138,363	\$4,312,565	10,059	\$137,535	1,775,926	\$4,045,465	1,924,348	\$8,495,565
Converse	42,736	\$3,336,103	5,826	\$93,271	1,872,111	\$6,653,130	1,920,673	\$10,082,504
Crook	4,044	\$308,927	133,178	\$1,890,702	1,233,129	\$7,424,778	1,370,351	\$9,624,407
Fremont	124,129	\$7,921,789	0	\$0	620,791	\$2,697,591	744,920	\$10,619,380
Goshen	112,160	\$9,638,003	165,322	\$2,361,862	991,950	\$6,235,838	1,269,432	\$18,235,703
Hot Springs	24,265	\$1,808,430	0	\$0	363,821	\$1,244,441	388,086	\$3,052,871
Johnson	83,519	\$7,855,460	2,400	\$32,971	1,778,535	\$7,832,700	1,864,454	\$15,721,131
Laramie	37,032	\$3,009,157	262,648	\$4,174,238	1,075,897	\$5,816,471	1,375,577	\$12,999,866
Lincoln	78,523	\$4,343,625	18,757	\$294,101	416,445	\$1,606,876	513,725	\$6,244,602
Natrona	25,172	\$2,083,916	1,064	\$16,951	1,279,816	\$3,943,448	1,306,052	\$6,044,315
Niobrara	11,369	\$716,607	35,868	\$522,416	1,315,844	\$4,775,450	1,363,081	\$6,014,473
Park	112,134	\$10,222,746	98	\$1,127	561,010	\$2,585,804	673,242	\$12,809,677
Platte	75,394	\$5,471,660	90,476	\$1,349,871	841,425	\$2,953,834	1,007,295	\$9,775,365
Sheridan	64,372	\$5,384,737	26,200	\$392,533	897,239	\$4,631,236	987,811	\$10,408,506
Sublette	133,549	\$2,968,810	0	\$0	412,525	\$3,170,288	546,074	\$6,139,098
Sweetwater	23,121	\$986,062	0	\$0	1,702,407	\$3,365,557	1,725,528	\$4,351,619
Teton	13,436	\$807,193	4,390	\$85,050	17,178	\$435,308	35,004	\$1,327,551
Unita	74,344	\$2,967,476	0	\$0	644,118	\$2,075,584	718,462	\$5,043,060
Washakie	43,842	\$4,497,341	2,827	\$35,706	302,135	\$1,465,264	348,804	\$5,998,311
Weston	2,949	\$82,408	31,685	\$441,388	1,010,961	\$3,418,252	1,045,595	\$3,942,048
Totals	1,410,995	\$90,888,611	872,047	\$13,070,995	23,050,301	\$89,447,488	25,333,343	\$193,407,094

Table 3-45. Total Locally Assessed Valuation by County

	Total Agricultural Land Valuation¹	Total Residential Land, Improvements & Personal Property¹	Total Commercial Land, Improvements & Personal Property¹	Total Industrial Property¹	Total Locally Assessed¹
Albany	\$6,794,736	\$189,060,881	\$60,950,461	\$7,046,558	\$263,852,636
Big Horn	\$12,110,208	\$38,843,427	\$10,004,460	\$10,910,623	\$71,868,718
Campbell	\$7,572,098	\$139,616,343	\$60,299,007	\$354,162,816	\$561,650,264
Carbon	\$8,495,565	\$63,398,551	\$18,389,354	\$65,834,235	\$156,117,705
Converse	\$10,082,504	\$59,845,975	\$13,872,388	\$48,081,944	\$131,882,811
Crook	\$9,624,407	\$27,310,909	\$6,194,040	\$7,287,769	\$50,417,125
Fremont	\$10,619,380	\$175,450,198	\$43,618,978	\$73,743,651	\$303,432,207
Goshen	\$18,235,703	\$50,882,916	\$11,839,550	\$3,349,467	\$84,307,636
Hot Springs	\$3,052,871	\$19,800,130	\$5,429,865	\$6,100,008	\$34,382,874
Johnson	\$15,721,131	\$76,562,127	\$12,039,714	\$41,922,787	\$146,245,759
Laramie	\$12,999,866	\$486,263,416	\$153,951,315	\$43,833,935	\$697,048,532
Lincoln	\$6,244,602	\$140,205,135	\$21,159,686	\$131,911,315	\$299,520,738
Natrona	\$6,044,315	\$385,698,540	\$142,967,781	\$54,316,636	\$589,027,272
Niobrara	\$6,014,473	\$8,088,468	\$2,541,361	\$1,769,463	\$18,413,765
Park	\$12,809,677	\$209,905,147	\$47,660,652	\$16,363,405	\$286,738,881
Platte	\$9,775,365	\$37,393,433	\$9,925,334	\$1,376,490	\$58,470,622
Sheridan	\$10,408,506	\$226,115,139	\$48,014,870	\$29,380,769	\$313,919,284
Sublette	\$6,139,098	\$113,466,778	\$24,603,585	\$144,817,853	\$289,027,314
Sweetwater	\$4,351,619	\$169,796,990	\$51,271,170	\$246,714,241	\$472,134,020
Teton	\$1,327,551	\$856,614,831	\$141,726,432	\$199,130	\$999,867,944
Unita	\$5,043,060	\$82,512,345	\$19,310,135	\$58,272,097	\$165,137,637
Washakie	\$5,998,311	\$34,893,089	\$12,034,180	\$10,162,738	\$63,088,318
Weston	\$3,942,048	\$25,443,870	\$4,222,070	\$6,952,912	\$40,560,900
Totals	\$193,407,094	\$3,617,168,638	\$922,026,388	\$1,364,510,842	\$6,097,112,962

¹State of Wyoming Department of Revenue 2007 Annual Report, pages 60 and 66

Table 3-46. Total of All State Assessed Property by County

	Non-Minerals²	Minerals²	Total of All State Assessed²	% of Total²
Albany	\$32,325,051	\$4,800,959	\$37,126,010	0.24%
Big Horn	\$14,933,003	\$137,256,514	\$152,189,517	0.99%
Campbell	\$87,969,218	\$3,903,447,011	\$3,991,416,229	25.93%
Carbon	\$59,467,588	\$676,413,047	\$735,880,635	4.78%
Converse	\$65,728,740	\$308,161,966	\$373,890,706	2.43%
Crook	\$6,489,648	\$86,306,486	\$92,796,134	0.60%
Fremont	\$20,190,394	\$866,915,401	\$887,105,795	5.76%
Goshen	\$25,144,802	\$42,521	\$25,187,323	0.16%
Hot Springs	\$7,464,336	\$135,790,266	\$143,254,602	0.93%
Johnson	\$4,257,635	\$545,557,471	\$549,815,106	3.57%
Laramie	\$54,854,686	\$22,590,320	\$77,445,006	0.50%
Lincoln	\$47,045,475	\$584,992,496	\$632,037,971	4.11%
Natrona	\$37,794,608	\$406,617,408	\$444,412,016	2.89%
Niobrara	\$15,507,887	\$32,219,507	\$47,727,394	0.31%
Park	\$13,738,584	\$420,968,136	\$434,706,720	2.82%
Platte	\$69,597,514	\$1,526,011	\$71,123,525	0.46%
Sheridan	\$14,193,771	\$291,275,286	\$305,469,057	1.98%
Sublette	\$3,772,761	\$3,792,898,647	\$3,796,671,408	24.66%
Sweetwater	\$135,630,638	\$1,789,510,897	\$1,925,141,535	12.51%
Teton	\$9,972,304	\$2,371,760	\$12,344,064	0.08%
Unita	\$59,556,786	\$463,430,005	\$522,986,791	3.40%
Washakie	\$8,004,307	\$47,934,030	\$55,938,337	0.36%
Weston	\$14,134,282	\$65,354,313	\$79,488,595	0.52%
Totals	\$807,774,018	\$14,586,380,458	\$15,394,154,476	100.00%

²State of Wyoming Department of Revenue 2007 Annual Report, p. 68

Table 3-47. Assessed Valuation of Rangeland Compared to Local and State Valuations

	% of Total Range Lands Valuation of Locally Assessed Valuation-'07	% of Total Range Lands Valuation of State Assessed Valuation-'07	% of Total Range Lands Valuation of Total Assessed Valuation-'07
Albany	1.96%	13.95%	1.72%
Big Horn	2.19%	1.03%	0.70%
Campbell	1.13%	0.16%	0.14%
Carbon	2.59%	0.55%	0.45%
Converse	5.04%	1.78%	1.32%
Crook	14.73%	8.00%	5.18%
Fremont	0.89%	0.30%	0.23%
Goshen	7.40%	24.76%	5.70%
Hot Springs	3.62%	0.87%	0.70%
Johnson	5.36%	1.42%	1.13%
Laramie	0.83%	7.51%	0.75%
Lincoln	0.54%	0.25%	0.17%
Natrona	0.67%	0.89%	0.38%
Niobrara	25.93%	10.01%	7.22%
Park	0.90%	0.59%	0.36%
Platte	5.05%	4.15%	2.28%
Sheridan	1.48%	1.52%	0.75%
Sublette	1.10%	0.08%	0.08%
Sweetwater	0.71%	0.17%	0.14%
Teton	0.04%	3.53%	0.04%
Unita	1.26%	0.40%	0.30%
Washakie	2.32%	2.62%	1.23%
Weston	8.43%	4.30%	2.85%
State Average	1.47%	0.58%	0.42%

Table 3-48 provides a comparison of the state and locally assessed valuations for both 2006 and 2007. Fremont County's assessed valuation was one of five counties that actually fell in 2007. The other counties that also fell were Carbon, Lincoln, Sublette and Unita. And the two counties valuations that declined the most during this timeframe were Sublette at about \$315 million and Fremont at slightly over \$185 million.

Table 3-48. Comparison of State and Locally Assessed Valuations (2006 & 2007)

	State Assessed ³			Locally Assessed ³			Total Assessed ³		
	Total 2007	Total 2006	'07 vs. '06	Total 2007	Total 2006	'07 vs. '06	Total 2007	Total 2006	'07 vs. '06
Albany	37,126,010	28,234,029	8,891,981	263,852,636	242,513,230	21,339,406	300,978,646	270,747,259	30,231,387
Big Horn	152,189,517	142,117,917	10,071,600	71,868,718	64,497,038	7,371,680	224,058,235	206,614,955	17,443,280
Campbell	3,991,416,229	3,777,059,839	214,356,390	561,650,264	486,502,114	75,148,150	4,553,066,493	4,263,561,953	289,504,540
Carbon	735,880,635	776,729,398	-40,848,763	156,117,705	121,954,030	34,163,675	891,998,340	898,683,428	-6,685,088
Converse	373,890,706	340,434,000	33,456,706	131,882,811	116,952,031	14,930,780	505,773,517	457,386,031	48,387,486
Crook	92,796,134	82,443,103	10,353,031	50,417,125	54,734,807	-4,317,682	143,213,259	137,177,910	6,035,349
Fremont	887,105,795	1,110,548,788	-223,442,993	303,432,207	265,090,829	38,341,378	1,190,538,002	1,375,639,617	-185,101,615
Goshen	25,187,323	23,478,114	1,709,209	84,307,636	78,832,624	5,475,012	109,494,959	102,310,738	7,184,221
Hot Springs	143,254,602	122,050,066	21,204,536	34,382,874	30,305,160	4,077,714	177,637,476	152,355,226	25,282,250
Johnson	549,815,106	338,932,676	210,882,430	146,245,759	108,049,300	38,196,459	696,060,865	446,981,976	249,078,889
Laramie	77,445,006	71,640,839	5,804,167	697,048,532	652,493,806	44,554,726	774,493,538	724,134,645	50,358,893
Lincoln	632,037,971	697,282,980	-65,245,009	299,520,738	246,341,051	53,179,687	931,558,709	943,624,031	-12,065,322
Natrona	444,412,016	472,632,245	-28,220,229	589,027,272	471,473,689	117,553,583	1,033,439,288	944,105,934	89,333,354
Niobrara	47,727,394	39,361,036	8,366,358	18,413,765	17,568,568	845,197	66,141,159	56,929,604	9,211,555
Park	434,706,720	378,479,484	56,227,236	286,738,881	246,341,136	40,397,745	721,445,601	624,820,620	96,624,981
Platte	71,123,525	69,378,767	1,744,758	58,470,622	52,296,834	6,173,788	129,594,147	121,675,601	7,918,546
Sheridan	305,469,057	296,512,918	8,956,139	313,919,284	268,149,896	45,769,388	619,388,341	564,662,814	54,725,527
Sublette	3,796,671,408	4,170,695,916	-374,024,508	289,027,314	230,922,401	58,104,913	4,085,698,722	4,401,618,317	-315,919,595
Sweetwater	1,925,141,535	1,990,544,347	-65,402,812	472,134,020	390,096,548	82,037,472	2,397,275,555	2,380,640,895	16,634,660
Teton	12,344,064	12,698,467	-354,403	999,867,944	913,057,219	86,810,725	1,012,212,008	925,755,686	86,456,322
Unita	522,986,791	608,805,867	-85,819,076	165,137,637	140,627,994	24,509,643	688,124,428	749,433,861	-61,309,433
Washakie	55,938,337	59,943,254	-4,004,917	63,088,318	57,354,391	5,733,927	119,026,655	117,297,645	1,729,010
Weston	79,488,595	77,497,875	1,990,720	40,560,900	35,003,149	5,557,751	120,049,495	112,501,024	7,548,471
Totals	15,394,154,476	15,687,501,925	-293,347,449	6,097,112,962	5,291,157,845	805,955,117	21,491,267,438	20,978,659,770	512,607,668

³State of Wyoming Department of Revenue 2007 Annual Report, p. 69

The total ad valorem tax assessed that was applied to the 2006 mineral production is depicted in Table 3-49. It also shows the relative importance of these taxes by county and state. The two counties having the largest total ad valorem production taxes assessed are Campbell at 25.57% and Sublette with 24.62%. By comparison, Fremont County's share of the state total is 6.72%.

Table 3-49. County and Statewide Average 2007 Mill Levies Applied to 2006 Mineral Production⁴

County	Average Mineral 2007 Mill Levies	Total Ad Valorem Production Tax Assessed	% of State Total
Albany	65.000	\$312,062	0.03%
Big Horn	73.592	\$10,101,044	1.11%
Campbell	59.815	\$233,486,459	25.57%
Carbon	61.807	\$41,807,319	4.58%
Converse	60.260	\$18,569,742	2.03%
Crook	61.522	\$5,309,708	0.58%
Fremont	70.810	\$61,386,027	6.72%
Goshen	68.013	\$2,892	0.00%
Hot Springs	70.008	\$9,506,405	1.04%
Johnson	68.829	\$37,550,176	4.11%
Laramie	71.829	\$1,622,651	0.18%
Lincoln	61.876	\$36,197,272	3.96%
Natrona	66.028	\$26,848,122	2.94%
Niobrara	68.500	\$2,207,037	0.24%
Park	70.742	\$29,780,328	3.26%
Platte	67.539	\$103,065	0.01%
Sheridan	66.299	\$19,311,197	2.12%
Sublette	59.270	\$224,804,720	24.62%
Sweetwater	65.449	\$117,121,462	12.83%
Teton	59.292	\$140,626	0.02%
Unita	62.706	\$29,059,972	3.18%
Washakie	69.279	\$3,320,808	0.36%
Weston	68.283	\$4,462,589	0.49%
Totals	62.593	\$913,011,683	100.00%

⁴State of Wyoming Department of Revenue 2007 Annual Report

Summary

To put the above sections in perspective, it is helpful to compare some of the key variables in Fremont County with the State of Wyoming. In order to do that, population, earnings and employment will be compared. Those comparisons are shown in Table 3-50.

Table 3-50. Comparison of Population, Earnings and Employment in Fremont County

	% Change in Population -'70-'05	% Change in Wage & Salary Employment -'70-'05	% of Proprietors-1970	% of Proprietors-2005	Personal Income Annual Growth Rate-'70-'05	Non-Labor Income Annual Growth Rate-'70-'05	Labor Income Annual Growth Rate-'70-'05	Non-Labor Sources % of Total Personal Income-'05
Fremont	29%	63%	18%	27%	2%	5%	2%	44%
Wyoming	52%	74%	19%	23%	3%	4%	3%	36%

One of the trends that emerge in Table 3-50 is the population growth for Wyoming is significantly higher than it is in Fremont County. Regarding the change in wage and salary employment, the Wyoming growth from 1970-2005 is again larger than Fremont County. However the percent of proprietors in both 1970 and 2005 compared to the total employment is about the same for both Wyoming and Fremont County. Also, the personal income, non-labor income and labor income growth rate is about the same for both Wyoming and Fremont County. But interestingly enough, the unemployment rates downloaded from the Bureau of Labor Statistics (BLS) web site (<http://www.bls.gov/>) indicates that the unemployment rate has been consistently higher in Fremont County as compared to Wyoming from 1990 to 2006 (Table 3-51). That statistic indicates even though the growth rate in income from 1970 to 2005 is about the same for Wyoming and Fremont County, there are relatively more people unemployed in Fremont than Wyoming.

Table 3-51. Unemployment Rate in Fremont County (1990-2006)

Year	Fremont Labor Force	Fremont Employment	Fremont Unemployment	Fremont Unemployment Rate	Wyoming Labor Force	Wyoming Employment	Wyoming Unemployment	Wyoming Unemployment Rate
1990	15,734	14,553	1,181	7.51%	236,043	223,531	12,512	5.30%
1991	15,603	14,539	1,064	6.82%	235,124	223,192	11,932	5.07%
1992	16,049	14,817	1,232	7.68%	238,076	224,562	13,514	5.68%
1993	16,299	15,105	1,194	7.33%	242,599	229,177	13,422	5.53%
1994	16,999	15,738	1,261	7.42%	249,475	236,885	12,590	5.05%
1995	17,406	16,106	1,300	7.47%	253,196	240,846	12,350	4.88%
1996	17,715	16,304	1,411	7.97%	254,717	241,560	13,157	5.17%
1997	17,579	16,188	1,391	7.91%	256,263	243,944	12,319	4.81%
1998	17,767	16,328	1,439	8.10%	260,570	247,748	12,822	4.92%
1999	18,176	16,787	1,389	7.64%	264,676	251,828	12,848	4.85%
2000	17,665	16,749	916	5.19%	266,882	256,685	10,197	3.82%
2001	18,149	17,214	935	5.15%	269,985	259,508	10,477	3.88%
2002	18,160	17,184	976	5.37%	269,654	258,462	11,192	4.15%
2003	17,797	16,765	1,032	5.80%	272,114	259,987	12,127	4.46%
2004	17,682	16,765	917	5.19%	274,458	263,705	10,753	3.92%
2005	17,801	16,941	860	4.83%	277,899	267,669	10,230	3.68%
2006	17,738	16,968	770	4.34%	284,690	275,617	9,073	3.19%

Looking at the distribution of earnings by sector indicates that, for example, farm earning in Fremont County has dropped from seventh (5.58% of total earnings) in 1970 to tenth (1.44% of total earnings) in 2000 out of the eleven sectors examined in the analysis. By 2005, Farm Earnings ranked fifteenth (1.66% of total earnings) out of the eighteen sectors identified.

The top three sectors measured in terms of percentage of total earnings from 1970 to 2005 was Mining (22.71%), government and government enterprises (20.11%) and Construction (13.31%) in 1970. This had changed somewhat by 2000 where Government and government enterprises (29.18%) was number one, followed by Services (21.99%) and Retail Trade (11.25%). By 2005, the top three were Government and government enterprises (32.67%), Other (utilities, wholesale trade, educational services, health care and social assistance) (14.72%) and retail trade (8.32%). What is interesting is government and government enterprises was in the top three for 1970, 2000 and 2005 and retail trade moved into a top three position in both 2000 and 2005. Finally, for more information on the study area, please refer to the Fremont County and Riverton, Lander and Jeffrey City profiles available at the Lander Field Office.

Chapter 4

Environmental Consequences

ENVIRONMENTAL CONSEQUENCES

This chapter describes environmental consequences that may result from implementing each of the four 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. Identical organization for Chapters Three and Four allows the reader to compare existing resource conditions to potential impacts for the same resources.

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, and are later in time or farther removed in distance, but 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, mid-term and at the long-term. The short-term is defined as 2008-2012, the time period in which the allotment management plan (AMP) begins to be implemented. The mid-term is defined as 2013-2017, the time period in which the AMP 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 long-term is 2018-2027, the time period in which objectives of the selected alternative and AMP could be reached.
2. For analysis purposes, the procedure used for quantifying economic impacts for all alternatives is based on a regional input/output model that provides a mathematical accounting of the flow of money, goods, and services through a region's economy. This model, known as IMPLAN, was calibrated to represent the local conditions found in Fremont County.
3. Sporadic grazing use on uplands is generally not considered as having an 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 2.
4. All four alternatives would allow for extensive permit (60 percent cattle and 70 percent sheep) nonuse, which has been authorized in the allotment over the past nine (1999-2007) years, to continue in the short-term to allow for drought recovery. 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 the GMCA mission statement and goals and objectives in Chapter One.

5. 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.”

EFFECTS COMMON TO ALL ALTERNATIVES

WILDERNESS STUDY AREAS AND WILD AND SCENIC RIVER

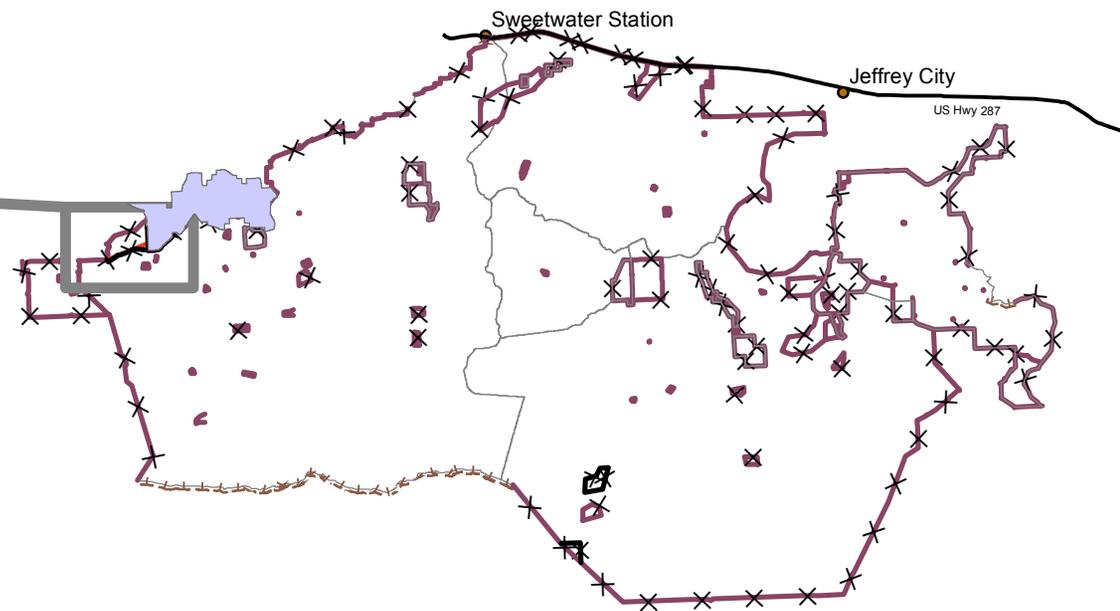
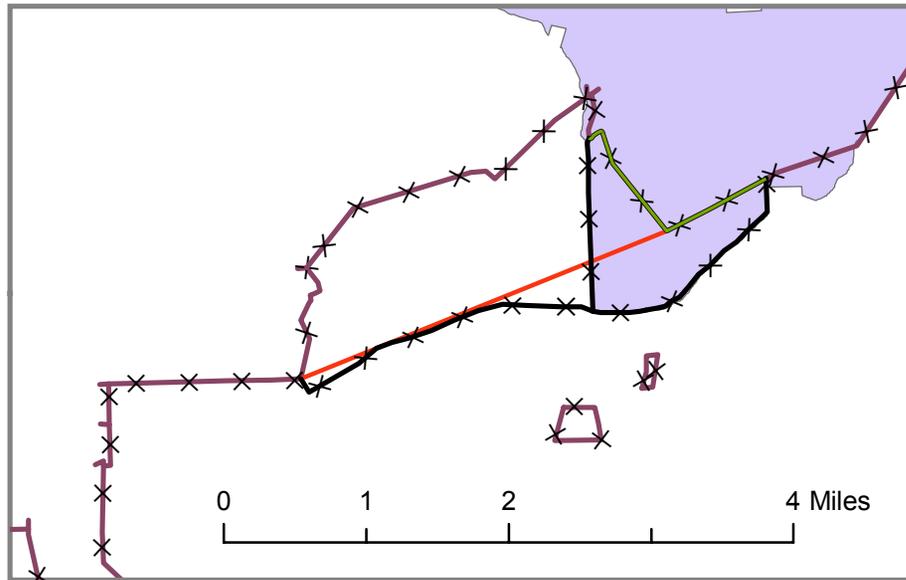
All alternatives propose a riparian pasture in the Wilson Bar area of the Sweetwater River. This section of the river is outside of the Sweetwater Canyon Wilderness Study Area (WSA). The fence was proposed in the 1999 decision with an alignment that had potential to: a) negatively impact the scenic quality of the WSA, b) cause fragmentation of the WSA by fences, c) constitute a grazing system dependent improvement that would be hard to remove if the area became a wilderness area, and d) constitute a range improvement that does not result in an improved condition in the WSA. For all the above reasons the alignment of the proposed Wilson Bar fence has been changed.

In order to connect the Wilson Bar Fence to the WSA riparian pasture it was necessary to realign the existing WSA pasture fence to the WSA boundary. This allows other fences to connect to the WSA fence in a manner that does not segment portions of the WSA. The proposed realignment is reflected in Map 4-1. Approximately 490 acres of the WSA contained within the GMCA would be included into the WSA riparian pasture after the fence is realigned along the boundary of the WSA (see Map 4-2). This realignment would occur in the Granite Creek area of the allotment and parallel an existing road in the area.

The stressors as a result of the above actions common to all alternatives are 1) relocating approximately 2.5 miles of the WSA fencing, and 2) facilitating positive rest and eventual controlled grazing on upstream (non-WSA) segments of the Sweetwater River.

Table 4-1 displays the expected impacts from the redesigned Wilson Bar Riparian Pasture. The changes made to the Wilson Bar Riparian Pasture and proposed realignment of the WSA riparian pasture would benefit the majority of the analyzed elements of the WSA resource. Most impacts associated with the simple presence of a fence would not represent a change from the existing environment, due to the fact that there is no net increase in the number or miles of fence. In addition, the area of the WSA fenced from the GMCA allotment would increase, which would facilitate rest and/or a more controlled grazing management strategy. Water quality of the Sweetwater River would improve as a result of better grazing management in the upstream Wilson Bar area, as well as the currently unfenced portions of Granite Creek within the WSA boundary.

Map 4-1: Range Project Proposals with WSA Mitigation All Alternatives

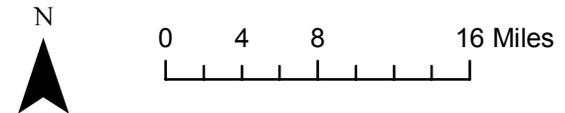
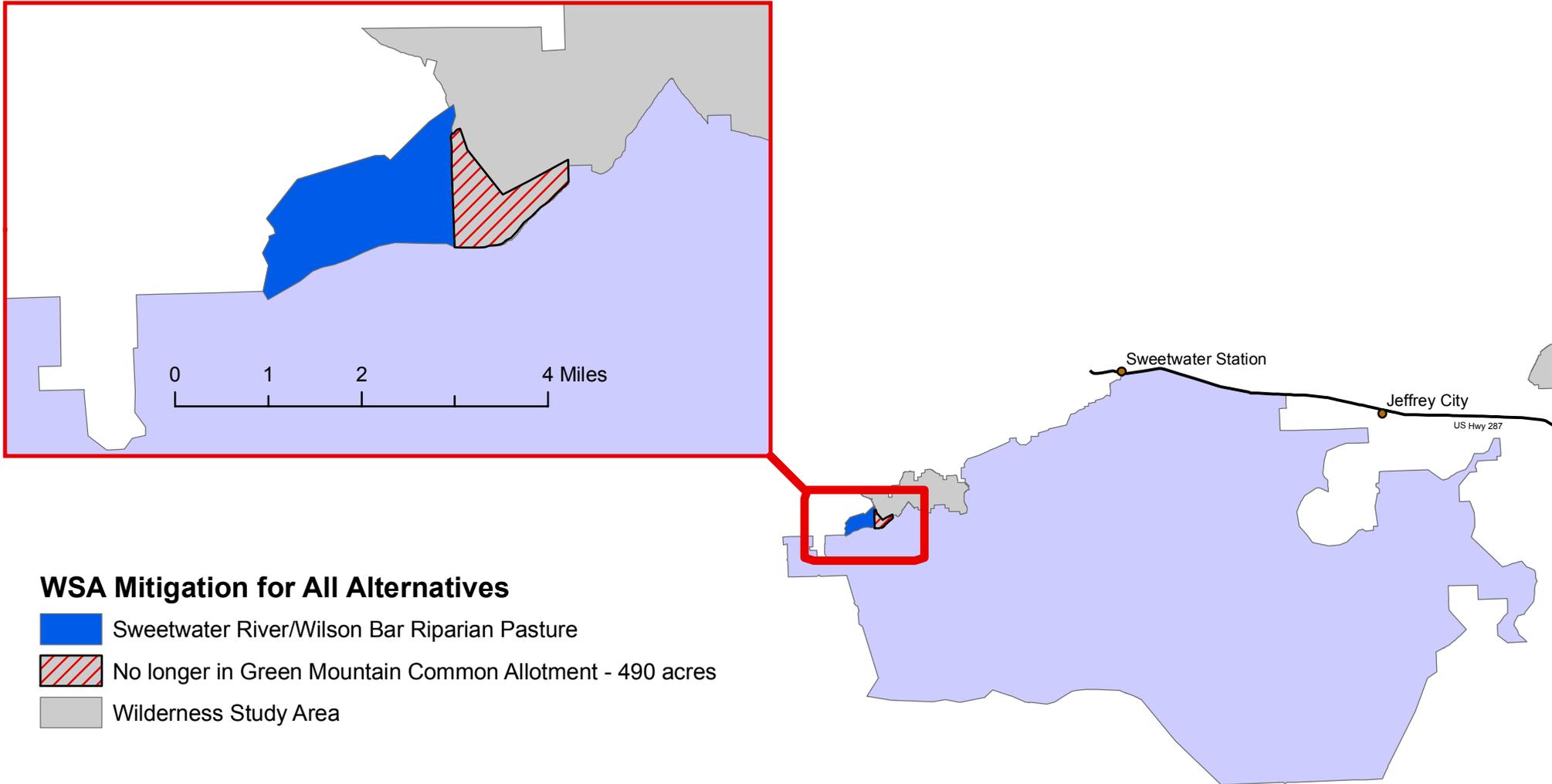


-  Wilderness Study Area
-  Proposed New Fences
-  Original Proposal - WSA Encroachment
-  Remove Existing Fence
-  Existing Fences
-  Cyclone Rim (un-fenced)



NO WARRANTY IS MADE BY THE BLM FOR USE OF THE DATA FOR PURPOSES NOT INTENDED BY BLM

Map 4.2: Wilderness Study Area Mitigation All Alternatives



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Table 4-1. Predicted Impacts to Wilderness Values As A Result Of the Proposed Wilson Bar Riparian Pasture and WSA Pasture Fence Relocation

Wilderness Value Indicator	Impact Description	Will the Impact Exceed Maximum Allowable Standard
Visual Resource	Low-moderate contrast	Further Analysis Below
Naturalness and Solitude		
Human Activity	No net increase	No
Wildlife presence	No loss or reduction in the presence or distribution of wildlife. Decreased evidence of livestock.	No
Facilities	No net increase in facilities	No
Pristine areas	No pristine areas impacted	No
Planning	Action meets all existing planning decisions	No
Primitive Recreation		
Recreation opportunities	No change in recreation setting results in no change to the availability of recreation opportunities	No
Natural appearing environment	Slight changes to the natural appearing environment would occur in the relocation area.	No
Special feature	Not present in the area proposed for the fence realignment. No anticipated impacts to the special features from the fence realignment	No
Surface Water	Overall surface water quality in the WSA would be enhanced by better grazing management on upstream portions of the river.	No
Vegetation		
Ecological Site Inventory	No change to the vegetation of the WSA is anticipated from the fence	No
Vegetation Utilization	Vegetation utilization would be reduced as a result of the fence relocation	No
Threatened or endangered plants	Plants do not exist within WSA	No
Plant Vigor	Plant vigor would increase in area of the WSA currently not fenced from the GMCA.	No
Wildlife		
Threatened or endangered animals	No threatened or endangered animals occupy the WSA	No
Wildlife habitat	No net change to wildlife habitat within the WSA would result.	No
Population	No wildlife populations would be reduced	No
Diversity	Population diversity would not be impacted. This is a result of a lack of impact to wildlife habitats and existing populations.	

VISUAL RESOURCES

The realignment of the fence to the WSA boundary would result in the fence paralleling a main access route running along the southern extent of the WSA. The proposed fence relocation is not a new visual impact; however the distance from the key observation point (in this case the access road) would decrease. Decreasing observation distance increases the level of project contrast with the existing landscape. The fence relocation would impact the observer’s view shed for approximately 2.5-2.75 miles. Since the fence would be paralleling an existing road (an existing linear visual impact) the level of change to the characteristic landscape would not be as conspicuous had the

area been un-impacted by human modifications. Based on the contrast rating system the level of visual impact from the fence would increase in this area to a moderate level. This intensity of impact is above the IMPs maximum allowable standard. Altering the fence realignment location to the south of the access road would reduce the level of impact to the WSA visual resource (as viewed from the access road). This small change would have a profound reduction in visual impacts for the simple reason that the viewer's attention is focused toward the WSA features and away from the fence line.

ALTERNATIVE ONE

EFFECTS ON SOIL AND WATER RESOURCES (Alternative One)

Introduction

Soil and water quality are closely tied to the adequacy of vegetative cover and type. Commonly used erosion and sediment yield equations all depend upon accurate assessments of soil cover for making good estimates. Vegetative cover is the one factor that a land manager can control most directly. Slopes, climates, soil physical features, and soil textures are little affected by management changes.

Soil Resources

This alternative would continue with the currently prescribed five use areas for the GMCA. Within the five use areas, herding and deferred-rotation grazing systems are expected to increase the use of vegetation on uplands, thereby alleviating most of the heavy hot-season use that presently occurs in the riparian areas. Monitoring of grazing would be frequent and sensitive enough to detect significant changes. Implementation of this alternative would not adversely impact soil potential in the uplands. With use levels of riparian vegetation expected to be moderate to heavy only within a rotation period, a fair chance of improvement from present conditions is expected, depending upon effective herding and proper stocking rates (Platts, 1990). For the immediate future, conditions of low seral stage riparian areas that have lost their soil fertility would remain the same, and current trends would continue. Those riparian areas that still retain their inherent soil fertility would show improvement, but it would take several decades under this strategy to note visual improvement.

Impacts in the uplands from bunched, herded livestock on the brittle brush component (i.e., sagebrush, rabbitbrush, bitterbrush, etc.) would be manifest as broken, trampled bushes, which would decrease the height of the plant community and leave an increased amount of plant litter (i.e., stem pieces and leaves) on the soil surface. This should favor a shift in the plant community to herbaceous species (and conceivably weedy species too) in localized heavily impacted areas. With a decrease in the height of the plant community, one can expect less snow catch on these areas and greater exposure to wind erosion. The increased litter can increase resistance to water erosion in the short term, but as wind and surface runoff moves this surface litter around, bare soil would be exposed to water erosion. On sandy soils, such as those in the Happy Springs Use Area and the sand dunes south of Green Mountain, loss of these shrubs would lead to the initiation of accelerated wind erosion.

This alternative in 1999 originally proposed 48 miles of riparian enclosure fence, 68 new water sources, and the placement of salt at least one-half mile from water to aid in the distribution of livestock, along with intensive herding. With the 68 new water sources originally proposed under this alternative, at least one new upland salt location would be a necessary aid in drawing livestock to the uplands. One new sacrifice area would be created at each salt block location. The sacrifice areas associated with the existing salt block locations are generally not as large as those associated with water sources, but some amount of bare, compacted soil is expected to develop around each one.

A combination of seven riparian pastures, (five completed and two not yet built) would be constructed and maintained on important riparian zones. These riparian pastures would be used by livestock either in the spring or fall period. The effects would be variable, but if properly managed, improvement in vegetative expression would be expected to occur over a period of several normal precipitation years. The functional integrity of the riparian systems would however, take longer to restore. This is because achieving functional integrity involves not just

establishing proper amounts of vegetative cover, but also attaining the proper mix of native species to form a stable, resilient plant community with root masses that can withstand normal flood events and protect bank soils. Proper vegetation establishment is crucial to create the stream channel geometry (i.e., channel shape) necessary to carry normal flows and withstand flood events without contributing abnormal sediment loads that could lead to impaired water quality.

The Affected Environment section of this document describes the local climate: growing seasons are very short, winters are long, and average annual temperatures are rather cold and precipitation in the growing season is undependable. These are not the conditions for rapid establishment of the proper kinds and amounts of cover for riparian zones. The nature of the climate in the area, combined with the amounts and kinds of vegetative community, will also determine how long it will take to establish proper stream channel geometry to accommodate normal flows and floods. Experience with similar riparian pastures in the allotment has shown that a decade or more may be required to restore a degraded riparian zone. Formerly wet soils that have undergone salinization (i.e., experienced lowered water tables through gully erosion and where topsoil has been lost through wind and water erosion and salts have been deposited at the surface through capillary action) are not expected to be restored under any management scenario.

Several drought and management-dependent soil erosion scenarios that would likely occur over time are stated below:

1) Average or heavy precipitation year with below-average vegetative growth: This scenario would yield the highest soil losses (i.e., erosion). The unfavorable vegetative growth could be due to a number of factors, such as the lingering effects of prior drought years, grazing use in the wrong season, too much grazing use/vegetation trampling, or precipitation that comes too late.

During these high periods of erosion, soil loss tolerances would be exceeded. When this happens, the rate of soil formation is exceeded by the rate of soil loss. With relatively thin surface horizons (layers), seemingly small erosional losses would result in the decrease of a site's potential to produce its characteristic vegetation. A site's susceptibility to invasion by noxious weeds would thus increase.

2) Average precipitation year with average or better vegetative growth (i.e., normal years): Soil erosion rates would not exceed soil formation rates, and the ability of the soil to produce its characteristic vegetation would be maintained.

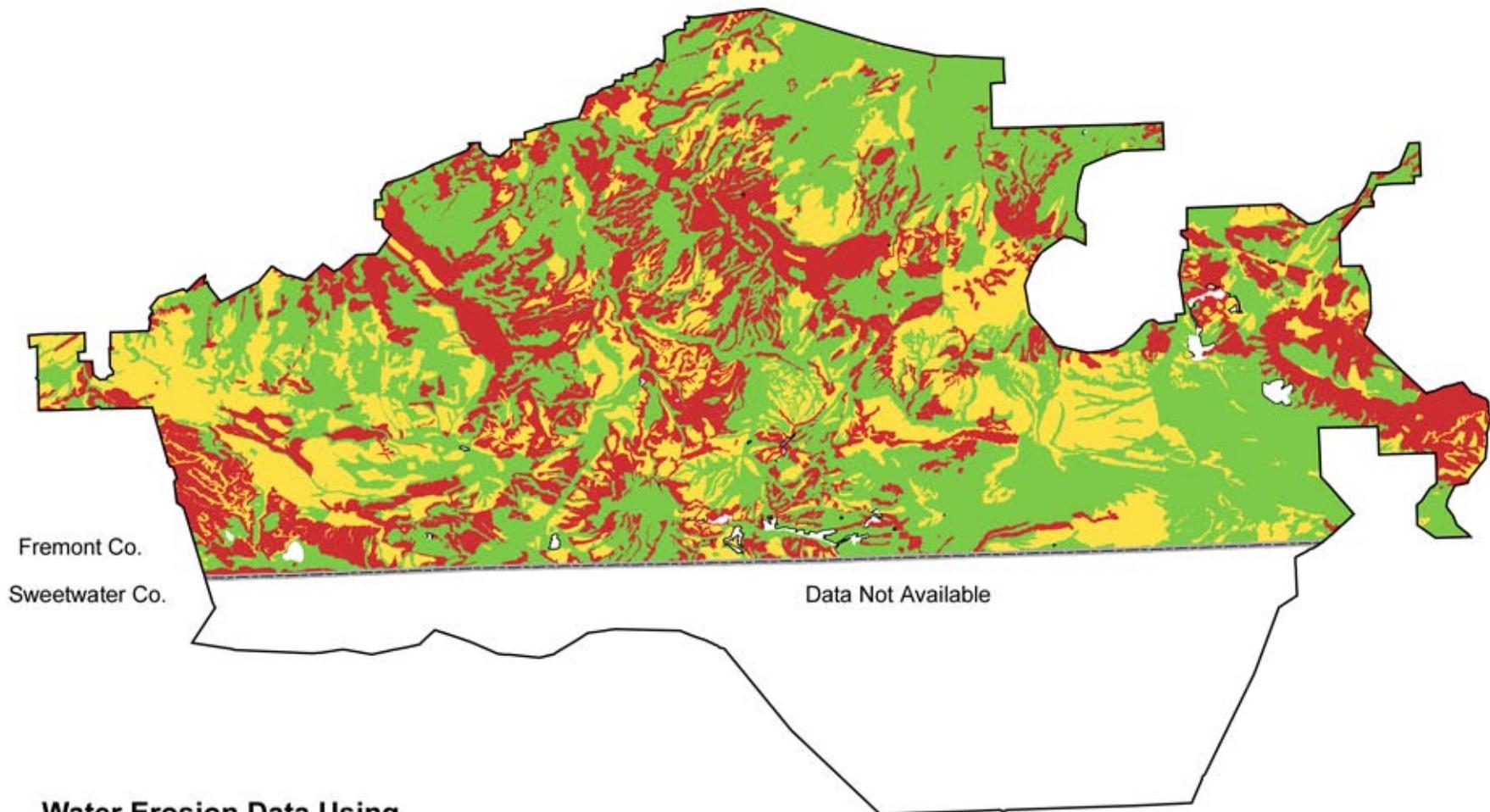
3) Unfavorable precipitation year with below-average vegetative growth: In such circumstances, erosion rates would not extensively exceed soil formation rates; however, with unfavorable vegetative growth, the erosive effects of average storms would be enhanced.

4) Unfavorable precipitation year with at least average vegetative growth: These years do not often occur, but they would yield the lowest soil erosion rates. Low overall precipitation years with adequate precipitation during the growing season would fit this scenario. The wetter soils of riparian areas would also fit this situation.

Over time, all of the scenarios above could happen regardless of which alternative is chosen. However, the grazing management changes under Alternatives One, Three, and Four would best ameliorate the effects of droughts on soils and their dependent vegetation, as well as the erosive effects of abnormally rainy years.

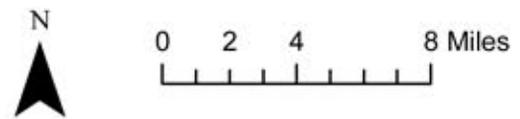
Map 4-3, Water Erosion Potential, and Map 4-4, Wind Erosion Potential, both illustrate that if a management scenario decreases soil cover too much in the uplands, accelerated wind erosion can result. Areas of currently stabilized sand dunes to the south of Green Mountain and medium-textured soils high in very fine sand, fine sand, and silt-size particles, like those in the Crooks Gap area, can become active and suffer erosional losses, consequently decreasing the potential of these sites. In the less-sandy areas, water erosion in the form of new and more frequent rills and gullies would result. Any increase in erosion rates should be negligible and not affect soil fertility.

Map 4-3: Water Erosion Data



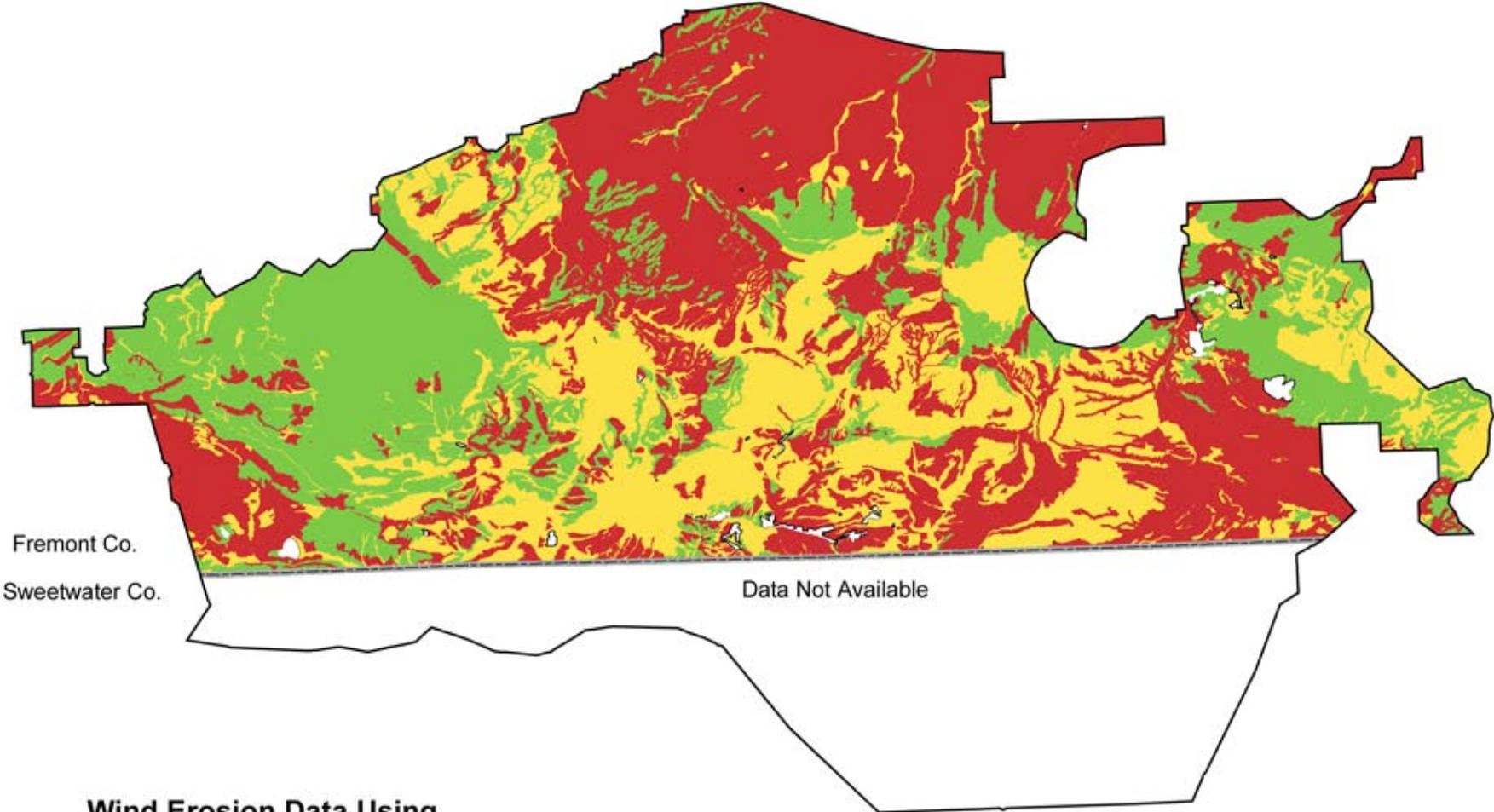
Water Erosion Data Using SSURGO for Fremont County

-  Severe
-  Moderate
-  Slight
-  Not Available



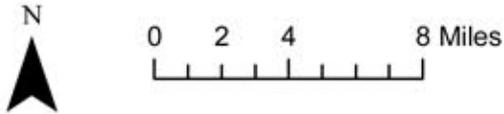
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Map 4-4: Wind Erosion Data



Wind Erosion Data Using SSURGO for Fremont County

- Severe
- Moderate
- Slight
- Not Available



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The use level identified under Alternative One should successfully maintain soil productivity and prevent unacceptable erosion rates, even with below-average precipitation. Alternative One would achieve the desired results within a 10-20 year timeframe. However, the success of this alternative depends not only on the development of new water sources in the uplands, but also on livestock herding in both the riparian and upland areas.

Short-term (one to five years) erosional impacts in the uplands would only be noticeable in areas impacted by new livestock water sources (sacrifice areas). With careful project planning, the acreage of heavy use and soil compaction would be minimized.

In the short-term, changes to the present condition of lowlands (i.e., riparian areas) would only be apparent, in spring development exclosures and riparian pastures that would be constructed. In the exclosures and pastures, increases in vegetative/litter 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 improve, as would water quality.

In the long-term (after 10 years), even though increased upland use is part of the management strategy in this alternative, the pasture rotation strategy would allow for enough rest in the uplands to maintain adequate soil cover to buffer the erosive effects of wind and precipitation. The rotation should also allow enough time to alleviate the annual soil compaction that can occur due to animal traffic under moist conditions.

Water Resources

The expected impacts to water resources from Alternative One would also apply to Alternatives Three and Four, with some minor variations primarily related to specific water development projects, fences, spring exclosures, riparian pastures, and livestock management strategies. Soil erosion rates, especially those of the lowlands, would be the largest contributing factors to water quality.

The uplands are generally lightly used, and with the proposed livestock management under Alternative One, they are not expected to deteriorate. Therefore, erosion rates and sediment yield from the uplands should not significantly change in both the short and long term.

Long term changes expected in the riparian areas are: increased plant species diversity, ground cover, bank stability, and vegetation height; as well as, alleviated soil compaction in riparian areas and the transition zones between them and adjacent uplands. Except in spring exclosures and riparian pastures, the current conditions of the lowlands are not expected to change in the short term.

Seven riparian pastures (five completed and two not yet built) would be built around some of the important riparian zones. These riparian pastures would initially be given three to ten years of rest. Livestock use would then be restricted to spring and fall periods. With the elimination of livestock and wild horse damage to stream banks and adjacent areas and with the restoration of the functional integrity of the riparian systems, improvements in water quality would occur.

As desirable amounts and kinds of vegetation are restored to the riparian areas through controlled livestock management, acceptable erosion levels would result in tolerable sediment yields. Improved water quality and soil moisture, along with creek and spring water yields reaching into the summer and fall seasons, are expected to occur in the long term; except in areas of stabilized sand dunes and locations where weedy species may establish.

Droughts have occurred in the past and will continue to occur in the future. Alternative One would optimize multiple uses while protecting and enhancing water quality.

Impacts to water resources outside of exclosures and riparian pastures would be directly attributable to the effectiveness of the herding; water quality should be enhanced.

There are currently 133 acres of land experiencing impacts from livestock (i.e., sacrifice areas) and project

developments (e.g., springs, wells, fences, and reservoirs) since the implementation of the 1999 Green Mountain Common Allotment Final Decision.

EFFECTS ON VEGETATION RESOURCES (Alternative One)

Vegetation - General

This section discusses generalized principles of plant growth in relation to the impacts of the various grazing treatments, followed by summaries of short and long-term impacts by use area for this alternative. The vegetation section concludes with a discussion of range improvement impacts on vegetation.

Estimates of vegetation impacts as a result of implementation of the alternatives are based upon vegetation studies and professional judgment. Although the vegetation studies were not performed within the allotment, they are believed to be applicable to the GMCA. It should be noted, however, that the predicted impacts are the best estimates of what would happen, and are not to be interpreted as certainties. The monitoring studies described in Chapter Two are designed to detect the actual vegetative impacts of the selected alternative. If the desired results are not being achieved, then the allotment management plan (AMP) and grazing systems would be revised as necessary.

Grazing Management

Defoliation of a plant by grazing reduces the photosynthetic capability of the plant. The leaves are the food factory. Rate of plant regrowth following grazing is dependent on the amount of leaf area remaining for photosynthesis and the availability of active axillary buds to initiate new tillers. Roots anchor the plants to the soil, take up water and nutrients, and if healthy, enable the plant to survive stress from drought, cold, heat, and grazing. Root growth is dependent upon the energy provided from photosynthesis. Healthy plant roots are essential for soil stability and erosion control, especially in riparian areas (USDA-NRCS, 1997).

Impacts to vegetation caused by grazing vary according to the vegetative stage of growth or dormancy. Defoliation of plants during susceptible periods can reduce the ability of plants to maintain growth and vigor (Buwai and Trlica, 1977). The time of defoliation is very important in determining the ability of the plant to recover. The most detrimental time of defoliation occurs during active growth when carbohydrate reserves are being used to produce herbage. McCarty and Price (Stoddart, Smith, and Box, 1975) identified two critical periods in the growth of forage grasses: (1) the period of active reproduction, from flower-stalk formation to and including seed ripening; and (2) the initiation of the normal carbohydrate-storage period.

Garrison (1972) stated that fall and winter seasons are the least detrimental periods for utilization of shrubs. Late spring and the middle of the growing season, when the carbohydrate reserves are the lowest, are the most damaging periods of use. Trlica and Cook (1971) found that most shrub species defoliated by clipping about May 10 or July 1 had significantly smaller food reserves by the fall season than did unclipped plants. Defoliation during the first part of April had less impact on food reserves than May or July defoliation.

Under Alternative One, each pasture in the GMCA would receive a rest period or deferment from livestock grazing during portions of the growing period. Deferring grazing use during the growing period is very important to the plant, in terms of carbohydrate reserve levels. The carbohydrate reserves are used during periods of rapid herbage growth, such as initial growth, subsequent regrowth, and for respiration and slight growth during the winter (Cook 1976; and Priestly from Coyne and Cook, 1970). Allowing growth without grazing pressure during portions of the growing period would allow the plant to have available ample carbohydrate reserves for normal growth and development. Not grazing during portions of the growing season would allow an increase in vigor, production, seed production, root growth/replacement and litter accumulation.

Livestock grazing occurs in all use areas and upland pastures (except Alkali Creek Sheep Use Area) during the summer growing period (Treatments A, B, D, and E). The seasonal grazing system in the Alkali Creek Sheep Use Area would result in sheep grazing from April 1 through June 15 and November 1 through December 31 each year. This spring sheep grazing has historically taken place near East Alkali Creek, on approximately 4,600 acres. The historical fall use would continue with the implementation of this alternative. Concentration of the fall sheep use in the use area would result in the decline of the vegetative vigor, production, and litter accumulation in the areas of overlap with spring sheep use. The remaining portions of the use area (approximately 16,600 acres) would be expected to improve in production, litter accumulation, vigor, and seed production (see Table 4-2).

Table 4-2. Predicted Short-term Impacts on Vegetation

Use Area name	Grazing System	Short-term Impacts of Grazing Treatment
Arapahoe (184,156 acres)	Four-pasture deferred-rotation system with season-long winter sheep grazing. Three treatments.	
Antelope Hills-Picket Lake (190,641 acres)	Treatment A: Graze from May 15 until seed ripe of key species (August 1), then rest until winter grazing (Nov. 1)	Graze: Vigor, seed production, litter accumulation reduced. Rest: Vigor and litter accumulation increased. Some seedling establishment.
	Treatment B: Rest until seed ripe of key species (August 1), then graze to trample seed into soil until October 31.	Rest: Vigor, seed production increased. Litter accumulation increased. Seedling establishment increased. Graze: Vigor, litter accumulation reduced. Trampling of seeds increased.
	Treatment C: Graze season-long through the winter (November 1-March 31)	Vigor and litter accumulation reduced.
Happy Springs (71,338 acres)	Three-pasture deferred-rotation grazing system with season-long winter sheep grazing in two pastures. Three treatments. Treatment B: Rest until seed ripe of key species (July 15-August 1), then graze to trample seed into soil until October 31.	Rest: Vigor, seed production, litter accumulation reduced. Seedling establishment increased. Graze: Vigor, litter accumulation reduced. Trampling of seeds.
	Treatment C: Graze season-long through the winter (November 1-March 31). Treatment D: Graze season-long through the summer (July 16-September 15)	Vigor and litter accumulation, seed production reduced Vigor and litter accumulation, seed production reduced.
Green Mountain (36,830 acres)	Three-pasture seasonal grazing system. Four treatments.	
	Treatment A: Graze from May 15 until seed ripe of key species (August 1), then rest until winter grazing (Nov. 1). Treatment E: Graze October 1 through January 15. Rest from August 15 through October 1. Treatment G: Graze December 15 to March 31. Rest from April 1 to December 15.	Graze: Vigor, seed production, litter accumulation reduced. Rest: Vigor, litter accumulation increased. Some seedling establishment. Graze: Vigor and litter accumulation reduced. Rest: Vigor, litter accumulation, seedling establishment increased. Graze: Vigor and litter accumulation reduced. Rest: Vigor, seed production, seedling establishment, litter accumulation increased.
Alkali Creek Sheep (21,174 acres)	Treatment F: Rest summer long.	Rest: Vigor, litter accumulation, seedling establishment, seed production increased.
Long Slough (4,488 acres)	Treatment H: Rest summer long. Graze spring (May 1-June 15) or fall (October 1-October 31)	Rest: Vigor, litter accumulation, seedling establishment, seed production increased.

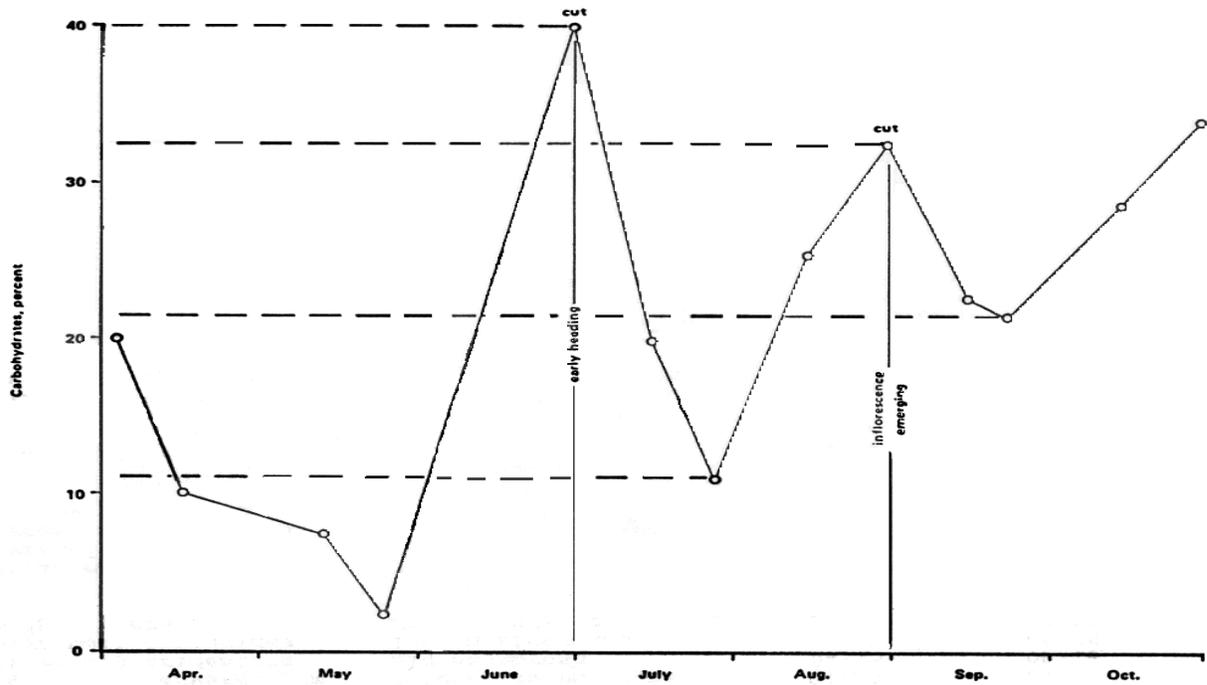
Spring and summer grazing by livestock would also occur in the Picket Lake and Daley Lake Pastures in the Antelope Hills-Picket Lake Use Area, Lost Creek and Eagles Nest Draw Pastures of the Arapahoe Use Area, Haypress Creek and Warm Springs Pastures of the Happy Springs Use Area, and the Sheep Creek Pasture of the Green Mountain Use Area (Treatments A and B). The turnout dates would alternate from May 1-15 one year to June 16-July 1 (August 1) the next year. This would allow time in alternate years for normal plant growth to occur during the growing season before livestock grazing begins. From April 1 to May 1-15, the allotment, except for the pasture the sheep are grazing, would receive rest from livestock grazing. Rest during this period of time is critical to the vegetation in order to begin growth (refer to Table 4-3, Phenology of Key Forage Species by Use Area).

Table 4-3. Phenology of Key Forage Species by Use Area

Use Area	Species	Common Names	Start Growth Date	Flowering Date	Seed Ripe Date	Average Range Readiness Date
Arapahoe	<i>Agropyron dasystachyum</i>	Thickspike wheatgrass	04-25 04-25	07-05 06-15	07-20 07-05	06-07
	<i>Oryzopsis hymenoides</i>	Indian ricegrass	04-15	09-15	10-15	
	<i>Artemisia tridentata</i>	Big sagebrush				
Happy Springs	<i>Agropyron dasystachyum</i>	Thickspike wheatgrass	04-25 04-15	07-05 09-15	07-20 10-15	06-07
	<i>Artemisia tridentata</i>	Big sagebrush	04-25	06-25	07-10	
	<i>Oryzopsis hymenoides</i>	Indian ricegrass	04-20	06-20	07-10	
	<i>Stipa comata</i>	Needle-and-thread grass				
Antelope Hills/ Picket Lake	<i>Atriplex nuttallii</i>	Nuttall saltbush	04-15	07-01	08-01	06-07
	<i>Ceratooides lanata</i>	Winterfat	04-15			
Green Mountain (Sheep Creek Pasture)	<i>Agropyron dasystachyum</i>	Thickspike wheatgrass	04-25 04-15	07-05 09-15	07-20 10-15	06-07
	<i>Artemisia tridentata</i>	Big sagebrush	04-25	06-25	07-10	
	<i>Oryzopsis hymenoides</i>	Indian ricegrass	04-20	06-20	07-10	
	<i>Stipa comata</i>	Needle-and-thread grass	04-20	07-01	07-15	
	<i>Agropyron spicatum</i>	Bluebunch wheatgrass				

Coincident with the beginning of growth at the end of the dormant season is a decline in stored carbohydrates (refer to Figure 4-1, Time of Defoliation Related to Carbohydrate Reserves and Figure 4-2 Relationship Between Grazing and Root Growth (Crider 1955)). The length of time during which stored foods are being depleted with the onset of growth may be as little as a few days in grasses (White 1973 from Stoddart, Smith, and Box 1975) or as much as months in some desert shrubs (Coyne and Cook 1970). The period ends when food manufactured by the newly-formed leaves exceeds the needs for metabolism and growth (Stoddart, Smith, and Box 1975). If grazing takes place during this time, the growth of the new leaves would be disrupted and would cause a delay in the replenishment of the food reserves.

Figure 4-1. Time of Defoliation Related to Carbohydrate Reserves



TIME OF DEFOLIATION RELATED TO CARBOHYDRATE RESERVE *

*Stoddart, Smith, and Box (1975)

Figure 4-2. Relationship Between Grazing and Root Growth (Crider 1955)

Relationship between grazing and root growth (Crider 1955)

	Top reduction	Single clipping
	90%	No root growth for 17 days. 60 percent of root growth on 33rd day.
	80%	No root growth for 12 days. 96 percent of root growth on 33rd day.
	70%	Approximately 48 percent of root growth after 17 days. 159 percent root growth on 33rd day.
	60%	Approximately 55 percent of root growth after 5 days. 192 percent root growth on 33rd day.
	50%	Averaged a 3 percent root growth stoppage for 14 days. 223 percent root growth on 33rd day.
	30%	117 percent root growth on 3rd day. 250 percent root growth on 33rd day.
	0%	129 percent root growth on 3rd day. 338 percent root growth on 33rd day.

Grazing during the growing season is considered detrimental to the vegetation, because it removes portions of the plant necessary in the synthesis of carbohydrates and by forcing the plant to deplete its carbohydrate reserves through regrowth. Preventing livestock from grazing the pasture the same time each year should allow the vegetation to recover. However, 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 (Briske et al., 2008).

The entire Green Mountain Use Area would receive a rest from livestock grazing from April 1 to May 1 to allow for growth of the vegetation. The absence of grazing would allow production of new leaves, which are vital in replenishing the depleted food reserves.

Spring-early summer cattle grazing (from May 1 or 15 to August 1) would occur in two pastures within the Arapahoe, Happy Springs, Green Mountain and Antelope-Hills Use Areas (treatment A) while the third and fourth pastures would be deferred (treatment B) until August 1. The entire allotment would be grazed from August 1 to October 31 (refer to Long Term Annual Grazing Treatments Table 4-6). This grazing system allows each pasture to be deferred for two months of the growing season on every third or fourth year (Treatment B). The deferment is important to the vegetation, in order to allow the plants an entire growing season without grazing pressure to improve vigor, seed production, root growth/replacement and litter accumulation.

Grazing during the fall, winter (treatments E, F, H and J), or dormant season is considered to be the least detrimental to the vegetation. Cook and Stoddart (1963) concluded that desert ranges are best adapted to winter grazing. Although there would be plant mortality and loss of crown cover (Cook and Stoddart 1963), the loss is expected to

be less than the plants' yearly growth.

However, cattle and sheep must be herded and moved frequently enough to avoid heavy to severe utilization in important wildlife habitat areas. Severe fall and winter defoliation of late season regrowth has been shown to reduce grass density and herbage production the following year (Manske 1998), because with late-season defoliation, plants are unable to replenish adequate amounts of reserve carbohydrates to support active growth (Coyne et al. 1995).

Despite some short-term detrimental effects due to periodic grazing during the growing season (i.e., two of every three or four years in the Arapahoe, Happy Springs, Green Mountain, and Antelope Hills-Picket Lake Use Areas), the overall beneficial effects of the grazing system on upland vegetation would more than offset these short-term impacts because: (1) the majority of the upland GMCA is in good or fair condition (see Table 4-4, Forage Condition and Table 4-5, Apparent Trend Summary), (2) grazing use would be deferred during the initial vegetation growing season, (3) the level of grazing use would be dispersed to areas which are presently receiving only light use, and (4) grazing would be kept at a level well below average annual growth.

Table 4-4. Forage Condition and Apparent Trend Summary (% Acres)¹

Allotment (Year)	Good	Fair	Poor	Unsampled
Old Green Mountain (1978)	47%	36%	2%	15%
Old Seven Lakes (1976)*	7%	88%	5%	0%
Old Seven Lakes (1976)**	6%	89%	5%	0%

*Cattle Forage Condition

**Sheep Forage Condition

Table 4-5. Apparent Trend in Forage/Soil Surface Condition (% Acres)¹

Allotment (Year)	Improving	Static	Declining	Unsampled
Old Green Mountain (1978)	66%	17%	1%	16%
Old Seven Lakes (1976)	2%	96%	2%	0%

¹1976 BLM Seven Lakes Planning Unit Resource Analysis and 1978 BLM Sweetwater Planning Unit Resource Analysis.

Upland Vegetation

Long-term impacts in the upland range of the three-pasture or four-pasture deferred-rotation grazing systems would be: slightly increased vegetation production due to the increased seedling establishment; improved vigor and root growth/replacement; increased litter accumulation; and increased percent composition of grass and forb key species.

A study by Gibbens and Fisser (1975) in the Red Desert region (in which 40 percent 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.

In this same study, a two pasture deferred-grazing system showed an increase in grass cover of 31 percent outside of a control, while the grass cover increase from 1967 to 1971 inside the control was 25 percent. Therefore, a net increase of grass cover from 1967 to 1971 of 6 percent was a result of the two-pasture deferred grazing system. Shrub cover change from 1967 to 1971 outside the enclosure was a decrease of 11 percent, while inside the enclosure was an increase of 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 by 10 percent.

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 4-6, Long Term Annual Grazing Treatments and Table 4-8, Acres Per Grazing Treatment Through One Complete Grazing Cycle). Winter grazing, 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). Adverse impacts such as decreased litter and seedling establishment, created by grazing from May 1 through July 15 in the East Alkali Creek, Bare Ring Butte, and Crooks Mountain Pastures, would be detrimental in the area of the summer sheep use.

Table 4-6. Long-Term Annual Grazing Treatments (Alternative One)

Use Area/Pasture	Year 1	Year 2	Year 3	Year 4
Antelope Hills/Picket Lake				
Granite Creek-Rocks	L-M	L-M	L-M	L-M
Alkali Creek	L-M	L-M	L-M	L-M
Picket Lake	A-L-M	B-L-M	A-L-M	B-L-M
Daley Lake	B-L-M	A-L-M	B-L-M	A-L-M
Arapahoe				
Bare Ring Butte	J-N	E-N	J-N	E-N
East Alkali Creek	E-N	J-N	E-N	J-N
Eagles Nest Draw	A-F-N	B-H-N	A-F-N	B-H-N
Lost Creek	B-H-N	A-F-N	B-H-N	A-F-N
Happy Springs				
Haypress Creek	A-N	J-N	A-N	J-N
Warm Springs	J-N	A-N	J-N	A-N
Crooks Mountain	D-N	D-N	D-N	D-N
Green Mountain				
Sheep Creek	A-J-N	A-J-N	A-J-N	A-J-N
Stratton Rim	I-N	I-N	I-N	I-N
Willow Creek	D-N	D-N	D-N	D-N
Green Mountain	D-N	D-N	D-N	D-N
Alkali Creek Sheep	C-G-J-H	C-G-J-H	C-G-J-H	C-G-J-H

Table 4-7. GMCA Riparian Management Pastures

Use Area/Pasture	Year 1	Year 2	Year 3	Year 4
Long Slough	I-G-O	J-G-O	I-G-O	J-G-O
Crooks Creek/Bare Ring Slough ¹	I-G	I-G	I-G	I-G
W. Fork Crooks Creek	I-G-O	G-J-O	I-G-O	G-J-O
*Lost Creek ²	I-G	G-J	I-G	G-J
Ice Slough	G-J-O	G-I-O	G-J-O	G-I-O
Warm Springs Creek	I-G-O	G-J-O	I-G-O	G-J-O
*Sweetwater River ¹	I-G-O	I-G-O	I-G-O	I-G-O

¹Willow plant communities present within riparian management pasture.

²Ten years of rest would be required before livestock grazing is authorized.

* Pasture not yet completed

Treatment G: Rest summer-long (June 16 through September 15). Under this treatment, the Alkali Creek Sheep and Long Slough Use Areas/Pastures would not be grazed by sheep or cattle during the hot season for riparian area improvement.

Treatment I: Graze season-long through the spring (May 1 or May 15 through June 15). This treatment would be

used with cattle in the Long Slough Use Area/Pasture and the Stratton Rim Pasture within the Green Mountain Use Area during the grazing year. The season of use would not exceed 31 days in the riparian pastures. Riparian pastures would be managed to maintain a minimum of a six-inch stubble height on herbaceous vegetation in the fall.

Treatment J: Graze September 16 or October 1 through October 31 or November 15. This fall season treatment would be used by cattle in the Long Slough Use Area/Pasture and other riparian pastures without willow plant communities. This fall season treatment would also be used by cattle and sheep in the upland pastures of the Arapahoe, Happy Springs, Antelope Hills-Picket Lake, and Green Mountain Use Areas during the grazing year. The season of use would not exceed 31 days in the riparian pastures. Riparian pastures would be managed to maintain a minimum of a six-inch stubble height on herbaceous vegetation after the fall grazing season.

Treatment O: Rest yearlong, for one to three years, to initiate the recovery process on degraded riparian areas within the Ice Slough, Long Slough, Warm Springs Creek, Sweetwater River, and West Fork Crooks Creek Riparian Management Pastures.

The increase in livestock grazing use during the winter from sheep (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. 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 the riparian management pasture 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 Lost Creek and Eagles Nest Draw Pastures, the production and condition would be expected to improve slightly, due to the change in distribution of livestock, wildlife, and wild horses from water developments. As mentioned previously, the winter season is considered to be the least detrimental to the vegetation in terms of grazing. Winter is 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 livestock, 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, Antelope Hills-Picket Lake and Happy Springs Use Areas. The deferment of grazing during the spring and summer months would also allow the vegetation to recover from the depletion of carbohydrate reserve levels from winter grazing. A slight increase in forage production over the entire GMCA would be expected from continued implementation of this alternative in the long-term.

Areas which are favored as sheep bed grounds would be expected to receive excessive grazing pressure. This alternative requires the sheep operators (Stan & Linda Cole and W.S. Baldwin during the initial and interim phases) 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-Picket Lake Use Area and the Lost Creek and Eagles Nest Draw Pastures of the Arapahoe Use Area. In these areas, 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. An area of approximately one to three acres per bed ground would be expected to be impacted. Based on field observations from the 1999-2007 grazing seasons, the continued heavy grazing of the sheep bed grounds would be detrimental to the localized upland vegetation in the long-term. The deferred-rotation grazing has not allowed the vegetation on these sites to recover from these short periods of heavy grazing. The long-term increase in livestock grazing use proposed under this alternative (50% of permitted use) would increase the grazing intensity on these localized sites above the 1999-2006 use levels (37% of permitted use).

Table 4-8. Acres per Grazing Treatment through One Complete Grazing Cycle (Alternative One)

Treatment	Public Land Acres			
	Year 1	Year 2	Year 3	Year 4
A	114,749	122,049	114,749	122,049
B	78,386	83,536	78,386	83,536
C	18,215	18,215	18,215	18,215
D	38,299	38,299	38,299	38,299
E	37,709	36,796	37,709	36,796
F	38,658	43,330	38,658	43,330
G	36,174	36,174	36,174	36,174
H	61,545	56,873	61,545	56,873
I	19,096	11,875	19,096	11,875
J	99,490	91,802	99,490	91,802
K	0	0	0	0
L	158,232	158,232	158,232	158,232
M	158,232	158,232	158,232	158,232
N	260,269	260,269	260,269	260,269
O	6,661	6,661	6,661	6,661

*The totals for each year are greater than the acreage of the allotment because some pastures receive more than one treatment per year.

Range Improvements

Table 4-9 shows that approximately 133 surface acres have been disturbed (as of December 2007) by the construction, maintenance, and continued existence of the range improvements from previous implementation of this alternative (1999 Final Decision).

Table 4-9. Surface Acres Disturbed as a Result of the Implementation of Alternative One Actual Range Improvements Constructed* (December 2007)

Type of Improvement	Number of Units	Acres Disturbed per Unit	Total Acres Disturbed
Spring development	8	2.6	20.8
Three-Wire fence (Use Area/Pasture boundary)	3.7 miles	1.5/miles	5.55
Riparian pasture fence	38.4 miles	1.5/miles	57.06
Cattleguard	5	0	0
Water well development	23	1.8	41.4
Reservoir reconstruction	1	4.0	4.0
Exclosure	3	.2 on fenceline	.6 on fenceline

(Artesian wells/wetland fenced)		.9 inside permanent enclosure	2.7 inside permanent enclosure
Pipeline	13.3miles	.1/miles	1.33
		TOTAL	133.4
*See Appendix 19 for rationale.			

Construction of the remaining proposed range improvements would remove approximately 60 acres from production. Table 4-10 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 the spring developments (31 acres), riparian pasture fences (14 acres), water wells (7 acres), and reservoirs (8 acres). The overall impact to the vegetation within the GMCA as a result of range improvement construction would be minor.

Table 4-10. Surface Acres Disturbed as a Result of Implementing Alternative One Long-Term (Remaining) Proposed Range Improvements*

Type of Improvement	Number of Units	Acres Disturbed per Unit	Total Acres Disturbed
Spring development	12+	2.6	31.2
Three-Wire fence (Use Area/Pasture boundary)	0 miles	1.5/miles	0
Riparian pasture fence	9.0 miles	1.5/miles	13.5
Cattleguard	3	0	0
Water well (existing) development	4	1.8	7.2
Reservoir reconstruction	2	4.0	8.0
Exclosure (Artesian wells/wetland fenced)	0	.2 on fenceline .9 inside permanent enclosure	0 on fenceline 0 inside permanent enclosure
Pipeline	0 miles	.1/miles	0
		TOTAL	59.9
*See Appendix 19 for rationale.			

Even though fences are beneficial in the management of livestock, they do cause impacts from trailing of livestock, wildlife, and wild horses along the fences. This would result in the deterioration of the vigor of plants due to over-grazing and trampling. Use of motorized vehicles for fence maintenance would also lead to a reduction in vigor of

vegetation. Another impact of the trailing of livestock and wildlife along a fence would be the removal of vegetation through trampling and compaction of the soil. This would cause adverse growing conditions. A change in composition of the vegetative species could occur in areas somewhat away from a fence; however, these impacts would be less noticeable. Heavy to severe grazing would cause a decrease in the preferred species and an increase in the less-preferred species.

The existing fence on the southern boundary of the GMCA would concentrate summer cattle use on the north side of the fence, near the proposed Lost Creek Riparian Pasture. Forage in the areas of concentration would be removed through livestock consumption and trampling. The grazing would result in the decline of 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 a spring or water well 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. Sacrifice areas would occur adjacent to the spring source and each of the water wells. Total disturbed area would be 2.6 acres for the spring development and 1.8 acres per water well development (Table 4-10). 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 the sacrifice area. The vigor decrease would come about from the dust on the plants, the partial trampling of vegetation by livestock, and the heavy to severe grazing which commonly takes place around water sources.

The development of water wells would improve the distribution of livestock over the entire GMCA, thus promoting a more even utilization of the forage. Proper utilization of the forage is important in maintaining or improving the vegetative vigor, production, or range condition (Blaisdell, et al. 1982, Blaisdell and Holmgren 1984). Properly-placed water developments, combined with the proposed grazing systems, would pull the livestock from the 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, called invaders, which are not part of the natural plant communities. The invaders would be mobile annuals, but later would encourage the establishment of herbaceous or woody perennials of low value (Stoddart, Smith, and Box 1975).

Any place which has the existing vegetation removed provides an opportunity for other plants to begin growth. The construction, maintenance, and use of the various proposed projects may cause enough disturbance to permit increased numbers of poisonous plants to invade the site. For example, halogeton (*Halogeton glomeratus*) is a poisonous annual often found on disturbed sites. The amount of trampling and utilization of the vegetation would decrease as the distance from water increased.

Summary

Short-term detrimental impacts under summer grazing (treatments A, B, D, E, L, M, and N) would include reductions in plant vigor, litter accumulation, and seed production. Short-term detrimental impacts from fall and winter grazing (treatments B, E, F, H, and J) would be reductions in plant vigor and litter accumulation. The summer-long rest and year-long rest (treatments G and O) treatment would increase vigor, litter accumulation, seedling establishment, and seed production for the Alkali Creek Sheep Use Area and seven riparian management pastures. Rest periods, which comprise part of treatments A and B, would enhance vegetation by increasing vigor, root growth/replacement, seed production, and litter accumulation of vegetation. The short-term impacts, such as increased vigor and seedling establishment, which would benefit the vegetation, are considered nearly equivalent to those which would be detrimental. This is due to the slight increase in grazing use above the 1980-2006 level

(Blaisdell, et al. 1982, Blaisdell and Holmgren 1984, Holechek et al. 1998).

The proposed long term use level (34,830 AUMs) for all grazing animals (cattle, sheep, wildlife, and wild horses) is 60 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. The proposed long term use level (34,830 AUMs) for all grazing animals (cattle, sheep, wildlife, and wild horses) would be an average stocking rate of 13.4 acres per AUM on the public land within GMCA. The last nine years (1999-2007) of below average precipitation have required lower livestock use levels to manage for rangeland health standards and provide for drought recovery. The next five years would be required for drought recovery.

Under this alternative, the upland (away from present livestock water sources) areas within the Arapahoe, Antelope Hills-Picket Lake, Green Mountain, and Happy Springs Use Areas, would receive in the long term a 66 percent increase in grazing use over the 1999-2006 recent use levels, due to additional forage availability as a result of increased distribution of livestock through range improvements. The area within the Picket Lake, Daly Lake, Lost Creek and Eagles Nest Draw Pastures (formerly Seven Lakes Incommon Allotment), which is approximately 40 percent of the GMCA (refer to Appendix 10), would receive most of this increased grazing use. This increased livestock grazing intensity, combined with the grazing systems, would result in the vegetation of the upland areas maintaining or slightly declining in vigor, root growth/replacement, production, seed production, and litter accumulation (Blaisdell, et al. 1982, Blaisdell and Holmgren 1984, Holechek et al. 1998).

The upland and lowland areas within the Alkali Creek Sheep Use Area and Long Slough Pasture would improve in vigor, root growth/replacement, production, seedling establishment, seed production, and litter accumulation due to the rest from grazing during the summer growing season.

Continued implementation of this alternative would result in a long-term slight increase in production (USDI-BLM 1979, Blaisdell and Holmgren 1984). Also, by 2027, it is expected that there would be static trend in upland range condition, and a static to improving trend in those riparian areas outside riparian management pastures within the Antelope Hills-Picket Lake Use Area. 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 modification to the GMCA deferred-rotation grazing system, which limits the summer grazing period to 30-31 days each for Granite Creek-Rocks and Alkali Creek Pastures of the Antelope Hills-Picket Lake Use Area, 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).

Construction of the remaining proposed range improvements would cause the loss of approximately 60 acres from production. Major impacts to the vegetation would be the removal of vegetation in the vicinity of the water troughs and the decrease in vigor of the vegetation, through trampling and heavy grazing by livestock, wild horses, and wildlife along fences.

Overall, the impacts upon vegetation by continued implementation of this alternative are: (1) a static to slight 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) a slight increase in plant vigor, root growth/replacement, seed production, litter accumulation and production; (3) a static-to-upward trend in the condition class on the upland areas adjacent to water sources and on an estimated 76 percent of the public land riparian areas in the allotment; and (4) a stable trend in live vegetation cover (USDI-BLM-1979)(Holechek et al. 1998).

Wetland-Riparian Vegetation

Since implementation of current management, riparian habitats which have been excluded from livestock grazing

(one-acre spring development/enhancement exclosures) have shown the most dramatic improvement. Vegetative structure and plant species diversity has increased to near-potential over the last eight years. On most sites, upland plant species have been replaced by mesic (water-loving) riparian plant species. As conditions have improved, additional vegetation has overhung stream banks, resulting in lowered water temperatures. Increased amounts of vegetation have also resulted in reduction of shearing or sloughing of stream bank soils. Exclusion from livestock grazing has also improved plant vigor, resulting in the expansion of the riparian area towards its potential extent. This expansion has increased the ability of these riparian areas to capture sediment on the upper banks, before it reaches the stream.

Riparian habitats occurring in those riparian pastures already constructed (see Appendix 21) have shown mixed levels of improvement, depending upon how long they have been in use. The West Fork Crooks Creek, Ice Slough, and Warm Springs riparian pastures have had the quickest timeframe for recovery, due to three years of rest from livestock grazing. The Long Slough Riparian Pasture has also improved, but at a slightly slower rate than the three previously mentioned riparian pastures. All riparian habitats in these riparian pastures are expected to move from their current low seral plant stage, to mid-seral or better within 10 years following full implementation. Spring-only grazing in the Long Slough Riparian Pasture would enable the existing riparian vegetation adequate time for vegetative regrowth and for the establishment of additional riparian vegetation on areas that have been encroached upon by upland plant species. The remaining riparian pastures would be used only in the spring or fall, and would also see improvement of the herbaceous riparian component. The current trend of upland species encroaching into the riparian areas would be reversed, and more mesic species would occur in these riparian areas.

Riparian habitats occurring in the Picket Lake and Daley Lake Pastures of the Antelope Hills/Picket Lake Use Area would be expected to remain static as a result of a 45 or 60-day grazing period. Three additional water wells in the area would improve livestock distribution away from riparian habitats, but increased stocking levels would offset this improvement.

Riparian habitats in the Green Mountain, Arapahoe, and Happy Springs Use Areas would generally remain static, or would trend slightly upward from existing conditions. The lower stocking rates included in Alternative One would decrease utilization of riparian plant species. Platts (1990) reports that proper stocking rates are critical in order for deferred-rotation grazing treatments to be successful in improving riparian habitats. Intensive livestock management (rotational grazing, herding, and additional upland waters) along with decreased numbers of livestock would help reduce impacts and provide enough residual vegetation needed for riparian improvement. This would occur on approximately three fourths of the acres of riparian habitat in these use areas.

Riparian habitats occurring in the Alkali Sheep Use Area would be expected to improve slightly, as a result of spring-fall-winter grazing by sheep. No willow riparian habitats occur in this pasture, so fall grazing would not have an impact on willows. During the spring, lush, cool-season forage occurs in the uplands, reducing utilization of riparian plants. Fall grazing by sheep in this use area would have less impact on riparian plants, because the plants have been able to complete their storage of carbohydrates; thus, they are coarser and less-likely to be grazed by sheep. Winter sheep and cattle use would not have any effect on herbaceous vegetation and stream banks, due to the dormancy of vegetation and frozen stream banks. During the winter period, livestock dispersal away from riparian areas is expected to be greatest, in turn; this would maintain adequate herbaceous vegetation cover on riparian areas.

EFFECTS ON LIVESTOCK GRAZING (Alternative One)

A long-term increase of approximately 6,500 AUMs available for use (above the 1999-2006 average) is expected as a result of continued implementation of this alternative. By 2027, it is projected that there would be an improvement in upland range condition of at least one-half condition class. This would result in fewer acres in early seral (poor) condition; fewer acres in mid seral (fair) condition; more acres in late seral (good) condition; and more acres in potential natural community (excellent) range condition. Improvement in upland forage conditions in the long-term would account for a slight increase in dual use (cattle and sheep) AUMs (USDI-BLM, 1979). Also, by 2027, it is expected that there would be a static-to-improving trend in those riparian areas outside riparian management pastures within the Antelope Hills-Picket Lake Use Area (approximately 1,485 acres which is a 76 percent of the total public land riparian acres) and a static to slightly declining trend in those riparian areas outside

the riparian management pastures within the Happy Springs, Green Mountain, and Arapahoe Use Areas (approximately 480 acres or 24 percent of the total public land riparian acres). For example, a riparian area in proper functioning condition would continue in proper functioning condition. Deferred-rotation grazing systems were evaluated by Platts and Nelson (1989). These systems were rated as fair for improving stream and riparian habitat (refer to Appendix 20). However, the proposed modification to the deferred-rotation grazing system, which limits the summer grazing period to 30-31 days each for Granite Creek-Rocks and Alkali Creek Pastures of the Antelope Hills-Picket Lake Use Area, 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).

This alternative would not enable two grazing permittees to convert 1,325 winter sheep AUMs to 689 summer cattle AUMs and 5,194 (former Seven Lakes) to 4,940 (former Green Mountain) summer sheep AUMs to 5,017-4,158 summer cattle AUMs, as the water developments become operational. Further, the two permittees, Stan and Linda Cole and W.S. Baldwin, would not experience an increase in the value of their base property to which their federal grazing permits are attached over the short-term, because there would be no sheep to cattle conversions authorized under this alternative. In effect, this alternative would not change the current level of economic viability of these two livestock operations. However, it would provide for the extensive (60 percent for cattle) nonuse, which has been authorized in the allotment over the past nine years, to continue in the short-term to allow for drought recovery.

This alternative would not change the performance of individual animals but should increase the number of cattle (approximately 1,080 head) above the 1999-2006 average by full implementation of the AMP in the long-term.

Table 4-11 lists the proposed (remaining) range improvements and their estimated project construction and installation costs at approximately \$113,860 to \$134,550. The estimated construction costs would range from \$0.24 to \$0.29 per public land acre or \$2.40 to \$2.84 per public land AUM. Table 4-12 shows estimated maintenance costs for the proposed (remaining) range improvements at \$3,390 per year. Table 4-13 shows long term estimated maintenance costs for the actual range improvements that have been constructed (as of December 2007) at \$10,540 per year. The total long term maintenance costs are estimated at \$13,930 per year.

**Table 4-11. Construction and Labor Requirements
Proposed (Remaining) Range Improvement Projects under Alternative One**

Year	Project	Units/Miles	Cost ¹	Total
	Three-wire (Use Area/Pasture Boundary)	0 miles	\$4,840 mile	\$ 0
2-5	Riparian Pasture Fencing (1 Pasture/Year)	9 miles	\$4,840 mile(barbed)	\$43,560
			\$2,541 mile(permanent electric)	\$ 22,870
2-5	Cattleguards (1 each/Year)	0 3	\$3,207 2-lane-24'	\$ 0
			\$1,694 1-lane-12'	\$ 5,080
2-5	Spring Development (Includes Fencing) (3 Each/Year)	12+	\$ 3,630 each	\$ 43,560+
2-5	Reservoir Construction	2	\$ 7,261 each	\$ 14,520
	Water Well Development (new)	0	\$31,462 each	\$ 0
2	Water Well Development (existing)	1	\$ 9,680 each	\$ 9,680
1-3	Water Well Development (existing)	3	\$ 6,050 each	\$ 18,150
	Water Pipelines (0 miles/year)	0 miles	\$ 7,624 mile	\$ 0
	Exclosure (Artesian Wells Wetland Fencing)	0 miles	\$ 4,840 mile	\$ 0
	TOTAL (Barbed Wire Fence)		(\$0.29/public land acre)	\$134,550
	TOTAL (Permanent Electric Fence)		(\$0.24/public land acre)	\$113,860

¹ Cost information on file in the Lander Field Office.

**Table 4-12. Estimated Maintenance Costs
Proposed (Remaining) Range Improvements under Alternative One**

Type of Improvement	Number of Units	Annual Maintenance Cost/Unit ¹	Total Annual Maintenance Cost	Estimated Life of Improvements
Springs	12+	\$121	\$1,450	20+ Years
Wells	4	242	970	20+
Pipelines	0 (miles)	61	0	20+
Reservoirs	2	120	240	20+
Three-wire Fence	0 (miles)	61	0	20+
Riparian Pasture Fence	9 (miles)	61	550	20+
Cattleguards	3	61	180	20+
Exclosure Fence	0 (miles)	61	0	20+
Total:			\$3,390	

¹ Cost information on file in the Lander Field Office.

**Table 4-13. Estimated Maintenance Costs
Actual Range Improvement Constructed (December, 2007)**

Type of Improvement	Number of Units	Annual Maintenance Cost/Unit ¹	Total Annual Maintenance Cost	Estimated Life of Improvements
Springs	8	\$121	\$970	20+ Years
Wells	23	242	5,570	20+
Pipelines	13.3 (miles)	61	810	20+
Reservoirs	1	120	120	20+
Three-wire Fence	3.7 (miles)	61	230	20+
Riparian Pasture Fence	38.4 (miles)	61	2,340	20+
Cattleguards	5	61	300	20+
Exclosure Fence	3.3 (miles)	61	200	20+
Total:			\$10,540	

¹ Cost information on file in the Lander Field Office.

Under this alternative, it is proposed these improvements would be completed by the end of year five (2012), and would be funded 50 percent by the BLM (out of range betterment funds) and 50 percent by the grazing permittees and other cooperators. The maintenance responsibility of the proposed projects would be assigned to individual grazing permittees or a formally recognized permittee grazing association, depending on the type and location of the project. These projects would be designed to solve the water and livestock distribution problems present in the allotment. In addition, the proposed (remaining) riparian management pasture and (completed) upland pasture fencing projects would allow livestock to be managed so that 22 percent (439 acres) of the public land riparian areas and 15 percent of the upland range would be improved, both in the short and long-term.

It is expected that there would be a static-to- improving trend in those riparian areas outside riparian management pastures within the Antelope Hills-Picket Lake Use Area (approximately 1,485 acres and 76 percent of the public land total), and a static to slightly declining trend in those riparian areas outside the riparian management pastures within the Happy Springs, Green Mountain, and Arapahoe Use Areas (approximately 480 acres or 24 percent of the public land total). Deferred-rotation grazing systems were evaluated by Platts and Nelson (1989). These systems were rated as fair for improving stream and riparian habitat (refer to Appendix 6).

The proposed (remaining) water developments listed in Table 4-11 would enable cattle to graze more of the allotment, making approximately an additional 6,500 summer cattle AUMs available (above the 1999-2006 authorized use level). This would allow an estimated authorized increase of 1,080 cattle and increased income potential for the grazing permittees in the long-term.

Additional herding would be needed to keep the cattle within the prescribed use areas and pastures. A description of the herding needed to implement the proposed grazing systems is listed in the Description of the Alternative One and Management Actions Common to All Alternatives. A moderate to intensive level of cattle herding would be required under this alternative. Five to six seasonal riders with the associated higher labor costs discussed in Effects on Socioeconomics may be necessary to accomplish effective herding. Sheep herding would also be required. It is estimated that the sheep herding would necessitate hiring three herders with the associated costs discussed in Effects on Socioeconomics.

The range improvement projects proposed in Table 4-11 would improve the distribution of cattle and sheep grazing. Nevertheless, experience has shown that cattle have congregated and stayed around water sources or spring developments in a rested or deferred pasture or riparian management pasture when effective herding has not occurred. The proposed (continued) herding in the allotment would prevent most problems of this nature, provided the cattle are closely monitored and controlled by the permittees.

Livestock operators in the allotment should benefit from proposed pasture and riparian management fencing and use area/pasture rotation because their cattle would be confined in a smaller area than presently. Although moving cattle during the summer (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-half to one-third the size of the area they can now graze. This should increase the probability of a cow being bred (USDI-BLM, 1979).

EFFECTS ON WILDLIFE/FISHERIES HABITAT AND SPECIAL STATUS SPECIES

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 eight 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. Improved habitat conditions have undoubtedly enhanced animal population stability for many of these species, by diminishing the effects of climate on population size. 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 also 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 flow during recent drought years. Although this improvement may not have been as dramatic as that in the spring exclosures, these pastures have likely provided a much greater benefit to nongame wildlife and other species, owing to the greater number of acres involved.

Herding would be used to properly distribute livestock throughout the allotment so that excessive, long-term use of riparian areas does not occur, and riparian habitat quality in areas outside exclosures and riparian pastures could be expected to improve slightly over time.

Big Game

Continued development of range improvement projects under Alternative One would cause a variety of impacts to big game. The completion of 48 miles of fence (see Appendix 21) would have some impact upon the movements of pronghorn antelope and mule deer. Pronghorn would be affected more than any other species, especially as they move to their winter ranges near Ice Slough, Lost Creek, and areas outside the allotment. The Crooks Creek

Riparian Pasture and the 2.5 miles of fence proposed to be constructed on the south side of Green Mountain to create the Green Mountain Use Area would have the greatest impact on pronghorn movements. Although the design and construction of all fences would be as wildlife friendly (designed to facilitate the movement of big game animals) as possible, fences of this type only function as such under optimum conditions. Animals that are too young, too weak from lack of forage, or otherwise impeded by snowfall, are more hindered by fences and, as a result, tend to use up much-needed energy reserves in attempting to find a way through. Nevertheless, the riparian pastures created by these fences do provide foraging areas free of livestock for those big game animals that are able to get inside them.

Likewise, wells previously drilled and equipped (and planned for the future) tend to concentrate large numbers of livestock around the water source. This in turn creates a sacrifice area of up to five acres around the well that is denuded of forage and compacted so as to be unproductive in the future (for both livestock and big game). Also, big game animals (primarily elk and mule deer) tend to avoid areas in which domestic livestock concentrate. These impacts notwithstanding, such wells may provide water for big game where it was previously unavailable.

With the expected distribution of livestock through herding and additional water developments, big game species will be able to utilize ungrazed pastures prior to livestock movement. This will provide big game the opportunity for greater selectivity in those areas free of livestock disturbance. Both mule deer and elk prefer to avoid cattle and sheep, if possible. Big game use of the Alkali Sheep Use Area would be expected during the summer period when livestock are not present. Another benefit would be improvement of herbaceous riparian vegetation, due to the lack of hot season livestock grazing.

Fall cattle and sheep grazing and winter sheep grazing may prevent improvement on important pronghorn and mule deer winter habitats near Ice Slough, Lost Creek, and the base of Crooks Mountain. Browse species important to wintering pronghorn and mule deer are most palatable to cattle and sheep during the fall and winter seasons.

Moose habitat conditions, especially those associated with willow riparian habitats, would be improved the most. These willow habitats are associated with the Sweetwater River Riparian Pasture (when constructed). Moose habitat in other portions of the allotment is not likely to receive much improvement.

Fisheries

The impacts to riparian habitats from this alternative 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. Nongame fisheries would be improved in the West Fork Crooks Creek. Improvements in riparian habitats within the GMCA would improve both trout and nongame fisheries waters outside the allotment (e.g., Sweetwater River). Improvements to fisheries in these streams would result from an increase in residual vegetation available to not only protect stream banks from erosion, but to also reduce sediment from entering the stream, which smothers trout eggs and eliminates over-wintering habitat. 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 also help maintain cooler water temperatures to support trout throughout the summer period when water temperatures can limit trout survival.

Special Status Species

None of the actions proposed under any of the alternatives are likely to 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 those species affected by Platte River depletion.

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 these 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.

Any future water developments proposed in the allotment under Alternative One would be subject to review (and possible consultation) under the Platte River Recovery Implementation Program, effective January 1, 2007.

Of the thirty 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 better livestock distribution would likely increase insect populations and, increase foraging opportunities. Likewise, water developments associated with Alternative One could benefit bats by providing additional water sources.

The dwarf shrew, like the bats mentioned above, is primarily an insectivore. Improvement of riparian habitat, therefore, would likewise benefit this species, as would additional water developments.

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. 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 3), 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). Alternative One allows for vegetation treatments to modify existing plant communities, but any such treatments would be subject to site-specific evaluation and NEPA analysis. Consequently, adverse impacts to pygmy rabbit habitat are not expected to occur.

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 (i.e., herding or around water developments). Plover habitat generally does not occur near riparian areas, so riparian pastures or exclosures already constructed or planned would have little impact on this species. It is unlikely that there would be any 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 will 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 because little habitat suitable for nesting is available. 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 a hilltop. 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 greater sage-grouse can be negatively impacted throughout various stages of its life cycle by livestock grazing and associated range improvements. Placement of fences or water development facilities that provide perches for raptors within sight of a lek can lead to excessive predation of breeding sage-grouse. Fences may also cause hazards to grouse flying to and from the lek. Concentrations of livestock during herding and near water developments can disrupt strutting (if too close to a lek) 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). Overgrazing of riparian areas may diminish the quality of brood-rearing habitat. 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. Water developments, although providing water where none existed before, tend to attract sage-grouse predators, increase potential for accidental drowning, and have been associated with the spread of the West Nile virus (WNV), which is almost always fatal in sage-grouse.

Any additional range improvements constructed under Alternative One would be subject to site-specific NEPA analysis and evaluated as to their potential impact on sage-grouse habitat. Whenever possible, future water developments would be located away from leks and suitable nesting habitat. With the improved livestock distribution from herding and additional water developments, residual stubble heights should be easier to manage, and improved riparian habitat should provide better brood-rearing habitat.

As riparian conditions gradually improve due to the continued implementation of herding, water developments, and riparian enclosures and pastures, habitat for species known to utilize riparian areas, such as the long-billed curlew, Northern leopard frog, Great Basin spadefoot, spotted frog, and boreal toad, is likely to improve also. 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 during periods of livestock concentration (i.e., turnout and herding).

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 the burrowing owl is not likely to be negatively impacted by Alternative One.

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.

The remaining BLM sensitive plants considered in this section include: Porter's sagebrush, Nelson's milkvetch, Cedar Rim thistle, Fremont bladderpod, Beaver Rim phlox, Rocky Mountain twinpod, persistent sepal yellowcress, and Shoshonea. Of these eight 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 is unlikely that Alternative One's livestock grazing would contribute to the need for federal listing.

EFFECTS ON WILD HORSES (Alternative One)

In the 1999 Decision, this alternative allowed for a change in season of use for sheep (spring summer, fall to yearlong), implementation of an allotment management plan, and the prediction of higher levels of cattle use than the long-term average. A partial conversion in the season of use for sheep occurred (7 month season to year round use). Higher levels of cattle use did not occur, and BLM's incomplete and less than fully successful implementation of the AMP prevented the predicted improvements in riparian vegetation from occurring. Those riparian areas that were fenced did improve. However, the drought that has persisted from 2000 through 2007 has severely depressed vegetative responses. Wild horse numbers were reduced to the lower limits of the AML for all three Herd Management Areas (HMAs) beginning in 2003 through 2006. Fertility control was also implemented on both the Antelope Hills/Cyclone Rim HMA, as well as the Green Mountain HMA.

Under this alternative, the predicted higher use levels by cattle would have created more competition between wild horses and cattle for available forage and water. The yearlong conversion to sheep under this alternative would also create competition for forage and water during crucial wintering periods when horses experience extreme environmental stress.

The extensive pasture and riparian fencing described under this alternative would be detrimental to the free-roaming character of the wild horse herds within this allotment. Any pasture fencing within the herd area boundaries would impede the natural movement of wild horses within the herd areas; the Ice Slough Riparian Fence that was constructed under this alternative is of particular interest. The Ice Slough area has been identified as a crucial wintering area for wild horses in the Crooks Mountain HMA. However, the wild horses in this HMA prefer to use this area for winter feed and water; thus, fencing the area would adversely impact the wild horses within this HMA by displacing them to areas outside the recognized HMA.

A possible mitigation of this problem would be to make the Ice Slough riparian fence a two- or three-wire electric fence that would be completely removed on or about September 15, promoting riparian area healing and allowing for fall-winter use of the area by wild horses. This area was previously fenced with a three-wire electric fence in 2000, yet it is not let down until late October (originally recommended to be completely removed). The observed behavior has been that wild horses do not use the area as extensively as in the past; this could be due to the open winters of the drought, or also because the fence is not taken down until sometime in late October. Horses have reacted negatively to the fence being down on the ground, and have also been observed avoiding the occasion to cross the wires on the ground. The vegetation within Ice Slough has been improved by the grazing prescription applied (five years of rest followed by limited spring or fall grazing since); however, this has been of little use to the wild horses, due to those reasons previously mentioned.

The West Fork of Crooks Creek Riparian Fence would also be detrimental to wild horses in the Green Mountain HMA. Wild horses from this area use the West Fork of Crooks Creek not only to water, but also to escape from inclement weather. Fencing of this area would also isolate the Green Mountain HMA, thereby reducing the interchange of horses from the Crooks Mountain HMA and, consequently, lowering the genetic variability within both HMAs.

Development of additional water may cause wild horse management problems, such as horses roaming outside of recognized herd areas, or the expansion of or changes in current herd boundaries. The implementation of grazing management would cause horses to move away from the herding activity. The grazing management may also shift livestock use from riparian areas to upland range areas, thereby creating forage competition with favored wild horse use areas.

There are some positive benefits to the development of water and to the implementation of grazing management. For one, organized grazing management tends to improve the overall forage base over time; as a result, wild horses would be provided with a steadily improving forage base. Similarly, water development would also provide for a more stable water supply.

It is estimated that the visitor days to the Green Mountain HMA would be reduced by approximately one-third, or possibly 30-40 visitor days per year. This would be in response to impacts that could negatively impact the population. A lost opportunity for the development of a wild horse viewing loop would occur in the Green Mountain HMA, due to the extensive fencing.

EFFECTS ON CULTURAL RESOURCES (Alternative One)

Prehistoric Sites

Due to the large size of the GMCA, only a small percentage of the allotment has been inventoried for cultural resources. A number of prehistoric cultural resource sites are known to be undergoing adverse effects (as defined in the NHPA and Wyoming State Protocol) from grazing-related effects, but mostly it remains unknown as to how many sites are suffering impacts.

Prehistoric sites are often located near natural water sources and riparian areas; similarly, livestock tend to congregate in these same areas. The different alternatives, with their differing levels of impacts to natural water sources/riparian areas, can be individually analyzed for effects to prehistoric cultural resources.

Alternative One is projected to have detrimental effects to prehistoric sites along riparian areas in the short term, and beneficial effects in the long term. This is because erosion, livestock congregation, and trampling would continue until this alternative's grazing/herding systems begin to have desired effects. The key to this alternative having an eventual beneficial effect on cultural resources is active livestock herding. When herding is successfully implemented, then prehistoric sites along riparian areas would slowly recover from the effects of erosion, livestock congregation and trampling. In the short term (1-5 years), as Alternative One begins to be implemented, known and not-yet-discovered prehistoric sites along riparian areas would continue to degrade. In the mid-term (5-10 years), as Alternative One's new projects and grazing systems take effect, the negative effects to these sites would diminish and may, in a few cases, disappear. In the longer term (10+ years), effects to prehistoric sites would begin to be positive, as positive conditions at prehistoric sites (lack of erosion and livestock concentration) outweigh previous conditions. Eleven significant prehistoric sites are known to be affected under this alternative.

Undiscovered sites along riparian zones affected by this alternative are predicted to number approximately 600. Estimates on the number of undiscovered prehistoric sites located along riparian zones within the GMCA were made based on the parameters discussed below.

Two types of riparian habitats were analyzed to help determine prehistoric site densities. Proper Functioning Condition (PFC) data, compiled by BLM over the last decade, was analyzed to calculate the number of miles of riparian vegetation on BLM-administered lands within the allotment. Map data on springs located on BLM-administered lands was also researched to detect other types of riparian habitats within the allotment.

Next, archeological files from the SHPO and BLM were analyzed to (a) determine the number of known sites near springs and along riparian zones, and (b) determine the amount of cultural resource inventories that have taken place within those zones. After the data was compiled, it was then possible to project the number of undiscovered prehistoric sites near streams and springs within the GMCA (Table 4-14).

Table 4-14. Number of Prehistoric Sites Predicted to Occur within Riparian Habitat on the GMCA

Streams	Quantity	Springs	Quantity
Miles of PFC inventoried for cultural resources	5.25	Number of springs inventoried for cultural resources	20
Cultural resource sites discovered during inventories	22	Number of inventoried springs with cultural resource sites	10
Sites/mile(s) of PFC inventoried	4	% of inventoried springs with sites	50%
Miles of PFC within GMCA	136	Estimated number of springs within GMCA	100
Projected number of not-yet-discovered sites along streams within GMCA	544	Projected number of not-yet-discovered sites associated with springs within GMCA	50

Table 4-15 describes the number of cultural sites affected by the implementation of Alternative One.

Table 4-15. Prehistoric Sites along Riparian Areas within the GMCA Affected by Alternative One

	Known Affected Prehistoric Sites	Not-Yet-Discovered Affected Prehistoric Sites (Predicted)
Short-term effects (1-5 years)	11 sites adversely affected (as defined in the NHPA and Wyoming State Protocol)	600 (predicted) sites adversely affected (as defined in the NHPA and Wyoming State Protocol)
Mid-term effects (5-10 years)	11 sites neutrally affected	600 (predicted) sites neutrally affected
Long-term effects (10+ years)	11 sites beneficially affected	600 (predicted) sites beneficially affected

Historic Trails and Sites

Alternative One is projected to have detrimental effects to National Historic Trails and historic sites along riparian areas in the short term, and beneficial effects in the long term (see Table 4-16). This is because erosion, livestock congregation, and trampling would continue until this alternative’s grazing systems begin to have desired effects. In the short term (1-5 years), as the Alternative begins to be implemented, five riparian area crossings of the Seminoe Cutoff National Historic Trail, and a site associated with the Seminoe Cutoff (Immigrant Spring) would continue to degrade. In the mid-term (5-10 years), as this alternative’s new projects and grazing/herding systems begin to take effect, the degrading effects to these trail crossings and sites would diminish and may disappear. In the longer term (10+ years), effects to National Historic Trails and historic sites would begin to be positive, as positive conditions at these locations (reductions in erosion and livestock concentration) outweigh previous conditions.

No new fence or water developments are planned in the vicinity of the OMCPE Trail, the Seminoe Cutoff, or the Rawlins-Fort Washakie Stage Trail under this alternative, so no new development-related effects are expected.

Table 4-16. Historic Trails and Sites Along Riparian Areas Within the GMCA Affected by Alternative One

	Known Affected Historic Trails	Known Affected Historic Sites
Short-term effects (1-5 years)	Five crossings of the Seminoe Cutoff NHT. Five total adverse effects (as defined in the NHPA and Wyoming State Protocol)	One historic site adversely affected (as defined in the NHPA and Wyoming State Protocol)
Mid-term effects (5-10 years)	Five crossings of the Seminoe Cutoff NHT neutrally affected	One historic site neutrally affected
Long-term effects (10+ years)	Five crossings of the Seminoe Cutoff NHT beneficially affected	One historic site beneficially affected

As shown in the following table, it is projected that this alternative's long-term impacts would cause fewer impacts to prehistoric sites, National Historic Trails, other historic trails, and historic sites than Alternatives Two and Four, and would cause the same number of impacts to these resources as Alternative Three.

Table 4-17. Comparison of Long-Term Effects on Cultural Resources by Alternative

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Adverse Effects (as defined in the NHPA and Wyoming State Protocol) to Known Prehistoric Sites	0	11	0	0
Adverse Effects to Not-Yet-Discovered Prehistoric Sites	0	600 (predicted)	0	0
Adverse Effects to National Historic Trails	0	5	0	0
Adverse Effects to Historic Sites	0	1	0	0
Adverse Effects to Statewide-Significant Historic Trails	0	2	0	1

EFFECTS ON RECREATION, VISUAL RESOURCES AND OPEN SPACE (Alternative One)

Range improvements and actions authorized under this alternative would not alter the recreation settings as documented in the affected environment. Since there is no change to the recreation setting, there would also be no change to the recreational activities, experiences, and benefits available or realized by recreationists within the area. This alternative would not alter the unique large unfenced area documented in the affected environment, thus allowing for the agency to maintain the future option of managing this quality for the public

General Public Big Game Recreation Feature

Alternative One would not alter the recreation setting of the feature, nor the available recreational experiences and benefits. Since this alternative is based on intensive livestock herding, the alternative would slowly enhance or improve the habitat and availability of big game animals. Since the alternative proposes a deferred grazing system the amount of residual forage left for wildlife under Alternative One would be high on uplands and low in riparian areas in all pastures except those used before the end of the growing season. In addition, it is anticipated that wet irrigated meadows and riparian systems, important habitat areas for big game animals, would improve slowly over a 20-40 year time period. The above impacts would interfere with the realization of experiences and benefits in the short term; but in the long-term, these impacts would recover due to intensive herding, the successful implementation of a deferred rotation grazing system, and utilization/management triggers.

Continental Divide National Scenic Trail Special Recreation Management Area

Alternative One would not alter the general setting of the feature, nor the recreation experiences and benefits.

Therefore, it is anticipated that few to no impacts would occur as a result of the implementation of this alternative.

Under Alternative One, livestock encounters along the CDNST would continue to be high around riparian areas and dispersed campsites adjacent to riparian areas. Since Alternative One is based on the successful implementation of an intensive herding and a deferred rotation grazing system, hiker encounters with livestock would be reduced in the long term as herding efforts become more successful. In the short term Alternative One would not reduce experience inhibiting encounters with livestock for visitors who recreate in pastures that contain cattle or have recently contained cattle. Inhibiting encounters could include livestock: in or near camp, in riparian areas, on or near trails, in meadows, manure in camp, tracks in riparian areas, trampled areas, and odors (Wallace et al 1996). These impacts could be slightly offset by a) the increase in upland vegetation expression and b) reduced negative livestock encounters in deferred pastures and pastures exhibiting substantial recovery/re-growth. It is important to point out that the nature of traveling along the CDNST requires hikers to stay close to riparian areas; therefore grazing alternatives (such as alternative one) that propose extensive herding to improve riparian vegetation would likely result in an enhanced visitor experience and reduced encounters with livestock.

Green Mountain Recreation Feature

No impacts to recreation settings and experiences and benefits opportunities are anticipated in the Green Mountain Recreation Feature under this alternative.

National Historic Trail Recreation Special Recreation Management Area

No impacts to recreation settings and resulting experiences and benefits are anticipated along the National Historic Trail under this alternative. The annual loss of the movement and color contrast components (key factors in drawing a visitor's attention to the landscape) rendered in riparian vegetation would continue under proposed deferred rotational grazing system proposed for Alternative One. Sanderson, et. al., (1986) found that customer or visitor preference for a landscape decreased, as grazing intensity increased. Long term recovery of this element in riparian areas would be slow-moderate, due to the lack of rest and increased stocking levels. These impacts would be offset due to the expected increase in upland plant expression and vigor. In addition impacts discussed above would be less noticeable during periods of deferment or in pastures that demonstrate re-growth and recovery.

EFFECTS ON WILDERNESS STUDY AREAS AND WILD AND SCENIC RIVERS (Alternative One)

Table 4-18 contains a discussion of each WSA value/required data element for analysis, and determines whether the level of impact from the action exceeds maximum allowable standards, as directed by the Interim Management Policy for Lands under Wilderness Review.

Table 4-18. Predicted Impacts to Wilderness Values as a Result of Implementing Alternative One

Wilderness value Indicator	Impact description	Will the Impact Exceed Maximum Allowable Standard
Visual Resource	Full implementation of Alternative one would continue the slight change to the visual resource documented in the affected environment. Moderate loss of the vegetation component in the Willow and Mormon Creek riparian system would continue to inhibit or reduce the movement element created by these taller grasses. Prior to the grazing season (especially during the pasture's deferment period) this change would be less obvious to the casual observer. Since this alternative proposes herding, use triggers, and deferment, recovery of the resource impacts (discussed above) would occur over the long term.	No
Naturalness and Solitude		
Human Activity	Increased operator presence, due to increased activity associated with locating and herding/moving livestock would occur during time periods when the cattle are in the Granite Creek Rocks Pasture. This increase would occur mostly in the unfenced portion of the WSA around the Willow Creek area. Overall the level of human activity would increase for a short time in a small area of the WSA; therefore this slight change would likely not be noticeable to visitors.	No
Wildlife Presence	Based on the slow increase in stocking rates and the level of active livestock herding proposed for Alternative 1 it is anticipated that the subsequent evidence of livestock increase would continue to occur at a similar level to that documented in the affected environment. The Willow Creek area is a primitive access point to the WSA; therefore the increase in the evidence of livestock would be most noticeable to visitors utilizing this access.	No
Primitive Recreation		
Recreation Opportunities	Alternative One proposes no new projects in the WSA. Additionally, the main feature of the WSA is unaffected by livestock grazing resulting from this AMP. The above factors would ensure no change to the recreation setting and therefore no change to the corresponding opportunities of the WSA	No
Natural Appearing Environment	Slight reduction in the naturalness component of the recreation setting would occur in heavier used riparian area. This reduction is a result of poor riparian functionality and increased presence of livestock. In the long term, the full implementation of the alternative would increase riparian functionality and reduce visitor encounters with livestock in turn recovering this setting over a 20-40 year period.	No
Special Feature	No changes to the Sweetwater canyon corridor would occur as a result of this alternative	No

Surface Water	Within the WSA fence water quality is expected to be good due to the years of rest and subsequent controlled grazing this has received; also, the WDEQ has monitored and assessed the Sweetwater River and removed it from the impaired water body list within the past ten years. Outside the fence this alternative relies on herding to prevent over use of the riparian zones. In the long term plant vigor and production is expected to increase. As more extensive root systems develop, increased water infiltration and retention, through increasing the organic matter content of these soils, can be expected.	No
Vegetation		
Ecological Site Inventory	No lowering in seral condition would result from this alternative. Stubble height and utilization triggers for livestock removal help managers work toward an upward trend.	No
Vegetation Utilization	Key riparian sites are to be grazed at 50% early in summer, and at 30 to 40 % if season will run to September 1. Upland areas receive less than 50% utilization.	No
Plant Vigor	No long term decrease in plant vigor would result from this alternative. Stubble height and utilization triggers for livestock removal would help managers slowly improve riparian and upland range conditions.	No
Wildlife		
Wildlife habitat	With improved livestock distribution accomplished by herding, riparian habitat should improve incrementally over time, and upland habitat could be expected to improve slightly or remain static.	No
Population	With increased stocking rates proposed under Alternative 1, wildlife populations are likely to remain static or possibly decline due to competition for forage.	No
Diversity	With improved habitat conditions, diversity of plant and non-game animal species would be expected to increase slightly over time.	No

CUMULATIVE IMPACTS (Alternative One)

Soil and Vegetation Resources

There are currently 133 acres undergoing impacts from livestock (i.e., sacrifice areas) and/or project developments (e.g., springs, wells, fences, and reservoirs) from projects completed since implementation of the 1999 EA. There remain 18 water projects and 9 miles of riparian fence still to be completed under this alternative. These new projects would create roughly 60 additional acres of sacrifice areas.

Livestock Grazing

An estimated total of \$10,540 in annual maintenance costs have accrued through 2007 as a result of construction of the range improvements in this alternative. An estimated \$3,390 of additional maintenance costs would occur upon completion of the proposed remaining range improvement projects by 2018.

Wildlife/Fisheries Habitat and Special Status Species

Additional fencing in the GMCA, in combination with fencing proposals in the Rawlins Field Office to improve livestock management south of the allotment, could negatively impact antelope movements of the Red Desert Antelope Herd, as they move to crucial winter habitats near Rawlins and Interstate 80. Antelope would continue to

be able to migrate to these crucial winter habitats, but new fencing could slow migration or change migration patterns.

The 1999 Green Mountain EA determined that vegetation removal, trampling, and soil compaction near proposed water developments in the GMCA combined with natural gas developments in the vicinity of Wamsutter would remove approximately 190 acres of forage for the Red Desert Antelope Herd. Moreover, the proposed Pappy Draw Coal Bed Natural Gas pilot project and the Devon CO₂ gas pipeline is expected to remove an additional 265 acres of both antelope and sage-grouse habitat for up to 30 years.

At the present time, there are two existing uranium mining districts and four additional areas of uranium exploration within the GMCA. No plans of development have been proposed for these resources so acres of habitat loss from mining activities are, as yet, undetermined.

Additional range improvements to be constructed under this alternative, combined with habitat loss and modifications from proposed (and potential) energy developments and utility corridors, will increase the cumulative impacts to sage-grouse habitat in the GMCA south of Crooks and Green Mountains.

Wild Horses

Additional pasture and riparian fencing would impede and change the natural movement of horses throughout the herd areas. Fencing could also prevent horses from moving to open areas that are blown free of snow during winter months; this could cause stress and winter die-offs that have previously not occurred. The conversions of summer sheep and spring-summer-fall cattle to yearlong sheep and yearlong cattle would create competition for forage and water during wintering periods when horses experience extreme environmental stress.

Cultural Resources

Long-term reductions in trampling and congregation near natural water sources and riparian areas would decrease impacts to cultural resources, causing a positive trend in their long-term survival.

Recreation and Visual Resources

As a result of actions planned under Alternative One and the mitigation developed to reduce impacts, livestock grazing on the allotment will not contribute to the trends documented in the affected environment. Therefore, cumulative impacts to the recreation setting and the available/realized experiences and benefits will occur at a similar rate to that documented in the affected environment.

Off site Impacts to the Recreation Interest Areas

Since Alternative One maintains the existing setting and outcomes for the general allotment, there will be no offsite impacts to the recreation features as a whole. Alternative One maintains the distinct niche represented by the setting of the GMCA.

Wilderness Study Area and Wild and Scenic Rivers

Since this alternative relies on extensive herding, utilization triggers, and a deferred rotation, the intensity of impacts as a result of Alternative One are anticipated to be light. In addition no offsite impacts to the Sweetwater WSA and WSR as a whole unit are anticipated. No impacts exceed maximum allowable standards as identified in the Interim Management Policy for Lands under Wilderness Review. As a result of the above findings, cumulative impacts to the WSA and WSR are anticipated to occur at a rate similar to the trends documented in the affected environment.

RESIDUAL IMPACTS (Alternative One)

Soil and Vegetation Resources

In about one to two decades, changes are anticipated for lowlands, as the upland water sources are developed, as livestock rotations are implemented in the use areas, and as more of the grazing use is shifted to the uplands. Lowlands would also show increases in vegetative and litter cover, as well as vegetative height. This would result in lower erosion rates and would contribute increased amounts of organic matter to the soil. Water quality and the storage of water and nutrients would also be enhanced by increased organic matter inputs to the lowland soils.

The residual impact to soils and vegetation would create approximately 60 new acres of sacrifice areas around constructed water developments, as shown in Table 4-9. Vegetation would be removed mainly by trampling, and somewhat by livestock and wildlife consumption. These areas would be mostly devoid of vegetation, with some compacted soils, and would remain in poor condition due to the continual use of the water source. It is believed that there would be a decrease in the vigor of the vegetative species immediately adjacent to the sacrifice area. The vigor decrease would come about from the dust on the plants, soil compaction by livestock when soils are moist, the trampling and resulting mechanical damage of vegetation by livestock, and the heavy grazing which commonly takes place around water sources. Trailing would cause the removal of vegetation, through trampling and compaction of the soil. Higher erosion rates would also ensue on these areas devoid of vegetation. Rill and gully initiation would occur on the sloping locations over time. Sandy soils would be prone to scouring by wind. The denuded, compacted, and heavily used areas would also be the most prone to weed establishment.

The residual impact to soils and vegetation from this alternative would be to create approximately 60 new acres of sacrifice areas, associated with the new construction of nine miles of riparian fence, 12 spring developments, four wells, and two reservoirs.

Riparian soils currently supporting low seral stage plant communities occurring outside of spring development or enhancement enclosures, riparian pastures, and special riparian grazing treatment pastures, would be maintained in their current seral stage or trend slightly downward. This would occur on approximately 229 acres (11 percent) of the riparian soils in the allotment classified as being in a low seral stage (non-functional PFC). Often, the most degraded areas will not come back, as too much soil fertility has already been lost; however, the greatest chances for improvement can be found in those mid-seral systems that account for about 70 percent of riparian soils in the allotment; these lowland areas are not severely degraded, and still retain some inherent soil fertility. Enhancing these mid-seral systems and keeping them from falling into lower seral conditions will benefit the largest amount of riparian/wetland areas in the long term.

Livestock Grazing

An estimated total of \$10,540 in annual maintenance costs have accrued through 2007 as a result of construction of the range improvements in this alternative. An estimated total \$3,390 of additional maintenance costs would occur upon completion of the proposed remaining range improvement projects by 2018. An estimated combined total \$13,930 of additional maintenance costs would accrue in the long term (2018-2027).

Wildlife/Fisheries Habitat and Threatened and Endangered Species

Approximately 480 acres of public land riparian habitat occurring outside special riparian management areas would be maintained in less-than-desirable conditions for sage-grouse brood rearing and nongame wildlife habitat. Reduced vegetative cover and lower production of forbs and insects would contribute to these conditions.

Increased distribution of pronghorn antelope and, to a lesser extent, mule deer, would occur as a result of additional waters being developed in areas that currently have no water.

Wild Horses

Development of range improvements will change distribution patterns, and draw wild horses into areas that were previously not used. Implementation of any grazing management other than season-long grazing would tend to improve the forage base over time. This would provide a better forage base for wild horses than currently exists.

Cultural Resources

Due the decrease in livestock grazing impacts and the resultant decreases in erosion, damage, and disruption to cultural resources, improvements to the condition of prehistoric sites, the OMCPE Trail, and the Seminole Cutoff will slowly occur.

Recreation and Visual Resources

This alternative heavily relies on the successful implementation of herding, utilization triggers, and a deferred rotation grazing system. Therefore impacts to recreation are light and can be mitigated. No residual impacts to the

recreational setting or experiences and benefits are anticipated as a result of the implementation of this alternative.

Wilderness Study Areas and Wild and Scenic Rivers

The indirect and direct impacts documented in Alternative One do not exceed maximum allowable standards as identified in the Interim Management Policy For Lands Under Wilderness Review. In addition, this level of impact does not exceed impact standards for the WSR resource. Therefore, residual impacts to the WSA and WSR resource will be slight as a result of Alternative One. As long as portions of the WSA and WSR resource are unfenced from the GMCA, slight impacts such as those documented in the affected environment will continue. This impact is somewhat offset by the location of the WSA fence and its low level of contrast with the characteristic landscape.

ALTERNATIVE 2

EFFECTS ON SOIL AND WATER RESOURCES (Alternative Two)

Soil Resources

This alternative has the most variation and complexity. Six proposed allotments would subdivide the GMCA under this alternative. Ninety four miles of new fencing, 22 miles of new pipelines and 39 new water sources are proposed to aid in the management and containment of livestock with little to no herding. There would be potentially heavy use levels in the long term, with a 50 percent increase (over the 1980-2006 levels) in livestock numbers, especially in the riparian zones. With the 39 new water sources proposed under this alternative, one may conservatively assume that at least one new upland salt location will be necessary near each new water source to aid in drawing livestock into the uplands. One new sacrifice area will be created at each salt block location. The sacrifice areas associated with existing salt block locations are generally not as large as those areas associated with water sources, but some amount of bare, compacted soil is expected to develop around each salt block location. This alternative is proposing to locate salt no closer than one-half mile from water sources.

Of the proposed subdivision of the allotment, one-half of the six new allotments would operate under a deferred-rotation grazing strategy. The Haypress Allotment would operate under a three-pasture rest-rotation, and the Happy Springs and Alkali Creek Sheep Allotments would operate under a continuous season-long grazing prescription.

A combination of seven riparian pastures, (five completed and two proposed) would be constructed and maintained on important riparian zones. These riparian pastures would be used by livestock either in the spring or in the fall. The effects would be variable, however, improvement in vegetative expression would be expected to occur over a period of several normal precipitation years. Functional integrity of the riparian systems will take longer to restore.

Mixed results are expected within the pastures of the three deferred-rotation grazing allotments. In some pastures, depending on the season, the potential to increase use of vegetation on the uplands exists. This would reduce the heavy hot-season use that presently occurs in the riparian areas year after year. However, drought and/or ineffective livestock grazing control can make achieving desirable future land health conditions difficult. This alternative relies primarily on fences for livestock control. Without intensive herding efforts, deferred-rotation grazing systems are not expected to improve riparian and nearby upland transition zone conditions substantially in either the short or long term.

Haypress Allotment

This rest-rotation grazing allotment would be most valuable at providing single-year (or possibly two years of) drought relief. Two of the three pastures would have the riparian area grazing during the hot season for too long a time to expect short or long-term improvements. With this grazing system, grass seedling establishment in the uplands would have a better chance of success than other grazing strategies employed in the other allotments. Soil resources should benefit from expected increases in vegetative cover and litter.

Happy Springs Allotment

Happy Springs Allotment would be divided into two pastures, with little or no herding to keep livestock off riparian zones. Livestock would still congregate in riparian areas, especially during the hot season. These riparian areas

would not be expected to improve. This grazing strategy typically does not favor riparian vegetation health or restoration of functional integrity. Upland soils further from water are expected to show increased levels of fertility due to improved plant vigor and litter accumulation. A slight increase in vegetative cover would reduce the potential for erosion.

Alkali Creek Sheep Allotment

The Alkali Creek Sheep Allotment would be grazed annually in the spring and fall periods. With deferment from grazing during the summer growing season, the lowland soils are expected to benefit from increases in soil fertility and protective vegetative cover. Upland areas further from water are expected to show moderate levels of improvement.

Double-grazing could occur in dry years along East Alkali Creek; this grazing strategy has not worked well with cattle grazing in allotments to the north of this area. Riparian areas along East Alkali Creek and adjacent transition zones to the uplands are not expected to improve with double grazing.

The proposed new projects for the six new allotments are expected to result in the creation of 147 acres of disturbance associated with new maintenance roads along fences, and another 72 acres of sacrifice areas for the new water sources. In the far western part of the allotment, 1.5 miles of fence are proposed to be reconstructed, with modification for a water gap (on private land) below Mud Springs. The spring occurs on BLM-administered public lands, and it would be fenced into what essentially serves as a fall gathering pasture, consisting of approximately 160 acres of private land and 40 acres of BLM-administered public lands. In the small gathering pasture, use levels are expected to be moderate for average years. With no spring or hot summer season use, the riparian conditions, and therefore soil and vegetation conditions, in the gathering pasture are expected to improve in both the short and, especially, long term.

Map 4-3, Water Erosion Potential, and Map 4-4, Wind Erosion Potential, both illustrate that if a management scenario decreases soil cover too much in the uplands, accelerated wind erosion can result. Areas of currently stabilized sand dunes to the south of Green Mountain, and medium-textured soils high in very fine sand, fine sand, and silt-size particles can become active and suffer erosional losses, consequently decreasing the potential of these sites. In the less-sandy areas, water erosion in the form of new and more frequent rills and gullies would result.

This alternative relies primarily on fences for livestock control. Without intensive herding efforts, deferred-rotation grazing systems are not expected to improve riparian and nearby upland transition zone conditions substantially in either the short or long term.

Water Resources

The impacts to water resources from Alternative Two would result from expected long term heavy livestock use of riparian zones and wetlands. Minor variations, primarily related to specific water development projects, spring exclosures, riparian pastures, and livestock management strategies, would also be expected. Accelerated soil erosion, especially on the lowlands, would be the largest contributing factor to water quality.

With expected long term heavy livestock use levels riparian zone improvement cannot be expected under this alternative. Except for the Alkali Creek Sheep Allotment, the limited length of deferment would not allow for improvements in vegetation, vegetative litter, and hydrologic conditions. The cattle trails found in the transition zones and extending to the uplands would remain in their present compacted state. The cattle trails would continue to channel runoff and sediment into the riparian areas, as cattle use on the cattle trails is expected to remain heavy. Only in the proposed Haypress (rest-rotation system) Allotment and Alkali Creek Sheep Allotment might this soil compaction have a better chance to decrease over time. As a result of these new management scenarios, water quality parameters such as turbidity, total dissolved solids (TDS), and suspended sediment (SS) would improve above the current situation. Drought will, of course, act as a complicating factor for all of the allotments.

There are currently 133 acres undergoing impacts from livestock (i.e., sacrifice areas) and project developments (e.g., springs, wells, fences, and reservoirs) from projects completed since implementation of the 1999 Final

Decision.

EFFECTS ON VEGETATION RESOURCES (Alternative Two)

Vegetation – General

Refer to the General Effects on Vegetation Resources for Alternative One.

Grazing Management

Refer to Grazing Management Section in Alternative One.

Upland Vegetation

The short-term impacts in the upland range of the two-pasture, three-pasture or five-pasture deferred-rotation grazing systems would be: slightly increased vegetation production due to the increased seedling establishment, improved vigor and root growth/replacement, increased litter accumulation, and increased percent composition of grass and forb key species.

A study by Gibbens and Fisser (1975) in the Red Desert region (in which the southern portion (40 percent) 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.

In this same study, a two pasture deferred-grazing system showed an increase in grass cover of 31 percent outside of a control, while the grass cover increase from 1967 to 1971 inside the control was 25 percent. Therefore, the net increase of grass cover from 1967 to 1971 of 6 percent was a result of the two-pasture deferred grazing system. Shrub cover change from 1967 to 1971 outside the enclosure was decrease of 11percent, while inside the enclosure was an increase of 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 two-pasture or three-pasture deferred-rotation grazing systems in the southern portion (Red Desert Region) of GMCA would decrease shrub cover 10 percent.

The proposed three-pasture rest-rotation grazing system in the proposed Haypress Allotment is expected to have these short-term impacts: improved plant vigor and root growth/replacement of vegetation species, increased litter accumulation, increased seed production and seedling establishment, and increased production.

The proposed five-pasture deferred-rotation grazing system in the proposed Green Mountain Allotment is expected to have these short-term impacts: improved plant vigor and root growth/replacement of vegetation species, increased litter accumulation, increased seed production and seedling establishment, and increased production.

Grazing in the proposed Arapahoe and Happy Springs Allotments would take place during the summer and winter months (refer to Table 4-19, Annual Grazing Treatments and Table 4-20, Acres Per Grazing Treatment Through One Complete Grazing Cycle for Alternative Two). The winter grazing season, which would receive 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, Warm Springs, and West Crooks Mountain Pastures would be detrimental in the area of the summer sheep use.

Table 4-19. Alternative Two – Long-Term Annual Grazing Treatments

Use Area Pasture	Year 1	Year 2	Year 3	Year 4
Antelope Hills/Picket Lake				
Granite Creek-Rocks	L-M	L-M	L-M	L-M
Alkali Creek	L-M	L-M	L-M	L-M
Picket Lake	A-L-M	B-L-M	A-L-M	B-L-M
Arapahoe				
Eagles Nest Draw	A-F-N	B-H-N	A-F-N	B-H-N
Lost Creek	B-H-N	A-F-N	B-H-N	A-F-N
Happy Springs				
Warm Springs	A-H-N	B-H-N	A-H-N	B-H-N
West Crooks Mountain	B-F-N	A-F-N	B-F-N	A-F-N
Haypress Creek				
Haypress	A-N	P	B-N	A-N
Cottonwood (Soap Holes)	B-N	A-N	P	B-N
Wood Gulch	P	B-N	A-N	P
Green Mountain				
Sheep Creek	A-J-N	A-J-N	A-J-N	A-J-N
Stratton Rim	I-N	I-N	I-N	I-N
West Willow Creek	E-N	J-N	D-N	E-N
East Willow Creek	J-N	D-N	E-N	J-N
Green Mountain	D-N	E-N	J-N	D-N
Alkali Creek Sheep	C-G-J-H	C-G-J-H	C-G-J-H	C-G-J-H

Riparian Management Pastures (continuation of Table 4-19)

Use Area Pasture	Year 1	Year 2	Year 3	Year 4
Long Slough	I-G-O	G-O	I-G-O	G-O
Crooks Creek/Bare Ring Slough ¹	I-G	I-G	I-G	I-G
W. Fork Crooks Creek	I-G-O	G-J-O	I-G-O	G-J-O
*Lost Creek ²	I-G	G-J	I-G	G-J
Ice Slough	G-J-O	G-J-O	G-J-O	G-J-O
Warm Springs Creek	I-G-O	G-J-O	I-G-O	G-J-O
*Sweetwater River ¹	I-G-O	I-G-O	I-G-O	I-G-O

¹Willow plant communities present within riparian management pasture.

²Ten years of rest would be required before livestock grazing is authorized.

* Pasture not yet completed

Treatment G: Rest summer-long (June 16 through September 15). Under this treatment, the Alkali Creek Sheep and Long Slough Use Areas/Pastures would not be grazed by sheep or cattle during the hot season for riparian area improvement.

Treatment I: Graze season-long through the spring (May 1 or May 15 through June 15). This treatment would be used with cattle in the Long Slough Use Area/Pasture and the Stratton Rim Pasture within the Green Mountain Use Area during the grazing year. The season of use would not exceed 31 days in the riparian pastures. Riparian pastures would be managed to maintain a minimum of a six-inch stubble height on herbaceous vegetation in the fall.

Treatment J: Graze September 16 or October 1 through October 31 or November 15. This fall season treatment would be used by cattle in the Long Slough Use Area/Pasture and the other riparian pastures without willow plant communities. This fall season treatment would also be used by cattle and sheep in the upland pastures of the Arapahoe, Happy Springs, Antelope Hills-Picket Lake, and Green Mountain Use Areas during the grazing year. The season of use would not exceed 31 days in the riparian pastures. Riparian pastures would be managed to maintain a minimum of a six-inch stubble height on herbaceous vegetation after the fall grazing season.

Treatment O: Rest yearlong for one to three years to initiate the recovery process on degraded riparian areas within the Ice Slough, Long Slough, Warm Springs Creek, Sweetwater River, and West Fork Crooks Creek Riparian Management Pastures. The long term increase in livestock grazing use during the winter, from sheep (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. 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 short-term, as a result of the riparian management pasture 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 Lost Creek and Eagles Nest Draw Pastures, the production and condition would be expected to improve slightly in the short term, due to the improved distribution of livestock, wildlife, and wild horses from water developments. As mentioned previously, the winter season is considered to be the least detrimental to the vegetation in terms of grazing. Winter is 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 livestock, 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 proposed Arapahoe, Antelope Hills-Picket Lake and Happy Springs Allotments, and 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. A slight increase in forage production over the entire GMCA would be expected from implementation of this alternative in the short-term.

Areas which are favored as sheep bed grounds would be expected to receive excessive grazing pressure. This alternative requires the sheep operators (Stan & Linda Cole and W.S. Baldwin during the initial and interim phases) to move the sheep bed grounds 1.5 miles every week. The exception to this would be in the Picket Lake and Alkali Creek Pastures of the proposed Antelope Hills-Picket Lake Allotment and the Lost Creek and Eagles Nest Draw Pastures of the proposed Arapahoe 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. An area of approximately one to three acres per bed ground would be expected to be impacted. Based on field observations from the 1999-2007 grazing seasons, the heavy grazing of the sheep bed grounds would be detrimental to the localized upland vegetation in the long-term. The deferred-rotation grazing has not allowed the vegetation on these sites to recover from these short periods of heavy grazing. The long term increase in livestock grazing use proposed under this alternative (76% of permitted use) would double the grazing intensity on these localized sites above the 1999-2006 use levels (37% of permitted use).

Table 4-20, Alternative Two - Long-Term Acres Per Grazing Treatment Through One Complete Grazing Cycle, shows the acres of different grazing treatments that are applied through a completed four year grazing cycle. The table displays the scale these grazing treatments affect annually and through a completed rotation cycle.

**Table 4-20. Alternative Two – Long-Term
Acres Per Grazing Treatment Through One Complete Grazing Cycle**

Treatment	Public Land Acres			
	Year 1	Year 2	Year 3	Year 4
A	164,090	129,277	158,613	126,965
B	117,936	152,146	115,624	155,061
C	17,982	17,982	17,982	17,982
D	12,826	1,806	2,760	12,826
E	2,760	12,826	1,806	2,760
F	74,366	104,511	74,366	104,511
G	27,197	27,197	27,197	27,197
H	136,072	105,927	136,072	105,927
I	10,426	2,096	10,426	2,096
J	31,872	37,797	42,892	36,754
K	0	0	0	0
L	173,868	173,868	173,868	173,868
M	173,868	173,868	173,868	173,868
N	247,680	247,078	244,766	247,680
O	9,073	9,073	9,073	9,073
P	10,510	11,113	13,425	10,510

*The totals for each year are greater than the acreage of the allotment because some pastures receive more than one treatment each year.

Range Improvements

Table 4-21 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 4-21. Surface Acres Disturbed as a Result of Implementing Alternative Two Long-Term Proposed Range Improvements*

Type of Improvement	Number of Units	Acres Disturbed per Unit	Total Acres Disturbed
Spring development	5+	2.6	13
Three-Wire fence (Allotment/Pasture boundary)	66 miles	1.5/miles	99
Riparian pasture fence	32 miles	1.5/miles	48
Cattleguard	17	0	0
Water well (existing) development	16	1.8	28.8
Reservoir reconstruction	2	4.0	8.0
Exclosure (Artesian wells/wetland fenced)	0	.2 on fenceline .9 inside permanent exclosure	0 on fenceline 0 inside permanent exclosure
Pipeline	22 miles	.1/miles	2.2
		TOTAL	199
*See Appendix 11 for rationale.			

Construction of the proposed range improvements would remove approximately 199 acres from production. Table 4-21 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 the allotment or pasture boundary fences (99 acres), riparian pasture fences (48 acres), water wells (29 acres), and spring developments (13 acres). The overall impact to the vegetation within the GMCA as a result of range improvement construction would be small.

Even though fences are beneficial in the management of livestock, they do cause trailing of livestock, wildlife, and wild horses along the fences. This would result in the deterioration of the vigor of plants near a fence due to over-grazing and trampling. Use of motorized vehicles for fence maintenance would also lead to a reduction in vigor of vegetation. Another impact of the trailing of livestock and wildlife along a fence would be the removal of vegetation through trampling and compaction of the soil. This would cause adverse growing conditions. A change in composition of the vegetative species could occur in the immediate vicinity of the fence in areas away from the fence; however these impacts would be less noticeable. Heavy to severe grazing would cause a decrease in the preferred species and an increase in the less-preferred species.

The existing fence on the southern boundary of the GMCA would concentrate summer cattle use on the north side of the fence near the proposed Lost Creek Riparian Pasture. Forage in the areas of concentration would be removed through livestock consumption and trampling. The grazing would result in the decline of preferred species and an increase in 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 a spring or water well 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. Sacrifice areas would occur adjacent to the spring source and each of the water wells. Total disturbed area would be 2.6 acres for the spring development, and 1.8 acres per water well development (Table 4-21). 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 the sacrifice area. The vigor decrease would come about from the dust on the plants, the partial trampling of vegetation by livestock, and the heavy to severe grazing which commonly takes place around water sources.

The development of water wells would improve the distribution of livestock over the entire GMCA, thus promoting a more even utilization of the forage. Proper utilization of the forage is important in maintaining or improving the vegetative vigor, production, or range condition (Blaisdell, et al. 1982, Blaisdell and Holmgren 1984). Properly-placed water developments, combined with the proposed grazing systems, would pull the livestock from the 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, called invaders, which are not part of the natural plant communities. The invaders would be mobile annuals, but later, would encourage the establishment of herbaceous or woody perennials of low value (Stoddart, Smith, and Box 1975).

Any place which has the existing vegetation removed provides an opportunity for other plants to begin growth. The construction, maintenance, and use of the various proposed projects may cause enough disturbances to permit increased numbers of poisonous plants to invade the site. For example, halogeton (*Halogeton glomeratus*) is a poisonous annual often found on disturbed sites. The amount of trampling and utilization of the vegetation would decrease as the distance from water increased.

Summary

Short-term detrimental impacts under summer grazing (treatments A, B, D, E, L, M, and N) would include reductions in plant vigor, litter accumulation, and seed production. Short-term detrimental impacts from fall and winter grazing (treatments B, E, F, H, and J) would be reductions in plant vigor and litter accumulation. The summer-long rest and year-long rest (treatments G, O and P) treatment would increase vigor, litter accumulation, seedling establishment, and seed production for the proposed Alkali Creek Sheep and Haypress Allotments and five riparian management pastures. Rest periods, which comprise part of treatments A and B, would enhance the vegetation by increasing vigor, root growth/replacement, seed production, and litter accumulation of the vegetation. The short-term impacts, such as increased vigor and seedling establishment would not be enough to offset those which would be detrimental in the long term. This is due to the marked increase in long term grazing use above the 1980-2006 level (Blaisdell, et al. 1982, Blaisdell and Holmgren 1984, Holechek et al. 1998).

The proposed long term use level (47,015 AUMs) for all grazing animals (cattle, sheep, wildlife, and wild horses) is 84 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.

The proposed long term use level (47,015 AUMs) for all grazing animals (cattle, sheep, wildlife, and wild horses) would be an average stocking rate of 10.0 acres per AUM on the public land within GMCA. The last nine years (1999-2007) of below average precipitation have required lower livestock use levels to manage for rangeland health standards and provide for drought recovery. The next five years would be required for drought recovery.

Under this alternative, the upland (away from present livestock water sources) areas within the proposed Arapahoe, Antelope Hills-Picket Lake, Green Mountain, Haypress and Happy Springs Allotments, would receive in the long term a 108 percent increase in grazing use over the 1999-2006 recent use levels, due to additional forage availability as a result of increased distribution of livestock through range improvements. The area within the Picket Lake, Alkali Creek, Lost Creek and Eagles Nest Draw Pastures (formerly Seven Lakes Incommon Allotment), which is approximately 40 percent of the GMCA (refer to Appendix 6), would receive most of this increased grazing use. This increased livestock grazing intensity, combined with the grazing systems, would result in the vegetation of the upland areas (depending on their proximity to water) maintaining or declining in vigor, root growth/replacement, production, seed production, and litter accumulation (Blaisdell, et al. 1982, Blaisdell and Holmgren 1984, Holechek et al. 1998).

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

Implementation of this alternative would result in a long-term slight decline in production (USDI-BLM 1979, Blaisdell and Holmgren 1984). In the long term, it is expected that there would be a static-to-declining trend in those riparian areas outside riparian management pastures within the proposed Arapahoe, Antelope Hills-Picket Lake, Green Mountain, Haypress and Happy Springs Allotments. 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 10).

Also, by 2027, it is expected that there would be static trend in upland range condition, a static-to-improving trend in those riparian areas outside riparian management pastures within the proposed fenced portion (approximately 26,730 acres) of the Granite Creek-Rocks Pasture of the Antelope Hills-Picket Lake 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).

Construction of the proposed range improvements would cause the loss of approximately 199 acres from production. Major impacts to the vegetation would be the removal of vegetation in the vicinity of the water troughs and the decrease in vigor of the vegetation, through trampling and heavy grazing by livestock, wild horses, and wildlife along fences.

Overall, the long term impacts upon vegetation from implementation of this alternative are: (1) a static-to-slight decrease 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) a static to slight decrease in plant vigor, root growth/replacement, seed production, litter accumulation and production; (3) a static-to-downward trend in the condition class on the upland areas adjacent to water sources and on an estimated 24 percent of the public land riparian areas in the allotment; and (4) a stable trend in live vegetation cover (USDI-BLM-1979) (Holechek et al. 1998).

Wetland-Riparian Vegetation

Most of the impacts to wetland-riparian areas stem from one simple fact: If not excluded by herding or fences, domestic livestock (and, to a lesser degree, wild horses) will congregate around these areas during hot weather.

Riparian areas offer everything that livestock need: readily available drinking water, succulent forage plants, cool ground to lay on, and, often, shade. For these reasons, livestock will remain in these areas until they have consumed all the available forage, and then will move only far enough away to find something else to eat before returning. Wetland-riparian areas denuded 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.

Except for the Haypress Allotment, most of the Alkali Creek Sheep Allotment and the Granite Creek Rocks Pasture proposals discussed above, Alternative Two does not offer any means of excluding livestock from wetland-riparian areas during the hot part of the grazing season. Consequently, it is unlikely that any substantial improvement will result from this alternative. In most cases, livestock will simply spend too much time in these sensitive parts of the allotment.

EFFECTS ON LIVESTOCK GRAZING (Alternative Two)

Short Term Cattle

This alternative would provide for extensive (60 percent for cattle) nonuse, which has been authorized in the allotment over the past nine (1999-2007) years to continue in the short-term to allow for drought recovery and construction of range improvements. This policy is discussed in Assumptions for Analysis.

Interim Cattle

Under this alternative by 2017, there would be a 29 percent increase (from the 1999-2006 average authorized cattle use) in spring-summer-fall cattle AUMs which would impact 18 cattle permittees by increasing the number of animal units of cattle use they would graze on public land within the GMCA. This alternative would not change the performance of individual animals but should increase the number of cattle from approximately 2,300 to 3,000 head (refer to Appendix 15) by the end of the interim implementation period.

Under this alternative by 2017, there would be a three percent increase (from the 1980-2006 average authorized cattle use) in spring-summer-fall cattle AUMs which would impact 18 cattle permittees by increasing the number of animal units of cattle use they would graze on public land within the GMCA. This alternative would not change the performance of individual animals but should increase the number of cattle from approximately 2,900 to 3,000 head (refer to Appendix 15) by the end of the interim implementation period.

Long Term Cattle

Under this alternative by 2027, there would be a 94 percent increase (from the 1999-2006 average authorized cattle use) in spring-summer-fall cattle AUMs which would impact 18 cattle permittees by increasing the number of animal units of cattle use they would graze on public land within the GMCA. This alternative would not change the performance of individual animals but should increase the number of cattle from approximately 2,300 to 4,500 head (refer to Appendix 15) by full implementation of the AMP in the long-term.

Under this alternative by 2027, there would be a 55 percent increase (from the 1980-2006 average authorized cattle use) in spring-summer-fall cattle AUMs which would impact 18 cattle permittees by increasing the number of animal units of cattle use they would graze on public land within the GMCA. This alternative would not change the performance of individual animals but should increase the number of cattle from approximately 2,900 to 4,500 head (refer to Appendix 15) by full implementation of the AMP in the long-term.

Short Term Sheep

This alternative would not enable two grazing permittees to convert 1,325 winter sheep AUMs to 689 summer cattle AUMs and 5,194 (former Seven Lakes) to 4,940 (former Green Mountain) summer sheep AUMs to 5,017-4,158 summer cattle AUMs as the water developments become operational. Further, the two permittees, Stan and Linda

Cole and W.S. Baldwin, would not experience an increase in the value of their base property to which their federal grazing permits are attached over the short-term because there would be no livestock conversions authorized under this alternative. In the short term, this alternative would not change the current level of economic viability of these two livestock operations.

Interim Sheep

Under this alternative by 2017, there would be a 72 percent increase in yearlong sheep AUMs (from the 1999-2006 average authorized sheep use) which would impact two sheep permittees by increasing the number of animal units of sheep use they would graze on public land within the GMCA. This alternative would not change the performance of individual animals but should increase the number of sheep from approximately 1,450 to 2,500 head (refer to Appendix 5) by the end of the interim implementation period.

Under this alternative by 2017, there would be a 7 percent decrease in yearlong sheep AUMs (from the 1980-2006 average authorized sheep use) which would impact two sheep permittees by decreasing the number of animal units of sheep use they would graze on public land within the GMCA. This alternative would not change the performance of individual animals but would decrease the number of sheep from approximately 2,700 to 2,500 head (refer to Appendix 5) by the end of the interim implementation period.

Long Term Sheep

Under this alternative by 2027, there would be a 160 percent increase in yearlong sheep AUMs (from the 1999-2006 average authorized sheep use) which would impact two sheep permittees by increasing the number of animal units of sheep use they would graze on public land within the GMCA. This alternative would not change the performance of individual animals but should increase the number of sheep from approximately 1,450 to 3,800 head (refer to Appendix 15) by full implementation of the AMP in the long-term.

Under this alternative by 2027, there would be a 40 percent increase in yearlong sheep AUMs (from the 1980-2006 average authorized sheep use) which would impact two sheep permittees by increasing the number of animal units of sheep use they would graze on public land within the GMCA. This alternative would not change the performance of individual animals but should increase the number of sheep from approximately 2,700 to 3,800 head (refer to Appendix 15) by full implementation of the AMP in the long-term.

Long Term Dual Use

From implementation of this alternative, a long-term increase in AUMs is predicted. By 2027, it is expected that there would be an improvement in upland range condition of at least one-half condition class resulting in fewer acres in low seral (poor) condition; fewer acres in mid seral (fair) condition; more acres in late seral (good) condition; and more acres in potential natural community (excellent) range condition (USDI-BLM, 1979). Improvement in upland and riparian forage conditions in the long-term would result in an increase in dual use (cattle and sheep) AUMs. However, the condition of riparian areas outside the riparian management pastures (approximately 1,360 acres or 66 percent of the public land total) is expected to remain static or further decline. Deferred-rotation grazing systems were evaluated by Platts and Nelson (1989). These systems were rated as fair for improving stream and riparian habitats (refer to Appendix 20).

Range Improvements

Table 4-22 lists the proposed range improvements and estimated project costs for their construction and installation at \$989,640 to \$1,063,210. Table 4-23 shows estimated maintenance costs for the proposed range improvements at \$13,075 per year. The estimated construction costs would range from \$2.11 to \$2.27 per public land acre or \$20.90 to \$22.45 per public land AUM. Under this alternative, it is proposed these improvements would be completed by the end of year 20 (2027) and would be funded 50 percent by the BLM (out of range betterment funds) and 50 percent by the grazing permittees and other cooperators. The maintenance responsibility of the proposed projects would be assigned to individual grazing permittees or a formally recognized permittee grazing association

**Table 4-22. Construction and Labor Requirements
For the Proposed Range Improvement Projects under Alternative Two**

Year	Project	Units/Miles	Cost ¹	Total
2-20	Three-wire (Use Area/Pasture Boundary)	66 miles	\$4,840 mile	\$ 319,440
2-5	Riparian Pasture Fencing (1 Pasture/Year)	32 miles	\$4,840 mile(barbed)	\$154,880
			\$2,541 mile (permanent or temporary electric)	\$ 81,310
2-20	Cattleguards (1 each/Year)	1	\$3,207 2-lane-24'	\$ 3,210
		16	\$1,694 1-lane-12'	\$ 27,100
2-10	Spring Development (Includes Fencing) (3 Each/Year)	5+	\$ 3,630 each	\$ 18,150+
4-5	Reservoir Construction	2	\$ 7,261 each	\$ 14,520
2-20	Water Well Development (new)	10	\$31,462 each	\$ 314,620
11-13	Water Well Development (existing)	2	\$ 9,680 each	\$ 19,360
3-9	Water Well Development (existing)	4	\$ 6,050 each	\$ 24,200
3-19	Water Pipelines (6) (4-5 miles/year)	22 miles	\$ 7,624 mile	\$ 167,730
	Exclosure (Artesian Wells Wetland Fencing)	0 miles	\$ 4,840 mile	\$ 0
	TOTAL (Barbed Wire Fence)		(\$2.27/public land acre)	\$1,063,210
	TOTAL (Permanent Electric Fence)		(\$2.11/public land acre)	\$989,640

¹ Cost information on file in the Lander Field Office.

Table 4-23. Estimated Maintenance of Proposed Range Improvements for Alternative Two

Type of Improvement	Number of Units	Annual Maintenance Cost/Unit ¹	Total Annual Maintenance Cost	Estimated Life of Improvements
Springs	5+	\$121	\$ 605	20+ Years
Wells	16	242	3,870	20+
Pipelines	22 (miles)	61	1,370	20+
Reservoirs	2	120	240	20+
Three-wire Fence	66 (miles)	61	4,030	20+
Riparian Pasture Fence	32 (miles)	61	1,950	20+
Cattleguards	17	61	1,040	20+
Exclosure Fence	0 (miles)	61	0	20+
		Total:	\$13,075	

¹Cost information on file in the Lander Field Office.

depending on the type and location of project. These projects would be designed to solve the water and livestock distribution problems present on the allotment. Nevertheless, the lowland (adjacent to existing waters) areas within the Arapahoe, Antelope Hills-Picket Lake, Green Mountain, and Happy Springs Use Areas would remain static or decline in vigor and condition due to the offsetting increase (51 percent from 1980-2006 average or 108 percent from 1999-2006 average) in the grazing intensity.

The proposed water developments listed in Table 4-21 would enable the cattle to graze much more of the allotment, making approximately an additional 4,000 to 13,100 summer cattle AUM's available (from the 1999-2006 authorized use levels). This would allow increases in cattle numbers both in the interim and long term, leading to an increased income potential for the grazing permittees in the interim and long-term.

Herding

Under this alternative, the permittees have requested increased flexibility, particularly related to herding cattle. All of the allotments would 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. Pasture rotation would be a phased movement of the cattle from one pasture to the next occurring over a five to eight day period. The higher level of proposed range improvements listed in Table 4-21 would be installed to make the herding program more manageable and less costly for permittees. Nevertheless, experience on GMCA has shown that cattle have congregated and stayed around water sources or spring developments in a rested or deferred pasture or riparian management pasture when effective herding has not occurred. The reduced level of herding proposed under this alternative, may prevent problems of this nature provided "range riders" monitor cattle locations and utilization levels.

Livestock operators in the allotment would benefit by the proposed pasture and riparian management fencing and use area/ pasture rotation because their cattle would be confined in a smaller area than presently. Although moving cattle during the summer (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-half 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).

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

Under Alternative Two, the GMCA would be subdivided into six new allotments. The location and distribution of livestock within these new allotments would be controlled by a combination of fences, water developments, and grazing prescriptions (rest-rotation or deferred-rotation) that would vary from allotment to allotment, depending upon permittee choice. Herding would be used only to rotate livestock from pasture to pasture. Depending upon

where and how these projects and techniques are used, impacts to wildlife and special status species would also vary across the area. Consequently, these impacts are analyzed separately according to the allotments in which they have been proposed. The proposed allotments for Alternative Two are as follows:

- 1) Happy Springs Proposal:** This proposed new allotment would lie between Crooks Mountain and Highway 287 east and south of Sweetwater Station. Eight miles of new east/west fence would divide the Happy Springs Allotment into a north and south pasture for a proposed two-pasture, deferred rotation grazing system. Two pipelines from existing wells with several water troughs are proposed.
- 2) Haypress Proposal:** The proposed Haypress Allotment would also lie between Crooks Mountain and Highway 287, but east of the proposed Happy Springs Allotment. Proposed range improvements would include 23 miles of new fence, a developed spring (also fenced), and six miles of pipeline to transport water from the spring development to at least four trough locations. These fences and water developments would provide for a three-pasture rest-rotation grazing system. Under this plan, two pastures would be grazed and a third rested each season.
- 3) Green Mountain Proposal:** The proposed Green Mountain Allotment would lie in the northeast corner of the current GMCA, south of Highway 287 and east of Crooks Creek. As such, it would occupy most of the top of Green Mountain, as well as parts of the north and south sides. Proposed range improvements include 11 miles of new fence (includes two fenced springs), four miles of pipeline, and a holding pasture. These projects would provide for a four-pasture deferred-rotation grazing system.
- 4) Arapahoe Proposal:** The proposed Arapahoe Allotment would include the area south of Crooks Mountain, east to the Field Office boundary, west to the Bison Basin road, and south into Great Divide Basin in Sweetwater County. This portion of the GMCA has fewer natural water sources than other areas, so the Arapahoe proposal includes plans to drill three new wells, re-drill and re-equip three others, develop two springs, and install two miles of pipeline to carry water from existing wells. Further proposed is a 14 mile-long north/south fence that would divide this new allotment for a two-pasture deferred-rotation grazing system.
- 5) Antelope Hills/Picket Lake Proposal:** The proposed Antelope Hills/Picket Lake Allotment would include all those areas of the GMCA west of Bison Basin Road. Included in this proposal are 23 miles of new fence, seven additional wells, five spring developments, and one new reservoir. These projects would be part of a three-pasture deferred-rotation grazing system.
- 6) Alkali Creek Sheep Proposal:** This remaining area not included in other allotment proposals lies in the approximate center of the existing GMCA in the vicinity of East Alkali Creek. It was established as a seasonal pasture for sheep in the 1999 Decision, and it is not used during the summer. No additional range improvements are proposed for this allotment.

Abundance and species diversity of nongame wildlife, game birds, fish species, special status species, and big game is dependent largely upon habitat quality. High quality habitat (as defined in Chapter Three) is characterized by having diverse age structure and plant species composition, as well as close proximity to water (riparian habitat). Consequently, the degree to which these species are impacted by the various proposals analyzed here is also largely dependent upon whether these habitat components are improved or diminished.

As most of the proposed allotments would include various combinations of range improvements, the impacts associated with these improvements are described as follows:

- 1) Fencing:** 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 movement. Sheldon (2005) found that pronghorn chose their seasonal home ranges in areas of lower fence density, including wildlife friendly fence. Even wildlife friendly fences tend to cause big game animals to hesitate and expend extra energy attempting to find a way through. In situations where passage over or under a

fence is further complicated by sudden snowfall, a fence can become an insurmountable barrier to migration. Techniques such as double gates and let-down sections do not entirely mitigate impacts associated with fences.

Fences also present additional problems to sage-grouse. Sage-grouse tend to fly near the ground, and collisions with fence wire (especially electric fence wires) serve as added causes of mortality. In areas of sage-grouse breeding and nesting, fence posts provide perching raptors a vantage point from which to observe and pick off sage-grouse on the ground. As sage-grouse activity is extensive throughout the GMCA, the location of fences in avoiding sage-grouse will only partially mitigate this impact.

Lastly, fences tend to concentrate livestock in certain areas. This impact, coupled with any increase in livestock numbers, increases the likelihood of trampling or disturbing the nests of sensitive bird species such as the ferruginous hawk, sage sparrow, loggerhead shrike, Brewer's sparrow, sage thrasher, and greater sage-grouse.

2) Water developments: Water developments, which may include wells, reservoirs, and spring developments, may also be useful to distribute livestock and to provide previously unavailable water sources for wildlife. However, during hot season use, livestock tend to congregate around such water sources, compacting the soil and denuding the vegetation. Placement of a water development typically creates a sacrifice area of up to five acres. Depending upon the area, such a concentration of livestock may increase the likelihood of sage-grouse nest trampling. Water developments also tend to attract predators because they concentrate prey species (e.g., sage-grouse) in areas where they may not have been before. Lastly, water developments provide breeding habitat for mosquitoes which may carry West Nile Virus (WNV). This disease, though occasionally fatal to humans, is almost always fatal to sage-grouse and various other bird species. The placement of water developments away from preferred nesting areas will only partially mitigate these impacts. Routine use of mosquito larvicide in water developments would help mitigate the threat of WNV.

3) Pipelines: Installation of pipelines used to move water from wells or spring developments removes forage-producing plants, cover for sage-grouse and other ground-nesting species, and also produces a disturbance that will take many years to heal. Location of pipelines within existing disturbances such as roads can be used to mitigate this impact.

Nongame Wildlife and Game Birds

Happy Springs

As mentioned earlier, improvement of habitat for nongame species and game birds depends largely on improvement of riparian areas in terms of age class and plant species diversity. This new allotment would include the Ice Slough and part of the Warm Springs riparian pastures. Other riparian areas not excluded from livestock grazing would be exposed to too many days of grazing each season to achieve any substantial improvement.

Haypress

Again, improvement of habitat for nongame species and game birds depends largely on improvement of riparian areas. Although this is the only proposal for a rest-rotation system under Alternative Two, the planned three-pasture system would require two pastures to be grazed heavily each year. While a year of rest would certainly benefit unfenced riparian areas, two subsequent years of heavy grazing would tend to undo any improvement.

Green Mountain

The five-pasture rotation proposed for this allotment would provide for less-intensive (fewer days) grazing in riparian areas than would the two- and three-pasture systems. However, BLM Technical Reference 1737-14 (1997) only ranks deferred grazing as a "4" on a scale of one to ten in its potential for improving riparian areas. Without improvement of riparian habitats, wildlife and fisheries habitats farther downstream are unlikely to improve.

Arapahoe

This proposed new allotment already includes one fairly large riparian pasture (West Crooks Creek) and a number of smaller riparian protective enclosures. However, for those riparian areas that remain unfenced, the same situation would exist as in the Happy Springs proposal. A two-pasture rotation would simply have livestock grazing in riparian areas for too long of a period during the hot season to achieve any improvement in conditions.

Antelope Hills

A number of riparian areas important to nongame wildlife and waterfowl occur within this proposed new allotment. Among these are Picket, Scotty, and McKay Lakes. The largest of these natural water bodies, Picket Lake, is excluded from livestock grazing by fence. This lake is important to migrating ducks and other waterfowl species. In addition to Picket Lake, a number of other important springs and associated riparian areas throughout this proposed allotment are excluded from grazing. Riparian habitat within these enclosures continues to improve steadily. However, riparian habitat essential to nongame, game birds, and special status species is likely to improve very little under a three-pasture grazing plan for reasons already discussed.

Alkali Creek Sheep

East Alkali Creek flows through this proposed allotment. Although some improvement in riparian habitat could be expected from excluding summer sheep grazing, no boundary fencing is proposed. Because cattle may be to drift into this area from adjacent allotments, improvement of the riparian areas may not be realized from hot season rest.

Big Game

Happy Springs

The proposed eight-mile fence would subdivide an extensive area of winter/yearlong pronghorn antelope range, and it would lie across the path of antelope migrating from the area around Crooks Mountain to their crucial winter range around Ice Slough (see Map 3-6).

Haypress

The north half of this proposed allotment is mostly antelope crucial winter range. Proposed fences would lie through this range, and also across the path of antelope moving north toward it in the fall.

Green Mountain

This proposed allotment encompasses most of the Green Mountain Area of Critical Environmental Concern (ACEC), previously established because of its importance as elk and mule deer crucial winter range and elk calving habitat. Two of the fences included in this proposal bisect this ACEC in two separate areas, dividing part of the crucial winter range from elk calving areas.

Arapahoe

Most of this proposed allotment is important seasonal range for antelope and elk. Antelope use this area as far north as the Crooks and Green Mountains; they then migrate south into lower elevations at the onset of winter. Elk graze in the lower areas in the summer, and they either migrate south or winter on top of Green and Crooks Mountains (see Map 3-4). Most of the southern boundary of this proposed allotment is either unfenced or separated from the Rawlins Field Office (RFO) by a seasonal let-down fence. Under current conditions, the proposed 14-mile north/south fence would not impede migration as much as an east/west fence. However, proposals have recently been made by permittees in the RFO (Stewart Creek Allotment) to either permanently fence the boundary, or to leave the let-down fence up well into the migration period (see Cumulative Impacts).

Antelope Hills

This proposed allotment is spring-summer-fall range for antelope. At the onset of winter, those animals using the northeast part of this area migrate to the east to crucial winter range, and those animals using the south and west portions migrate to the south into the Rawlins Field Office. Much of the west part of this proposed allotment is elk crucial winter range. Moose wintering along the Sweetwater River may also use the side drainages (i.e. Granite, Mormon, and Willow Creeks). Portions of the 23 miles of new fence proposed for the Antelope Hills/Picket Lake Allotment would lie across seasonal migration routes for antelope and elk.

Alkali Creek Sheep

This proposed allotment does not include any big game crucial winter range. It is used primarily as spring-summer-fall range by the Red Desert antelope herd that migrate southward at the beginning of winter. Because there are no proposals for new fences, big game migration would not be impacted by this proposed allotment.

Fisheries

Happy Springs

All the existing natural water sources in the proposed allotment are ephemeral and do not include fisheries habitat.

Haypress

The proposed Haypress allotment includes portions of Cottonwood, Haypress, Nancy, Wood's Gulch, and O'Brian Creeks, all of which are perennial. Several of these streams are classified by the Wyoming Game and Fish Department (WGFD) as trout fisheries. Without improvement of riparian habitats, wildlife and fisheries habitats are unlikely to improve.

Green Mountain

This proposed allotment contributes to both Cottonwood Creek on the north side of Green Mountain and Crooks Creek on the south. Both streams are classified by the Wyoming Game and Fish Department (WGFD) as trout fisheries. Without improvement of riparian habitats, wildlife and fisheries habitats farther downstream are unlikely to improve.

Arapahoe

Most of this proposed allotment lies in the Lost Creek drainage which is highly ephemeral and of little importance as fishery habitat. However, certain northern portions of this area drain into either Crooks Creek or Alkali Creek - both of which are classified as trout streams by the WGFD. As mentioned above, without improvement of riparian habitats, wildlife and fisheries habitats farther downstream are unlikely to improve.

Antelope Hills

The east side of this proposed allotment contributes to the West Alkali Creek drainage, while much of the west side contributes directly to the Sweetwater River via Granite Creek, Mormon Creek, and Willow Creek (Sweetwater Canyon). Alkali, Mormon, and Willow Creeks are all classified as trout waters, as is the Sweetwater River. Again, improvement of these fisheries habitats is dependent upon improvement in riparian habitat upstream.

Alkali Creek Sheep

East Alkali Creek is a principal tributary of Alkali Creek, a designated trout stream. As previously mentioned under the discussion of the Arapahoe proposal, improvement in riparian conditions is essential to improving fisheries habitat.

Special Status Species

Happy Springs

This proposed allotment includes portions of four sage-grouse lek/nesting complexes and an extensive area of suitable nesting habitat. The proposed fence would lie across this nesting habitat. Some improvement in riparian habitat associated with the aforementioned riparian pastures would benefit the grouse, but these projects also include the adverse impacts described above.

Haypress

This proposed new allotment includes portions of five sage-grouse lek/nesting complexes and extensive suitable nesting habitat. The proposed west boundary fence would lie very close to two of these leks, and interior cross fencing would lie within the nesting habitat.

Green Mountain

The proposed Green Mountain Allotment does not include any known sage-grouse leks. However, suitable nesting

habitat does exist in large, open parks on the mountaintop. Being partly forested, this area is more important to such raptor species as the Northern goshawk and Cooper's hawk, as well as to bats that may roost seasonally in the trees. Generally speaking, livestock grazing does not impact enough of these species' habitat to be of concern.

Arapahoe

The proposed Arapahoe Allotment includes all or portions of 25 sage-grouse lek/nesting complexes and some of the most productive nesting areas in the Lander Field Office. The proposed 14-mile fence and at least five of the proposed water developments would fall within two miles of a lek.

In addition to sage-grouse, this proposed allotment also contains suitable habitat for sagebrush obligate species such as the pygmy rabbit, sage thrasher, loggerhead shrike, Brewer's sparrow, and sage sparrow. These species are generally not adversely impacted by moderate levels of livestock grazing, but they could be impacted by the loss of habitat that would result from water developments, pipelines, or other surface disturbance.

Antelope Hills

This proposed allotment includes all or portions of 13 sage-grouse lek/nesting complexes. Part of the proposed 23 miles of fencing will fall across one of these complexes, and at least four complexes would contain water developments. In addition to sage-grouse, this proposed allotment also contains suitable habitat for sagebrush obligate species such as the pygmy rabbit, sage thrasher, loggerhead shrike, Brewer's sparrow, and sage sparrow. As previously mentioned, these species are generally not adversely impacted by moderate levels of livestock grazing, but they could be impacted by the loss of habitat that would result from water developments, pipelines, or other surface disturbance.

Alkali Creek Sheep

The proposed Alkali Creek Sheep Allotment would include all or part of four sage-grouse lek/nesting complexes. These would not be impacted by range improvement projects, as no range improvement projects are proposed. However, improvement in riparian habitat vital to sage-grouse and other special status species is unlikely to occur.

EFFECTS ON WILD HORSES (Alternative Two)

All of the impacts described in Alternative One would also occur in Alternative Two. In addition, Alternative Two would result in more impacts to wild horses than would Alternative One. The primary difference between Alternative One and Alternative Two is the amount and type of developments. Alternative Two proposes more range improvements (water, fencing, and various grazing systems) than Alternative One, and many of these projects would impact all of the HMA's that are relatively unfenced. The impact of authorizing up to 76 percent of permitted use under this alternative (long term) would increase the competition for forage between domestic livestock and wild horses. Such high stocking levels would result in decreased herd health and vigor. A severe winter and/or drought conditions would compound this effect by increasing the potential herd mortality.

Alternative Two's minimal livestock herding would be used only to rotate livestock from pasture to pasture. Depending upon where and how these projects and techniques are used, impacts to herd management areas would also vary across the allotment. Consequently, these impacts are analyzed separately according to the HMA's in which they have been proposed.

Antelope Hills/Cyclone Rim

Two projects of particular concern in the Antelope Hills/Cyclone Rim HMA are the proposed Granite Rocks Fence and the proposed partial temporary/permanent north/south section of fence, which amounts to approximately 27 miles of new fence. These projects would trisect the Antelope Hills/Cyclone Rim HMA, preventing free movement of horses to major portions of the HMA. These fences would also concentrate horses into smaller pastures during the summer months. These projects would block the normal migration patterns and routes from summer pastures to winter ranges. During a normal year, snow depths can vary from a few inches on windblown slopes to many feet of snow in draws and ravines. Temperatures can vary from 20 to 30 degrees above zero to minus 50 or 60 degrees below zero with wind chill factors. The additional fencing within the herd area could cause the loss of 1-3 horses per year, which in the absence of these fences, would otherwise have lived. These animals would become trapped in

corners or in an area with deep snows and little forage to support them. It is also estimated that approximately once every 20 to 30 years, a very severe winter in combination with these fences, could result in the deaths of approximately 60-80 horses. This occurred in the Green Mountain HMA in the mid 1980's when horses became trapped behind the district boundary fence and could not move to winter ranges.

An indirect effect of these fences and the death of horses would be the loss of genetic diversity. Genetic diversity in this herd area has been dependent upon the interchange of genetic material from Crooks Mountain, Lost Creek and the Divide Basin HMA's. These fences would tend to isolate the herd and prevent interchange from occurring. In isolation with no genetic interchange taking place, more horses would be needed in the population to maintain genetic diversity. However, increasing the population size may not safeguard the wild horse population, as previously discussed. Wild horses have limited ability to negotiate fencing in the deep snows common to the HMA, and as a result, chances of a winter die-off would increase. Temporary fencing during the livestock use season would further restrict the wild horse's ability to roam freely within the HMA.

The proposed deferred-grazing system for this portion of the allotment could improve upland range vegetation over a long period of time. However, current evaluations of deferred-grazing systems do not improve or heal riparian habitats over time. 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 not be offset by the expected improvement of upland ranges.

Crooks Mountain

The fencing (approximately 27 miles) and proposed grazing system for the north side of Crooks Mountain is located in the heart of the Crooks Mountain Wild Horse HMA. The proposed fencing would severely limit any ability for wild horses to migrate from the summer range on Crooks Mountain north to the winter range in the Ice Slough area. This fencing would also isolate the population from interchange between the other two HMAs that ensure genetic viability for the herd. With the new fencing, the current population (65-85 adult horses) may need to be increased. However, increasing the population size may not safeguard the wild horse population, especially when the deep winter snows limit the horses' ability to negotiate fencing. This overall limitation would increase the chances of a winter die-off. The same discussion on estimated deaths and severity of winter conditions that was mentioned in the Antelope Hills/Cyclone Rim HMA applies here also. The increased fencing would have the same effects as described above in the Antelope Hills/Cyclone Rim HMA.

Green Mountain

The fencing (approximately 33 miles) and proposed grazing system for that portion of the Green Mountain Allotment that lies to the north of Crooks Creek would cut off any interchange between horses of the Crooks Mountain HMA, and would severely limit interchange with the Stewart Creek HMA. It would cut off any migration from Green Mountain proper (spring-summer-fall range) to critical winter ranges to the south and west along Crooks Creek. Wild horses have limited abilities in negotiating fences in deep snows, and fencing in these areas would increase the chances of a winter die-off. The same discussion on estimated deaths and severity of winter conditions that was mentioned in the Antelope Hills/Cyclone Rim HMA applies here also. The increased fencing would have the same effects as described above in the Antelope Hills/Cyclone Rim HMA.

Under this alternative in the long term, the wild horse numbers would decline below AML. Such a population decline would reduce visitor days as much as 90 percent. This would amount to the loss of approximately 400 visitor days among the three HMA's. Also, foregone would be the opportunity to develop any one of the three HMA's as a wild horse scenic route.

EFFECTS ON CULTURAL RESOURCES (Alternative Two)

Prehistoric Sites

Alternative Two is projected to continue and, in some years, increase the current level of impacts on natural water sources and riparian areas from intensive livestock trampling and congregation. Eleven known significant prehistoric sites would be affected under this alternative. Not-yet-discovered sites along riparian zones affected by

this alternative are predicted to number approximately 600. Alternative Two would cause direct adverse effects on these sites (as defined in the NHPA and Wyoming State Protocol) through livestock trampling and congregation impacts (see Appendix 3).

Historic Trails and Sites

Under this alternative, two new fences are proposed to cross segments of the Seminole Cutoff National Historic Trail. These fences would cause a “moderate” or “strong” contrast upon the Seminole Cutoff in two highly pristine locations; therefore, Alternative Two will cause adverse effects (as defined in the NHPA and Wyoming State Protocol) upon the Seminole Cutoff. The fences proposed in this alternative also do not conform to decisions and policies in the BLM Wyoming Oregon/Mormon Pioneer National Historic Trails Management Plan and the 1987 Lander RMP (see Appendix 3). In addition, a proposed pipeline would be built directly on a significant segment of the Rawlins-Fort Washakie Stage Trail, as would one trough. The pipeline and troughs would cause direct and visual adverse effects (as defined in the NHPA and Wyoming State Protocol) through construction and livestock trampling impacts. Alternative Two’s impacts on National Historic Trails and the Rawlins-Fort Washakie Stage Trail are shown in the following table:

Table 4-24. Historic Trails and Sites Affected by Proposed Range Projects under Alternative Two

Known Affected National Historic Trails	Two new fence crossings of the Seminole Cutoff NHT. Two total adverse effects (as defined in the NHPA and Wyoming State Protocol)
Known Affected Statewide Significant Historic Trails	2.5 miles of new pipeline and one trough installation on the Rawlins-Fort Washakie Stage Trail. Two total adverse effects (as defined in the NHPA and Wyoming State Protocol)

Alternative Two is also projected to continue and, in some years, increase the current level of impacts on natural water sources and riparian areas from intensive livestock trampling and congregation. Five riparian area crossings of the Seminole Cutoff National Historic Trail, and a site associated with the Seminole Cutoff (Immigrant Spring) are already known to be suffering from livestock trampling and congregation. Without herding or other measures to prevent intensive hot season grazing, it is projected that Alternative Two would also continue and, in some years, increase direct and visual adverse effects on these sites (as defined in the NHPA and Wyoming State Protocol) through livestock trampling and congregation impacts.

As shown in Table 4-17 (see Alternative One, Cultural Resources section), it is projected that this alternative’s long-term impacts would cause more impacts to prehistoric sites, National Historic Trails, other historic trails, and historic sites than Alternatives One, Three, and Four.

EFFECTS ON RECREATION, VISUAL RESOURCES AND OPEN SPACE (Alternative Two)

GMCA

Range improvements and actions authorized under the proposed action would alter the recreation settings discussed in the affected environment. Changes to the GMCA recreation setting resulting from the full implementation of Alternative Two include:

Short Term Setting Changes

1) Contacts with other groups - During the implementation phase of the proposed action, individuals and contract crews would be out on the allotment on a consistent basis. This would increase the occurrences of contacts with other groups in the allotment in and along travel routes to project areas. This change would compound (for a five to ten -year time period) the social setting trend documented in the affected environment.

Long Term Setting Changes

1) Remoteness Indicator - Most range improvements result in additional new roads for maintenance and access to the improvement site. These new roads would influence the remoteness character in a manner that demonstrates a setting indicative of that in a middle country physical recreation environment. As a result, those back country

settings that exist within one-half mile of or are bisected by these range improvements, along with access roads, would either no longer exist, be drastically reduced in acreage, or become fragmented. Approximately 16% of the 9313 acres of back country settings within the allotment would demonstrate this trend after the full implementation of Alternative Two.

2) Naturalness Indicator - The naturalness indicator (an important indicator to recreational experiences and benefits on the allotment) in and around the range improvement sites would demonstrate a setting indicative of that in a front country environment. This would intensify the trend documented in (back country and middle country) areas within view and adjacent to all proposed new fences and water developments. At the point in time when all the range improvements proposed under Alternative Two are implemented in the GMCA, the recreation naturalness indicator (of the Physical Setting) would shift to a front country environment; this is a change from the dominant setting. This change would occur on approximately 34% of the 299199 acres of back and middle country physical settings in the allotment

3) Evidence of Use Indicator - continued maintenance and monitoring of the range improvements proposed under alternative two would result in an evidence of use indicator (in and around these improvements) indicative of a middle country environment. All improvements within primitive or back country settings would alter the social setting around the project area to a middle country environment. These changes would compound the trends throughout the allotment. This change would be demonstrated on 15% of the 298, 988 acres displaying an evidence of use indicator indicative of primitive or back country settings.

4) Mechanized use indicator - the increase in motorized use in proximity to range improvements would also produce an administrative setting indicative of that in middle country environments. All improvements in primitive and back country administrative settings would alter the area in and around the improvement towards a middle country setting. This change would compound the trend indicated in the affected environment section. This change would occur on approximately 16% of the 9313 acres currently demonstrating a mechanized use indicator of primitive and back country settings.

The extensive amount of new fence installation throughout the allotment would remove the unique “situational attribute” documented in the affected environment. Sanderson et al 1986 found that as management activities (such as fencing) for livestock management increased visitor demand or enticement for an area decreased. Therefore, the extensive amount of new fencing proposed for this alternative would decrease visitor demand or enticement for the GMCA. This loss of a situational attribute would alter the available/realized experiences and benefits in the area. Long distance, non-motorized, cross country travel of great distance would no longer be an activity available to or a means of participating in the ‘other’ activities in the allotment. Those recreationists who travel cross country by foot would be able to negotiate the obstacles; in contrast, this change would especially limit recreationist who choose to utilize horses to recreate in the allotment. Alternative Two would remove the future management option of managing the unfenced quality for recreationist.

The impacts resulting from the general setting and situational attribute changes, as a result of range improvements/herding and management techniques, would alter the recreation experience and benefits available for customer realization within the allotment. The modification of the setting and outcome components that make the area unique would synergize with the area’s overall distance from population centers to produce a general reduction in visitor use.

The changes to setting indicated above for the general allotment would be reflected across all recreation features. The table below demonstrates the percentage of acres modified within recreation features as a result of alternative two. It is important to note that these figures are calculated based on the total area altered within the feature divided by the current availability of the setting (that is altered) within the affected feature. Therefore these figures exclusively represent the overall change to the recreation feature.

Table 4-25. Recreation Feature Percent Change in Existing Setting (acres) by Indicator

Recreation Feature Percent Change in Existing Setting (acres) by Indicator				
	Physical Indicators		Social Indicators	Administrative Indicators
Feature	Remoteness (to middle country)	Naturalness (to front country)	Evidence of use (to middle country)	Mechanized use (to middle country)
Big Game Hunting	.93%	5.26%	5.25%	.93%
CDNST	21.11%	25.78%	25.79%	20.25%
Green Mountain	.02%	9.06%	9.15%	.02%
NHT	1.99%	9.37%	9.37%	1.99%

General Public Big Game Hunting Recreation Feature

Alternative Two would alter the general setting of the recreation feature as demonstrated above. The new water developments and fences proposed under Alternative Two constitute a reduced habitat quality; in addition, the forage utilization levels and riparian area condition would remain at levels and continue trends similar to those discussed in the affected environment. As a result of setting changes and the reduction in habitat and forage quality, the General Public Big Game Hunting Recreation Feature would absorb a diminished recreation setting and reduced experience and benefit availability. Consequently, hunters who historically chose to recreate on the allotment for its distinct experiences and benefits would be forced to travel outside of the analysis area in search of their desired experiences and benefits.

Continental Divide National Scenic Trail Special Recreation Area

In addition to the general recreation setting impacts to the CDNST demonstrated above, visual impacts to the trail corridor would result from three perpendicular crossings of the trail. The change to the visual environment would meet visual resource objectives as established in the BLM LFO resource management plan; however these changes would diminish or lower the realization rate of the recreation experiences and benefits.

In the short term, Alternative Two would cause livestock encounters along the CDNST to continue to be high around riparian areas and dispersed campsites adjacent to these riparian areas. Alternative Two proposes range projects to facilitate livestock distribution and a deferred rotation grazing system. However, increased stocking rates would offset the aforementioned benefits. As a result, it is anticipated that hiker encounters with livestock would increase in the long term. Alternative Two would not reduce experience inhibiting encounters with livestock for visitors who recreate in pastures that contain cattle or have recently contained cattle. Experience inhibiting encounters could include livestock: in or near camp, in riparian areas, on or near trails, in meadows, manure in camp, tracks in riparian areas, trampled areas, and odors (Wallace et al 1996). These impacts would be slightly offset by a) the increase in upland vegetation expression and b) reduced negative livestock encounters in deferred pastures and pastures exhibiting substantial recovery/re-growth. It is important to point out that the nature (need for water) of traveling along the CDNST requires hikers to stay close to riparian areas; therefore grazing alternatives (such as Alternative Two) that do not propose extensive herding to improve riparian vegetation would likely result in increased grazing pressure in these areas and subsequent increased overall encounters with livestock.

Green Mountain Recreation Feature

Impacts to general recreation settings are anticipated in the Green Mountain Recreation Feature and therefore it is anticipated that these changes would reduce the availability of preferred activities experiences and benefits for recreationists using the area.

National Historic Trail Recreation Special Recreation Area

In addition to the general setting impacts documented above, the proposed action would alter the undeveloped nature of the Seminole Cutoff portion of the NHT, this change would result in more homogeneity in recreational

settings and experiences and benefits across the entire NHT corridor.

Alternative Two would decrease the visual quality of the vegetative component during and after use periods. In addition the construction of 3 fences that run perpendicular to the trail would introduce an unnatural/linear/symmetric human modification to the view shed. Over 20 years Alternative Two would also degrade the visual quality of the vegetative component through continued reduction of variety and contrast. The annual loss of the movement and color contrast components (key factors in drawing a visitor's attention to the landscape) rendered in riparian vegetation would continue under proposed deferred rotational grazing system proposed for Alternative Two. Sanderson et. al., (1986) found that customer or visitor preference for a landscape decreased, as grazing intensity increased. Long term recovery of this element in riparian areas would be variable: 1) the warm springs riparian enclosure area would continue upward trends, 2) the area contained within the Granite Creek Rocks Pasture fence would be static to slightly upward, and 3) the area unfenced from the general allotment would decline due to the lack of rest and herding, and increased stocking levels. These impacts would be slightly offset due to the expected increase in upland plant expression and vigor. In addition impacts discussed above would be less noticeable during periods of deferment or in pastures that demonstrate re-growth and recovery. As a result of the short term slightly degraded visual environment and the alteration of the general recreation settings, the available recreational experiences and benefits on the GMCA portion of the National Historic Trail Special Recreation Management Area would be reduced or altered.

EFFECTS ON WILDERNESS STUDY AREAS AND WILD AND SCENIC RIVERS (Alternative Two)

Table 4-26 contains a discussion of each required WSA value/data element and determines whether the level of impact from the action exceeds maximum allowable standards as directed by the Interim Management Policy for Lands under Wilderness Review.

Table 4-26. Predicted Impacts to Wilderness values as a result of Alternative Two

Wilderness Value Indicator	Impact Description	Will the Impact Exceed Maximum Allowable Standard
Visual resource	Full implementation of Alternative two would result in slight change to the visual resource. Moderate loss of the vegetation component in riparian system would result in a loss of the movement element created by these taller grasses. These impacts would be offset due to the expected increase in upland plant expression and vigor. In addition impacts discussed above would be less noticeable during periods of deferment or in pastures that demonstrate re-growth and recovery. Prior to the grazing season (especially during the pastures deferment period) this change would be less obvious to the casual observer. Long term condition of riparian vegetation would be static or declining due to the lack of rest, lack of livestock herding, lack of utilization triggers, and increased stocking levels proposed for this alternative	No if 1999 decision utilization standards are implemented.
Naturalness and Solitude		
Human Activity	Alternative 2 proposes no active herding to keep livestock away from riparian areas. Therefore the level of human activity would not change as a result of the actions authorized.	No
Wildlife Presence	Based on the increase in stocking rates and the lack of active livestock herding proposed for alternative 2 it is anticipated that the subsequent evidence of livestock (especially in riparian areas) would increase. This change would alter visitor experience on a localized level, in or near unfenced riparian areas. Further analysis below	No if 1999 decision utilization standards are implemented.
Primitive Recreation		
Recreation Opportunities	Alternative 2 proposes no new projects in the WSA, additionally the main feature of the WSA is un-affected by livestock grazing resulting from this AMP. The above factors cause no change to the recreation setting and therefore no change to the corresponding opportunities of the WSA as a whole.	No if 1999 decision utilization standards are implemented.
Natural Appearing Environment	Moderate reduction in the naturalness component of the recreation setting would occur in the riparian areas outside the Sweetwater Canyon Fence. This reduction is a result of poor riparian functionality and increased presence of livestock. In the long term the full implementation of the alternative would decrease riparian functionality and increase visitor encounters with livestock. This would impact recreation opportunities dependent on the natural appearing environment in the localized areas along unfenced riparian areas.	No if 1999 decision utilization standards are implemented.
Special feature	No changes to the Sweetwater canyon corridor would occur as a result of this alternative	No
Surface Water	Further analysis below	No
Vegetation		
Ecological Site Inventory	Decline in seral condition could result from this alternative. Without stubble height and utilization triggers for livestock	No if 1999 decision utilization standards

	removal, managers would have to use “other means” to work toward an upward trend.	are implemented.
Vegetation Utilization	This alternative does provide for monitoring of utilization. However, livestock would not be moved based on utilization standards. In order to avoid exceeding maximum allowable use levels, utilization standards in the Granite Creek Rocks Pasture would be implemented as discussed under alternative one, the existing management.	No if 1999 decision utilization standards are implemented.
Plant Vigor	A long term decrease in plant vigor could result from this alternative. Without stubble height and utilization triggers for livestock removal, managers would have to use “other means” to improve riparian and upland range conditions.	No if 1999 decision utilization standards are implemented.
Wildlife		
Wildlife habitat	Without herding to achieve distribution, livestock grazing would tend to increase in riparian habitats, causing a decline in quality. Upland habitat quality would likely remain static or trend upward slightly.	No if 1999 decision utilization standards are implemented.
Population	Because habitat quality is likely to remain static or improve incrementally, wildlife populations would also be expected to remain static.	No if 1999 decision utilization standards are implemented.
<u>Diversity</u>	Habitat diversity is greatest in riparian areas. Concentration of livestock in riparian areas is likely to cause a decline of habitat quality and a subsequent decline in species diversity.	No if 1999 decision utilization standards are implemented.

WSA resources requiring further analysis:

Primitive Recreation

Type of recreation opportunities: Since Alternative Two proposes a deferred rotation grazing system, no livestock herding, and no utilization triggers, visitors camping or recreating in unfenced WSA riparian areas would encounter livestock in several different manners: in or near dispersed camps, in riparian areas, in meadows, manure in camp, tracks in riparian areas, and odors. Johnson et al 1997 found these factors to strongly detract from the wilderness experiences.

Surface Waters

General Discussion: Within the WSA fence water quality is expected to be good due to the years of rest and subsequent controlled grazing this has received; also, the WDEQ has monitored and assessed the Sweetwater River and removed it from the impaired water body list within the past ten years. In the long term plant vigor and production is expected to increase. As more extensive root systems develop, increased water infiltration and retention can be expected. Outside the fence this alternative relies on pasture moves in a deferred grazing system to prevent over use of the riparian zones. However, the short portions of the tributary streams against the WSA boundary fence can be reasonably expected to be used more by livestock than riparian areas further from a fence. Given the short growing season, low precipitation, drought frequency of the area, and a low seral condition of these riparian zones a deferred rotation grazing system alone is not expected to improve these areas for decades.

Vegetation

Ecological Site Inventory: The proposed fence which provides greater ability to rotate season of use and to defer the pasture containing the WSA could improve seral condition over time. Potential lack of long term trend monitoring or of short term monitoring for management objectives such as utilization or stubble height combined with the highest potential stocking rate of all the alternatives, could jeopardize a stable or improving seral condition on ecological sites within the WSA.

Utilization by key species: Refer to analyses above.

Plant vigor: Refer to analyses above.

CUMULATIVE IMPACTS (Alternative Two)

Soil and Vegetation Resources

Between 1986 and 2006 there have been 307.4 miles of new fence built on the LFO. This equates to 15.37 miles of new fence construction per year. This mileage includes both enclosure fences and traditional pasture fences. This alternative currently proposes 98 miles of new pasture fences. As this alternative would rely most heavily on new fences to achieve better livestock distribution on the allotment, more fence mileage can be reasonably expected as unforeseen livestock management situations arise that can only be remedied by more fencing. Additionally, as more fences are built, more water projects would be needed as areas formerly serviced by existing water would no longer be available.

Approximately 50 acres of sacrifice areas around new water developments would be created. The vegetation would be removed mainly by trampling and somewhat by livestock and wildlife consumption. These areas would be mostly devoid of vegetation with some compacted soils and would remain in poor condition due to the continual use of the water source. It is believed that there would be a decrease in the vigor of the vegetative species immediately adjacent to the sacrifice area. The vigor decrease would come about from the dust on the plants, soil compaction by livestock soils are moist, the trampling and resulting mechanical damage of vegetation by livestock, and the heavy grazing which commonly takes place around water sources. Another 147 acres (98 miles fence x 1.5 acres trailing disturbance per mile = 147 acres) would be affected by the trailing of livestock, wild horses, and wildlife along the proposed pasture and riparian management fences. Trailing would cause the removal of vegetation through trampling and compaction of the soil. Higher erosion rates would also ensue on these areas devoid of vegetation. Rill and gully initiation would occur on the sloping locations over time. Sandy soils would be prone to scouring by wind. The denuded, compacted, and heavily-used areas would also be the locations most prone to weed establishment. The installation of water pipelines would disturb another 2 acres.

With the livestock use levels and management strategy proposed under this alternative, riparian zone improvement cannot be expected in the short or long term. Shifting away from hot season use highly benefits riparian vegetation, but under this alternative, the limited length of deferment would not suffice in allowing for improvements in vegetation, vegetative litter, and hydrologic conditions. The cattle trails found in the transition zones and extending to the uplands would remain in their present compacted state. The cattle trails would continue to channel runoff and sediment into the riparian areas, as cattle use on the cattle trails is expected to remain heavy. Two allotments, Haypress and Alkali Creek Sheep, have the potential to provide some riparian zone improvements in the long term.

Livestock Grazing

An estimated total of \$10,540 in annual maintenance costs have accrued through 2007 as a result of construction of the range improvements in Alternative One. An estimated total \$13,075 of additional maintenance costs would occur upon completion of the proposed range improvement projects in this alternative by 2027.

Wildlife/Fisheries Habitat and Special Status Species

Additional fencing in the GMCA, in combination with fencing proposals in the Rawlins Field Office to improve livestock management south of the allotment, could negatively impact antelope movements of the Red Desert Antelope Herd as they move to crucial winter habitats near Rawlins and Interstate 80.

The cumulative impacts of habitat loss from proposed water developments coupled with energy development and the CO2 pipeline would be the same as that described under Alternative One in addition to 23 more developments, 22 miles of water pipelines, and vegetation removal from trailing along 98 miles of additional fences.

Wild Horses

The cumulative impacts of Alternative Two are the same as the cumulative impacts for Alternative One. In addition, the overall level of development of water projects and fencing that lies outside the herd areas in travel zones also virtually eliminates the travel zones, as well as any exchange of horses among the three different HMAs. The proposed level of water development within the allotment would also permanently draw wild horses into areas

that they may have only passed through - or not used at all - prior to water development. It is anticipated that at this level of development, the integrity of the historic use areas would be lost, and wild horses would be found throughout the entire allotment.

Cultural Resources

The historic character of the Seminole Cutoff National Historic Trail would be degraded.

Recreation and Visual Resources

The actions and the intensity of those actions authorized (and the developed mitigation) under Alternative Two would synergies with existing/planned actions in the allotment to compound the trends documented in the affected environment. Over a 20 year time frame the allotment would endure an irreversible (Clark 1979) urbanization of the recreation setting. This would drastically change the experiences and benefits available to recreationist on the allotment. Loss of the distinct niche represented by the settings and experiences and benefits opportunities of the GMCA would homogenize the recreation (experience and benefit) opportunities available within all recreation features. This homogenization would reduce visitor ability to recreate in the setting they desire to achieve the experiences and benefits important to the individual or group. Inevitably this impact indirectly produces visitor conflicts when recreationists are forced to use a setting where their desired experiences and benefits are not easily facilitated.

Wilderness Study Areas and Wild and Scenic Rivers

The intensity of impacts as a result of Alternative Two would exceed maximum allowable impacts for the WSA resource; these impacts would also affect the WSR resource. The impacts are on a localized level and probably could be mitigated without causing additional impacts. Potential to impact recreationists experience and benefit realization level exists, however this would occur in access areas and during the trip into the core WSA only. The area contained within the WSA and WSR does not have any known reasonable foreseeable actions that might synergies with the above impacts. In addition, no impacts to the WSA resource as a whole are anticipated as a result of the actions planned for Alternative Two.

RESIDUAL IMPACTS (Alternative Two)

Soil and Vegetation Resources

There are currently 133 acres undergoing impacts from livestock (i.e., sacrifice areas) and project developments (e.g., springs, wells, fences, and reservoirs) from projects completed since implementation of the 1999 Final Decision.

The residual impact to soils and vegetation from this alternative would be to create approximately 199 acres of sacrifice area associated with 98 miles of new fences, 23 water developments, and 22 miles water pipelines.

Approximately 50 acres of sacrifice areas around new water developments would be created. The vegetation would be removed mainly by trampling and somewhat by livestock and wildlife consumption. These areas would be mostly devoid of vegetation with some compacted soils and would remain in poor condition due to the continual use of the water source. It is believed that there would be a decrease in the vigor of the vegetative species immediately adjacent to the sacrifice area. The vigor decrease would come about from the dust on the plants, soil compaction by livestock soils are moist, the trampling and resulting mechanical damage of vegetation by livestock, and the heavy grazing which commonly takes place around water sources. Another 147 acres (28 miles fence x 1.5 acres trailing disturbance per mile = 42 acres) would be affected by the trailing of livestock, wild horses, and wildlife along the proposed pasture and riparian management fences. Trailing would cause the removal of vegetation through trampling and compaction of the soil. Higher erosion rates would also ensue on these areas devoid of vegetation. About two acres of disturbance would be created with water pipeline installation. Rill and gully initiation would occur on the sloping locations over time. Sandy soils would be prone to scouring by wind. The denuded, compacted, and heavily-used areas would also be the most prone to weed establishment.

With the livestock use levels and management strategy proposed under this alternative, riparian zone improvement cannot be expected in the long term. Shifting away from hot season use highly benefits riparian vegetation, but

under this alternative, the limited length of deferment would not suffice in allowing for improvements in vegetation, vegetative litter, and hydrologic conditions. The cattle trails found in the transition zones and extending to the uplands would remain in their present compacted state. The cattle trails would continue to channel runoff and sediment into the riparian areas, as cattle use on the cattle trails is expected to remain heavy. Two allotments, Haypress and Alkali Creek Sheep, have the potential to provide some riparian zone improvements in the long term.

Livestock Grazing

An estimated total of \$10,540 in annual maintenance costs have accrued through 2007 as a result of construction of the range improvements in Alternative One. An estimated total \$13,075 of additional maintenance costs would occur upon completion of the proposed range improvement projects in this alternative by 2027. An estimated combined total \$23,615 of additional maintenance costs would accrue in the long term.

Wildlife/Fisheries Habitat and Special Status Species

Although let-down or removable fence sections would help mitigate the previously discussed impacts to big game movement and migration, some degree of interference with these movements would remain, even in the presence of these mitigations.

Placement of proposed water developments may aid in mitigating the disturbance to nesting and loss of habitat associated with these projects; however, they would still produce a sacrifice area, attract predators, and provide a breeding ground for mosquitoes.

Addition of larvicide to stock-watering developments would greatly decrease the threat of West Nile Virus, but it is unlikely to completely remove all mosquitoes associated with such projects. Some mosquitoes would likely remain as a residual threat.

Wild Horses

Wild horse distribution patterns and seasonal ranges would change. Integrity of the historic HMAs would also likely change.

Cultural Resources

Cultural resources in riparian zones would continue to suffer impacts and degradation. The introduction of modern impacts and intrusions upon the Seminoe Cutoff and the Rawlins-Fort Washakie Stage Trail would reduce the historical and recreational character of these trails.

Recreation and Visual Resources

The loss of the nearly undeveloped naturalness character of the allotment in addition to the removal of the un-fenced “situational attribute” constitutes a residual impact to the recreational setting and available/realized customer experiences and benefits. Alternative Two would limit future recreation management options for the allotment. In addition the setting changes resulting from this alternative that are consistent with the trend indicated in the affected environment would alter the setting in a direction that is nearly impossible to reverse (Clark 1979).

Wilderness Study Areas and Wild and Scenic Rivers

The indirect and direct impacts documented for Alternative Two do exceed maximum allowable standards as identified in the Interim Management Policy for Lands under Wilderness Review. In addition this level of impact does exceed impact standards for the WSR resource. It is anticipated that this impact would occur on a localized level around unfenced riparian areas. The developed mitigation for Alternative Two reduces the impact to the WSR and WSA resource to a level that does not exceed the maximum allowable standards. Therefore residual impacts to the WSA and WSR resource would be slight as a result of the alternative and identified mitigation. As long as portions of the WSA and WSR resource are unfenced from the GMCA slight visual and aesthetic impacts would continue in these areas. The lack of active herding proposed in this alternative would concentrate these impacts in the WSA and WSR riparian areas of Mormon and Willow creek. This impact is somewhat offset by the location of the WSA fence and its low level of contrast with the characteristic landscape. No residual impacts to the WSA and WSR resource as a whole are anticipated as a result of this alternative.

ALTERNATIVE THREE

EFFECTS ON SOIL AND WATER RESOURCES (Alternative Three)

Soil Resources

This alternative makes use of the same use areas as Alternative One, but proposes no new water developments and no net gain in fence mileage. Salt would be located no closer than one-half mile from existing water sources. Livestock numbers would be based on a carrying capacity analysis. Triggers for moving livestock would be somewhat more stringent, and this alternative's herding requirement calls for more effort on the part of the livestock operators than Alternative One.

Within Alternative Three's five proposed use areas, herding and deferred-rotation grazing systems are expected to increase livestock use on the uplands and alleviate some of the heavy use presently occurring in the riparian areas. Monitoring of grazing use would be sensitive enough to detect significant change. Implementation of this alternative would not adversely impact soil potential in the uplands. With use levels of riparian vegetation expected to be no more than moderate, a fair chance of improvement from present vegetation and litter cover conditions is expected. This expectation depends upon effective herding and proper stocking rates at carrying capacity (Platts, 1989), and very intensive management of livestock would be necessary. The conditions of riparian areas would show slow improvement over many years or decades; complicating 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.

Map 4-3, Water Erosion Potential, and Map 4-4, Wind Erosion Potential, illustrate that if a management scenario decreases soil cover too much in the uplands, accelerated wind erosion can result. Areas of currently stabilized sand dunes south of Green Mountain, and medium-textured soils high in very fine sand, fine sand, and silt-size particles, can become active and suffer erosional losses, decreasing the potential of these sites. In less-sandy areas, water erosion in the form of new and more frequent rills and gullies would result. Any increases in erosion rates should be negligible and not affect soil fertility.

The Alkali Creek Use Area is different from the others in that it would be managed for spring-fall and winter-continuous seasonal grazing of sheep. The saline soils on Alkali and East Alkali Creeks do not support willows, but do grow sedges and grasses. In the long-term, managed grazing of sheep, at levels almost one-half that of current preference 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 of and build soils in these lowland areas.

As under Alternative One, a combination of seven riparian pastures (five completed and two proposed) would be constructed and maintained on important riparian zones. These riparian pastures would be used by livestock either in the spring or fall period. The effects 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.

In the short-term, some improvement to the present condition of lowlands (i.e., riparian areas) would be apparent, due to the implementation of . In the 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. Both water and nutrient storage of these sites would be enhanced, as would water quality.

The mid-term (five to 10 years), pasture rotation strategy should allow for enough rest in the uplands to maintain adequate soil cover to buffer the erosive effects of wind and precipitation. The rotation should also allow enough time to alleviate annual soil compaction that can occur due to animal traffic under moist conditions.

Water Resources

The expected impacts to water resources from Alternative Three would also apply to Alternatives One and Four, with some minor variations primarily related to specific water development projects, spring exclosures, riparian pastures, and livestock management strategies. Soil erosion rates, especially those of the lowlands, would be the largest contributing factors to water quality.

Within this alternative's five proposed use areas and the pastures associated with each, the fate of the vegetation and rates of soil erosion, especially in and immediately adjacent to the riparian areas, would have the greatest influence on water quality. With livestock use levels under this alternative expected to be light to moderate, a slow rate of riparian zone improvement can be expected. Drought would, of course, be a complicating factor retarding progress in some years.

With the proposed managed grazing of sheep and no hot season grazing, the Alkali Creek Sheep Use Area (at levels reflecting the current carrying capacity) would yield riparian zone improvements sooner than the other use areas in the allotment. As a result of this new management scenario, water quality parameters such as turbidity, total dissolved solids (TDS), and suspended sediment (SS) would be improved above the current situation.

Seven riparian pastures (five completed and two proposed) would be built around some of the important riparian zones. Rest of these riparian pastures would occur until, such a time when the pasture meets the Standards for Rangeland Health. Livestock use would then be restricted to spring and fall periods. With the elimination of livestock and horse damage to stream banks and adjacent areas, along with the restoration of the functional integrity of the riparian systems, improvements in water quality would occur.

Deferred-rotation grazing and conservative triggers for moving livestock by herding would also be used to eliminate vegetation use on any given spot for part of the year. It would also be used to lessen impacts to riparian areas where cattle tend to congregate, especially in the summer season.

Impacts to water resources outside of exclosures and riparian pastures would be directly attributable to the effectiveness of the herding. As the livestock use on the riparian areas would be substantially decreased, water quality should be enhanced.

EFFECTS ON VEGETATION RESOURCES (Alternative Three)

Vegetation – General

Refer to the General Effects on Vegetation Resources for Alternative One.

Grazing Management

Refer to Grazing Management Section in Alternative One.

Upland Vegetation

The long-term impacts in the upland range of the three-pasture or four-pasture deferred-rotation grazing systems would be: slightly increased vegetation production, due to the increased seedling establishment, improved vigor and root growth/replacement, increased litter accumulation, and increased percent composition of grass and forb key species.

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.

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 6 percent from 1967 to 1971 was a result of the two-pasture deferred grazing system. Shrub cover change from 1967 to 1971 outside the enclosure decreased 11percent, 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 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, Table 4-28, GMCA Riparian Management Pastures, and Table 4-29, Acres per Grazing Treatment through One Complete Grazing Cycle for Alternative Three). 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 East Alkali Creek, Bare Ring Butte, and Crooks Mountain Pastures would be detrimental in the area of the summer sheep use.

Table 4-27. Annual Grazing Treatments under Alternative Three

Use Area Pasture	Year 1	Year 2	Year 3	Year 4
Antelope Hills/Picket Lake				
Granite Creek-Rocks	L-M	L-M	L-M	L-M
Alkali Creek	L-M	L-M	L-M	L-M
Picket Lake	A-L-M	B-L-M	A-L-M	B-L-M
Daley Lake	B-L-M	A-L-M	B-L-M	A-L-M
Arapahoe				
Bare Ring Butte	J-N	E-N	J-N	E-N
East Alkali Creek	E-N	J-N	E-N	J-N
Eagles Nest Draw	A-F-N	B-H-N	A-F-N	B-H-N
Lost Creek	B-H-N	A-F-N	B-H-N	A-F-N
Happy Springs				
Haypress Creek	A-N	J-N	A-N	J-N
Warm Springs	J-N	A-N	J-N	A-N
Crooks Mountain	D-N	D-N	D-N	D-N
Green Mountain				
Sheep Creek	A-J-N	A-J-N	A-J-N	A-J-N
Stratton Rim	I-N	I-N	I-N	I-N
Willow Creek	D-N	D-N	D-N	D-N
Green Mountain	D-N	D-N	D-N	D-N
Alkali Creek Sheep	C-G-J-H	C-G-J-H	C-G-J-H	C-G-J-H

Table 4-28. GMCA Riparian Management Pastures

Use Area Pasture	Year 1	Year 2	Year 3	Year 4
Long Slough	I-G-O	G-O	I-G-O	G-O
Crooks Creek/Bare Ring Slough ¹	I-G	I-G	I-G	I-G
W. Fork Crooks Creek	I-G-O	G-J-O	I-G-O	G-J-O
*Lost Creek ²	I-G	G-J	I-G	G-J
Ice Slough	G-J-O	G-J-O	G-J-O	G-J-O
Warm Springs Creek	I-G-O	G-J-O	I-G-O	G-J-O
*Sweetwater River ¹	I-G-O	I-G-O	I-G-O	I-G-O

¹Willow plant communities present within riparian management pasture.

²Ten years of rest would be required before livestock grazing is authorized.

* Pasture not yet completed

Treatment G: Rest summer-long (June 16 through September 15). Under this treatment, the Alkali Creek Sheep and Long Slough Use Areas/Pastures would not be grazed by sheep or cattle during the hot season, for riparian area improvement.

Treatment I: Graze season-long through the spring (May 1 or May 15 through June 15). This treatment would be used with cattle in the Long Slough Use Area/Pasture and the Stratton Rim Pasture within the Green Mountain Use Area during the grazing year. The season of use would not exceed 31 days in the riparian pastures. Riparian pastures would be managed to maintain a minimum of a six-inch stubble height on herbaceous vegetation in the fall.

Treatment J: Graze September 16 or October 1 through October 31 or November 15. This fall season treatment would be used by cattle in the Long Slough Use Area/Pasture and other riparian pastures without willow plant communities. This fall season treatment would also be used by cattle and sheep in the upland pastures of the Arapahoe, Happy Springs, Antelope Hills-Picket Lake, and Green Mountain Use Areas during the grazing year. The season of use would not exceed 31 days in the riparian pastures. Riparian pastures would be managed to maintain a minimum of a six-inch stubble height on herbaceous vegetation after the fall grazing season.

Treatment O: Rest yearlong for one to three years, to initiate the recovery process on degraded riparian areas within the Ice Slough, Long Slough, Warm Springs Creek, Sweetwater River, and West Fork Crooks Creek Riparian Management Pastures.

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. 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 markedly reduced livestock grazing levels, the riparian management pasture 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 Lost Creek and Eagles Nest Draw Pastures, the production and condition would be expected to improve considerably, due to the distribution of livestock, wildlife, and wild horses by water developments and markedly 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 livestock, 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, Antelope Hills-Picket Lake and Happy Springs Use Areas. 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 GMCA 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 (Stan & Linda Cole and W.S. Baldwin during the initial and interim phases) 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-Picket Lake Use Area, and the Lost Creek and Eagles Nest Draw Pastures of the Arapahoe Use Area, 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 markedly reduced livestock grazing levels should allow the vegetation to recover from these short periods of heavy grazing.

Table 4-29, Alternative Three - Long-Term Acres Per Grazing Treatment Through One Complete Grazing Cycle, shows the acres of different grazing treatments that are applied through a completed four year grazing cycle. The table displays the scale these grazing treatments affect annually, and through a completed rotation cycle.

Table 4-29. Acres per Grazing Treatment Through One Complete Grazing Cycle (Alternative Three)

Treatment	Public Land Acres			
	Year 1	Year 2	Year 3	Year 4
A	114,749	122,049	114,749	122,049
B	78,386	83,536	78,386	83,536
C	18,215	18,215	18,215	18,215
D	38,299	38,299	38,299	38,299
E	37,709	36,796	37,709	36,796
F	38,658	43,330	38,658	43,330
G	36,174	36,174	36,174	36,174
H	61,545	56,873	61,545	56,873
I	19,096	11,875	19,096	11,875
J	99,490	91,802	99,490	91,802
K	0	0	0	0
L	158,232	158,232	158,232	158,232
M	158,232	158,232	158,232	158,232
N	260,269	260,269	260,269	260,269
O	6,661	6,661	6,661	6,661

*The totals for each year are greater than the acreage of the allotment because some pastures receive more than one treatment each year.

Range Improvements

Table 4-30 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 4-30. Surface Acres Disturbed as a Result of Implementing Alternative Three Long-Term Proposed Range Improvements*

TYPE IMPROVEMENT	NUMBER	ACRES DISTURBED PER UNIT	TOTAL ACRES DISTURBED
Spring development	12+	2.6	31.2
Three-Wire fence (Use Area/Pasture boundary)	0 miles	1.5/miles	0
Riparian pasture fence	9.0 miles	1.5/miles	13.5
Cattleguard	3	0	0
Water well (existing) development	4	1.8	7.2
Reservoir reconstruction	2	4.0	8.0
Exclosure (Artesian wells/wetland fenced)	0	.2 on fenceline .9 inside permanent exclosure	0 on fenceline 0 inside permanent exclosure
Pipeline	0 miles	.1/miles	0
		TOTAL	59.9
*See Appendix 11 for rationale.			

Construction of the proposed range improvements would remove approximately 60 acres from production. Table 4-30 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 developments (31 acres), riparian pasture fences (14 acres), water wells (7 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 are beneficial in the management of livestock, they do cause trailing of livestock, wildlife, and wild horses along the fences. 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 a reduction in vigor of vegetation. Another impact of the trailing of livestock and wildlife along a fence would be the removal of vegetation through trampling and compaction of the soil. This would cause adverse growing conditions. 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.

The existing fence on the southern boundary of the GMCA would concentrate summer cattle use on the north side of the fence, near the proposed Lost Creek Riparian Pasture. 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 a spring or water well 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. Sacrifice areas would occur adjacent to the spring source and each of the water wells. Total disturbed area would be 2.6 acres for each spring development, and 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 the sacrifice area. 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.

The development of water wells under this alternative would improve the distribution of livestock over the entire GMCA, thus promoting a more even utilization of the 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 grazing systems, 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, 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).

Any place which has the existing vegetation removed provides an opportunity for other plants to begin growth. The construction, maintenance, and use of the various proposed projects may cause enough disturbance to permit increased numbers of poisonous plants to invade the site. For example, halogeton (*Halogeton glomeratus*) is a poisonous annual often found on disturbed sites. The amount of trampling and utilization of the vegetation would decrease, as the distance from water increased.

Summary

Short-term detrimental impacts under this alternative's summer grazing (treatments A, B, D, E, K, L, M, and N) would include reductions in plant vigor, litter accumulation, and seed production. Short-term detrimental impacts from fall and winter grazing (treatments B, E, F, H, and J) would be reductions in plant vigor and litter accumulation. The summer-long rest and year-long rest (treatments G and O) treatment would increase vigor, litter accumulation, seedling establishment, and seed production for the Alkali Creek Sheep Use Area and five riparian management pastures. Rest periods, which comprise part of treatments A and B, would enhance the vegetation, by increasing vigor, root growth/replacement, seed production, and litter accumulation of the vegetation. 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 proposed long term use level (23,110 AUMs) for all grazing animals (cattle, sheep, wildlife, and wild horses) under Alternative Three 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 Three's proposed long

term use level (23,110 AUMs) for all grazing animals (cattle, sheep, wildlife, and wild horses) would set an average stocking rate of 20.2 acres per AUM on the public land within GMCA. The last nine years (1999-2007) of below average precipitation have required lower livestock use levels, to manage for rangeland health standards and provide for drought recovery. The next five years would be needed for drought recovery.

Under this alternative, the upland (away from present livestock water sources) areas within the Arapahoe, Antelope Hills-Picket Lake, Green Mountain, and Happy Springs Use Areas would receive a 30 percent decrease in grazing use over the 1999-2006 recent use levels due to the greatly reduced livestock stocking levels. The area within the Picket Lake, Daly Lake, Lost Creek and Eagles Nest Draw Pastures (formerly Seven Lakes Incommon Allotment), which is approximately 40 percent of the GMCA (refer to Appendix 10), would receive most of this decreased grazing use and deferment. This decreased livestock grazing intensity, combined with the proposed grazing systems, would result in the vegetation of the upland areas maintaining, and in the long term, improving in vigor, root growth/replacement, production, seed production, and litter accumulation (Blaisdell, et al. 1982, Blaisdell and Holmgren 1984, Holechek et al. 1998).

The upland and lowland areas within the Alkali Creek Sheep Use Area and Long Slough 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). Also, by 2027, 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-Picket Lake Use Area. 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).

Construction of the remaining proposed range improvements proposed in Alternative Three would cause the loss of approximately 60 acres from production. Major impacts to vegetation would be the removal of vegetation in the vicinity of the water troughs, and a decrease in vigor of the vegetation, through trampling and heavy grazing by livestock, wild horses, and wildlife along fences.

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 76 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).

Wetland-Riparian Vegetation

This analysis of the impacts associated with Alternative Three assumes that livestock use levels in certain areas would be drastically reduced and, in some areas, eliminated to achieve healthy rangeland standards. This would occur through the use of recovery prescriptions for areas identified as not meeting objectives, and also through the strict enforcement of livestock herding requirements. This alternative contains no provisions for additional fencing (except temporary), and only water developments that benefit wildlife would be approved. The use of predetermined trigger points, based on stubble height and utilization, would be used to determine when to move livestock from pasture to pasture.

Under this alternative, improvement in plant diversity, variety of age classes, and structure in plant communities in riparian areas, would be similar to those described under Alternative One. However, that these improvements are likely to be greatly accelerated due to a substantial decrease in livestock numbers and duration of use.

Improvements would occur most rapidly in existing riparian pastures, because Alternative Three requires these to be completely rested until Standards for Healthy Rangelands are met.

EFFECTS ON LIVESTOCK GRAZING (Alternative Three)

Short Term Cattle

A permanent reduction of AUMs would be determined through a detailed suitability, capability and forage production analysis. For the purposes of this analysis, a projection of approximately 25% of permitted AUMs has been used. Unlike the other three alternatives, Alternative Three assumes the various levels of livestock AUMs (Initial, Interim and Long Term levels) would remain constant, after the suitability, capability and forage production analysis are complete.

Under this alternative, by 2013, there would be a 34 percent decrease (from the 1999-2006 average of authorized cattle use) in spring-summer-fall cattle AUMs, which would clearly impact 18 cattle permittees, by decreasing the number of animal units of cattle use they would graze on public land within the GMCA. This alternative would not change the performance of individual animals but would decrease the number of cattle from approximately 2,300 to 1,500 head (refer to Appendix 15) by the end of the short term.

Under this alternative by 2013, there would be a 47 percent decrease (from the 1980-2006 average authorized cattle use) in spring-summer-fall cattle AUMs which would impact 18 cattle permittees by decreasing the number of animal units of cattle use they would graze on public land within the GMCA. This alternative would not change the performance of individual animals, but would decrease the number of cattle from approximately 2,900 to 1,500 head (refer to Appendix 15) by the end of the short term.

Interim Cattle

A permanent reduction of AUMs would be determined through a detailed suitability, capability and forage production analysis. For the purposes of this analysis, a projection of approximately 25% of permitted AUMs has been used. Unlike, the other three alternatives, Alternative Three assumes that the various levels of livestock AUMs (Initial, Interim and Long Term levels) would remain constant, after the suitability, capability and forage production analyses are complete.

Under this alternative, by 2017, there would be a 34 percent decrease (from the 1999-2006 average authorized cattle use) in spring-summer-fall cattle AUMs, which would clearly impact 18 cattle permittees, by decreasing the number of animal units of cattle use they could graze on public land within the GMCA. This alternative would not change the performance of individual animals, but would decrease the number of cattle from approximately 2,300 to 1,500 head (refer to Appendix 15) by the end of the interim implementation period.

Under this alternative, by 2017, there would be a 47 percent decrease (from the 1980-2006 average authorized cattle use) in spring-summer-fall cattle AUMs which would clearly impact 18 cattle permittees, by decreasing the number of animal units of cattle use they could graze on public land within the GMCA. This alternative would not change the performance of individual animals, but would decrease the number of cattle from approximately 2,900 to 1,500 head (refer to Appendix 15) by the end of the interim implementation period.

Long Term Cattle

A permanent reduction of AUMs would be determined through a detailed suitability, capability and forage production analysis. For the purposes of this analysis, a projection of approximately 25% of permitted AUMs has been used. Unlike, the other three alternatives, Alternative Three assumes that the various levels of livestock AUMs (Initial, Interim and Long Term levels) would remain constant, after the suitability, capability and forage production analyses are complete.

Under this alternative, by 2027, there would be a 34 percent decrease (from the 1999-2006 average authorized cattle

use) in spring-summer-fall cattle AUMs, which would clearly impact 18 cattle permittees, by decreasing the number of animal units of cattle use they could graze on public land within the GMCA. This alternative would not change the performance of individual animals, but would decrease the number of cattle from approximately 2,300 to 1,500 head (refer to Appendix 15) by full implementation of the AMP in the long-term.

Under this alternative, by 2027, there would be a 47 percent decrease (from the 1980-2006 average authorized cattle use) in spring-summer-fall cattle AUMs, which would clearly impact 18 cattle permittees, by decreasing the number of animal units of cattle use they could graze on public land within the GMCA. This alternative would not change the performance of individual animals, but would decrease the number of cattle from approximately 2,900 to 1,500 head (refer to Appendix 15) by full implementation of the AMP in the long-term.

Short Term Sheep

A permanent reduction of AUMs would be determined through a detailed suitability, capability and forage production analysis. For the purposes of this analysis, a projection of approximately 25% of sheep permitted AUMs has been used. Unlike, the other three alternatives, Alternative Three assumes that the various levels of livestock AUMs (Initial, Interim and Long Term levels) would remain constant, after the suitability, capability and forage production analyses are complete.

Under this alternative, by 2013, there would be a 13 percent decrease (from the 1999-2006 average authorized sheep use) in yearlong sheep AUMs, which would slightly impact two sheep permittees, by decreasing the number of animal units of sheep use they could graze on public land within the GMCA. This alternative would not change the performance of individual animals, but would decrease the number of sheep from approximately 1,450 to 1,265 head (refer to Appendix 15) by the end of the short term.

Under this alternative, by 2013, there would be a 53 percent decrease (from the 1980-2006 average authorized sheep use) in yearlong sheep AUMs, which would clearly impact two sheep permittees, by decreasing the number of animal units of sheep use they could graze on public land within the GMCA. This alternative would not change the performance of individual animals, but would decrease the number of sheep from approximately 2,700 to 1,265 head (refer to Appendix 15) by the end of the short term.

This alternative would not enable two grazing permittees to convert 1,325 winter sheep AUMs to 689 summer cattle AUMs. It would also not enable these permittees to convert 5,194 (former Seven Lakes) to 4,940 (former Green Mountain) summer sheep AUMs to 5,017-4,158 summer cattle AUMs. Further, the two permittees, Stan and Linda Cole and W.S. Baldwin, would not experience an increase in the value of their base property, to which their federal grazing permits are attached over the short-term, because there would be no livestock conversions authorized under this alternative. In the short term, this alternative would not appreciably change the current level of economic viability of these two livestock operations.

Interim Sheep

A permanent reduction of AUMs would be determined through a detailed suitability, capability and forage production analysis. For the purposes of this analysis, a projection of approximately 25% of sheep permitted AUMs has been used. Unlike, the other three alternatives, Alternative Three assumes that the various levels of livestock AUMs (Initial, Interim and Long Term levels) would remain constant, after the suitability, capability and forage production analyses are complete.

Under this alternative, by 2013, there would be a 13 percent decrease (from the 1999-2006 average authorized sheep use) in yearlong sheep AUMs, which would slightly impact two sheep permittees, by decreasing the number of animal units of sheep use they could graze on public land within the GMCA. This alternative would not change the performance of individual animals, but would decrease the number of sheep from approximately 1,450 to 1,265 head (refer to Appendix 15) by the end of the interim implementation period.

Under this alternative, by 2013, there would be a 53 percent decrease (from the 1980-2006 average authorized sheep

use) in yearlong sheep AUMs, which would clearly impact two sheep permittees, by decreasing the number of animal units of sheep use they could graze on public land within the GMCA. This alternative would not change the performance of individual animals, but would decrease the number of sheep from approximately 2,700 to 1,265 head (refer to Appendix 15) by the end of the interim implementation period.

Long Term Sheep

A permanent reduction of AUMs would be determined through a detailed suitability, capability and forage production analysis. For the purposes of this analysis, a projection of approximately 25% of sheep permitted AUMs has been used. Unlike, the other three alternatives, Alternative Three assumes that the various levels of livestock AUMs (Initial, Interim and Long Term levels) would remain constant, after the suitability, capability and forage production analyses are complete.

Under this alternative, by 2027, there would be a 13 percent decrease (from the 1999-2006 average authorized sheep use) in yearlong sheep AUMs, which would slightly impact two sheep permittees, by decreasing the number of animal units of sheep use they would graze on public land within the GMCA. This alternative would not change the performance of individual animals, but would decrease the number of sheep from approximately 1,450 to 1,265 head (refer to Appendix 15) by full implementation of the AMP in the long-term.

Under this alternative, by 2027, there would be a 53 percent decrease (from the 1980-2006 average authorized sheep use) in yearlong sheep AUMs, which would clearly impact two sheep permittees, by decreasing the number of animal units of sheep use they could graze on public land within the GMCA. This alternative would not change the performance of individual animals, but would decrease the number of sheep from approximately 2,700 to 1,265 head (refer to Appendix 15) by full implementation of the AMP in the long-term.

Long Term Dual Use

From implementation of this alternative, a projected 75 percent long-term decrease in AUMs would be authorized. However, by 2027, it is expected that there would be an improvement in upland range condition of at least one-half condition class, resulting in: fewer acres in low seral (poor) condition; fewer acres in mid seral (fair) condition; more acres in late seral (good) condition; and more acres in potential natural community (excellent) range condition (USDI-BLM, 1979). Improvement in upland and riparian forage conditions, in the long-term should, result in an increase in dual use (cattle and sheep) AUMs. The condition of riparian areas outside the riparian management pastures (approximately 1,360 acres or 66 percent of the public land total) is expected to remain static in the short term, and begin to slowly improve in the interim period. This improvement (from the current situation) in vegetation cover and diversity would continue into the long term. Deferred-rotation grazing systems were evaluated by Platts and Nelson (1989). Although these systems were only rated as fair for improving stream and riparian habitats (refer to Appendix 20), the considerably reduced grazing use levels in the short term, interim, and long term periods would accelerate the rate of riparian area recovery.

Range Improvements

Table 4-31 lists the proposed range improvements, and estimated project costs for their construction and installation at \$70,300 to \$90,990. Table 4-32 shows estimated maintenance costs for the proposed range improvements at \$1,945 per year. The estimated construction costs would range from \$0.15 to \$0.19 per public land acre, or \$1.48 to \$1.92 per public land AUM. Under this alternative, it is proposed these improvements would be completed by the end of year 6 (2013), and would be funded 50 percent by the BLM (out of range betterment funds) and 50 percent by the grazing permittees and other cooperators. The maintenance responsibility of the proposed projects would be assigned to individual grazing permittees or a formally recognized permittee grazing association, depending on the type and location of project. These projects would be designed to solve the water and livestock distribution problems present on the allotment.

The current trends and conditions of the lowland (adjacent to existing waters) areas within the Arapahoe, Antelope Hills-Picket Lake, Green Mountain, and Happy Springs Use Areas would continue in the short term, pending

completion of the proposed water developments and fencing. Completion of the proposed water developments and fencing would occur in the interim period, and these lowland areas would show improvement in plant vigor and then condition. Improvement in vegetation cover and diversity would continue into the long term. The overall improvement in condition of these lowland areas, due to periodic deferment, would be enhanced by the reduced (49 percent from 1980-2006 average or 30 percent from 1999-2006 average) grazing intensity.

Herding

Under this alternative, herding would be mandatory. 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. Active herding would be required to take place at least five days per week. A description of the herding needed to implement the proposed grazing systems is in the Description of Alternative Three and Management Actions Common to All Alternatives (Chapter Two). A minimum of three seasonal riders, with the associated labor costs discussed in Effects on Socioeconomics, would be necessary to accomplish effective herding. Sheep herding would also be required. It is estimated that the sheep herding would necessitate hiring one to two herders, with the associated costs discussed in Effects on Socioeconomics.

The range improvement projects proposed in Table 4-31 would improve the distribution of cattle and sheep grazing. Nevertheless, experience on GMCA has shown that cattle have congregated and stayed around water sources or spring developments in a rested or deferred pasture or riparian management pasture, when effective herding has not occurred. The level of herding proposed under this alternative would prevent most problems of this nature, provided cattle locations and utilization levels are closely monitored and controlled by the “range riders”. If active daily riding were not observed more than twice in a particular use area in a grazing season, the permittee(s) using that use area would be issued a 10 percent suspension in permitted AUMs, to begin the following year and taken in animal numbers or time. This herding requirement has the potential for negative economic consequences, and could reduce the affected permittee’s revenue.

Livestock operators in the allotment should benefit from the proposed pasture and riparian management fencing and use area/pasture rotation, because their cattle would be confined in a smaller area than at present. Although moving cattle during the summer (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-half to one-third the size of the area they can now graze. This should increase the probability of a cow being bred (USDI-BLM, 1979).

**Table 4-31. Construction and Labor Requirements under Alternative Three
For the Proposed Range Improvement Projects**

YEAR	PROJECT	UNITS/MILES	COST ¹	TOTAL
	Three-wire (Use Area/Pasture Boundary)	0 miles	\$4,840 mile	\$ 0
2-6	Riparian Pasture Fencing (1 Pasture/Year)	9 miles	\$4,840 mile(barbed)	\$43,560
			\$2,541 mile (permanent or temporary electric)	\$ 22,870
2-6	Cattleguards (1 each/Year)	0	\$3,207 2-lane-24'	\$ 0
		3	\$1,694 1-lane-12'	\$ 5,080
	Spring Development (Includes Fencing) (1 Each/Year)	0	\$ 3,630 each	\$ 0
2-5	Reservoir Reconstruction	2	\$ 7,261 each	\$ 14,520
	Water Well Development (new) (1 Each/Year)	0	\$31,462 each	\$ 0
1	Water Well Development (existing)	1	\$ 9,680 each	\$ 9,680
1-3	Water Well Development (existing) (1 Each/Year)	3	\$ 6,050 each	\$ 18,150
	Water Pipelines (0) (0 miles/year)	0 miles	\$ 7,624 mile	\$ 0
	Exclosure (Artesian Wells Wetland Fencing)	0 miles	\$ 4,840 mile	\$ 0
	TOTAL (Barbed Wire Fence)		(\$ 0.19/public land acre)	\$ 90,990
	TOTAL (Permanent Electric Fence)		(\$ 0.15/public land acre)	\$ 70,300

¹ Cost information on file in the Lander Field Office.

Table 4-32. Estimated Maintenance of Proposed Range Improvements (Alternative Three)

Improvement	Number of Units	Annual Maintenance Cost/unit¹	Total Annual Maintenance Cost	Estimated Life of Improvements
Springs	0	\$121	\$ 0	20+ years
Wells	4	242	970	20+
Pipelines	0 (miles)	61	0	20+
Reservoirs	2	120	240	20+
Three-wire fence	0 (miles)	61	0	20+
Riparian pasture Fence	9 (miles)	61	185	20+
Cattleguards	3	61	185	20+
Exclosure fence	0 (miles)	61	0	20+
		Total	\$1,945	

¹Cost information on file in the Lander Field Office.

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

Nongame Wildlife and Game Birds

Nongame wildlife and game bird habitat conditions would improve most rapidly in those one-acre spring development/enhancement exclosures, and in the five completed riparian pastures (of seven planned) constructed over the last eight years. Within these exclosures, exclusion from livestock grazing will continue to increase plant diversity, variety of plant age classes, and additional structure in plant communities. The result of this improvement has likely been a corresponding increase in the abundance and species diversity of nongame wildlife. Nongame and game bird habitat outside these exclosures would improve as described in Alternative One, but would occur at a more rapid rate than Alternative One because of reduced livestock numbers and faster rotation due to trigger points.

Big Game

Under Alternative Three, impacts to big game associated with fences would be the same as those described under Alternative One. Negative impacts from wells and other water developments would probably be diminished, because these would likely be fewer in number. Whatever benefit to big game that might be provided by the addition of water sources, in areas where there was none previously, would also be diminished under this alternative.

With the expected distribution of livestock through mandatory herding, big game species would be able to utilize ungrazed pastures prior to livestock movement, as described in Alternative One. This would likewise provide big game the opportunity for greater selectivity, and would also provide areas free from livestock disturbance. Big game use of the Alkali Sheep Use Area would also be expected during the summer period, when livestock are not present. As with Alternative One, herbaceous riparian vegetation would be expected to improve, due to the lack of hot season livestock grazing, but would likely do so more quickly under Alternative Three because of reduced livestock numbers and faster rotation due to trigger points.

Because trigger points for moving livestock would be tied to browse utilization (as well as stubble height) in Alternative Three, browse species important to wintering pronghorn and mule deer would likely respond favorably, but at a slower rate than herbaceous vegetation.

Expected improvements in livestock distribution away from important wildlife habitat associated with Alternative One, would be unlikely under Alternative Three because of the reduced number of water developments predicted. Likewise, any increase in the availability of suitable habitat that would result in a slight redistribution of pronghorn and mule deer (i.e., east of Lost Creek and the area between Crooks Mountain and U.S. Highway 287) would also be unlikely to occur. 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 One, but would occur at a faster rate under Alternative Three.

Fisheries

Improvements in trout and nongame fisheries under Alternative Three would be the same as those described under Alternative One, but would likely occur sooner, owing to reduced livestock numbers and faster rotation.

Special Status Species

Chapter 3 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 those species affected by Platte River depletion.

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) this species requires 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 of this species 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 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.

Any future water developments proposed in the allotment under Alternative One would be subject to review (and possible consultation) under the Platte River Recovery Implementation Program, effective January 1, 2007.

Of the thirty BLM Sensitive plant and animal species carried forward from Chapter Three for consideration, impacts from Alternative Three should be the same as those described under Alternative One, with the following exceptions: 1) improvement of mountain plover and burrowing owl habitat from possible localized overgrazing would not occur; 2) sage-grouse would not be adversely impacted by range improvements, and stubble height trigger points in Alternative Three (for moving livestock) should provide adequate residual stubble for concealment of nests in the following spring; 3) a rapid improvement in riparian conditions due to drastically reduced livestock grazing would provide much improved sage-grouse brood-rearing habitat; and 4) there would be less likelihood of trampling or disturbance of the nests of sensitive ground-nesting or shrub-nesting bird species.

EFFECTS ON WILD HORSES (Alternative Three)

This alternative would have very little impact on the existing situation within the wild horse HMAs. This alternative assumes fewer livestock numbers, no new fencing, and no net increase in water developments. Livestock would be moved by herding, and a decreased number in livestock would provide more forage and less competition for wild horses; however, herding of livestock would be an activity that wild horses would shy away from, and would in turn leave the area in which the herding would occur. Additionally, with this alternative, it can be expected that forage conditions would improve over the current situation. This could equate to better herd health and better forage conditions during winter months, when horses experience stress from cold conditions.

Having no new fencing would allow for wild horse travel zones between herd areas to remain open; as a result, genetic interchange among the herd areas would remain stable. Migration within HMAs would also allow for optimum movement/escape during periods of stress. However, temporary fencing could be approved on a seasonal basis in this alternative. This could cause temporary shifts in spring-summer-fall movement patterns and migration.

Alternative Three's 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 available.

EFFECTS ON CULTURAL RESOURCES (Alternative Three)

Prehistoric Sites

Alternative Three is projected to have beneficial effects to prehistoric sites along riparian areas, in both the short term and in the long term, because erosion, livestock congregation, and trampling would be reduced until Proper Functioning Condition (PFC) standards are met. Eleven known significant prehistoric sites would be affected under this alternative, and would be beneficially affected as positive conditions at prehistoric sites (reductions of erosion and livestock concentration) outweigh previous negative conditions.

Not-yet-discovered prehistoric sites along riparian zones would also be beneficially affected by this alternative. The conditions at these sites, predicted to number approximately 600 (see Table 4-16), would improve, as positive conditions such as reductions of erosion and livestock concentration outweigh previous negative conditions.

Historic Trails and Sites

Alternative Three is projected to have beneficial effects to National Historic Trails and historic sites along riparian areas, in both the short term and in the long term. This is because erosion, livestock congregation, and trampling would be reduced until Proper Functioning Condition (PFC) standards are met. Five riparian area crossings of the Seminole Cutoff National Historic Trail, and a site associated with the Seminole Cutoff (Immigrant Spring), would be beneficially affected, as positive conditions at these locations (reductions in erosion and livestock concentration) outweigh previous negative conditions.

No fence or water developments are planned in the vicinity of the OMCPE Trail, the Seminole Cutoff, or the Rawlins-Fort Washakie Stage Trail under this alternative, so no new development-related effects are expected.

As shown in Table 4-17 (see Alternative One, Cultural Resources section), it is projected that this alternative's long-term impacts would cause fewer impacts to prehistoric sites, National Historic Trails, other historic trails, and historic sites than Alternatives Two and Four, and would cause the same number of impacts to these resources as Alternative One.

EFFECTS ON RECREATION, VISUAL RESOURCES AND OPEN SPACE (Alternative Three)

Range improvements authorized under this alternative would not alter the recreation settings as documented in the affected environment. Since there is no change to the recreation setting, there would also be no change to the recreational experiences and benefits available or realized by recreationists within the area. This alternative would not alter the unique "situational attribute" documented in the affected environment allowing for the agency to maintain the future option of managing this quality for recreationists.

General Public Big Game Hunting Recreation Feature

Alternative Three would not alter the general setting of this feature, nor the available recreational experiences and benefits. This alternative would enhance or improve the habitat and availability of big game animals. Forage utilization under Alternative Three is low (with excess forage being left for wildlife) in addition proper functioning condition of most riparian systems (critical wildlife habitat) would demonstrate an upward trend. If these trends continue over the next 20 years the General Public Big Game Recreation Feature would demonstrate an enhanced recreational setting and experiences and benefits.

Continental Divide National Scenic Trail Special Recreation Management Area

Alternative Three would not alter the general setting of this feature, nor the available recreation experiences and benefits. Therefore, little to no impacts are anticipated as a result of this alternative to the CDNST settings and the areas recreational experiences and benefits.

The decreased stocking rates proposed to be implemented under Alternative Three would result in reduced livestock aesthetic impacts (cattle defecation, hummocking, etc.) and water quality impacts. It is also anticipated that the implementation of this alternative would enhance the quality of the unfenced CDNST water sources.

Green Mountain Recreation Feature

No impacts to recreation settings and available experiences and benefits are anticipated in the Green Mountain Recreation Feature.

National Historic Trail Special Recreation Management Area

No impact to the recreation setting and the available experiences and benefits are anticipated as a result of this alternative along the National Historic Trail.

Visual Resources

Alternative Three would benefit the visual quality of the vegetative component, through increases in variety and contrast. Increases in vegetation would eventually recover the movement and color contrast components (key factors in drawing visitors' attention to the landscape) rendered in the vegetation. In turn, the recreation setting and available experiences and benefits would also be enhanced, as a result of the benefits rendered to the visual quality of the historic trail landscape.

Open Space

The reduction in AUMs under Alternative Three would likely cause some permittees to leave the ranching business and to sell private lands within their ranching operations. Some of those private ranch lands are surrounded by or adjacent to BLM-administered public lands within the GMCA. Others are located within view of US Route 287, one of the main tourist routes to the National Parks and a major thoroughfare for the area's residents. The potential for the development of rural subdivisions in and near the GMCA would likewise increase as a result of the sale of these private lands. The development of rural subdivisions in the area would decrease the amount of open space related to the allotment and nearby agriculture lands. The potential effects of rural subdivision development would be comparable to, or greater than, the loss of open space associated with the development of the Pappy Draw Oil Field and, unlike mineral developments, would be permanent with unmitigated long term impacts to wildlife, recreation, visual resources and other resource values.

The area where these rural subdivisions could occur have been identified in a report entitled "Strategic Ranchland in the Rocky Mountain West" written in 2000 by American Farmland Trust (AFT), the Center of the American Trust, and the Nature Conservancy. Those lands lie between Sweetwater Station and Muddy Gap Junction in the Sweetwater River Valley. Several ranches owned by GMCA permittees that are currently identified as "Strategic Ranchland at Risk" appear on the map that accompanies this report.

EFFECTS ON WILDERNESS STUDY AREAS AND WILD AND SCENIC RIVERS (Alternative Three)

The table below contains a discussion of each required WSA value/data element and determines whether the level of impact from the action exceeds maximum allowable standards, as directed by the Interim Management Policy for Lands under Wilderness Review.

Table 4-33. Predicted Impacts to Wilderness Values as a Result of Implementing Alternative Three

Wilderness Value Indicator	Impact Description	Will the Impact Exceed Maximum Allowable Standard
Visual Resource	Full implementation of Alternative Three would result in increases in the vegetation component in the riparian systems, in turn returning the movement element created by these taller grasses. Recovery of this element would occur quickly, due to the large reduction in stocking rates, use level triggers, and the herding requirements.	No
Naturalness and Solitude		
Human Activity	Human Activity would slightly increase, due to herding requirements proposed for this alternative	No
Wildlife presence	Since wildlife forage would be increased in this alternative, the probability of increased wildlife occupation is high. In addition, the level of livestock evidence would be reduced as a result of reduced stocking levels.	No
Primitive Recreation		
Recreation Opportunities	Alternative Three proposes no new projects in the WSA. Additionally, the main feature of the WSA is unaffected by livestock grazing resulting from this AMP. The above factors cause no change to the recreation setting, and therefore no change to the corresponding opportunities of the WSA. In addition, it is anticipated that Alternative Three would enhance visitor experiences in the area of the WSA contained within the GMCA.	No
Natural Appearing Environment	Enhancement of the naturalness component of the recreation setting would occur in the riparian areas outside the Sweetwater Canyon Fence. This enhancement would be a result of the reduced stocking rate and utilization triggers proposed for this alternative. In the long term, the full implementation of the alternative would increase riparian functionality and reduce the presence of livestock.	No
Special feature		
Surface Water	Within the WSA fence, water quality is expected to be good, due to the years of rest and subsequent controlled grazing it has received. Also, the WDEQ has monitored and assessed the Sweetwater River, and removed it from the impaired water body list within the past ten years. Outside the fence, this alternative relies on herding to prevent over-use of the riparian zones. In the long term, plant vigor and production is expected to increase. As more extensive root systems develop, increased water infiltration and retention, through increasing the organic matter content of these soils, can be expected.	No
Vegetation		
Ecological Site Inventory	No lowering in seral condition would result from this alternative. Stubble height and utilization triggers for livestock removal, increased herding, stocking rates based on suitability and capability, plus "recovery prescriptions," would help managers work toward an upward trend.	No

Vegetation Utilization	This alternative provides for monitoring of utilization and livestock would be moved based on utilization standards. In order to meet the standards contained in the IMP, utilization objectives within the WSA would have to be 50 percent.	No
Plant Vigor	No long term decrease in plant vigor would result from this alternative. Stubble height and utilization triggers for livestock removal would help managers improve riparian and upland range conditions.	No
Threatened or endangered plants	Same as Alternative One.	No
Wildlife		
Wildlife habitat	Because Alternative Three includes a substantial reduction in livestock numbers and stricter vegetation objectives, habitat (both riparian and upland) would likely improve dramatically.	No
Population	As habitat conditions improve, wildlife populations (especially plants and non-game) are also likely to increase.	No
Diversity	Improved habitat conditions (especially riparian) are likely to cause increased plant and animal diversity.	No

CUMULATIVE IMPACTS (Alternative Three)

Soil and Vegetation Resources

There are currently 133 acres undergoing impacts from livestock (i.e., sacrifice areas) and/or project developments (e.g., springs, wells, fences, and reservoirs) from projects completed since implementation of the 1999 Final Decision. No new water developments are proposed in this alternative. There would be no net gain in the amount of fences on the entire GMCA under Alternative Three. No additional impacts from livestock management projects are expected to arise from this alternative.

Livestock Grazing

An estimated total of \$10,540 in annual maintenance costs have accrued through 2007 as a result of construction of the range improvements in Alternative One. An estimated total \$1,945 of additional maintenance costs would occur upon completion of the proposed remaining range improvement projects by 2018.

Wildlife/Fisheries Habitat and Special Status Species

Alternative Three’s lack of additional permanent fencing in the GMCA would offset any impacts associated with the Rawlins Field Office’s fencing proposals to improve livestock management south of the allotment. The Rawlins proposals could negatively impact the Red Desert Antelope Herd’s movement to crucial winter habitats near Rawlins and Interstate 80. Antelope would continue to be able to migrate to these crucial winter habitats under this alternative, but with fewer obstacles that could change migration patterns or slow migration.

The cumulative impacts of habitat loss from proposed water developments coupled with energy development and the CO2 pipeline would be the same as that described under Alternative One.

A general improvement in both riparian and upland sage-grouse habitat, resulting from the mandatory stubble height and utilization requirements of Alternative Three, would tend to offset continued loss or fragmentation of sage-grouse habitat associated with energy development activities in the vicinity of the GMCA.

Wild Horses

Cumulative impacts from temporary fencing could occur. Impact intensity would depend on how much temporary fencing is authorized, and where the temporary fencing is located. Each individual project would add to the cumulative impacts.

Cultural Resources

Reductions in trampling and congregation impacts near natural water sources and riparian area would decrease impacts to cultural resources, and would lead to a positive trend in their long-term survival.

Recreation and Visual Resources

As a result of actions planned under Alternative Three and the mitigation developed to reduce recreational impacts, livestock grazing on the allotment would not contribute to the trends documented in the affected environment. Therefore, cumulative impacts to the recreation setting and the available/realized experiences and benefits would occur at a similar rate to that documented in the affected environment.

Off site impacts to the Recreation Features

Since Alternative Three maintains the existing setting, and experiences and benefits for the general allotment, there would be no offsite impacts to the recreation features as a whole. Alternative Three maintains the distinct niche represented by the setting of the GMCA.

Wilderness Study Area and Wild and Scenic Rivers

The impacts from Alternative Three and the identified mitigation to WSA and WSR resource are anticipated to be light. In addition, no offsite impacts to the Sweetwater WSA and WSR as a whole unit are anticipated. No impacts exceed maximum allowable standards, as identified in the Interim Management Policy for Lands under Wilderness Review. As a result of the above findings, cumulative impacts to the WSA and WSR are anticipated to continue in similar trends as documented in the affected environment.

RESIDUAL IMPACTS

Soil and Vegetation Resources

Under Alternative Three, in about a decade or so, changes are anticipated for lowlands, as livestock rotations are implemented in the use areas and more of the grazing use is shifted to the uplands. Lowlands would show increases in vegetative and litter cover and vegetative height. This would result in lower erosion rates, and contribute increased amounts of organic matter to the soil. Water quality and the storage of water and nutrients would also be enhanced by increased organic matter inputs to the lowland soils.

The Alkali Creek Sheep Use Area, having no hot-season use, and managed use by sheep, is expected to improve, displaying enhanced vegetation, soil, and water storage sooner than any other use area under this alternative. This would yield greater resilience to drought impacts, while also aiding in resisting the invasion and establishment of noxious weeds.

Riparian soils occurring outside of spring development/enhancement exclosures, riparian pastures, and special riparian grazing treatment pastures would be maintained in their current seral stage, or they could possibly trend slightly upward over an exceptionally long period of favorable growing conditions. This would occur on approximately 229 acres, or 11 percent, of the riparian soils in the allotment in this currently low seral stage. Often, the most degraded areas would not come back, as too much soil fertility has already been lost. However, the greatest chances for improvement can be found in those mid-seral systems that account for about 70 percent of these systems that are not severely degraded and still retain some inherent soil fertility. Enhancing these mid-seral systems and keeping them from falling into low seral conditions would benefit the largest percentage of riparian/wetland areas in the long term.

In the aforementioned sacrifice areas and their zones of impact, like the stock trails that radiate out from them, ideal conditions are created for the establishment of annual and perennial weeds. With ever-increasing recreational use, mineral development, natural animal movements, and annual turnout of livestock fed on non-certified weed-free hay, the chances for the establishment of new weeds and the spread of existing populations is highly likely.

Livestock Grazing

An estimated total of \$10,540 in annual maintenance costs have accrued through 2007 as a result of construction of

the range improvements in this alternative. An estimated total \$1,945 of additional maintenance costs would occur upon completion of the proposed remaining range improvement projects by 2018. An estimated combined total \$12,485 of additional maintenance costs would accrue in the long term (2018-2027).

Wildlife/Fisheries Habitat and Threatened and Endangered Species

Long-term improvements in habitat conditions and reduced competition between big game species and domestic livestock would likely lead to increased stability and an overall increase in big game populations.

Long-term improvements in sage-grouse habitat conditions (both upland and riparian) would help sage-grouse populations in the GMCA remain static or increase.

Wild Horses

No residual impacts have been identified for wild horses under Alternative Three.

Cultural Resources

Due the decrease in livestock grazing impacts and the resultant decreases in erosion, damage, and disruption to these resources, improvements to the condition of prehistoric and historic sites and trails would slowly occur.

Recreation and Visual Resources

No residual impacts to the recreational setting or experiences and benefits are anticipated as a result of the implementation of this alternative.

Wild Study Areas and Wild and Scenic Rivers

The indirect and direct impacts documented for alternative 3 do not exceed maximum allowable standards as identified in the Interim Management Policy For Lands Under Wilderness Review. In addition this level of impact does not exceed impact standards for the WSR resource. Therefore residual impacts to the WSA and WSR resource would be slight as a result of the alternative. As long as portions of the WSA and WSR resource are unfenced from the GMCA slight visual and aesthetic impacts would continue in these areas. This impact is somewhat offset by the location of the WSA fence and its low level of contrast with the characteristic landscape. Moving the fence to the boundary would increase the level of contrast at the boundary of the WSA.

ALTERNATIVE 4

EFFECTS ON SOIL AND WATER RESOURCES (Alternative Four)

Soil Resources

Under this alternative, the GMCA would be divided into two allotments. This alternative proposes 48 miles of riparian enclosure fence, 68 new water sources, locations of salt at least one-half mile from water (to aid in the handling and distribution of livestock), and intensive herding. Nineteen miles of new fence would be required to divide the proposed two new allotments. With the 68 new water sources proposed under this alternative, one may conservatively assume that at least one new upland salt location per water development would be necessary to aid in drawing livestock into the uplands. One new sacrifice area would be created at each salt block location. The sacrifice areas associated with the existing salt block locations are generally not as large as those associated with water sources, but some amount of bare, compacted soil would be expected to develop around each one.

Within the Alkali Creek Common Allotment, livestock numbers would be based on historic use of the allotment, which is about 49 percent of the permitted use. Herding and rest-rotation grazing systems are expected to increase livestock use of vegetation on the uplands and alleviate some of the heavy use presently occurring in the riparian areas. Monitoring of grazing use would be sensitive enough to detect significant change. Implementation of this alternative would not adversely impact soil potential in the uplands. With use levels of riparian vegetation expected to be no more than moderate in grazing years, a fair to good chance of improvement from present conditions is expected, depending upon effective herding and proper stocking rates (Platts, 1989). However, very intensive management of livestock would be necessary to handle one large herd of livestock. Soil health conditions of

riparian areas would show slow improvement over many years or decades because complicating environmental conditions (such as drought) can slow or negate progress in some years.

As under Alternative One, a combination of seven riparian pastures, five completed and two proposed, would be constructed and maintained on important riparian zones. These riparian pastures would be used by livestock either in the spring or fall period. The effects would be variable, but, improvement in vegetative expression would be expected to occur over a period of several normal precipitation years. Functional integrity of the riparian systems, and the soils found there, would take longer to restore.

Impacts in the uplands from bunched, herded livestock would have a negative effect on the brittle shrub component (i.e., sagebrush, bitterbrush) in some areas. On sandy soils, loss of these shrubs would lead to the initiation of accelerated wind erosion (see Map 4-4, Wind Erosion Potential).

Map 4-3, Water Erosion Potential, and Map 4-4, Wind Erosion Potential, illustrate that if a management scenario decreases soil cover too much in the uplands, accelerated wind erosion can result. Areas of currently stabilized sand dunes to the south of Green Mountain, and medium- textured soils high in very fine sand, fine sand, and silt-size particles can become active and suffer erosional losses, decreasing the potential of these sites. In the medium and heavy-textured soils, water erosion in the form of new and more frequent rills and gullies would result. Any increases in erosion rates should be negligible and not affect soil fertility.

In the short-term, changes to the present condition of lowlands would be apparent. In the spring development exclosures and riparian pastures that would be constructed, increases in vegetation cover and litter would be most rapid. In the exclosures and fenced pastures, increases in vegetative/litter 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. This grazing system holds the most promise to improve the Functioning-at-Risk and Non-Functional riparian conditions on the proposed Alkali Creek Allotment.

In the mid-term (five to ten years), even though increased upland use is part of the management strategy in this alternative, the pasture rotation strategy should allow for enough rest in the uplands to maintain adequate soil cover to buffer the erosive effects of wind and precipitation. The rotation should also allow enough time to alleviate annual soil compaction due to animal trafficking under moist conditions.

Water Resources

The expected impacts to water resources from Alternatives One and Three would also apply to Alternative Four with some variations primarily related to specific water development projects, new fences, spring exclosures, riparian pastures, and livestock management strategies.

Within the proposed Alkali Creek Allotment, the fate of the vegetation and rates of soil erosion - especially in and immediately adjacent to the riparian areas - would have the greatest influence on water quality. With livestock use levels under this alternative expected to be light to heavy, some amount of riparian zone trampling and bank damage is expected to occur. The heaviest impacts would occur around scarce natural water sources such as streams and springs. The transition zones between the uplands and the riparian areas are also susceptible to mechanical damage by livestock, such as soil compaction, when they are moist. With a rest-rotation grazing system, there should be enough time afforded for alleviation of what soil compaction may occur, thereby maintaining normal soil infiltration rates.

Some improvement in riparian conditions would be expected in the proposed Green Mountain Allotment. With a deferred-rotation system, the highest precipitation zone in the area and the highest potential production for riparian areas have excellent potential for maintaining and enhancing desirable riparian and wetland vegetation. Pasture moves in the forested parts of the allotment will be problematic, for moving all of the cattle out of one pasture and into another could prove to be difficult. The results of leaving a few of the cattle in the timbered areas of a pasture after the majority have been cleaned out, is sufficient to cause undesirable impacts to the small mountain streams found there.

For the new Green Mountain Allotment, deferred-rotation grazing and herding would be used to eliminate vegetation use on any given spot for most of the grazing season. This grazing strategy would lessen impacts to the riparian areas where cattle tend to congregate, especially in the summer season.

With the proposed managed grazing of sheep and no hot season grazing (at levels almost half that of current preference), the Alkali Creek Sheep Use Area would yield riparian zone improvements more rapidly when compared to the Green Mountain Allotment. As a result of this new management scenario, water quality parameters such as turbidity, total dissolved solids (TDS), and suspended sediment (SS) would be improved above the current situation.

For the seven riparian pastures previously described improvements in water quality would occur. This would be due to the elimination of livestock and horse damage to stream banks and adjacent areas, along with the restoration of the functional integrity of the riparian systems. Impacts to water resources outside of enclosures and riparian pastures would be directly attributable to the herding effectiveness; water quality should be enhanced.

There are currently 133 acres of land experiencing impacts from livestock (i.e., sacrifice areas) project developments (e.g., springs, wells, fences, and reservoirs) from projects completed since implementation of the 1999 Final Decision.

EFFECTS ON VEGETATION RESOURCES (Alternative Four)

Vegetation – General

Refer to the General effects on Vegetation Resources for Alternative One.

Grazing Management

Refer to the Grazing Management Section in Alternative One.

Upland Vegetation - Short Term

Under Alternative Four, each pasture in the proposed Alkali Creek Common Allotment (ACCA) or Green Mountain Allotment (GMA) would receive a rest period or deferment from livestock grazing during portions of the growing period. Deferring grazing use during the growing period is very important to the plant in terms of carbohydrate reserve levels. The carbohydrate reserves are used during periods of rapid herbage growth, such as initial growth, subsequent regrowth, and for respiration and slight growth during the winter (Cook 1976; Priestly 1962-from Coyne and Cook, 1970). Allowing growth without grazing pressure during portions of the growing period would allow the plant to have available ample carbohydrate reserves for normal growth and development. The restriction of grazing during portions of the growing season would allow an increase in vigor, root growth and replacement, seed production, and litter accumulation.

Seasonal grazing system in the Alkali Creek Sheep Pasture would result in sheep grazing from April 1 through June 15 and November 1 through December 31 of each year. This spring sheep grazing has historically taken place near East Alkali Creek on approximately 4,600 acres. The historical fall use would continue with the implementation of this alternative. Concentration of the fall sheep use in this use area would result in the decline of the vegetative vigor, production, and litter accumulation in the areas of overlap with spring sheep use. The remaining portions of the use area (approximately 16,600 acres) would be expected to improve in production, root growth and replacement, litter accumulation, vigor, and seed production.

Grazing during the growing season is considered detrimental to the vegetation by removal of portions of the plant necessary in the synthesis of carbohydrates and by forcing the plant to deplete its carbohydrate reserves by regrowth. However, not allowing livestock to graze the pasture the same time each year would allow the vegetation to recover.

In the proposed Alkali Creek Common Allotment one pasture each year would receive year round rest from livestock grazing to allow for growth and recovery of the vegetation. The absence of grazing would allow the plants an entire growing season without grazing pressure to improve vigor, root growth and replacement, seed production, and litter accumulation.

Spring-early summer cattle grazing (from May 1 to July 9) would occur in two pastures within the ACCA (Treatments Q and R) while the third and fourth pastures would be deferred (Treatments S and T) until July 10 (refer to Annual Grazing Treatments Table 4-34). This rest rotation grazing system allows two pastures to be deferred for two months of the growing season every year (Treatments S and T). The deferment is important to the vegetation in order to allow the plants most of the growing season without grazing pressure to improve vigor, root growth and replacement, seed production, and litter accumulation.

Grazing during the fall, winter (Treatments H and J), or dormant season is considered to be the least detrimental to the vegetation. Cook and Stoddart (1963) concluded that desert ranges are best adapted to winter grazing. Although there would be plant mortality and loss of crown cover (Cook and Stoddart 1963), the loss is expected to be less than the plants' yearly growth.

Despite some short-term negative effects due to periodic grazing during the growing season for both allotments, the overall beneficial effects of the grazing systems on upland vegetation would more than offset these short-term impacts because: (1) the majority of the upland rangeland is in good or fair condition (see Table 4-4, Forage Condition and Apparent Trend Summary), (2) grazing use would be rested or deferred during the initial vegetation growing season, (3) the level of grazing use would be dispersed to areas which are presently receiving only light use, and (4) grazing would be kept at a level well below average annual growth during the short term and interim periods.

Upland Vegetation – Long Term

The long-term impacts in the upland range of the ACCA five-pasture rest-rotation and GMA six-pasture deferred-rotation grazing systems would be increased vegetation production due to the increased seedling establishment, improved vigor, improved root growth and replacement, increased litter accumulation, and increased percentage composition of grass and forb key species.

A study by Gibbens and Fisser (1975) in the Red Desert region (where 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.

In this same study, a two pasture deferred-grazing system showed an increase in grass cover of 31 percent outside of the control area, while the grass cover increase from 1967 to 1971 inside the control area was 25 percent. Therefore, the net increase of grass cover from 1967 to 1971 of 6 percent was a result of the two-pasture deferred grazing system. Shrub cover change from 1967 to 1971 outside the enclosure showed a decrease of 11 percent, while inside the enclosure was an increase of 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 five-pasture rest-rotation grazing system in the southern portion (Red Desert Region) of ACCA would decrease shrub cover 10 percent.

The proposed six-pasture deferred-rotation grazing system in the GMA is expected to have these long-term impacts: improved vigor of vegetation species including root growth and replacement, increased litter accumulation, increased seed production and seedling establishment, and increased production.

Grazing in the North and South Arapahoe and Happy Springs Pastures would take place during the summer and winter months (refer to Table 4-34, Annual Grazing Treatments and Table 4-35, Acres Per Grazing Treatment Through One Complete Grazing Cycle). The winter grazing season, which would receive 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 resulting impacts, such as decreased litter and seedling establishment created by grazing from May 1 through July 9 in these pastures, would be detrimental in the area of the summer sheep use.

Table 4-34. Long-Term Annual Grazing Treatments (Alternative Four)

Allotment/Pasture	Year 1	Year 2	Year 3	Year 4	Year 5
Alkali Creek Common					
Happy Springs	Q	P	T	S	R
North Arapahoe	R	Q	P	T	S
South Arapahoe	S	R	Q	P	T
Picket Lake	T	S	R	Q	P
Antelope Hills	P	T	S	R	Q
Alkali Creek Sheep	C-G-J-H	C-G-J-H	C-G-J-H	C-G-J-H	C-G-J-H
Green Mountain					
Sheep Creek	A-J-N	B-J-N	A-J-N	B-J-N	A-J-N
Reserve (Green Mt.)	D-N	D-N	D-N	D-N	D-N
Willow Creek	B-J-N	A-J-N	B-J-N	A-J-N	B-J-N
Crooks Creek	A-J-N	B-J-N	A-J-N	B-J-N	A-J-N
Stratton Rim	I-J-N	I-J-N	I-J-N	I-J-N	I-J-N
Hadsell	B-J-N	A-J-N	B-J-N	A-J-N	B-J-N

Riparian Management Pastures

Alkali Creek Common	Year 1	Year 2	Year 3	Year 4	Year 5
Long Slough	I-G-O	G-O	I-G-O	G-O	I-G-O
Crooks Creek/Bare Ring Slough ¹	I-G	I-G	I-G	I-G	I-G
W. Fork Crooks Creek	I-G-O	G-J-O	I-G-O	G-J-O	I-G-O
*Lost Creek ²	I-G	I-G	I-G	I-G	I-G
Ice Slough	G-J-O	G-J-O	G-J-O	G-J-O	G-J-O
Warm Springs Creek	I-G-O	G-J-O	I-G-O	G-J-O	I-G-O
*Sweetwater River ¹	I-G-O	I-G-O	I-G-O	I-G-O	I-G-O

¹Willow plant communities present within riparian management pasture.

²Ten years of rest would be required before livestock grazing is authorized.

* Pasture not yet completed

See Appendix 5 for a description of the grazing treatments listed in Table 4-34 above.

The increase in sheep grazing use during the winter, with no increased use expected from wildlife or wild horses, would not be significant enough to be detrimental to the vegetation resource over the long-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 the riparian management pasture and the rest-rotation grazing system (Blaisdell, et al. 1982, Blaisdell and Holmgren 1984, Masters, et al. 1996a, Holechek, et al. 1998). Within the Picket Lake, North Arapahoe and South Arapahoe Pastures, production and condition would be expected to improve slightly due to the improved distribution of livestock and wild horses through the use of water developments. As previously mentioned, the winter season is considered to be the least detrimental to the vegetation in terms of grazing. Winter is 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, root growth and replacement, seed production, seedling establishment, and litter accumulation.

Concentration of livestock, 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 ACCA. Rest or deferment of grazing during the spring and summer months would allow the vegetation to recuperate from the depletion of carbohydrate reserve levels from winter grazing. A slight increase in forage production over the entire ACCA would be expected from implementation of this alternative in the long-term.

Areas which are favored as sheep bed-grounds would be expected to receive excessive grazing pressure. This alternative requires the sheep operators to move the sheep bed-grounds 1.5 miles every week. This impact would not occur in the Picket Lake, North Arapahoe and South Arapahoe Pastures of the ACCA where three miles of movement is required every week. The 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 restoration would be extremely limited. An area of approximately one to three acres per bed ground would be expected to be impacted. The rest-rotation grazing system however, would allow the vegetation to partially recover from these short periods of heavy grazing. The rest-rotation grazing system and reduced livestock grazing levels should allow the vegetation to recover from these short periods of heavy grazing.

Table 4-35, Alternative Four - Long-Term Acres Per Grazing Treatment Through One Complete Grazing Cycle, shows the acres of different grazing treatments that are applied through a completed five year grazing cycle. The table displays the acres utilized by livestock grazing by the various annual treatments through one complete cycle.

**Table 4-35. Alternative Four-Long-Term
Acres per Grazing Treatment through One Complete Grazing Cycle**

Treatment	Public Land Acres				
	Year 1*	Year 2*	Year 3*	Year 4*	Year 5*
A	17,969	8,538	17,969	8,538	17,969
B	8,538	17,969	8,538	17,969	8,538
C	18,207	18,207	18,207	18,207	18,207
D	12,893	12,893	12,893	12,893	12,893
E	0	0	0	0	0
F	0	0	0	0	0
G	28,908	28,908	28,908	28,908	28,908
H	61,545	56,873	61,545	56,873	61,545
I	11,758	2,901	11,758	2,901	11,758
J	46,514	46,514	46,514	46,514	46,514
K	0	0	0	0	0
L	0	0	0	0	0
M	0	0	0	0	0
N	44,101	44,101	44,101	44,101	44,101
O	10,032	10,032	10,032	10,032	10,032
P	94,721	68,831	78,360	85,441	82,032
Q	68,831	78,360	85,441	82,032	94,721
R	78,360	85,441	82,032	94,721	68,831
S	85,441	82,032	94,721	68,831	78,360
T	82,032	94,721	68,831	78,360	85,441

*The totals for each year are greater than the acreage of the allotment because some pastures receive more than one treatment each year.

Range Improvements

Construction of the proposed range improvements would remove approximately 114 acres from production. Table 4-36 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 the spring developments (31 acres), pasture boundary fences (29 acres), riparian pasture fences (14 acres), water wells (29 acres), and reservoirs (12 acres). The overall impact to the vegetation within the GMCA as a result of range improvement construction would be minor.

Even though fences are beneficial in the management of livestock, they do cause trailing impacts along the fences. This would result in the deterioration of the vigor of the plants due to overgrazing and trampling. Use of motorized vehicles for maintenance would also lead to a reduction in vigor of vegetation. Another impact of the trailing of livestock, wild horses, and wildlife along fence lines, would be the removal of vegetation through trampling and compaction of the soil. This would cause adverse growing conditions. A change in composition of the vegetative species could occur in the immediate vicinity of the fence in areas away from the fence, impacts would be less noticeable. Heavy grazing would cause a decrease in the preferred species and an increase in the less-preferred species.

The existing fence on the southern boundary of the GMCA (proposed ACCA) would concentrate summer cattle use on the north side of the fence near the proposed Lost Creek Riparian Pasture. The forage in the areas of concentration would be removed by livestock through consumption and trampling. The grazing would result in the de-

cline 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 a spring would include removal of vegetation, changes in composition, and decrease in vigor of plants. Use of the spring development by livestock would result in removal of vegetation immediately around the water trough, a circle roughly 50 yards in radius. Sacrifice areas would occur adjacent to the spring source and each of the water wells. Total disturbed area would be 2.6 acres for the spring development and 1.8 acres per water well development (Table 4-36). The 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 the sacrifice area. The decrease in vigor would come about from the dust on the plants, the partial trampling of vegetation by livestock, and the heavy grazing which commonly takes place around water sources.

The development of the water wells would improve the distribution of livestock over the ACCA, thus promoting a more even utilization of the forage. Proper utilization of the forage is important in maintaining or improving the vegetative vigor, production, or range condition (Blaisdell, et al. 1982, Blaisdell and Holmgren 1984). The properly-placed water developments, combined with the grazing systems, would pull the livestock from the overused existing natural water sources such as Crooks Creek and Lost Creek, allowing these areas to improve in vigor and production.

Overgrazing is marked by a disappearance of the preferred plants or of those 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, called invaders, which are not part of the natural plant communities. The invaders would be mobile annuals, but later, would encourage the establishment of herbaceous or woody perennials of low value (Stoddart, Smith, and Box 1975).

Any place which has the existing vegetation removed provides an opportunity for other plants to begin growth. The construction, maintenance, and use of the various proposed projects may cause enough disturbance to permit increased numbers of poisonous plants to invade the site. For example, halogeton (*Halogeton glomeratus*) is a poisonous annual often found on disturbed sites. The amount of trampling and utilization of the vegetation would decrease as the distance from water increased.

Table 4-36 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 4-36. Surface Acres Disturbed
Alternative Four Long-Term Proposed Range Improvements***

Type of Improvement	Number	Acres Disturbed per Unit	Total Acres Disturbed
Spring development	12+	2.6	31.2
Three-Wire fence (Use Area/Pasture boundary)	19 miles	1.5/miles	28.5
Riparian pasture fence	9.0 miles	1.5/miles	13.5
Cattleguard	3	0	0
Water well (new and existing) development	16	1.8	28.8
Reservoir reconstruction	3	4.0	12
Exclosure (Artesian wells/wetland fenced)	0	.2 on fenceline .9 inside permanent exclosure	0 on fenceline 0 inside permanent exclosure
Pipeline	0 miles	.1/miles	0
		Total	114
*See Appendix 11 for rationale.			

Summary

Short-term impacts under summer grazing (treatments A, B, D and N) would be reductions in plant vigor, litter accumulation, and seed production. Short-term impacts from fall and winter grazing (treatments B, H and J) would be reductions in plant vigor and litter accumulation. The summer-long rest and year-long rest (treatments G, O and

P) treatment would increase vigor, litter accumulation, seedling establishment, and seed production for the proposed Alkali Creek Sheep Pasture, the rotating rest pasture in ACCA and five riparian management pastures. Rest periods, which comprise part of treatments A and B, would enhance the vegetation by increasing vigor, root growth and replacement, seed production, and litter accumulation of the vegetation. The short-term impacts, such as increased vigor and seedling establishment would be enough to offset those which would be detrimental due to the moderate (20 percent) increase in long term grazing use above the 1980-2006 level (Blaisdell, et al. 1982, Blaisdell and Holmgren 1984, Holechek et al. 1998).

The proposed long term use level (39,455 AUMs) for all grazing animals (cattle, sheep, wildlife, and wild horses) are 68 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. The proposed long term use level (39,455 AUMs) for all grazing animals (cattle, sheep, wildlife, and wild horses) would be an average stocking rate of 11.9 acres per AUM on the public land within the ACCA and GMA. The last nine years (1999-2007) of below average precipitation have required lower livestock use levels to manage for rangeland health standards and provide for drought recovery.

Under this alternative, additional forage will be made more readily available for utilization as a result of increased distribution of livestock through range improvements. In the long term the upland areas located away from present livestock water sources within the North Arapahoe, South Arapahoe, Antelope Hills, Picket Lake, and Happy Springs Pastures and GMA would receive a 64 percent increase in grazing use over the 1999-2006 use levels. The area within the Picket Lake, North Arapahoe and South Arapahoe Pastures (formerly Seven Lakes Incommon Allotment), approximately 40 percent of the GMCA (refer to Appendix 6), would receive most of this increased grazing use. This increased livestock grazing intensity, combined with the grazing systems, would result in the vegetation of the upland areas maintaining or slightly improving in vigor, root growth and replacement, production, seed production, and litter accumulation (Blaisdell, et al. 1982, Blaisdell and Holmgren 1984, Holechek et al. 1998).

The upland and lowland areas within the Alkali Creek Sheep Use Area and Long Slough Pasture would improve in vigor, production, seedling establishment, seed production, and litter accumulation due to the lack of grazing during the summer growing season and year-long rest period.

Implementation of this alternative would result in a slight increase in production (USDI-BLM 1979, Blaisdell and Holmgren 1984). Also, by 2019, it is expected that there would be a static trend in upland range condition, a static to improving trend in those riparian areas outside riparian pastures within the Antelope Hills Pasture. Platts and Nelson (1989) rated rest-rotation grazing systems as fair for improving stream and riparian habitats (refer to Appendix 10). However, the proposed rest-rotation grazing system, which limits the summer grazing period to 35 days for this pasture, would allow for long-term improvement compared to the existing situation (Myers 1989, Masters et al. 1996b, Mosley, et al. 1997, Clary and Webster 1989, Clary and Webster 1990, USDI-BLM 1998).

Construction of the proposed range improvements would cause the loss of approximately 114 acres from production. Major impacts to the vegetation would be the removal of vegetation in the vicinity of the water troughs and the decrease in vigor of the vegetation through trampling and heavy grazing by livestock, wild horses, and wildlife along fences.

Overall, the impacts upon vegetation by implementation of this alternative are: (1) a static to slight 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) a slight increase in

production; (3) a static to upward trend in the condition class on the upland areas adjacent to water sources and on an estimated 76 percent of the public land riparian areas in the allotment; and (4) a stable trend in live vegetation cover (USDI-BLM-1979)(Holechek et al. 1998).

Wetland-Riparian Vegetation

Under this alternative, riparian pastures would continue to be grazed with a limited number of cattle for a predetermined amount of time in either the spring or the fall. Spring exclusions/developments would continue to be excluded from grazing. However, under Alternative Four, each riparian pasture would receive two years of rest out of every five, because grazing would not be permitted if cattle were present in those areas during the hot season (mid-summer). Improvement in plant diversity, variety of age classes, and structure in plant communities in riparian exclusions would be the same as those described under Alternative One. Improvement in riparian pastures would be similar to Alternative One, but accelerated due to the additional rest built into the grazing regime.

Riparian areas outside protective exclusions or pastures would also improve, even with hot season use, because of the limited amount of grazing time allotted for each pasture. In addition, these areas would also receive one year of rest out of every five, accelerating their improvement beyond that described in Alternative One.

EFFECTS ON LIVESTOCK GRAZING (Alternative Four)

Short Term Cattle

This alternative would provide for an initial use level of approximately 25 percent of permitted use. The extensive (75 percent for cattle) nonuse which has been authorized in the allotment over the past nine (1999-2007) years would continue in the short-term to allow for drought recovery and construction of range improvements. This policy is discussed in Assumptions for Analysis.

Interim Cattle

Under this alternative by 2017, there would be a 27 percent increase (from the 1999-2006 average authorized cattle use) in spring-summer-fall cattle AUMs which would impact 18 cattle permittees by increasing the number of animal units of cattle use they would graze on public land within the GMCA. This alternative would not change the performance of individual animals but should increase the number of cattle from approximately 2,300 to 3,850 head (refer to Appendix 5) by the end of the interim implementation period.

Under this alternative by 2017, there would be a 2 percent increase (from the 1980-2006 average authorized cattle use) in spring-summer-fall cattle AUMs which would impact 18 cattle permittees by increasing the number of animal units of cattle use they would graze on public land within the GMCA. This alternative would not change the performance of individual animals but should increase the number of cattle from approximately 2,900 to 3,850 head (refer to Appendix 5) by the end of the interim implementation period.

Long Term Cattle

Under this alternative by 2027, there would be a 56 percent increase (from the 1999-2006 average authorized cattle use) in spring-summer-fall cattle AUMs which would impact 18 cattle permittees by increasing the number of animal units of cattle use they would graze on public land within the GMCA. This alternative would not change the performance of individual animals but should increase the number of cattle from approximately 2,300 to 4,700 head (refer to Appendix 5) by full implementation of the AMP in the long-term.

Under this alternative by 2027, there would be a 25 percent increase (from the 1980-2006 average authorized cattle use) in spring-summer-fall cattle AUMs which would impact 18 cattle permittees by increasing the number of animal units of cattle use they would graze on public land within the GMCA. This alternative should not change the performance of individual animals but should increase the number of cattle from approximately 2,900 to 4,700 head (refer to Appendix 5) by full implementation of the AMP in the long-term.

Short Term Sheep

This alternative would not enable two grazing permittees to convert 1,325 winter sheep AUMs to 689 summer cattle AUMs and 5,194 (former Seven Lakes) to 4,940 (former Green Mountain) summer sheep AUMs to 5,017-4,158 summer cattle AUMs as the water developments become operational. Further, the two permittees, Stan and Linda Cole and W.S. Baldwin, would not experience an increase in the value of their base property to which their federal grazing permits are attached over the short-term because there would be no livestock conversions authorized under this alternative. In the short term, this alternative would not change the current level of economic viability of these two livestock operations.

Interim Sheep

Under this alternative by 2017, there would be a 62 percent increase in yearlong sheep AUMs (from the 1999-2006 average authorized sheep use) which would impact two sheep permittees by increasing the number of animal units of sheep use they would graze on public land within the GMCA. This alternative would not change the performance of individual animals but should increase the number of sheep from approximately 1,450 to 2,350 head (refer to Appendix 5) by the end of the interim implementation period.

Under this alternative by 2017, there would be a 13 percent decrease in yearlong sheep AUMs (from the 1980-2006 average authorized sheep use) which would impact two sheep permittees by decreasing the number of animal units of sheep use they would graze on public land within the GMCA. This alternative would not change the performance of individual animals but would decrease the number of sheep from approximately 2,700 to 2,350 head (refer to Appendix 5) by the end of the interim implementation period.

Long Term Sheep

Under this alternative by 2027, there would be a 97 percent increase in yearlong sheep AUMs (from the 1999-2006 average authorized sheep use) which would impact two sheep permittees by increasing the number of animal units of sheep use they would graze on public land within the GMCA. This alternative would not change the performance of individual animals but should increase the number of sheep from approximately 1,450 to 2,850 head (refer to Appendix 5) by full implementation of the AMP in the long-term.

Under this alternative by 2027, there would be a 6 percent increase in yearlong sheep AUMs (from the 1980-2006 average authorized sheep use) which would impact two sheep permittees by increasing the number of animal units of sheep use they would graze on public land within the GMCA. This alternative would not change the performance of individual animals but should increase the number of sheep from approximately 2,700 to 2,850 head (refer to Appendix 5) by full implementation of the AMP in the long-term.

Long Term Dual Use

From implementation of this alternative, a long-term increase in AUMs is predicted. By 2027, it is expected that there would be an improvement in upland range condition of at least one-half condition class resulting in fewer acres in low seral (poor) condition; fewer acres in mid seral (fair) condition; more acres in late seral (good) condition; and more acres in potential natural community (excellent) range condition (USDI-BLM, 1979). Improvement in upland and riparian forage conditions in the long-term would result in an increase in dual use (cattle and sheep) AUMs. The condition of riparian areas outside the riparian management pastures (approximately 1,360 acres or 66 percent of the public land total) is expected to remain static in the short term and begin to improve in the interim period. Improvement in vegetation cover and diversity would continue into the long term. Rest and deferred-rotation grazing systems were evaluated by Platts and Nelson (1989). Although these systems were only rated as fair for improving stream and riparian habitats (refer to Appendix 10), the reduced grazing use levels in the short term and interim periods would increase the rate of riparian area recovery.

Range Improvements

Table 4-37 lists the proposed range improvements and estimated project costs for their construction and installation at \$590,630 to \$611,320. Table 4-38 shows estimated maintenance costs for the proposed range improvements at \$7,575 per year. The estimated construction costs would range from \$1.26 to \$1.30 per public land acre or \$12.47 to \$12.91 per public land AUM. Under this alternative, it is proposed these improvements would be completed by the end of year 13 (2020) and would be funded 50 percent by the BLM (out of range betterment funds) and 50 percent by the grazing permittees and other cooperators. The maintenance responsibility of the proposed projects would be assigned to individual grazing permittees or a formally recognized permittee grazing association depending on the type and location of project. These projects would be designed to solve the water and livestock distribution problems present on the allotment.

The current trends and conditions of the lowland (adjacent to existing waters) areas within the Arapahoe, Antelope Hills-Picket Lake, Green Mountain, and Happy Springs Use Areas would continue in the short term pending completion of the proposed water developments and fencing. Completion of the proposed water developments and fencing would occur in the interim period and these lowland areas would show improvement in plant vigor and then condition. Improvement in vegetation cover and diversity would continue into the long term. The overall improvement in condition of these lowland areas due to periodic rest and deferment should offset the increase (20 percent from 1980-2006 average or 64 percent from 1999-2006 average) in the grazing intensity.

The proposed water developments listed in Table 4-37 would enable the cattle to graze much more of the allotment, making approximately an additional 3,800 to 7,800 summer cattle AUM's available (from the 1999-2006 authorized use levels). This would allow increases in cattle numbers both in the interim and long term, leading to an increased income potential for the grazing permittees in the interim and long-term.

Herding

Under this alternative, herding would be mandatory on both allotments. The deferred and rest-rotation grazing systems both 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 and pastures. A description of the herding needed to implement the proposed grazing systems is in Description of Alternative Four and Section Management Actions Common to All Alternatives. A more intensive level of cattle herding would be required under this alternative. Nine to ten seasonal riders with the associated higher labor costs discussed in Effects on Socioeconomics would be necessary to accomplish effective herding. 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.

The higher level of proposed range improvements listed in Table 4-37 would be installed to make the herding program more manageable. However, there still would be higher herding costs for permittees associated with nine to ten seasonal riders. Nevertheless, experience on GMCA has shown that cattle have congregated and stayed around water sources or spring developments in a rested or deferred pasture or riparian management pasture when effective herding has not occurred. The increased level of herding proposed under this alternative, would prevent most problems of this nature provided cattle locations and utilization levels are closely monitored and controlled by the "range riders".

Livestock operators in the allotment would benefit by the proposed pasture and riparian management fencing and use area/ pasture rotation because their cattle would be confined in a smaller area than presently. Although moving cattle during the summer (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 4-37. Construction and Labor Requirements for the Proposed Range Improvements Under Alternative Four

Year	Project	Units/Miles	Cost ¹	Total
2-6	Three-wire (Use Area/Pasture Boundary)	19 miles	\$4,840 mile	\$ 91,960
2-6	Riparian Pasture Fencing (1 Pasture/Year)	9 miles	\$4,840 mile(barbed)	\$43,560
			\$2,541 mile (permanent or temporary electric)	\$ 22,870
2-6	Cattleguards (1 each/Year)	0	\$3,207 2-lane-24'	\$ 0
		3	\$1,694 1-lane-12'	\$ 5,080
2-13	Spring Development (Includes Fencing) (1 Each/Year)	12+	\$ 3,630 each	\$ 43,560+
2-5	Reservoir Construction	3	\$ 7,261 each	\$ 21,785
2-13	Water Well Development (new) (1 Each/Year)	12	\$31,462 each	\$ 377,545
1	Water Well Development (existing)	1	\$ 9,680 each	\$ 9,680
1-3	Water Well Development (existing) (1 Each/Year)	3	\$ 6,050 each	\$ 18,150
	Water Pipelines (0) (0 miles/year)	0 miles	\$ 7,624 mile	\$ 0
	Exclosure (Artesian Wells Wetland Fencing)	0 miles	\$ 4,840 mile	\$ 0
	TOTAL (Barbed Wire Fence)		(\$1.30/public land acre)	\$611,320
	TOTAL (Permanent Electric Fence)		(\$1.26/public land acre)	\$590,630

¹ Cost information on file at the Lander Field Office.

Table 4-38. Estimated Maintenance of Proposed Range Improvements Under Alternative Four

Improvement	Number of Units	Annual Maintenance Cost/unit¹	Total Annual Maintenance Cost	Estimated Life of Improvements
Springs	12+	\$121	\$1,450	20+ years
Wells	16	242	3,870	20+
Pipelines	0 (miles)	61	0	20+
Reservoirs	3	120	360	20+
Three-wire fence	19 (miles)	61	1,160	20+
Riparian pasture Fence	9 (miles)	61	550	20+
Cattleguards	3	61	185	20+
Exclosure fence	0 (miles)	61	0	20+
		Total	\$7,575	

¹Cost information on file in the Lander Field Office

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

Nongame Wildlife and Game Birds

Nongame wildlife and game bird habitat conditions are closely linked to riparian conditions; therefore, improvement of habitat and corresponding increases in nongame/game bird populations and species diversity could be expected to take place as riparian areas improve.

Big Game

Under Alternative Four, negative impacts to big game associated with fences and water developments would occur. Likewise, whatever benefit to big game that might be provided by the addition of water sources in areas where there were none previously would also be realized under this alternative.

With the expected distribution of livestock through mandatory herding, big game species would be able to utilize ungrazed pastures prior to livestock movement as described in Alternative One. This would likewise provide an opportunity for big game to use areas free from livestock disturbance. However, moving cattle in one large herd would likely result in the complete displacement of big game from a given area until the cattle herd was to move on. In the wake of this movement, herbaceous forage would be greatly reduced until regrowth could occur. Big game use of the Alkali Sheep Use Area would also be expected during the summer period when livestock are not present. As with Alternative One, herbaceous riparian vegetation would be expected to improve due to the lack of hot season livestock grazing.

Expected improvements in livestock distribution away from important wildlife habitat associated with Alternative One would also occur under Alternative Four, since both alternatives share the same prescriptions for water. Likewise, any increase in the availability of suitable habitat resulting in a slight redistribution of pronghorn and mule deer (i.e. east of Lost Creek and the area between Crooks Mountain and U.S. Highway 287) would also be likely to occur under Alternative Four.

An improvement in moose habitat conditions outside protective exclosures/pastures would be slightly better than those described in Alternative One, due to one year's rest out of five. Those conditions associated with willow riparian habitats along the Sweetwater River and Crooks Creek Riparian Pastures (when constructed) would be similar to those described in Alternative One; however, Alternative Four's improvements would occur more rapidly due to the additional rest (two years out of five).

Fisheries

Improvements in trout and nongame fisheries under Alternative Four would be similar to those described under

Alternative One, but would likely occur sooner because of reduced livestock numbers, relatively brief (though heavy) grazing before rotation, and one year of rest out of every five years. Fisheries improvements in riparian pastures would be even faster due to two years of rest out of five (see Wetland-Riparian).

Special Status Species

None of the actions proposed under any of the alternatives are likely to affect any federally threatened or endangered species that may occur in the allotment. Prior to authorization of any surface-disturbing activity, 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 3 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 those species affected by Platte River depletion.

Although potential habitat for the Ute ladies’ tresses occurs within certain parts of the allotment, there would likely be no effect to this species for the following reasons: 1) occurrence of this species has never been documented in the Lander Field Office; 2) none of the alternatives represent a substantial increase in livestock grazing; 3) no habitat type conversions would occur as a result of any of the alternatives; and 4) any new surface-disturbing activities planned under any of the alternatives would be subject to a separate site-specific NEPA review.

Any future water developments proposed in the allotment under Alternative Four would be subject to review (and possible consultation) under the Platte River Recovery Implementation Program, effective January 1, 2007.

Of the thirty BLM Sensitive plant and animal species carried forward from Chapter 3 for consideration, impacts from Alternative Four would be similar to those described under Alternative One, with the following exceptions: 1) sage-grouse (and other ground-nesting birds) would likely be negatively impacted by the large concentrations of cattle associated with the grazing regime in this alternative; 2) nests and eggs would be more likely to be trampled by livestock in the first pasture of the season; 3) sage-grouse chicks could be trampled, and herbaceous plant communities necessary to early brood survival could be reduced by brief but intensive grazing in the second pasture of the season; 4) by the time the herd reaches the third pasture (mid- to late summer), it may be in competition with sage-grouse broods seeking forb plants in riparian areas. By this time, however, sage-grouse chicks would be fairly mobile and able to select foraging areas away from (and possibly ahead of) cattle. During the occurrence of these impacts in pastures of use, sage-grouse nesting and brood-rearing in the rest pasture would proceed completely undisturbed by livestock. Of the four alternatives considered in this document, Alternative Four most imitates the grazing behavior of the bison with which these sensitive plant and animal species evolved (i.e., concentrated and intensive but of short duration).

EFFECTS ON WILD HORSES (Alternative Four)

The impacts associated with this alternative are identical to those identified under Alternative One. Also, the impacts associated with the fencing in Alternative Two for the Green Mountain HMA, would be the same as in this alternative. The fencing proposed in the Green Mountains (approximately 22 miles new fence) within the Green Mountain HMA would be detrimental to the wild horses, as it would prevent migration from winter ranges to summer ranges. Potential fence traps for horses to be caught in would also be created, especially throughout the winter months when snows on the mountain become deep and fences cannot be negotiated. This fencing, combined with the privately planned fencing on Crooks Creek, would eliminate the travel zone that exists between the Green Mountain HMA and the Crooks Mountain HMA, and would remove a portion of the travel zone between Green Mountain and the Stewart Creek HMA. Consequently, the lost opportunity to develop a wild horse viewing loop would occur, and the visitor days could be reduced by as much as 100 visitor days.

EFFECTS ON CULTURAL RESOURCES (Alternative Four)

Prehistoric Sites

Alternative Four is projected to have similar impacts to prehistoric sites as Alternative One. This is because erosion, livestock congregation, and trampling would continue until this alternative's grazing systems begin to have desired effects. The key to this alternative having an eventual beneficial effect on cultural resources is rest. When adequate rest of riparian areas, combined with high intensity-short duration grazing, is successfully implemented, then prehistoric sites along those areas would slowly recover from past and current effects of erosion, livestock congregation and trampling. In the short term (0-5 years), as the Alternative begins to be implemented, known and not-yet-discovered prehistoric sites along riparian areas would continue to degrade. In the mid-term (5-10 years), as this alternative's new projects and grazing systems take effect, the degrading effects to these sites would diminish and may, in a few cases, disappear. In the longer term (10+ years), effects to prehistoric sites would begin to be positive, as positive conditions at prehistoric sites (lack of erosion and livestock concentration) outweigh previous conditions.

Eleven known significant prehistoric sites are known to be affected under this alternative. Not-yet-discovered sites along riparian zones affected by this alternative are predicted to number approximately 600 (see Table 4-14).

Historic Trails and Sites

Under this alternative, one fence is planned that would cross the Rawlins-Fort Washakie Stage Trail. This fence would cause one direct and one visual adverse effect (as defined in the NHPA and Wyoming State Protocol) to the Rawlins-Fort Washakie Stage Trail. Livestock trailing and trampling along this fence (which would close off water at Crooks Creek) may occur, which would also cause adverse effects.

Alternative Four is also projected to have similar impacts to National Historic Trails and historic sites as Alternative One. In the short term (0-5 years), as the Alternative begins to be implemented, five riparian area crossings of the Seminoe Cutoff National Historic Trail, and a site associated with the Seminoe Cutoff (Immigrant Spring) along riparian areas would continue to degrade. In the mid-term (5-10 years), as this alternative's new projects and grazing/herding systems begin to take effect, the degrading effects to these trail crossings and sites would diminish and may disappear. In the longer term (10+ years), effects to National Historic Trails and historic sites would begin to be positive, as positive conditions at these locations (reductions in erosion and livestock concentration) outweigh previous conditions.

As shown in Table 4-17 (see Alternative One, Cultural Resources section), it is projected that this alternative's long-term impacts would cause fewer impacts to prehistoric sites, National Historic Trails, other historic trails, and historic sites than Alternative Two, but would cause more impacts to these resources than Alternatives One and Three.

EFFECTS ON RECREATION, VISUAL RESOURCES AND OPEN SPACE (Alternative Four)

Range improvements and actions authorized under this alternative would slightly alter the recreation settings as documented in the affected environment. Changes to the GMCA recreation setting resulting from the full implementation of Alternative Four include:

1) Naturalness indicator - The naturalness indicator around the range improvement sites would demonstrate a setting indicative of that in a front country setting. This would intensify the trend documented in those (back country and middle country) areas within view and adjacent to the proposed Green Mountain fence and the southern area of the allotment where several new water wells would be developed. This change would occur on 2.84% of the 298,989 acres of back and middle country settings within the allotment.

2) Evidence of Use indicator - continued maintenance and monitoring of the range improvements proposed under Alternative Four would result in an evidence of use indicator in and around these improvements indicative of a middle country environment. All improvements within primitive or back country settings would alter the social setting around the project area to that of a middle country environment. This trend would occur on 2.84% of 298,988 acres of primitive and back country settings.

No impacts are anticipated to the remoteness indicator or the mechanized use indicators.

The new fence installation around the Green Mountain Use Area would slightly alter the unique “situational attribute” documented in the affected environment; although a large portion of the unfenced character would remain in the core of the allotment the installation of this fence would reduce the agency’s abilities to manage for this quality. As Sanderson, et. al. (1986) found, the installation of the Green Mountain fence would decrease visitor preference for the area.

Overall changes to the setting component of the recreational environment within the GMCA would be slight; therefore the availability/realization of the benefits and experiences would also be slightly impacted. It is anticipated that the extent of the projects developed during the implementation of Alternative Four would not alter the setting to a threshold where the recreational experiences and benefits are no longer available, modified, or extensively reduced.

Table 4-39. Percent Reduction in Existing Setting (acres) by Recreation Setting Indicator

ALTERNATIVE 4: Recreation Feature % Reduction in Existing Setting (acres) by Recreation Setting Indicator				
	Physical Indicators		Social Indicators	Administrative Indicators
Feature	Remoteness (to Middle Country)	Naturalness (to Front Country)	Evidence of use (to Middle Country)	Mechanized use (to Middle Country)
Big Game Hunting Area	0%	.34%	.34%	0%
CDNST	0%	1.39%	1.39%	0%
Green Mountain	0%	8.28%	8.36%	0%
NHT	0%	.30%	.30%	0%

General Public Big Game Hunting Recreation Feature

Alternative Four would slightly alter the general setting of the feature and potentially the recreational experiences and benefits. The new water developments and fence proposed under Alternative Four constitutes a reduced habitat quality, however gains in habitat quality due to the double rest rotation system proposed, intensive herding, and the reduced overall stocking rate would offset the range improvement impacts.

Continental Divide National Scenic Trail Special Recreation Management Area

Alternative Four would not extensively alter the general setting of neither the feature nor the recreation experiences and benefits, therefore little to no impacts are anticipated as a result of this alternative to the CDNST settings and the areas recreational experiences and benefits.

The rest rotation ‘one heard’ grazing system and increased stocking rates proposed to be implemented under Alternative Four would result in extensive livestock aesthetic impacts (cattle defecation etc) during the period when the large heard is in pastures containing the CDNST, otherwise aesthetic impacts before and after a grazing period would be slight. Alternative Four would increase recreation experience and benefit detracting livestock encounters (Wallace, et al 1996) such as cows near camp, manure on the trail, and cows or impacts near streams. During rest or deferment periods in pastures containing the CDNST the aesthetics would improve. It is also anticipated that the implementation of this alternative would impact water quality during and after use periods, however during rest periods the water quality would be enhanced. Overall the alternatives rest rotation proposal would benefit the function of riparian areas in turn enhancing the quality of the unfenced CDNST water sources.

Green Mountain Recreation Feature

Impacts to recreation settings are anticipated in the Green Mountain Recreation Feature as a result of the fence and other projects around the mountain. However, the removal of the mountain from the general allotment would facilitate a rest period in the feature. The rest facilitated by the fence would offset setting impacts, and may actually enhance and/or increase the realization rate of the recreational experiences and benefits on the mountain.

National Historic Trail Recreation Special Recreation Management Area

Very slight impacts to the recreation setting and the resulting recreation experiences and benefits in this Special Recreation Management Area are anticipated as a result of this alternative.

Visual Resources

Alternative Four would decrease visual quality of the vegetative component during and after use periods. During rest and deferment periods the vegetative visual quality would improve. Over 20 years Alternative Four would benefit the visual quality of the vegetative component through increases in variety and contrast. Increases in vegetation would eventually recover the movement and color contrast components (key factors in drawing visitors' attention to the landscape) rendered in the vegetation. In turn the recreation setting and realized/available experiences and benefits would also be enhanced as a result of the benefits rendered to the visual quality of the historic trail landscape.

Open Space

The reduction in AUMs under this alternative would likely cause some permittees to leave the ranching business and to sell private lands within their ranching operations. However, this impact is not expected to occur to the degree described in Alternative Three since not as many AUMs would be reduced. Some of those private ranch lands are surrounded by or adjacent to BLM-administered public lands within the GMCA. Others are located within view of US Route 287, one of the main tourist routes to the National Parks and a major thoroughfare for the area's residents. The potential for the development of rural subdivisions in and near the GMCA would likewise increase as a result of the sale of these private lands. The development of rural subdivisions in the area would decrease the amount of open space related to the allotment and nearby agriculture lands. The potential effects of rural subdivision development would be comparable to, or greater than, the loss of open space associated with the development of the Pappy Draw Oil Field and, unlike mineral developments, would be permanent with unmitigated long term impacts to wildlife, recreation, visual resources and other resource values.

The area where these rural subdivisions could occur have been identified in a report entitled "Strategic Ranchland in the Rocky Mountain West" written in 2000 by American Farmland Trust (AFT), the Center of the American Trust, and the Nature Conservancy. Those lands lie between Sweetwater Station and Muddy Gap Junction in the Sweetwater River Valley. Several ranches owned by GMCA permittees that are currently identified as "Strategic Ranchland at Risk" appear on the map that accompanies this report.

EFFECTS ON WILDERNESS STUDY AREAS AND WILD AND SCENIC RIVERS (Alternative Four)

The table below contains a discussion of each required WSA value/data element and determines whether the level of impact from the action exceeds maximum allowable standards as directed by the Interim Management Policy for Lands under Wilderness Review.

Table 4-40. Predicted Impacts to Wilderness values as a Result of Implementing Alternative Four

Wilderness Value Indicator	Impact Description	Will the Impact Exceed Maximum Allowable Standard?
Visual Resource	Full implementation of Alternative four would result in slight change to the visual resource. Slight loss of the vegetation component in the riparian system would result in a loss of the movement element created by these taller grasses. Prior to the grazing season and especially during the pastures rest or deferment period this change would not be obvious to the casual observer. Long term recovery of this element would occur quickly due to the level of rest, active herding, and decreased stocking levels. .	No
Naturalness and Solitude		
Human Activity	Human activity would increase due to the intensive herding	No

	required in this alternative. This increase would only occur in the GMCA portion of the WSA for a short duration every 4 years out of the 5.	
<u>Wildlife presence</u>	Since this alternative relies heavily on herding and a rest rotation grazing system it is anticipated that increases in livestock encounters would be dispersed and not concentrated. This lack of concentrated livestock impact area would enhance the wilderness experience from the current condition.	No
Primitive Recreation		
Recreation Opportunities	Alternative 4 proposes no new projects in the WSA, additionally the main feature of the WSA is un-affected by livestock grazing resulting from this AMP. The above factors cause no change to the recreation setting and therefore no change to the corresponding opportunities available in the WSA. In addition it is anticipated that alternative 4 would not degrade visitor experiences in the area of the WSA contained within the GMCA.	No
Natural Appearing Environment	Slight reduction in the naturalness component of the recreation setting would occur in the riparian areas outside the Sweetwater Canyon Fence. This reduction is a result of poor riparian functionality and increased presence of livestock. In the long term the full implementation of the alternative would increase riparian functionality and reduce the presence of livestock.	No
<u>Surface Water</u>	Within the WSA fence water quality is expected to be good due to the years of rest and subsequent controlled grazing this has received; also, the WDEQ has monitored and assessed the Sweetwater River and removed it from the impaired water body list within the past ten years.	No Further Analysis Below
Vegetation		
Ecological Site Inventory	No lowering in seral condition would result from this alternative. Periodic rest, utilization triggers for livestock removal, and the increased ability to respond to triggers through herding would help managers work toward an upward trend.	No
Vegetation Utilization	Livestock would be moved based on utilization standards. The standard within the WSA would by definition be 50%.	No
Plant Vigor	No long term decrease in plant vigor would result from this alternative. Stubble height and utilization triggers for livestock removal would help managers improve riparian and upland range conditions.	No
Wildlife		
Wildlife Habitat	Under Alternative 4, this area would be grazed intensely for a relatively short period of time four years out of five and rested during the fifth. By this prescription, the impacts associated with livestock grazing would be minimized, recovery by vegetation would be rapid, and habitat quality would be expected to increase.	No
Population	The increased habitat quality described above should lead to an increase in population, especially for plants and non-game species.	No
Diversity	Decreased impacts to riparian areas, especially during the hot season, would be expected to cause some increase in diversity among plants and localized animal species.	No

WSA Resources Requiring Further Analysis:

Surface Waters

Outside the fence this alternative relies on herding to prevent over use of the riparian zones. In the long term plant vigor and production is expected to increase. As more extensive root systems develop, increased water infiltration and retention, through increasing the organic matter content of these soils, can be expected.

CUMULATIVE IMPACTS (Alternative Four)

Soil and Vegetation Resources

There are currently 133 acres undergoing impacts from livestock (i.e., sacrifice areas) and/or project developments (e.g., springs, wells, fences, and reservoirs) from projects completed since implementation of the 1999 Final Decision. This alternative would call for the completion of 12 spring developments, 16 new wells, and three reservoirs. Alternative Four would create 114 acres of new sacrifice area disturbance. This would amount to a total 247 acres of sacrifice areas.

Livestock Grazing

An estimated total of \$10,540 in annual maintenance costs have accrued through 2007 as a result of construction of the range improvements in Alternative One. An estimated total \$7,575 of additional maintenance costs would occur upon completion of the proposed range improvement projects in this alternative by 2021.

Wildlife/Fisheries Habitat and Special Status Species

Additional fencing in the GMCA, in combination with fencing proposals in the Rawlins Field Office to improve livestock management south of the allotment, could negatively impact antelope movements of the Red Desert Antelope Herd as they move to crucial winter habitats near Rawlins and Interstate 80. Antelope would continue to be able to migrate to these crucial winter habitats, but new fencing could slow migration or change migration patterns.

The cumulative impacts of habitat loss from proposed water developments coupled with energy development and the CO2 pipeline would be the same as that described under Alternative One.

Wild Horses

The pasture and riparian fencing would be detrimental to the free-roaming character of the wild horse herds in the allotment. Any fencing would impede natural movements of wild horses within the herd areas. Fencing could also prevent horses from moving to open areas that are blown free of snow during winter months; this could cause stress and winter die-offs that have previously not occurred.

Cultural Resources

Reductions in trampling and congregation near natural water sources and riparian areas would decrease impacts to cultural resources, causing a positive trend in their long-term survival. However, new fencing across the Rawlins-Fort Washakie Stage Trail would degrade the historic character of this historic resource.

Recreation and Visual Resources

The actions and the intensity of those actions authorized (and the developed mitigation) under Alternative Four would not comprehensively compound the trends documented in the affected environment. Therefore, cumulative impacts to the recreation setting and the available/realized experiences and benefits would occur at a similar rate to that documented in the affected environment.

Off Site Impacts to the Recreation Features

Since Alternative Four maintains the existing setting and recreation outcomes for the general allotment, there would be no offsite impacts to the recreation features as a whole. Alternative Four maintains the distinct niche represented by the setting of the GMCA.

Wilderness Study Area and Wild and Scenic Rivers

The intensity of impacts as a result of Alternative Four would not exceed maximum allowable impacts for the WSA and WSR resource. The impacts that would occur are on a localized level and probably could be mitigated without

causing additional impacts. Potential to impact recreationists experience and benefit realization level exists, however this would occur in access areas and during the trip into the core WSA only. The area contained within the WSA and WSR does not have any known reasonable foreseeable actions that might synergies with the above impacts. In addition, no impacts to the WSA resource as a whole are anticipated as a result of the actions planned for Alternative Four.

RESIDUAL IMPACTS (Alternative Four)

Soil and Vegetation Resources

In about one to two decades, the Alkali Creek Common Allotment would show changes in the lowlands as the upland water sources are developed, livestock rotations and rest are implemented in the pastures, and more of the grazing use is shifted to the uplands. Lowlands would also show increases in vegetative/litter cover and vegetation height. This would result in lower erosion rates and contribute increased amounts of organic matter to the soil. Water quality, infiltration, and the storage of water and nutrients would also be enhanced by increased organic matter inputs to the lowland soils.

The smaller, new Green Mountain Allotment would also be expected to show some improvement in this period due to the planned grazing deferment, herding, and the naturally higher amounts of precipitation that occur on the mountain.

The residual impact to soils and vegetation from this alternative would be to create approximately 114 acres of sacrifice area associated with the new construction of nine miles of riparian fence, 19 miles of allotment division fence, 12 spring developments, 16 wells, and 3 reservoirs.

Approximately 114 acres of sacrifice areas around new water developments would be created. The vegetation would be removed mainly by trampling and somewhat by livestock and wildlife consumption. These areas would be mostly devoid of vegetation with some compacted soils and would remain in poor condition due to the continual use of the water source. It is believed that there would be a decrease in the vigor of the vegetative species immediately adjacent to the sacrifice area. The vigor decrease would come about from the dust on the plants, soil compaction by livestock soils are moist, the trampling and resulting mechanical damage of vegetation by livestock, and the heavy grazing which commonly takes place around water sources. Another 42 acres (28 miles fence x 1.5 acres trailing disturbance per mile = 42 acres) would be affected by the trailing of livestock, wild horses, and wildlife along the proposed pasture and riparian management fences. Trailing would cause the removal of vegetation through trampling and compaction of the soil. Higher erosion rates would also ensue on these areas devoid of vegetation. There would also be 28 miles of allotment division and enclosure fence-associated maintenance road altogether. Rill and gully initiation would occur on the sloping locations over time. Sandy soils would be prone to scouring by wind. The denuded, compacted, and heavily-used areas would also be the areas most prone to weed establishment.

Riparian soils occurring outside of spring development/enhancement enclosures, riparian pastures, and special riparian grazing treatment pastures would be maintained in their current seral stage, or would trend slightly upward over an exceptionally long period of favorable growing conditions. This would occur on approximately 229 acres (11 percent) of the low seral stage riparian soils in the allotment. Oftentimes, the most degraded areas would not come back, as too much soil fertility has already been lost; however, the greatest chances for improvement can be found in the mid-seral systems that account for approximately 70 percent of those systems that are not severely degraded, and that still retain some inherent soil fertility. Enhancing these mid-seral systems and keeping them from falling into low seral conditions would benefit the largest percentage of riparian/wetland areas in the long term.

Livestock Grazing

An estimated total of \$10,540 in annual maintenance costs have accrued through 2007 as a result of construction of the range improvements in Alternative One. An estimated total \$7,575 of additional maintenance costs would occur upon completion of the proposed range improvement projects in this alternative by 2021. An estimated combined total \$18,115 of additional maintenance costs would accrue in the long term.

Wildlife/Fisheries Habitat and Special Status Species

Approximately 480 acres of public land riparian habitat occurring outside special riparian management areas would be maintained in less-than-desirable conditions for sage-grouse brood rearing and nongame wildlife habitat. Reduced vegetative cover and lower production of forbs and insects would contribute to these conditions.

Increased distribution of pronghorn antelope and, to a lesser extent, mule deer, would occur as a result of additional waters being developed in areas that currently have no water.

Wild Horses

Development of range improvements would change distribution patterns and draw wild horses into areas that were previously not used. Implementation of any grazing management other than season-long grazing would tend to improve the forage base over time. This would provide a better forage base for wild horses than currently exists.

Cultural Resources

Due to the decrease in livestock grazing impacts and the resultant decreases in erosion, damage, and disruption to cultural resources, improvements to the condition of prehistoric sites, the OMCPE Trail, and the Seminoe Cutoff would slowly occur. However, the Rawlins-Fort Washakie Stage Trail would be further degraded due to increased modern intrusions.

Recreation and Visual Resources

The slight loss of the nearly undeveloped character of the allotment in addition to the slight loss of the unfenced “situational attribute” constitutes a residual impact to the recreational setting and available/realized experiences and benefits. Alternative 4 would slightly limit future recreation management options for the allotment. In addition any setting changes consistent with the trend indicated in the affected environment would alter the setting in a direction that is nearly impossible to reverse (Clark 1979).

Wilderness Study Area and Wild and Scenic Rivers

The indirect and direct impacts documented for Alternative Four do not exceed maximum allowable standards as identified in the Interim Management Policy For Lands Under Wilderness Review. In addition this level of impact does not exceed impact standards for the WSR resource. Therefore residual impacts to the WSA and WSR resource would be slight as a result of the alternative. As long as portions of the WSA and WSR resource are unfenced from the GMCA slight visual and aesthetic impacts would continue in these areas. In addition slight visual resource impacts would continue as a result of the WSA fence. However, the slight change facilitates quality visitor experiences in the interior of the WSA. In addition light livestock use and encounters would continue to occur in GMCA portions of the WSA. These residual impacts would not exceed the maximum allowable thresholds contained in the Interim Management Policy.

EFFECTS AND COMPARISON OF ALTERNATIVES ON SOCIOECONOMICS

Introduction

This section analyzes the estimated socioeconomic impacts associated with the management alternatives considered in this document. More specifically, the analysis focuses on the estimated income and employment impact associated with each alternative. The analytical procedure used for quantifying the impacts is a regional Input/Output model based on secondary data and then calibrated to represent the local conditions found in Fremont County. The analysis itself was done by David (Tex) Taylor (University of Wyoming), who used a calibrated IMPLAN (Minnesota IMPLAN Group, Inc.) model for Fremont County; the output of that effort is the source for the estimated impacts depicted later on in this section.

In addition to the IMPLAN analysis, a benefit/cost (B/C) analysis was done for all the alternatives (see Appendix 25). The purpose of this analysis was to provide additional information as an aid in ranking the alternatives. However, it should be mentioned that the B/C analysis only focused on the benefits and costs measured in the market place. The nonmarket impacts, such as values associated with open space, preservation of historic trails, protection and enhancement of riparian areas, protection and enhancement of protected species habitat, improvement of wildlife habitat, etc, were not quantified and incorporated into the analysis. Consequently, the B/C results represent only the market benefits and costs and not the nonmarket impacts. Therefore, the reader should be cautioned against using the results from the B/C analysis as the sole economic ranking criteria for ranking the

alternatives. Moreover, it should be pointed out that even though the nonmarket impacts were not quantified for the purposes of this analysis 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. Nonetheless, even with the nonmarket caveat, results from the B/C analysis provide useful information that can be used in part to compare alternatives. A B/C section later on discusses the results derived from the B/C analysis.

Assumptions for IMPLAN

IMPLAN is a regional economic model that provides a mathematical accounting of the flow of money, goods, and services through a region's economy. The model provides estimates of how a specific economic activity translates into jobs and income for the region. It also includes the "ripple effect" ("multiplier effect") of changes in economic sectors that may not be directly impacted by management actions, but are linked to industries that are directly impacted. In IMPLAN, these ripple effects are termed indirect impacts and accounts for changes in industries that sell inputs to the industries that are directly affected. It also quantifies the induced impacts which are the result of changes in household spending as household income increases or decreases due to the changes in production.

This analysis involves quantifying the direct changes in economic activity for some sectors in IMPLAN, which create indirect changes in activity for related sectors due to the "ripple effect". These production and consumption relationships, also called input-output relationships, are derived by IMPLAN to estimate the indirect and induced impacts based on changes in production that may result from a specific management alternative.

The technical assumptions for the IMPLAN model are:

Changes in exports are a driver of economic activity in the study area and affect output, earnings and employment, which in turn impacts population

Economic impacts to the study area accrue from BLM decisions impacting exports from the study region. This would include decisions affecting activities such as livestock grazing, oil and natural gas development and production, increased recreation opportunity, etc.

Indirect and induced benefits are quantified by the IMPLAN model.

Expenditures of residents would occur in the region regardless of BLM's actions that affect recreational opportunities, but changes in nonresident recreation patterns would alter the amount of money entering the local region. Thus, the analysis of economic impacts from recreation considers only recreation expenditures of nonresidents of the study area.

Regional Economic Impact Analysis Common to All Alternatives

IMPLAN was used to estimate the earnings and employment impact for all alternatives and the analysis was done in 2005 dollars. For the purpose of this effort, the impacts were separated out into direct impacts created by the BLM management action itself. Then the indirect and induced impacts generated by the direct change in economic activity created by the management action itself were also quantified. To illustrate how this works, suppose a management action creates increased livestock sales delivered outside the study region. This is the direct impact of the management decision. It is then assumed that this increased activity drives additional sales and purchases that have an impact on both earnings and employment within the study region, which is referred to as the indirect impact. Finally, the resultant impact of this additional economic activity increases jobs and income for households, which are referred to as the induced impact. The extent of this additional impact (indirect and induced) is often referred to as the multiplier effect, which would also be quantified.

To further clarify what is meant by using a regional impact analysis or input/output model (IMPLAN) to quantify the impacts associated with the alternatives being analyzed within the study area, the analysis starts out by identifying and quantifying the direct impacts associated with the alternatives being analyzed. For this analysis, the direct impacts are defined as those caused by the specific management action being analyzed and further assuming that they occur at the same time. For example, the direct impacts are assumed to occur simultaneously even though in reality these impacts may take time to work their way through the sectors in the study area. To illustrate this point, assume there is a management action being proposed that permits additional grazing on public lands. Furthermore, for the purposes of this example, it is assumed the result of this action results in exporting additional livestock sales outside the study area. This produces a direct infusion of money into the local economy. From a theoretical view, the impacts of this economic activity would be assumed to occur instantaneously. Moreover, to

capture the impact over time, the annual estimated increased livestock sales in our example are estimated over the project horizon, which in this case is 20 years. The result of the regional analysis quantifies the expected economic impact resulting from a continuing direct injection of revenue produced by the hypothetical increase in livestock exports into the study area's economy.

Once the direct impacts have been quantified, the indirect impacts are estimated. For the purpose of this analysis, the indirect impacts are generally defined as impacts caused by the direct impacts generated by management action associated with each alternative. From a theoretical standpoint, indirect impacts are a result of the direct impacts discussed above and they are also assumed to occur simultaneously. However, in the real world, just as direct impacts take time to work their way through the study area's economy, the indirect impacts also take time to work their way through the economy. Given the fact that management decisions impact the study area's economy over time, the direct and indirect impacts are estimated on an annual basis through the life of the planning horizon based on the estimated annual direct impact of the management decisions.

The economic activity created by additional livestock sales outside the region in our hypothetical example increases household spending and employment. The result of this economic activity is referred to as the induced impact and it further increased the economic activity created by the direct infusion of revenue in the study region from the initial increased livestock exports.

While the previous discussion provided a general understanding of the theoretical underpinnings of an input/output analysis, it is also important to have a general understanding of the likely economic outcome associated with BLM decisions affecting federal grazing in the GMCA before attempting to estimate the regional impacts. 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. For the purposes of the IMPLAN analysis, it is assumed that the level of economic activity associated with the livestock sector is a function of the forecasted AUMs by alternative. However, it needs to be noted that in order to determine if these cash flows reductions are actually realized, they have to be compared to historical long term actual use that will be discussed later on in this section.

Focusing on the IMPLAN analysis, it would be inappropriate to estimate the impact of BLM grazing reductions by simply evaluating the impact based on the average value of a BLM AUM of production because it does not fully account for the overall impact to the individual ranching operation. Consequently, if the IMPLAN runs were based only on the value of the direct production associated with BLM grazing to the ranching operation, the regional impact would be underestimated. On the other end of the spectrum, it could be argued that a BLM decision to reduce grazing that simultaneously impacts all the operators over a large area could lead to the affected operators being put out of business. Should this actually happen, the estimated economic impact to the study area would be based on a loss of economic activity from all these operations going out of business. However, taking this approach would likely overstate the impact. Not all operators would go out of business. Some operations would be sold and the new operator may be able to continue producing livestock. 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.

A more likely scenario is the affected permittees would adjust their operation to maximize profits. 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. So for this analysis, the IMPLAN runs are based on the premise that the operators would respond to BLM reductions in grazing by modifying their operation to maximize profits and a corresponding reduction in economic activity within the study would occur, which is quantified by the IMPLAN results presented below.

In order to perform this analysis, the resource specialists estimated the impact by year and by alternative. From this effort, it was clear that the two resources showing the largest impact were livestock grazing and recreation visitor use. Therefore, the estimated level of grazing by livestock type and year for each alternative was estimated and serves as the foundation for the IMPLAN analysis. Likewise, the annual visitor days by type of recreation for each alternative was also estimated and the estimated recreation impact produced by IMPLAN is a product of that work as well.

Geographic Area Evaluated for Impacts

The study area for this analysis is Fremont County.

Regional Impacts

Alternative One

Table 4-41 illustrates the IMPLAN run for Alternative One. For this alternative, the direct impact (Value of Production) from livestock grazing produces about 2.1 times that amount in total economic impacts. With regard to recreation, the multiplier is lower than it is for livestock grazing and translates into slightly over 1.3, which means that the total impact derived from recreation is little over 1.3 times the direct impact. Overall, the average multiplier is slightly over 1.84 for the 20 year planning horizon, meaning that the total impact is 1.84 times the direct impact shown in Table 4-41.

Table 4-41. IMPLAN Run for Alternative One

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Direct Effects										
Livestock Grazing	\$971,991	\$971,991	\$971,991	\$971,991	\$971,991	\$990,931	\$1,009,872	\$1,028,812	\$1,047,753	\$1,066,693
Consumptive Recreation	\$421,654	\$425,870	\$430,129	\$434,430	\$438,774	\$443,162	\$447,594	\$452,070	\$456,590	\$461,156
Non Consumptive Recreation	\$64,656	\$65,590	\$66,538	\$67,502	\$68,481	\$69,476	\$70,488	\$71,515	\$72,560	\$73,622
Total	\$1,458,300	\$1,463,450	\$1,468,657	\$1,473,922	\$1,479,246	\$1,503,569	\$1,527,953	\$1,552,397	\$1,576,903	\$1,601,471
Total Impact										
Livestock Grazing	\$2,030,368	\$2,030,368	\$2,030,368	\$2,030,368	\$2,030,368	\$2,069,977	\$2,109,586	\$2,149,195	\$2,188,804	\$2,228,413
Consumptive Recreation	\$560,821	\$566,429	\$572,094	\$577,815	\$583,593	\$589,429	\$595,323	\$601,276	\$607,289	\$613,362
Non Consumptive Recreation	\$87,314	\$88,577	\$89,861	\$91,165	\$92,491	\$93,838	\$95,207	\$96,599	\$98,013	\$99,450
Total	\$2,678,503	\$2,685,375	\$2,692,323	\$2,699,348	\$2,706,452	\$2,753,244	\$2,800,117	\$2,847,070	\$2,894,106	\$2,941,225

Year	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Average
Direct Effects											
Livestock Grazing	\$1,093,540	\$1,120,386	\$1,147,233	\$1,174,079	\$1,200,925	\$1,227,772	\$1,254,618	\$1,281,465	\$1,308,311	\$1,335,158	\$22,147,501
Consumptive Recreation	\$465,768	\$470,426	\$475,130	\$479,881	\$484,680	\$489,527	\$494,422	\$499,366	\$504,360	\$509,403	\$9,284,392
Non Consumptive Recreation	\$74,700	\$75,797	\$76,911	\$78,044	\$79,196	\$80,366	\$81,556	\$82,765	\$83,994	\$85,243	\$1,489,000
Total	\$1,634,008	\$1,666,609	\$1,699,274	\$1,732,004	\$1,764,801	\$1,797,665	\$1,830,596	\$1,863,596	\$1,896,665	\$1,929,805	\$32,920,893
Total Impact											
Livestock Grazing	\$2,284,491	\$2,340,569	\$2,396,647	\$2,452,724	\$2,508,802	\$2,564,880	\$2,620,958	\$2,677,035	\$2,733,113	\$2,789,191	\$46,266,229
Consumptive Recreation	\$619,495	\$625,690	\$631,947	\$638,267	\$644,649	\$651,096	\$657,607	\$664,183	\$670,825	\$677,533	\$12,348,723
Non Consumptive Recreation	\$100,911	\$102,395	\$103,904	\$105,438	\$106,997	\$108,582	\$110,193	\$111,830	\$113,495	\$115,187	\$2,011,445
Total	\$3,004,897	\$3,068,655	\$3,132,498	\$3,196,429	\$3,260,449	\$3,324,558	\$3,388,757	\$3,453,048	\$3,517,433	\$3,581,911	\$60,626,398

Impacts on Earnings and Employment

The average annual total labor earnings over the 20 year planning horizon are about \$877.6 thousand (Table 4-42). This total consists of average annual livestock labor earnings for Alternative One that amounts to about \$701 thousand and an annual average of slightly over \$176.7 thousand for recreation (Table 4-42). The relative contribution of livestock and recreation, livestock labor earnings accounts for about 80 percent of the total and the remaining 20 percent is associated with recreation.

Table 4-42 also depicts the estimated employment associated with Alternative One. In this case, the total annual average estimated employment over the 20 year study period is 36.7 and the contribution from livestock grazing and recreation is 25.9 and 10.8 respectively. Therefore, livestock grazing accounts for about 70.6 percent of the total employment and recreation makes up the remaining 29.4 percent.

Table 4-42 indicates the average total earnings per job over the 20 year planning period are about \$24,000. Over this same time frame, the average earnings per job for livestock grazing is slightly over \$27,000, which is considerably larger than the average of nearly \$17,000 earnings per job for recreation.

Alternative Two

Regional Impacts

Table 4-43 illustrates the IMPLAN run for Alternative Two. For this alternative, the direct impact (Value of Production) from livestock grazing produces nearly 2.1 times that amount in total economic impacts. With regard to recreation, the multiplier is lower than it is for livestock grazing and translates into a little over 1.3, which means that the total impact derived from recreation is slightly over 1.3 times the direct impact. Overall, the average multiplier is 1.9 for the 20 year planning horizon, meaning that the total impact is 1.9 times the direct impact shown in Table 4-43.

Impacts on Earnings and Employment

The average annual total labor earnings over the 20 year planning horizon are about \$1.046 million (Table 4-44). This total consists of average annual livestock labor earnings for Alternative 2 that amounts to about \$906 thousand and an annual average of about \$140.5 thousand for recreation (Table 4-44). Looking at the relative contribution of livestock and recreation, livestock labor earnings accounts for about 86.6 percent of the total and the remaining 13.4 percent is associated with recreation.

Table 4-44 also depicts the estimated employment associated with Alternative Two. In this case, the total annual average estimated employment over the 20 year study period is 42.1 and the contribution from livestock grazing and recreation is 33.5 and 8.6 respectively. Therefore, livestock grazing accounts for about 79.6 percent of the total employment and recreation makes up the remaining 20.4 percent.

Table 4-44 indicates the average total earnings per job over the 20 year planning period are about \$24,800. Over this same time frame, the average earnings per job for livestock grazing is slightly over \$27,000, which is considerably larger than the average of slightly less than \$17,000 earnings per job for recreation.

Table 4-42. Earnings and Employment, Alternative One

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Labor Earnings										
Livestock Grazing	\$615,260	\$615,260	\$615,260	\$615,260	\$615,260	\$627,232	\$639,204	\$651,176	\$663,148	\$675,120
Consumptive Recreation	\$137,899	\$139,278	\$140,671	\$142,078	\$143,498	\$144,933	\$146,383	\$147,847	\$149,325	\$150,818
Non Consumptive Recreation	\$21,589	\$21,903	\$22,223	\$22,548	\$22,878	\$23,213	\$23,554	\$23,901	\$24,253	\$24,611
Total	\$774,748	\$776,442	\$778,154	\$779,886	\$781,636	\$795,379	\$809,141	\$822,923	\$836,726	\$850,549
Total Employment										
Livestock Grazing	22.7	22.7	22.7	22.7	22.7	23.2	23.6	24.1	24.5	25.0
Consumptive Recreation	8.5	8.6	8.7	8.8	8.9	8.9	9.0	9.1	9.2	9.3
Non Consumptive Recreation	1.2	1.2	1.3	1.3	1.3	1.3	1.3	1.3	1.4	1.4
Total	32.5	32.6	32.7	32.8	32.9	33.4	34.0	34.5	35.1	35.7
Average Earnings/Job										
Livestock Grazing	\$27,063	\$27,063	\$27,063	\$27,063	\$27,063	\$27,057	\$27,051	\$27,046	\$27,040	\$27,035
Consumptive Recreation	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210
Non Consumptive Recreation	\$17,756	\$17,754	\$17,753	\$17,751	\$17,749	\$17,747	\$17,745	\$17,743	\$17,742	\$17,740
Total	\$23,870	\$23,846	\$23,823	\$23,799	\$23,775	\$23,792	\$23,807	\$23,822	\$23,836	\$23,850

Year	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Average
Total Labor Earnings											
Livestock Grazing	\$692,114	\$709,108	\$726,102	\$743,096	\$760,090	\$777,084	\$794,078	\$811,072	\$828,066	\$845,060	\$700,902
Consumptive Recreation	\$152,327	\$153,850	\$155,388	\$156,942	\$158,512	\$160,097	\$161,698	\$163,315	\$164,948	\$166,597	\$151,820
Non Consumptive Recreation	\$24,975	\$25,345	\$25,721	\$26,103	\$26,492	\$26,886	\$27,288	\$27,696	\$28,111	\$28,533	\$24,891
Total	\$869,415	\$888,302	\$907,211	\$926,141	\$945,093	\$964,067	\$983,064	\$1,002,083	\$1,021,125	\$1,040,190	\$877,614
Total Employment											
Livestock Grazing	25.6	26.2	26.9	27.5	28.1	28.7	29.4	30.0	30.6	31.2	25.9
Consumptive Recreation	9.4	9.5	9.6	9.7	9.8	9.9	10.0	10.1	10.2	10.3	9.4
Non Consumptive Recreation	1.4	1.4	1.5	1.5	1.5	1.5	1.5	1.6	1.6	1.6	1.4
Total	36.4	37.1	37.9	38.6	39.4	40.1	40.9	41.6	42.4	43.1	36.7
Average Earnings/Job											
Livestock Grazing	\$27,036	\$27,037	\$27,038	\$27,038	\$27,039	\$27,040	\$27,040	\$27,041	\$27,042	\$27,042	\$27,047
Consumptive Recreation	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210
Non Consumptive Recreation	\$17,738	\$17,736	\$17,734	\$17,732	\$17,731	\$17,729	\$17,727	\$17,725	\$17,723	\$17,721	\$17,739
Total	\$23,882	\$23,913	\$23,942	\$23,970	\$23,997	\$24,023	\$24,047	\$24,070	\$24,092	\$24,113	\$23,914

Table 4-43. IMPLAN Run for Alternative Two

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Direct Effects										
Livestock Grazing	\$971,991	\$1,012,260	\$1,052,530	\$1,092,800	\$1,133,069	\$1,173,339	\$1,213,609	\$1,253,879	\$1,294,148	\$1,334,418
Consumptive Recreation	\$421,654	\$423,762	\$425,881	\$428,010	\$430,150	\$408,643	\$388,210	\$368,800	\$350,360	\$332,842
Non Consumptive Recreation	\$64,656	\$63,976	\$63,322	\$62,695	\$62,092	\$59,495	\$57,013	\$54,640	\$52,371	\$50,202
Total	\$1,458,300	\$1,499,998	\$1,541,733	\$1,583,504	\$1,625,312	\$1,641,477	\$1,658,832	\$1,677,319	\$1,696,880	\$1,717,462
Total Impact										
Livestock Grazing	\$2,030,368	\$2,114,485	\$2,198,602	\$2,282,718	\$2,366,835	\$2,450,951	\$2,535,068	\$2,619,185	\$2,703,301	\$2,787,418
Consumptive Recreation	\$560,821	\$563,625	\$566,443	\$569,276	\$572,122	\$543,516	\$516,340	\$490,523	\$465,997	\$442,697
Non Consumptive Recreation	\$87,314	\$86,385	\$85,492	\$84,635	\$83,812	\$80,312	\$76,967	\$73,768	\$70,710	\$67,786
Total	\$2,678,503	\$2,764,495	\$2,850,537	\$2,936,629	\$3,022,769	\$3,074,779	\$3,128,375	\$3,183,476	\$3,240,008	\$3,297,901

Year	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Average
Direct Effects											
Livestock Grazing	\$1,402,577	\$1,470,736	\$1,538,895	\$1,607,054	\$1,675,213	\$1,743,372	\$1,811,531	\$1,879,690	\$1,947,850	\$2,016,009	\$1,431,249
Consumptive Recreation	\$336,170	\$339,532	\$342,927	\$346,357	\$349,820	\$353,318	\$356,852	\$360,420	\$364,024	\$367,665	\$374,770
Non Consumptive Recreation	\$49,832	\$49,485	\$49,159	\$48,855	\$48,572	\$48,309	\$48,065	\$47,841	\$47,636	\$47,450	\$53,783
Total	\$1,788,580	\$1,859,753	\$1,930,982	\$2,002,266	\$2,073,605	\$2,144,999	\$2,216,448	\$2,287,952	\$2,359,510	\$2,431,123	\$1,859,802
Total Impact											
Livestock Grazing	\$2,929,836	\$3,072,254	\$3,214,672	\$3,357,090	\$3,499,509	\$3,641,927	\$3,784,345	\$3,926,763	\$4,069,181	\$4,211,600	\$2,989,805
Consumptive Recreation	\$447,124	\$451,595	\$456,111	\$460,672	\$465,279	\$469,932	\$474,631	\$479,378	\$484,171	\$489,013	\$498,463
Non Consumptive Recreation	\$67,278	\$66,800	\$66,352	\$65,932	\$65,541	\$65,178	\$64,842	\$64,532	\$64,247	\$63,988	\$72,594
Total	\$3,444,238	\$3,590,649	\$3,737,135	\$3,883,695	\$4,030,329	\$4,177,037	\$4,323,818	\$4,470,672	\$4,617,600	\$4,764,600	\$3,560,862

Table 4-44. Earnings and Employment, Alternative Two

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<u>Total Labor Earnings</u>										
Livestock Grazing	\$615,260	\$640,751	\$666,242	\$691,733	\$717,224	\$742,715	\$768,206	\$793,697	\$819,188	\$844,679
Consumptive Recreation	\$137,899	\$138,589	\$139,282	\$139,978	\$140,678	\$133,644	\$126,962	\$120,614	\$114,583	\$108,854
Non Consumptive Recreation	\$21,589	\$21,352	\$21,124	\$20,905	\$20,695	\$19,835	\$19,012	\$18,226	\$17,474	\$16,755
Total	\$774,748	\$800,692	\$826,648	\$852,616	\$878,597	\$896,194	\$914,180	\$932,537	\$951,245	\$970,288
<u>Total Employment</u>										
Livestock Grazing	22.7	23.7	24.6	25.6	26.5	27.4	28.4	29.3	30.3	31.2
Consumptive Recreation	8.5	8.5	8.6	8.6	8.7	8.2	7.8	7.4	7.1	6.7
Non Consumptive Recreation	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.0	1.0	0.9
Total	32.5	33.4	34.4	35.4	36.3	36.8	37.3	37.8	38.3	38.9
<u>Average Earnings/Job</u>										
Livestock Grazing	\$27,063	\$27,063	\$27,063	\$27,063	\$27,064	\$27,064	\$27,064	\$27,064	\$27,064	\$27,064
Consumptive Recreation	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210
Non Consumptive Recreation	\$17,756	\$17,763	\$17,769	\$17,776	\$17,782	\$17,778	\$17,775	\$17,771	\$17,767	\$17,763
Total	\$23,870	\$23,953	\$24,031	\$24,105	\$24,175	\$24,351	\$24,518	\$24,675	\$24,824	\$24,963

Year	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Average
<u>Total Labor Earnings</u>											
Livestock Grazing	\$887,807	\$930,935	\$974,062	\$1,017,190	\$1,060,318	\$1,103,445	\$1,146,573	\$1,189,701	\$1,232,829	\$1,275,956	\$905,926
Consumptive Recreation	\$109,942	\$111,042	\$112,152	\$113,274	\$114,407	\$115,551	\$116,706	\$117,873	\$119,052	\$120,242	\$122,566
Non Consumptive Recreation	\$16,622	\$16,498	\$16,381	\$16,271	\$16,169	\$16,073	\$15,984	\$15,902	\$15,826	\$15,756	\$17,922
Total	\$1,014,372	\$1,058,475	\$1,102,596	\$1,146,735	\$1,190,893	\$1,235,069	\$1,279,263	\$1,323,476	\$1,367,706	\$1,411,955	\$1,046,414
<u>Total Employment</u>											
Livestock Grazing	32.8	34.4	36.0	37.6	39.2	40.8	42.4	44.0	45.6	47.2	33.5
Consumptive Recreation	6.8	6.9	6.9	7.0	7.1	7.1	7.2	7.3	7.3	7.4	7.6
Non Consumptive Recreation	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.0
Total	40.5	42.2	43.8	45.5	47.2	48.8	50.5	52.2	53.8	55.5	42.1
<u>Average Earnings/Job</u>											
Livestock Grazing	\$27,060	\$27,057	\$27,053	\$27,050	\$27,048	\$27,045	\$27,043	\$27,040	\$27,038	\$27,036	\$27,055
Consumptive Recreation	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210
Non Consumptive Recreation	\$17,771	\$17,778	\$17,785	\$17,793	\$17,800	\$17,807	\$17,815	\$17,822	\$17,829	\$17,836	\$17,787
Total	\$25,030	\$25,091	\$25,148	\$25,200	\$25,248	\$25,293	\$25,334	\$25,373	\$25,409	\$25,443	\$24,802

Alternative Three

Regional Impacts

Table 4-45 illustrates the IMPLAN run for Alternative Three. For this alternative, the direct impact (Value of Production) from livestock grazing produces slightly less than 2.09 times that amount in total economic impacts. With regard to recreation, the multiplier is lower than it is for livestock grazing and translates into a little over 1.3, which means that the total impact derived from recreation is a little over 1.3 times the direct impact. Overall, the average multiplier is about 1.75 for the 20 year planning horizon, meaning that the total impact is 1.75 times the direct impact shown in Table 4-45.

Impacts on Earnings and Employment

The average annual total labor earnings over the 20 year planning horizon are about \$611.2 thousand (Table 4-46). This total consists of average annual livestock labor earnings for Alternative Three that amounts to about \$430.5 thousand and an annual average of slightly less than \$180.7 thousand for recreation (Table 4-46). Looking at the relative contribution of livestock and recreation, livestock labor earnings accounts for about 70.4 percent of the total and the remaining 29.6 percent is associated with recreation.

Table 4-46 also depicts the estimated employment associated with Alternative 3. In this case, the total annual average estimated employment over the 20 year study period is 26.9 and the contribution from livestock grazing and recreation is 15.9 and 11.0 respectively. Therefore, livestock grazing accounts for about 59.1 percent of the total employment and recreation makes up the remaining 40.9 percent.

Table 4-46 indicates the average total earnings per job over the 20 year planning period are \$22,700. Over this same time frame, the average earnings per job for livestock grazing is slightly over \$27,000, which is considerably larger than the average of about \$17,000 earnings per job for recreation.

Table 4-45. IMPLAN Run for Alternative Three

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
<u>Direct Effects</u>											
Livestock Grazing	\$680,111	\$680,111	\$680,111	\$680,111	\$680,111	\$680,111	\$680,111	\$680,111	\$680,111	\$680,111	
Consumptive Recreation	\$421,654	\$425,870	\$430,129	\$434,430	\$438,774	\$449,744	\$460,987	\$472,512	\$484,325	\$496,433	
Non Consumptive Recreation	\$64,656	\$64,156	\$63,685	\$63,242	\$62,828	\$63,003	\$63,223	\$63,490	\$63,803	\$64,162	
Total	\$1,166,421	\$1,170,137	\$1,173,925	\$1,177,783	\$1,181,713	\$1,192,857	\$1,204,322	\$1,216,113	\$1,228,239	\$1,240,706	
<u>Total Impact</u>											
Livestock Grazing	\$1,420,636	\$1,420,636	\$1,420,636	\$1,420,636	\$1,420,636	\$1,420,636	\$1,420,636	\$1,420,636	\$1,420,636	\$1,420,636	
Consumptive Recreation	\$560,821	\$566,429	\$572,094	\$577,815	\$583,593	\$598,183	\$613,137	\$628,466	\$644,177	\$660,282	
Non Consumptive Recreation	\$87,314	\$86,626	\$85,979	\$85,371	\$84,800	\$85,020	\$85,303	\$85,649	\$86,056	\$86,526	
Total	\$2,068,771	\$2,073,692	\$2,078,708	\$2,083,821	\$2,089,029	\$2,103,839	\$2,119,076	\$2,134,750	\$2,150,869	\$2,167,444	
Year	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Average
<u>Direct Effects</u>											
Livestock Grazing	\$680,111	\$680,111	\$680,111	\$680,111	\$680,111	\$680,111	\$680,111	\$680,111	\$680,111	\$680,111	\$680,111
Consumptive Recreation	\$501,397	\$506,411	\$511,475	\$516,590	\$521,756	\$526,974	\$532,243	\$537,566	\$542,941	\$548,371	\$488,029
Non Consumptive Recreation	\$63,932	\$63,725	\$63,542	\$63,382	\$63,244	\$63,127	\$63,032	\$62,958	\$62,904	\$62,870	\$63,448
Total	\$1,245,440	\$1,250,247	\$1,255,128	\$1,260,083	\$1,265,110	\$1,270,212	\$1,275,386	\$1,280,635	\$1,285,956	\$1,291,352	\$1,231,588
<u>Total Impact</u>											
Livestock Grazing	\$1,420,636	\$1,420,636	\$1,420,636	\$1,420,636	\$1,420,636	\$1,420,636	\$1,420,636	\$1,420,636	\$1,420,636	\$1,420,636	\$1,420,636
Consumptive Recreation	\$666,884	\$673,553	\$680,289	\$687,092	\$693,963	\$700,902	\$707,911	\$714,990	\$722,140	\$729,362	\$649,104
Non Consumptive Recreation	\$86,205	\$85,916	\$85,659	\$85,433	\$85,237	\$85,071	\$84,933	\$84,824	\$84,743	\$84,688	\$85,568
Total	\$2,173,725	\$2,180,105	\$2,186,584	\$2,193,161	\$2,199,836	\$2,206,609	\$2,213,480	\$2,220,450	\$2,227,519	\$2,234,686	\$2,155,308

Table 4-46. Earnings and Employment, Alternative Three

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<u>Total Labor Earnings</u>										
Livestock Grazing	\$430,515	\$430,515	\$430,515	\$430,515	\$430,515	\$430,515	\$430,515	\$430,515	\$430,515	\$430,515
Consumptive Recreation	\$137,899	\$139,278	\$140,671	\$142,078	\$143,498	\$147,086	\$150,763	\$154,532	\$158,395	\$162,355
Non Consumptive Recreation	\$21,589	\$21,411	\$21,242	\$21,084	\$20,935	\$20,978	\$21,037	\$21,112	\$21,202	\$21,307
Total	\$590,004	\$591,204	\$592,429	\$593,677	\$594,949	\$598,580	\$602,316	\$606,159	\$610,112	\$614,178
<u>Total Employment</u>										
Livestock Grazing	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9
Consumptive Recreation	8.5	8.6	8.7	8.8	8.9	9.1	9.3	9.5	9.8	10.0
Non Consumptive Recreation	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Total	25.6	25.7	25.8	25.9	25.9	26.2	26.4	26.6	26.9	27.1
<u>Average Earnings/Job</u>										
Livestock Grazing	\$27,069	\$27,069	\$27,069	\$27,069	\$27,069	\$27,069	\$27,069	\$27,069	\$27,069	\$27,069
Consumptive Recreation	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210
Non Consumptive Recreation	\$17,756	\$17,764	\$17,771	\$17,779	\$17,786	\$17,796	\$17,806	\$17,816	\$17,825	\$17,835
Total	\$23,022	\$23,002	\$22,982	\$22,962	\$22,941	\$22,884	\$22,827	\$22,769	\$22,710	\$22,651

Year	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Average
<u>Total Labor Earnings</u>											
Livestock Grazing	\$430,515	\$430,515	\$430,515	\$430,515	\$430,515	\$430,515	\$430,515	\$430,515	\$430,515	\$430,515	\$430,515
Consumptive Recreation	\$163,979	\$165,619	\$167,275	\$168,948	\$170,637	\$172,344	\$174,067	\$175,808	\$177,566	\$179,341	\$159,607
Non Consumptive Recreation	\$21,220	\$21,142	\$21,071	\$21,008	\$20,953	\$20,905	\$20,865	\$20,831	\$20,804	\$20,785	\$21,074
Total	\$615,714	\$617,276	\$618,861	\$620,471	\$622,106	\$623,764	\$625,447	\$627,154	\$628,886	\$630,641	\$611,196
<u>Total Employment</u>											
Livestock Grazing	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9
Consumptive Recreation	10.1	10.2	10.3	10.4	10.5	10.6	10.7	10.8	11.0	11.1	9.8
Non Consumptive Recreation	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Total	27.2	27.3	27.4	27.5	27.6	27.7	27.8	27.9	28.0	28.1	26.9
<u>Average Earnings/Job</u>											
Livestock Grazing	\$27,069	\$27,069	\$27,069	\$27,069	\$27,069	\$27,069	\$27,069	\$27,069	\$27,069	\$27,069	\$27,069
Consumptive Recreation	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210
Non Consumptive Recreation	\$17,842	\$17,849	\$17,855	\$17,862	\$17,869	\$17,875	\$17,881	\$17,888	\$17,894	\$17,900	\$17,832
Total	\$22,629	\$22,606	\$22,583	\$22,560	\$22,537	\$22,514	\$22,490	\$22,467	\$22,443	\$22,419	\$22,700

Alternative Four

Regional Impacts

Table 4-47 illustrates the IMPLAN run for Alternative Four. For this alternative, the direct impact (Value of Production) from livestock grazing produces about 2.09 times that amount in total economic impacts. With regard to recreation, the multiplier is lower than it is for livestock grazing and translates into nearly 1.34, which means that the total impact derived from recreation is nearly 1.34 times the direct impact. Overall, the average multiplier is slightly over 1.84 for the 20 year planning horizon, meaning that the total impact is 1.84 times the direct impact shown in Table 4-47.

Impacts on Earnings and Employment

The average annual total labor earnings over the 20 year planning horizon are about \$896.6 thousand (Table 4-48). This total consists of average annual livestock labor earnings for Alternative 4 that amounts to about \$721.6 thousand and an annual average of nearly \$175 thousand for recreation (Table 4-48). Looking at the relative contribution of livestock and recreation, livestock labor earnings accounts for 80.5 percent of the total and the remaining 19.5 percent is associated with recreation.

Table 4-48 also depicts the estimated employment associated with Alternative Four. In this case, the total annual average estimated employment over the 20 year study period is 37.2 and the contribution from livestock grazing and recreation is 26.5 and 10.7 respectively. Therefore, livestock grazing accounts for about 71.3 percent of the total employment and recreation makes up the remaining 28.7 percent.

Table 4-48 indicates the average total earnings per job over the 20 year planning period are about \$24,000. Over this same time frame, the average earnings per job for livestock grazing are slightly over \$27,200, which is considerably larger than the average a little more than \$17,000 earnings per job for recreation.

Table 4-47. IMPLAN Run for Alternative Four

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<u>Direct Effects</u>										
Livestock Grazing	\$680,111	\$728,438	\$776,765	\$825,092	\$873,420	\$921,747	\$970,074	\$1,018,401	\$1,066,728	\$1,115,056
Consumptive Recreation	\$421,654	\$425,870	\$430,129	\$434,430	\$438,774	\$445,356	\$452,036	\$458,817	\$465,699	\$472,685
Non Consumptive Recreation	\$64,656	\$64,156	\$63,685	\$63,242	\$62,828	\$62,628	\$62,459	\$62,322	\$62,214	\$62,136
Total	\$1,166,421	\$1,218,464	\$1,270,579	\$1,322,765	\$1,375,022	\$1,429,731	\$1,484,570	\$1,539,540	\$1,594,641	\$1,649,876
<u>Total Impact</u>										
Livestock Grazing	\$1,420,636	\$1,521,447	\$1,622,257	\$1,723,068	\$1,823,879	\$1,924,689	\$2,025,500	\$2,126,311	\$2,227,122	\$2,327,932
Consumptive Recreation	\$560,821	\$566,429	\$572,094	\$577,815	\$583,593	\$592,347	\$601,232	\$610,250	\$619,404	\$628,695
Non Consumptive Recreation	\$87,314	\$86,626	\$85,979	\$85,371	\$84,800	\$84,518	\$84,278	\$84,080	\$83,923	\$83,806
Total	\$2,068,771	\$2,174,502	\$2,280,330	\$2,386,253	\$2,492,271	\$2,601,554	\$2,711,010	\$2,820,641	\$2,930,448	\$3,040,433

Year	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Average
<u>Direct Effects</u>											
Livestock Grazing	\$1,163,383	\$1,211,710	\$1,260,037	\$1,308,364	\$1,356,692	\$1,405,019	\$1,453,346	\$1,501,673	\$1,550,000	\$1,598,328	\$1,139,219
Consumptive Recreation	\$477,412	\$482,186	\$487,007	\$491,878	\$496,796	\$501,764	\$506,782	\$511,850	\$516,968	\$522,138	\$472,012
Non Consumptive Recreation	\$61,885	\$61,658	\$61,454	\$61,273	\$61,114	\$60,976	\$60,859	\$60,763	\$60,688	\$60,632	\$62,081
Total	\$1,702,679	\$1,755,554	\$1,808,499	\$1,861,515	\$1,914,602	\$1,967,759	\$2,020,987	\$2,074,286	\$2,127,656	\$2,181,097	\$1,673,312
<u>Total Impact</u>											
Livestock Grazing	\$2,428,743	\$2,529,554	\$2,630,364	\$2,731,175	\$2,831,986	\$2,932,797	\$3,033,607	\$3,134,418	\$3,235,229	\$3,336,040	\$2,378,338
Consumptive Recreation	\$634,982	\$641,332	\$647,745	\$654,223	\$660,765	\$667,373	\$674,046	\$680,787	\$687,595	\$694,471	\$627,800
Non Consumptive Recreation	\$83,457	\$83,141	\$82,856	\$82,602	\$82,378	\$82,183	\$82,017	\$81,878	\$81,767	\$81,683	\$83,733
Total	\$3,147,182	\$3,254,027	\$3,360,966	\$3,468,000	\$3,575,129	\$3,682,352	\$3,789,670	\$3,897,083	\$4,004,591	\$4,112,193	\$3,089,870

Table 4-48. Earnings and Employment, Alternative Four (8)

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Labor Earnings										
Livestock Grazing	\$430,515	\$461,160	\$491,804	\$522,448	\$553,092	\$583,736	\$614,380	\$645,024	\$675,668	\$706,312
Consumptive Recreation	\$137,899	\$139,278	\$140,671	\$142,078	\$143,498	\$145,651	\$147,836	\$150,053	\$152,304	\$154,589
Non Consumptive Recreation	\$21,589	\$21,411	\$21,242	\$21,084	\$20,935	\$20,856	\$20,788	\$20,731	\$20,683	\$20,646
Total	\$590,004	\$621,848	\$653,717	\$685,609	\$717,525	\$750,243	\$783,004	\$815,808	\$848,655	\$881,547
Total Employment										
Livestock Grazing	15.9	17.0	18.1	19.3	20.4	21.5	22.6	23.7	24.8	26.0
Consumptive Recreation	8.5	8.6	8.7	8.8	8.9	9.0	9.1	9.3	9.4	9.5
Non Consumptive Recreation	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Total	25.6	26.8	28.0	29.2	30.4	31.6	32.9	34.1	35.4	36.6
Average Earnings/Job										
Livestock Grazing	\$27,069	\$27,094	\$27,115	\$27,134	\$27,151	\$27,167	\$27,180	\$27,193	\$27,204	\$27,214
Consumptive Recreation	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210
Non Consumptive Recreation	\$17,756	\$17,764	\$17,771	\$17,779	\$17,786	\$17,794	\$17,802	\$17,810	\$17,818	\$17,826
Total	\$23,022	\$23,187	\$23,338	\$23,476	\$23,603	\$23,708	\$23,806	\$23,895	\$23,978	\$24,054

Year	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Average
Total Labor Earnings											
Livestock Grazing	\$736,956	\$767,600	\$798,244	\$828,888	\$859,533	\$890,177	\$920,821	\$951,465	\$982,109	\$1,012,753	\$721,634
Consumptive Recreation	\$156,135	\$157,696	\$159,273	\$160,866	\$162,474	\$164,099	\$165,740	\$167,397	\$169,071	\$170,762	\$154,368
Non Consumptive Recreation	\$20,553	\$20,467	\$20,390	\$20,321	\$20,258	\$20,204	\$20,156	\$20,115	\$20,082	\$20,055	\$20,628
Total	\$913,643	\$945,764	\$977,907	\$1,010,075	\$1,042,265	\$1,074,479	\$1,106,717	\$1,138,978	\$1,171,262	\$1,203,570	\$896,631
Total Employment											
Livestock Grazing	27.1	28.2	29.3	30.4	31.5	32.7	33.8	34.9	36.0	37.1	26.5
Consumptive Recreation	9.6	9.7	9.8	9.9	10.0	10.1	10.2	10.3	10.4	10.5	9.5
Non Consumptive Recreation	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.2
Total	37.9	39.1	40.3	41.5	42.7	43.9	45.1	46.3	47.6	48.8	37.2
Average Earnings/Job											
Livestock Grazing	\$27,224	\$27,233	\$27,241	\$27,248	\$27,255	\$27,262	\$27,268	\$27,273	\$27,279	\$27,284	\$27,204
Consumptive Recreation	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210	\$16,210
Non Consumptive Recreation	\$17,833	\$17,840	\$17,847	\$17,854	\$17,861	\$17,867	\$17,874	\$17,880	\$17,886	\$17,893	\$17,827
Total	\$24,136	\$24,212	\$24,283	\$24,350	\$24,413	\$24,472	\$24,527	\$24,580	\$24,629	\$24,676	\$24,017

Benefit/Cost Analysis

A benefit/cost analysis was done for each alternative. In order to do the analysis, the resource specialists estimated the annual costs and benefits for each alternative over the 20 year planning horizon. The annual benefits and costs produced from this effort were then expressed in 2006 dollars based on an estimated annual inflation rate of 1.93% (Consumer Price Index For All Urban Consumers: All Items, CPIAUCSL) and a discount rate of 3.0% (Office of Management and Budget, M-07-05, January 2, 2007). The summary of this analysis is illustrated in Table 4-49.

Table 4-49. Benefit/Cost Analysis

Present Value ('06 \$) Summary Table				
Item	Alt. #1	Alt. #2	Alt. #3	Alt. #4
<u>Cost</u>				
<u>New Development Cost</u>				
BLM	\$123,912	\$641,257	\$0	\$389,273
Permittee	\$47,867	\$687,370	\$0	\$427,175
Other Sources	\$32,387	\$0	\$0	\$0
Subtotal	\$204,166	\$1,328,627	\$0	\$816,448
<u>Other BLM Cost</u>	\$5,918,882	\$6,009,891	\$5,814,013	\$5,971,630
<u>Other Permittee Cost</u>	\$6,381,154	\$4,020,211	\$5,885,869	\$4,792,973
<u>Other Agency Cost</u>	\$3,939,358	\$4,485,455	\$2,386,670	\$3,431,272
<u>Summary</u>				
Total BLM Cost	\$6,042,794	\$6,651,148	\$5,814,013	\$6,360,903
Total Permittee Cost	\$6,429,021	\$4,707,581	\$5,885,869	\$5,220,149
Total Other Sources Cost	\$32,387	\$0	\$0	\$0
Total Other Agency Cost	\$3,939,358	\$4,485,455	\$2,386,670	\$3,431,272
Total Cost	\$16,443,561	\$15,844,184	\$14,086,551	\$15,012,324
<u>Benefits</u>				
Recreation Benefit	\$6,699,132	\$5,488,035	\$6,925,800	\$6,723,798
Water Storage Benefits	\$199,090	\$124,678	\$230,123	\$288,764
Salvage Values	\$902	\$10,891	\$0	\$6,167
Permittee Revenue	\$11,213,125	\$14,134,416	\$7,120,492	\$11,264,462
Total Benefit	\$18,112,249	\$19,758,019	\$14,276,415	\$18,283,190
<u>Discounted Benefit Cost Calculations</u>				
Discounted Total Benefits	\$18,112,249	\$19,758,019	\$14,276,415	\$18,283,190
Discounted Total Cost	\$16,443,561	\$15,844,184	\$14,086,551	\$15,012,324
Benefit/Cost Ratio	1.10	1.25	1.01	1.22

Looking at the results depicted in Table 4-49, Alternative Two yields the highest B/C ratio followed in descending order by Alternatives Four, One, and finally Three. But as mentioned in the Introduction to the Socioeconomics section, while the rank order of the B/C ratios provides useful information regarding how the market benefits and costs associated with each alternative stack up against each other, they only include the market costs and benefits. This means the nonmarket impacts are not included in the analysis and the reader should be cautioned against using the results from the B/C analysis as the sole economic ranking criteria.

A close examination of Table 4-49 produces some interesting observations. First of all, the magnitude of costs varies between alternatives. Second, the distribution, of costs and benefits changes depending on the management alternative being considered. Finally, the marginal costs to obtain the benefits likewise vary between alternatives. To get a clearer view of these relationships, Tables 4-50, 4-51 and 4-52 are presented below.

Table 4-50 indicates that under Alternative Two, both the BLM and permittee spend the most on new development costs geared principally for range improvements relative to the other three alternatives. This table also indicates that all other BLM costs are the highest under Alternative Two and the lowest for the permittee. Looking at the total costs, BLM costs associated with Alternative Two are again the highest and permittee costs are the lowest compared to the other three alternatives.

Looking at the benefit side, Table 4-50 indicates recreation benefits ranks the lowest under Alternative Two while permittee revenues rank the highest. Water storage benefits under Alternative Two also ranks the lowest relative to the other alternatives. But overall, the market benefits derived from all three alternatives favors Alternative Two, followed by Alternatives Four, One and Three. However, the reader should again remember that the nonmarket benefits are not included in this analysis. And one could reasonably conclude that the nonmarket benefits will vary among the alternatives and would likely be larger for alternatives with less intensive livestock grazing.

Table 4-50. Ranking of Costs

Ranking of Costs - Present Value ('06 \$ Summary Table)					
Item	Alt. #1	Alt. #2	Alt. #3	Alt. #4	
<u>Cost</u>					
<u>New Development Cost</u>					
BLM	3	1	4	2	
Permittee	3	1	4	2	
Other Sources	1	2	2	2	
Subtotal	3	1	4	2	
<u>Other BLM Cost</u>	3	1	4	2	
<u>Other Permittee Cost</u>	1	4	2	3	
<u>Other Agency Cost</u>	2	1	4	3	
<u>Summary</u>					
Total BLM Cost	3	1	4	2	
Total Permittee Cost	1	4	2	3	
Total Other Sources Cost	1	2	2	2	
Total Other Agency Cost	2	1	4	3	
Total Cost	1	2	4	3	
<u>Benefits</u>					
Recreation Benefit	3	4	1	2	
Water Storage Benefits	3	4	2	1	
Salvage Values	3	1	4	2	
Permittee Revenue	3	1	4	2	
Total Benefit	3	1	4	2	

Table 4-51 illustrates the percentage distribution of costs and benefits associated with each alternative. Looking at the results this way indicates the BLM's share of the new development costs is the highest under Alternative One and the permittees share of the new development costs are the highest under Alternative Two. Regarding other BLM costs, their proportion of the total other costs is the highest under Alternative Four followed closely by

Alternatives Two and Three. The permittees share to the total other costs is the lowest under Alternative Two and the highest under Alternative Three. Regarding total costs, Table 4-51 indicates BLM's share is highest under Alternative Four, followed closely by Alternative Two and the lowest under Alternative One. Contrasted to the permittee's proportion of total costs, their highest share occurs under Alternative Three and their lowest share falls under Alternative Two.

Table 4-51. Percentage Distribution of Costs and Benefits

Percentage Distribution of Costs and Benefits - Present Value ('06 \$ Summary Table)				
Item	Alt. #1	Alt. #2	Alt. #3	Alt. #4
<u>Cost</u>				
<u>New Development Cost</u>				
BLM	60.7%	48.3%		47.7%
Permittee	23.4%	51.7%		52.3%
Other Sources	15.9%	0.0%		0.0%
Subtotal	100.0%	100.0%		100.0%
<u>Other BLM Cost</u>	36.4%	41.4%	41.3%	42.1%
<u>Other Permittee Cost</u>	39.3%	27.7%	41.8%	33.8%
<u>Other Agency Cost</u>	24.3%	30.9%	16.9%	24.2%
<u>Summary</u>				
Total BLM Cost	36.7%	42.0%	41.3%	42.4%
Total Permittee Cost	39.1%	29.7%	41.8%	34.8%
Total Other Sources Cost	0.2%	0.0%	0.0%	0.0%
Total Other Agency Cost	24.0%	28.3%	16.9%	22.9%
Total Cost	100.0%	100.0%	100.0%	100.0%
<u>Benefits</u>				
Recreation Benefit	37.0%	27.8%	48.5%	36.8%
Water Storage Benefits	1.1%	0.6%	1.6%	1.6%
Salvage Values	0.0%	0.1%	0.0%	0.0%
Permittee Revenue	61.9%	71.5%	49.9%	61.6%
Total Benefit	100.0%	100.0%	100.0%	100.0%

Table 4-52 depicts the anticipated benefit per dollar of cost. In terms of the dollar of benefits derived from each dollar of cost, not surprisingly, the results indicate that Alternative Two ranks the highest, followed by Alternatives Four, One and Three. What is interesting in this table is that relative ranking varies depending on who is bearing the cost. For example, BLM derives the lowest return, measured in dollars of benefits per dollar in cost, for Alternative Three. The next lowest return in benefits per dollar expended by BLM is Alternative Two followed by One and Four. This ranking is different for the permittee cost. In their case, the highest benefit per dollar of cost occurs in Alternative Two followed by Four, One and Three.

Table 4-52. Anticipated Benefit Per Dollar Of Cost

Cost/\$ of Benefit - Present Value ('06 \$ Summary Table)				
Item	Alt. #1	Alt. #2	Alt. #3	Alt. #4
Total BLM Cost	\$3.00	\$2.97	\$2.46	\$2.87
Total Permittee Cost	\$2.82	\$4.20	\$2.43	\$3.50
Total Other Sources Cost	\$559.25			
Total Other Agency Cost	\$4.60	\$4.40	\$5.98	\$5.33
Total Cost	\$1.10	\$1.25	\$1.01	\$1.22

Conclusion

The following table (Table 4-53) is presented to show the overall results from the IMPLAN runs. A careful examination of this table indicates total labor earnings, total employment and average earnings per job is the highest for Alternative Two, followed by Alternatives Four, One and Three. This means that Alternative Two has the highest relative impact on the study region. However, to get a clearer understanding of the relative importance of these results, it is helpful to compare them to the earnings and employment in Fremont County. That comparison can be found in Table 4-54.

Table 4-53. Overall Results From IMPLAN Runs

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<u>Total Labor Earnings (Ranch Production Perspective)</u>										
Alternative 1	\$774,748	\$776,442	\$778,154	\$779,886	\$781,636	\$795,379	\$809,141	\$822,923	\$836,726	\$850,549
Alternative 2	\$774,748	\$800,692	\$826,648	\$852,616	\$878,597	\$896,194	\$914,180	\$932,537	\$951,245	\$970,288
Alternative 3	\$590,004	\$591,204	\$592,429	\$593,677	\$594,949	\$598,580	\$602,316	\$606,159	\$610,112	\$614,178
Alternative 4	\$590,004	\$621,848	\$653,717	\$685,609	\$717,525	\$750,243	\$783,004	\$815,808	\$848,655	\$881,547
<u>Total Employment (Ranch Production Perspective)</u>										
Alternative 1	32.5	32.6	32.7	32.8	32.9	33.4	34.0	34.5	35.1	35.7
Alternative 2	32.5	33.4	34.4	35.4	36.3	36.8	37.3	37.8	38.3	38.9
Alternative 3	25.6	25.7	25.8	25.9	25.9	26.2	26.4	26.6	26.9	27.1
Alternative 4	25.6	26.8	28.0	29.2	30.4	31.6	32.9	34.1	35.4	36.6
<u>Average Earnings/Job</u>										
Alternative 1	\$23,870	\$23,846	\$23,823	\$23,799	\$23,775	\$23,792	\$23,807	\$23,822	\$23,836	\$23,850
Alternative 2	\$23,870	\$23,953	\$24,031	\$24,105	\$24,175	\$24,351	\$24,518	\$24,675	\$24,824	\$24,963
Alternative 3	\$23,022	\$23,002	\$22,982	\$22,962	\$22,941	\$22,884	\$22,827	\$22,769	\$22,710	\$22,651
Alternative 4	\$23,022	\$23,187	\$23,338	\$23,476	\$23,603	\$23,708	\$23,806	\$23,895	\$23,978	\$24,054

Table 4-53 (cont.)

Year	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Average
<u>Total Labor Earnings (Ranch Production Perspective)</u>											
Alternative 1	\$869,415	\$888,302	\$907,211	\$926,141	\$945,093	\$964,067	\$983,064	\$1,002,083	\$1,021,125	\$1,040,190	\$877,614
Alternative 2	\$1,014,372	\$1,058,475	\$1,102,596	\$1,146,735	\$1,190,893	\$1,235,069	\$1,279,263	\$1,323,476	\$1,367,706	\$1,411,955	\$1,046,414
Alternative 3	\$615,714	\$617,276	\$618,861	\$620,471	\$622,106	\$623,764	\$625,447	\$627,154	\$628,886	\$630,641	\$611,196
Alternative 4	\$913,643	\$945,764	\$977,907	\$1,010,075	\$1,042,265	\$1,074,479	\$1,106,717	\$1,138,978	\$1,171,262	\$1,203,570	\$896,631
<u>Total Employment (Ranch Production Perspective)</u>											
Alternative 1	36.4	37.1	37.9	38.6	39.4	40.1	40.9	41.6	42.4	43.1	36.7
Alternative 2	40.5	42.2	43.8	45.5	47.2	48.8	50.5	52.2	53.8	55.5	42.1
Alternative 3	27.2	27.3	27.4	27.5	27.6	27.7	27.8	27.9	28.0	28.1	26.9
Alternative 4	37.9	39.1	40.3	41.5	42.7	43.9	45.1	46.3	47.6	48.8	37.2
<u>Average Earnings/Job</u>											
Alternative 1	\$23,882	\$23,913	\$23,942	\$23,970	\$23,997	\$24,023	\$24,047	\$24,070	\$24,092	\$24,113	\$23,914
Alternative 2	\$25,030	\$25,091	\$25,148	\$25,200	\$25,248	\$25,293	\$25,334	\$25,373	\$25,409	\$25,443	\$24,802
Alternative 3	\$22,629	\$22,606	\$22,583	\$22,560	\$22,537	\$22,514	\$22,490	\$22,467	\$22,443	\$22,419	\$22,700
Alternative 4	\$24,136	\$24,212	\$24,283	\$24,350	\$24,413	\$24,472	\$24,527	\$24,580	\$24,629	\$24,676	\$24,017

Table 4-54. IMPLAN Average Total Labor Earnings & Employment (2008 - 2027)

IMPLAN Average Total Labor Earnings & Employment (2008 - 2027)					
REIS¹ Fremont County Earnings & Employment					
Item	Employment (2005)	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Earnings	\$651,935,000	\$877,614	\$1,046,414	\$611,196	\$896,631
% of Total		0.1346%	0.1605%	0.0938%	0.1375%
Employment	22,766	37	42	27	37
% of Total		0.1611%	0.1847%	0.1183%	0.1634%

¹Regional Economic Information System (REIS) 1969-2005

Overall, the earnings and employment generated by IMPLAN for all four alternatives represent less than .2% of the total earnings and employment for Fremont County (Table 4-54). Even though there is a variation in the regional economic activity produced by all the alternatives, the impact to the study region would be inconsequential. Therefore, regardless of what management alternative is chosen, the expected economic impact to Fremont County would be minor.

Even though the anticipated economic impact relative to the study region from any of the four alternatives is small, there could be important economic ramifications affecting individual livestock operations. The extent of this impact depends on whether or not individual alternatives lead to “real” reductions in livestock grazing on BLM administered lands in GMCA. In other words, are the proposed cuts in grazing “paper cuts”, cuts in licensed use not affecting long term historical stocking rates on the GMCA, or do they represent reductions in grazing levels that are lower than long term historical levels? To answer this question, Table 4-55 was constructed to provide a historical reference showing the authorized use for the GMCA compared to the average use being projected by alternative.

The time period for the historical use was broken into three categories. The first was from 1980 to 1998, which is considered by some to represent a more typical weather cycle. The second period identified was from 1999 to 2006 and was a period marked by drought. Finally, historical authorized use was computed for the entire 26 year period beginning in 1980 and extending through 2006.

Table 4-55. Authorized Use for GMCA Compared to Average Use Projected by Alternative

GMCA (BLM)		Alt. 1	Alt. 2	Alt. 3	Alt. 4
<i>Cattle</i>					
Minimum Cattle AUMs		13,030	13,030	9,120	9,120
Maximum Cattle AUMs		17,880	26,990	9,120	21,660
Average Cattle AUMs		14,833	19,178	9,120	15,390
Historical Authorized Use (AUMs)		Based on Average Stocking Levels			
'80-'98	18,826	Yes	No	Yes	Yes
'99-'06	13,892	No	No	Yes	No
'80-'06	17,364	Yes	No	Yes	Yes
<i>Sheep</i>					
Minimum Sheep AUMs		4,350	4,350	3,040	3,040
Maximum Sheep AUMs		6,000	9,070	3,040	6,840
Average Sheep AUMs		4,973	6,418	3,040	4,940
Historical Authorized Use (AUMs)		Based on Average Stocking Levels			
'80-'98	7,697	Yes	Yes	Yes	Yes
'99-'06	3,478	No	No	Yes	No
'80-'06	6,447	Yes	Yes	Yes	Yes
<i>Total</i>					
Minimum Total AUMs		17,380	17,380	12,160	12,160
Maximum Total AUMs		23,880	36,060	12,160	28,500
Average Total AUMs		19,805	25,595	12,160	20,330
Historical Authorized Use (AUMs)		Based on Average Stocking Levels			
'80-'98	26,523	Yes	Yes	Yes	Yes
'99-'06	17,370	No	No	Yes	No
'80-'06	23,811	Yes	No	Yes	Yes

After the historical data was compiled, it was compared to the estimated stocking levels for cattle, sheep and the total of the two. The result of that comparison is shown in Table 4-55 and can be interpreted by whether there is a “Yes” or “No” in the table. A “Yes” indicates there is a “real” cut in grazing and a “No” indicates the cut is a paper cut and would not result in stocking levels below what has occurred historically. For example, the “No” under Alternative Two for all three timeframes considered for cattle indicates the stocking levels under this alternative would not be reduced below what has historically occurred over the period from 1980 through 2006. Alternatively, the “Yes” occurring under all three timeframes for Alternative Two for cattle indicates this alternative would produce grazing reductions that lower stocking rates below what has historically occurred in the GMCA for all three timeframes considered. Therefore reductions in cash flows to the impacted operators would be expected for this alternative.

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, 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.

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.

Finally, while the social considerations are difficult to quantify, this area has a longstanding cultural background tied to livestock grazing. Even though livestock grazing on the GMCA represents a minor contribution to the study area's 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. 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.

Chapter 5

Consultation and Coordination

CONSULTATION AND COORDINATION

CONSULTATION AND COORDINATION

This allotment analysis has been developed in consultation and coordination with the grazing permittees, state and local agency personnel, other affected parties, and interested members of the public-at-large. The following is a chronology of public participation and consultation:

December 13, 2007	Open house held at the Pronghorn Lodge, Monarch Room, Lander, Wyoming (1:00 p.m. – 5:00 p.m.). Letter sent to GMCA permittees and Interested Publics.
October 3, 2007	Letter to the US Fish and Wildlife Service requesting consultation on grazing permit renewal for the Green Mountain Common Allotment.
April 18, 2007	Open house held at the Pronghorn Lodge, Monarch Room, Lander, Wyoming (1:00-5:00 p.m.). Letter sent to GMCA permittees and Interested Publics.
March 20, 2007	Advisory meeting to discuss dry conditions and provide an update of the GMCA environmental assessment. Letter sent to GMCA grazing permittees and Interested Publics.
January 24, 2007	Letter to Stanley and Linda Cole, Alkali Creek Grazing Association regarding Mr. Cole’s request for a change in “kind” of livestock and the GMCA Environmental Assessment scoping period.
December 13, 2006	Open house held at the Pronghorn Lodge, Monarch Room, Lander, Wyoming (1:00 – 5:00 p.m.). Post-season meeting which included the gathering of comments for the proposed alternatives for the GMCA Environmental Assessment. Letter was sent to GMCA grazing permittees and Interested Publics.
December 5, 2006	Meeting with Jonathan Ratner, Western Watersheds Project, to clarify questions regarding his input for the development of alternatives on the GMCA Environmental Assessment. The meeting took place at the Lander BLM Field Office in Lander, Wyoming.
November 15, 2006	Letter sent to Mr. Neil Rodgers, Interested Public on the GMCA. A copy of grazing management alternatives for the GMCA was sent to him per his request.
November 8 & 9, 2006	Green Mountain Common Allotment permittee meeting to update the grazing permittees on the status of the grazing management alternatives. The November 8 meeting was held in Lander at the BLM office. The November 9 meeting took place at the Fire Hall in Jeffrey City.
June 12 & 13, 2006	Grazing permittee meetings held in Jeffrey City and Lander. Status of the GMCA EA was discussed with the grazing permittees.
April 13, 2006	Open house at the Pronghorn Lodge, Monarch Room, Lander Wyoming (1:00-5:30). Pre-season meeting which included a briefing on the status of the GMCA EA and grazing management alternatives. GMCA grazing permittees and Interested Publics were invited to attend.
March 6, 2006	Wyoming State Grazing Board Meeting in Lander, Wyoming. Board members were briefed on status of grazing management alternatives and comment period.

February 9, 2006	E-mail communications between Lander BLM Field Office and Cathy Meyer, Fremont County Cattleman's Association Grazing Task Force, regarding the status of the GMCA EA.
January 14, 2006	Fremont County Cattleman's Association meeting. Rubel Vigil of the Lander BLM Field Office attended the meeting and provided a briefing on several topics, including the status of the GMCA EA.
December 22, 2005	Letter to GMCA grazing permittees and Interested Public extending the scoping period by 30 days for comments on the alternatives for the GMCA EA.
November 17, 2005	Letter to GMCA grazing permittees and Interested Publics regarding the release of the four grazing alternatives for public comment.
November 7, 2005	Wyoming State Grazing Board Meeting in Lander, Wyoming. Board members were briefed on status of the GMCA EA process.
August 12, 2005	Document received from Wyoming Department of Agriculture on the development of a grazing alternative from the GMCA grazing permittees. WDA helped develop the alternative.
August 12, 2004	Meeting between the Lander BLM Field Office ID Team and the GMCA permittees at the Fremont County Library, Lander, Wyoming to clarify questions regarding permittee input for the development of the permittee alternative. The meeting was sponsored by the WDA, Popo Agie Conservation District, State Grazing Board and the Fremont County Cattleman's Association.
February 9, 2004	Meeting facilitated by the National Riparian Service Team to move forward on the development of the GMCA AMP. The meeting was attended by members of the Large Working Group, which included the GMCA grazing permittees, BLM and other Interested Publics and agencies. The meeting took place in Lander, Wyoming.

MANAGEMENT TEAM

Robert Ross Jr., Field Manager
Rubel Vigil, Jr., Assistant Field Manager

INTERDISCIPLINARY TEAM

John Likins, Range Management Specialist
Griff Morgan, Wildlife Biologist
Greg Bautz, Soil Scientist
Roy Packer, Range Management Specialist
Jared Oakleaf, Outdoor Recreation Planner
Connie Breckenridge, GIS Specialist
Craig Bromley, Archaeologist
Kristin Yannone, Environmental Coordinator/Planner
Angela Lake, Writer/Editor
Bruce Collins, Public Affairs Specialist

INTERESTED PUBLIC

A complete list of other interested individuals and organizations that participated in the public scoping process for this Environmental Assessment is provided in Appendix 23.

Chapter 6

References, Glossary and Appendices

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GLOSSARY

Allotment Evaluation-The process of evaluation is the examination and professional judgment concerning the worth, quality, significance, amount, degree, or condition of the natural resources based on interpretation of monitoring data. An allotment evaluation provides a subjective assessment of all available information concerning a specific area and its management. The goal of an evaluation is to determine whether satisfactory progress is occurring, to identify the necessary actions necessary to correct deficiencies. Since resource objectives and monitoring methods vary from location to location, no standard set of criteria or format for the evaluation process is prescribed. Permittees, lessees, other rangeland users, and interested parties are consulted and encouraged to participate in monitoring evaluations. (USDI, BLM 1985)

Allotment Management Plan - A documented program developed as an activity plan, consistent with the definition at 43 U.S.C. 1702(k), that focuses on, and contains the necessary instructions for, the management of livestock grazing on the public lands to meet resource condition, sustained yield, multiple use, economic and other objectives. (43 Code of Federal Regulations 4100.0-5)

Animal Unit Month (AUM) - The amount of forage (780 pounds of dry matter) necessary for the sustenance of one cow or its equivalent for a period of one month. (43 Code of Federal Regulations 4100.0-5)

Annual Operating Plan (AOP) - The annual operating plan prescribes the annual plan of action that implements management actions of the allotment management plan. It specifies the grazing permittee and BLM's responsibilities for the current grazing season. The AOP is used to set objectives, implement utilization standards, and modify a grazing system to meet management and vegetative objectives for the allotment.

Axillary [bud] - Are also known as lateral buds which occur in the axils of leaves (in the upper angle of where the leaf grows from the stem).

Criteria, Rangeland Health - The [standard, or rule, or principle, used for testing in making a] determination of whether a rangeland is healthy, at risk, or unhealthy is based on the evaluation of three criteria: degree of soil stability and watershed function, integrity of nutrient cycles and energy flows, and the presence of functioning recovery mechanisms. (National Research Council 1994)

Desired Plant Community (DPC) - A plant community which produces the kind, proportion, and amount of vegetation necessary for meeting or exceeding land use plan (LUP) or activity plan objectives established for an ecological site(s). The determined DPC must be consistent with the site's capability to produce the desired vegetation through management, land treatment, or a combination of the two. Also defined as the plant community that has been identified through a management plan to best meet the plan's objectives for the site". (Society for Range Management 1989, 1995)

DPC has also been defined as "of the several plant communities that may occupy a site, the one that has been identified through a management plan to best meet the plan's objectives for the site". (Society for Range Management 1995)

Dormancy - The condition of a plant or seed in which life functions are virtually at a standstill. (Soil Conservation Society of America 1982)

Drainage, soil - As a natural condition of the soil, refers to the frequency and duration of periods when the soil is free of saturation; for example, in well-drained soils the water is removed readily but not rapidly; in poorly drained soils the root zone is waterlogged for long periods unless artificially drained, and the roots of ordinary crop plants cannot get enough oxygen; in excessively drained soils the water is removed so completely that most crop plants suffer from lack of water. Strictly speaking, excessively drained soils are a result of excessive runoff due to steep

slopes or low available water holding capacity due to small amounts of silt and clay in the soil material. (Soil Conservation Society of America 1982)

Ecological Site (ES) - A kind of land with a specific potential natural community and specific site characteristics, differing from other kinds of land in its ability to produce vegetation and to respond to management. (Society for Range Management 1989)

A kind of land with specific physical characteristics which differs from other kinds of land in its ability to produce distinctive kinds of vegetation and in its response to management. (Society for Range Management 1995)

Emergent [Vegetation] - Herbaceous wetland vegetation that is erect and rooted. (Soil and Water Conservation Society 2006)

Farm Products - All crops, crop products, plants or portions thereof, but not including livestock (Wyoming Weed and Pest Control Act of 1973).

Grazing System - The manipulation of grazing animals to accomplish a desired result. (Soil and Water Conservation Society 2006)

Functioning-At-Risk-Riparian-wetland areas - Are those riparian/wetland areas that are in functioning condition, but an existing soil, water, or vegetation attribute makes them susceptible to degradation. (USDI, BLM 1993)

Geographic Information System (GIS) - A data base management system used to store, retrieve, manipulate, analyze, and display spatial information.

Gully - A channel or miniature valley cut by concentrated runoff but through which water commonly flows only during and immediately after heavy rains or during the melting of snow; may be dendritic or branching or it may be linear, rather long, narrow, and of uniform width. The distinction between gully and rill is one of depth. A gully is sufficiently deep [(>6 inches)] that it would not be obliterated by normal tillage operations, whereas a rill is of lesser depth [(< 6 inches)] and would be smoothed by ordinary farm tillage. (Soil Conservation Society of America 1982)

Key Observation Point (KOP) - One or a series of points on a travel route or at a use area or potential use area where the view of human activities would be most revealing. KOPs in the GMCA are located along Hwy 287, BLM roads such as the Hudson-Atlantic City Road, county roads, and the National Trails. (BLM Manual 8400 1984)

Key Species - (1) Forage species of sufficient abundance and palatability to justify its use as an indicator to the degree of use of associated species. (2) Those species which must, because of their importance, be considered in the management program. (Society for Range Management 1989)

Lacustrine - Any wetland or deepwater habitat with the following characteristics: 1) situated in a topographic depression or dammed river channel, 2) lacking trees, shrubs, persistent emergents, emergent mosses or lichens with greater than 30 percent aerial coverage, and 3) total area exceeds eight ha (20 acres). (Cowardin et. al. 1979)

Lentic Wetland - These wetlands occur in basins and lack a defined channel and floodplain. Included are perennial or intermittent bodies of water such as lakes, reservoirs, potholes, marshes, ponds, and stockponds. Other examples include bogs, wet meadows, and seeps not associated with a defined channel. (Hansen et.al. 1995)

Lotic Wetlands - These wetlands are associated with running water systems found along rivers, streams, and drainageways. Such wetlands contain a defined channel which periodically, or continuously, carries flowing water, dissolved and suspended material. (Hansen et. al. 1995)

Minimum Ecological Standard - The minimum standard for rangeland management is to prevent human-induced loss of rangeland health. (National Research Council 1994)

Nonfunctional-Riparian-Wetland Areas - Are those riparian/wetland areas that clearly are not providing adequate vegetation, landform, or large woody debris to dissipate stream energy associated with high flows and thus are not reducing erosion, improving water quality, etc., as listed above. The absence of certain physical attributes, such as a floodplain where one should be, are indicators of nonfunctioning conditions. (USDI, BLM 1993)

Nutrient Cycling and Energy Flow - The movement through nature of elements, or, compounds, essential as raw materials for organism growth and development, such as carbon, oxygen, nitrogen, phosphorus, etc.

Palustrine - Any non-tidal wetland of a class dominated by trees, shrubs, persistent emergents, or emergent mosses or lichens. (Cowardin et. al. 1979)

Pasture - An area devoted to the production of forage, introduced or native, and harvested by grazing. (Soil and Water Conservation Society 2006)

Phenology - The study of periodic biological phenomena which are recurrent such as flowering, seeding, etc., especially as related to climate. (Society for Range Management 1989)

Potential Natural Community (PNC) - The biotic community that would become established on an ecological site if all successional sequences were completed without interferences by man under the present environmental conditions. Natural disturbances are inherent in its development. The PNC may include acclimatized or naturalized non-native species. (Society for Range Management 1989)

Proper Functioning Condition-Riparian-Wetland Areas - Riparian/wetland areas are [defined to be] functioning properly when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high waterflows, thereby reducing erosion and improving water quality; filter sediment, capture bedload, and aid floodplain development; improve flood-water retention and ground-water recharge; develop root masses that stabilize streambanks against cutting action; develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses; and support greater biodiversity. The functioning condition of riparian-wetland areas is a result of interaction among geology, soil, water, and vegetation. (USDI, BLM 1993)

Range Condition - (a) A generic term relating to present status of a unit range in terms of specific values or potentials. Specific values or potentials must be stated. (b) The present state of vegetation of a range site in relation to the climax (natural potential) plant community for that site. It is an expression of the relative degree to which the kinds, proportions, and amounts of plants in a plant community resemble that of the climax plant community for the site. (Society for Range Management 1989) (c) The present state of the plant community on a range (ecological) site in relation to the potential natural plant community for that site. (Soil and Water Conservation Society 2006)

Range Condition Class - Confusion has existed regarding both definition and use of this term. (1) The following definition fits the thinking expressed in the definition Range Condition (a) above: One of a series of arbitrary categories used to either classify ecological status of a specific range site in relation to its potential (early, mid, late seral or PNC) or classify management-oriented value categories for specific potentials, e.g., good condition spring cattle range. (2) Some agencies consider range condition class in the context of Range Condition (b) above as follows:

Range Condition Class	Percent of Climax for the Range Site
Excellent	76-100
Good	51-75
Fair	26-50
Poor	0-25

(Society for Range Management 1989)

Range Improvement - An authorized physical modification or treatment which is designed to improve production of forage; change vegetation composition; control patterns of use; provide water; stabilize soil and water conditions; restore, protect and improve the condition of rangeland ecosystems to benefit livestock, wild horses and burros, and fish and wildlife. The term includes, but is not limited to, structures, treatment projects, and use of mechanical devices or modifications achieved through mechanical means. (43 CFR 4100.0-5)

Also, according to the Public Rangelands Improvement Act of 1978, 43 USC 1902(f): “The term “range improvement” means any activity or program on or relating to rangelands which is designed to improve production of forage; change vegetative composition; control patterns of use; provide water; stabilize soil and water conditions; and provide habitat for livestock and wildlife. The term includes, but is not limited to, structures, treatment projects, and the use of mechanical means to accomplish the desired results.

Rangeland Health - The degree to which the integrity of the soil and the ecological processes of rangeland ecosystems are sustained. (National Research Council 1994)

Rangeland Health indicators - These are specific observable attributes, or features (such as soil erosion and deposition, vegetative cover and composition, bare ground and litter, noxious weeds, species diversity, population trends) applied as appropriate to the potential of an ecological site. Water chemistry and physical characteristics (such as temperature and turbidity), air chemistry and visibility are also considered in rangeland health evaluations.

Recovery Mechanisms - The natural recovery processes, both chemical and biological, involved in converting disturbed, or degraded lands, to their former uses or other productive uses. This commonly involves using strategies that capture organic matter to build topsoils to restore impaired, or lost, soil fertility to support desirable kinds and amounts of vegetation.

Resource Value Rating (RVR) - The value of vegetation present on an ecological site for a particular use or benefit (i.e. livestock forage). Resource value ratings may be established for each plant community capable of being produced on an ecological site, including exotic or cultivated species. (Society for Range Management 1989)

Rill - See the above definition of a gully.

Riparian Area - A geographically delineable area with distinctive functions and characteristics. Includes both the riparian ecosystem and the adjacent aquatic ecosystem. (Ehrhart and Hansen 1997)

Riparian areas are a form of wetland transitional between permanently saturated wetlands and upland areas. (USDI, BLM Technical Reference 1737-7 1992)

Riverine - Any wetland or deepwater habitat contained within a channel, with exception of wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens. (Cowardin et. al. 1979).

Seed Ripe - The developmental stage of grass growth when a viable seed is produced. A viable seed is one that is capable of germinating to produce a seedling under favorable conditions [The seed ripe stage occurs after peak of flowering and before seed dissemination.] . (Association of Official Seed Analysts 1998)..

Seral Stages - The series of relatively transitory plant communities that develop during ecological succession from bare ground to the climax stage.

Semiarid-A term applied to regions or climates where moisture is normally greater than under arid conditions but still definitely limits the growth of most crops. Dryland farming methods or irrigation generally are required for crop production. The upper limit of average annual precipitation in the cool semiarid regions is as low as 15 inches (38.1cm), whereas in tropical regions it is as high as 45 or 50 inches (114-127 cm).

Service Area - The area that can be properly grazed by livestock watering at a certain water. In determining such area, natural and cultural barriers, recognized habitats of livestock, proper livestock practices, and range management factors will be considered. (43 Code of Federal Regulations 4100.0-5 1971)

Site Conservation Rating (SCR) - Site conservation rating is defined as an assessment of the protection afforded a site by the current vegetation against loss of potential. (Society for Range Management 1995)

Site Conservation Threshold (SCT) - Site conservation threshold is defined as the kind, amount, and/or pattern of vegetation needed as a minimum on a given site to prevent accelerated erosion. The threshold in this case is in the rate of soil erosion. Vegetation which provides protection equal to or in excess of that necessary to prevent accelerated erosion would be above the threshold and would be rated as "satisfactory" or "sustainable. Vegetation which does not provide adequate protection would be rated "unsatisfactory" or "unsustainable". (Society for Range Management 1995)

Soil Quality - Soil quality is the fitness of a specific kind of soil to function within its surroundings, support plant and animal productivity, maintain or enhance water and air quality, and support human health and habitation. (USDA-NRCS 1996)

Soil Stability - Soils that exhibit natural erosion where the rate of soil formation is not exceeded by the rate of erosion and soil fertility is maintained.

Supplemental Feed - A feed which supplements the forage available from the public lands and is provided to improve livestock nutrition or rangeland management. (42 Code of Federal Regulations 4100.0-5)

Suspended Sediment - The very fine soil particles that remain in suspension in water for a considerable period of time; maintained in suspension by the upward components of turbulent currents or may be fine enough to form a colloidal suspension. Abbr. SS. (Soil Conservation Society of America 1982)

Total Dissolved Solids -The total dissolved mineral constituents of water. Abbr. TDS. (Soil Conservation Society of America 1982)

Treatments - Vegetation manipulations (fire, herbicides, grazing, brush beating, etc) to achieve desired results.

Use - (1) The proportion of current year's forage production that is consumed and/or destroyed by grazing animals. May refer either to a single species or to the vegetation as a whole. Synonym-Degree of Use. (2) Utilization of range for purpose such as grazing, bedding, shelter, trailing, watering, watershed, recreation, forestry, etc. (Society for Range Management 1989)

Use Area - Synonymous with the word pasture in this document.

Vegetative Expression - (1) How the land reflects its management and use through the growth of vegetation. (2) The

manifestation of plant growth.

Watershed Function - The ability of a watershed to infiltrate, store, release, and make available water for plant and animal use.

Wetland - Areas that under normal circumstances have hydrophytic vegetation, hydric soils, and wetland hydrology. It includes landscape units such as bogs, fens, carrs, marches, and lowlands covered with shallow, and sometimes ephemeral or intermittent waters. Wetlands are also potholes, sloughs, wet meadows, riparian zones, overflow areas, and shallow lakes and ponds having submerged and emergent vegetation. (Cowardin et.al. 1979)

APPENDICES

The following is a list of the Appendices referenced in the body of the document.

- Appendix 1 - Range Improvement Cost Summary
- Appendix 2 - Proposed AMP Outline and 43 CFR 4120 - Allotment Management Plans
- Appendix 3 - Cultural Resource Policy and Decisions
- Appendix 4 - Grazing System Identification
- Appendix 5 - Grazing Treatments
- Appendix 6 - Wyoming Policy on Reclamation
- Appendix 7 - Surface Water Classes
- Appendix 8 - Proper Functioning Condition Assessment
- Appendix 9 - Green Mountain Common Allotment and Sweetwater Planning Unit Resource Analysis-Range Condition
- Appendix 10 - Seven Lakes Incommon Allotment
- Appendix 11 - Ground Cover Summary
- Appendix 12 - GMCA Ecological Sites
- Appendix 13 - Green Mountain EIS Range Survey Methodology
- Appendix 14 - Descriptions and Specifications for Chemical Spraying and Release of Biological Control Agents
- Appendix 15 - Grazing Preference Summary
- Appendix 16 - Sage Grouse Life History and Habitat Needs
- Appendix 17 - Natural Resource Recreation Setting: Range, Condition and Trend
- Appendix 18 - Seven Lakes EIS Range Survey Methodology
- Appendix 19 - Methods of Computing Affected Area
- Appendix 20 - Evaluating and Rating Grazing Strategies for Stream Riparian Habitat
- Appendix 21 - Riparian Pasture Acres and Miles of Fence Needed to Complete Riparian Pastures by Alternative
- Appendix 22 - Goals and Objectives
- Appendix 23 - Interested Publics
- Appendix 24 - Photos of Seminole Cutoff Segment of OCMPE Trail for Map 3-9
- Appendix 25 - Tables and Graphs for Economic Analysis

APPENDIX 2

ALLOTMENT MANAGEMENT PLAN OUTLINE

INTRODUCTION

I. ALLOTMENT ISSUES AND LAND USE PLANNING GOALS OR OBJECTIVES

- A. ALLOTMENT ISSUES
- B. LAND USE PLANNING GOALS
- C. ALLOTMENT RESOURCE GOALS
- D. ALLOTMENT RESOURCE OBJECTIVES
 - 1. UPLAND SITES
 - a. LONG TERM (DPC) OBJECTIVES
 - b. SHORT TERM OBJECTIVES - RESERVED
 - 2. RIPARIAN SITES
 - a. WILLOW RIPARIAN AREAS
 - i. LONG TERM (DPC) OBJECTIVES
 - ii. SHORT TERM OBJECTIVES - RESERVED
 - b. WET MEADOW RIPARIAN AREAS
 - i. LONG TERM (DPC) OBJECTIVES
 - ii. SHORT TERM OBJECTIVES - RESERVED

II. ALLOTMENT RESOURCE MANAGEMENT ACTIONS

- A. GRAZING MANAGEMENT
 - 1. TURNOUT DATES
 - 2. GRAZING SYSTEMS
 - a. INITIAL PERIOD 1999-2000
 - b. INTERIM PERIOD 2001-2009
 - c. LONG TERM PERIOD 2010-2019
 - 3. UTILIZATION
 - 4. RIPARIAN AREAS
 - 5. STUBBLE HEIGHTS
- B. RANGE IMPROVEMENTS
 - 1. INITIAL PERIOD 1999-2000
 - 2. INTERIM PERIOD 2001-2009
 - 3. LONG TERM PERIOD 2010-2019
- C. FLEXIBILITY
- D. BILLING PROCEDURES

III. MONITORING

- A. STUDIES
 - 1. ACTUAL USE
 - 2. UTILIZATION
 - a. UPLAND SITES
 - b. RIPARIAN SITES
 - 3. TREND
 - a. UPLAND SITES
 - b. RIPARIAN SITES

IV. EVALUATION AND REVISION

V. APPROVAL

Subpart 4120--Grazing Management

Sec. 4120.1 Reserved

Sec. 4120.2 Allotment management plans and resource activity plans.

Allotment management plans or other activity plans intended to serve as the functional equivalent of allotment management plans may be developed by permittees or lessees, other Federal or State resource management agencies, interested citizens, and the Bureau of Land Management. When such plans affecting the administration of grazing allotments are developed, the following provisions apply:

(a) An allotment management plan or other activity plans intended to serve as the functional equivalent of allotment management plans shall be prepared in careful and considered consultation, cooperation, and coordination with affected permittee(s) or lessee(s), landowners involved, the resource advisory council, any State having lands or responsible for managing resources within the area to be covered by such a plan, and the interested public. The plan shall become effective upon approval by the authorized officer. The plans shall --

(1) Include terms and conditions under §§ 4130.3, 4130.3-1, 4130.3-2, 4130.3-3, and subpart 4180 of this part;

(2) Prescribe the livestock grazing practices necessary to meet specific resource objectives;

(3) Specify the limits of flexibility, to be determined and granted on the basis of the operator's demonstrated stewardship, within which the permittee(s) or lessee(s) may adjust operations without prior approval of the authorized officer; and

(4) Provide for monitoring to evaluate the effectiveness of management actions in achieving the specific resource objectives of the plan.

(b) Private and State lands may be included in allotment management plans or other activity plans intended to serve as the functional equivalent of allotment management plans dealing with rangeland management with the consent or at the request of the parties who own or control those lands.

(c) The authorized officer shall provide opportunity for public participation in the planning and environmental analysis of proposed plans affecting the administration of grazing and shall give public notice concerning the availability of environmental documents prepared as a part of the development of such plans, prior to implementing the plans. The decision document following the environmental analysis shall be considered the proposed decision for the purposes of subpart 4160 of this part.

(d) A requirement to conform with completed allotment management plans or other applicable activity plans intended to serve as the functional equivalent of allotment management plans shall be incorporated into the terms and conditions of the grazing permit(s) or lease(s) for the allotment.

(e) Allotment management plans or other applicable activity plans intended to serve as the functional equivalent of allotment management plans may be revised or terminated by the authorized officer after consultation, cooperation, and coordination with the affected permittees or lessees, landowners involved, the resource advisory council, any State having lands or responsible for managing resources within the area to be covered by the plan, and the interested public.

APPENDIX 3

POLICIES AND DECISIONS CONCERNING EFFECTS TO THE OREGON/MORMON/CALIFORNIA/PONY EXPRESS TRAILS IN THE LANDER FIELD OFFICE

The Wyoming State Protocol to implement the National Historic Preservation Act states:

“If a proposed project will be visible and there is moderate or strong contrast a determination of ‘Adverse Effect’ is appropriate. A ‘Moderate Contrast’ occurs when the proposed project elements, or portions of the elements, begin to attract attention and begin to dominate the characteristic landscape. A ‘Strong Contrast’ occurs when the proposed project elements, or portions of the elements, demand attention, cannot be overlooked, and are dominant on the landscape (see Appendix C of this Protocol). In this case, a determination of ‘Adverse Effect’ is appropriate.”

The BLM Wyoming Oregon/Mormon Pioneer National Historic Trails Management Plan states:

“Because of the Trails’ status as congressionally designated components of the National Trails System, management decisions have been made that significant segments of the Oregon and Mormon Pioneer Trails are to be protected. It is incumbent on BLM managers to maintain the scenic/historic integrity of historic sites and cross country segments on the public, to avoid destruction of trail resources, to mitigate unavoidable impacts, to accord the trails a priority status in the land use planning process, and generally extend to the trails the type of protection afforded to other nationally significant historic sites.”

(Oregon/Mormon Pioneer National Historic Trails Management Plan: Part I, Bureau of Land Management Responsibilities, Section 3).

The Plan also states:

“All historic sites and cross-country segments of the trails on federal lands should be managed to protect and interpret their historic values.” (Oregon/Mormon Pioneer National Historic Trails Management Plan: Part II, General Management Objectives, Section 3).

The Plan also states:

“New fencing projects will cross the trail corridor at right angles to minimize the number of feet per miles of fence within the corridor. Gates, and in some cases, cattleguards will be installed in the fence at trail crossings. *Fragile or pristine trail ruts will be avoided with fence crossings.*” (Oregon/Mormon Pioneer National Historic Trails Management Plan: Part III, Oregon/Mormon Trail General Management Policy, Fencing section).

The 1987 Lander RMP states:

“The management plan focuses on general methods of management that protect and maintain important trail values, while allowing public use and enjoyment of the trails. Important segments of the trails and trail-related sites are recommended for special protection, interpretation, use, or other management measures.....The management decisions outlined in the Oregon/Mormon Pioneer Trails Management Plan are consistent with the decisions in the RMP.” (Lander RMP Record of Decision, Overview, Cultural/Natural History section)

The Lander RMP also states:

“The Oregon/Mormon Pioneer Trail Management Plan will establish protection, use, and management guidelines for public land trail resources throughout the state of Wyoming, including the Lander Resource Area. Recommendations now formulated for the trail will establish the following in the Beaver Creek Management Unit: a ¼ mile or visible horizon corridor (whichever is closer) on each side of selected trail segments, where modern intrusions and disturbances will be minimized or prohibited.....Adoption of these recommendations will provide continued protection of this National Historic Trail and several of its highly important sites. This type of management will ensure compliance with National Trails System Act requirements for the protection of important trail segments and sites, as well as provide for the preservation of several National Register listed and eligible trail properties. Longstanding efforts of BLM to protect and encourage public enjoyment of the trail will continue.” (Lander RMP Record of Decision, Decisions by Resource Management Unit, Beaver Creek Management Unit, Cultural/Natural History section)

Grazing System Identification

JOHN R. LACEY AND H. WALT VAN POOLLEN

Abstract

Grazing system terminology is a problem in the range management field. The proposed dichotomous key standardizes terminology and facilitates communication.

Grazing systems have been clearly defined as the manipulation of animals to accomplish a desired result (Range Term Glossary Committee 1964, and Soil Conservation Society 1976). Unfortunately, "grazing system" terminology has not been consistently defined. The "confusing terminology" (Shiflet and Heady 1971) disrupts communication between rangers in the field.

The purpose of this paper is to stress the need for standardizing grazing system terminology and to present an approach which can be used to consistently classify grazing systems.

Problems

The problems created by including many range management practices in grazing system terminology are evident when grazing literature is reviewed (Hickey 1969). In the early 1900's, deferred grazing was defined as "grazing after seed maturity" (Jardine and Anderson), but Dyksterhuis (1949) modified the definition to the "practice of taking all the livestock out of one pasture for certain months." However, Shiflet and Heady (1971) concluded that deferred rotation grazing is discontinuing grazing on various parts of a range in succeeding years. Then, the Range Term Glossary Committee (1974) felt they had developed a precise meaning when they wrote "deferred-rotation is any grazing system having a stocking density greater than one and less than two which provides for a systematic rotation of the deferment among pastures."

With the above definitions, it is not surprising that there are inconsistencies among authors. For example, Schmutz's (1973) 3-pasture deferred-rotation alternately rests or "defers" grazing on the pasture during critical growing periods. Each pasture is grazed 4 months of the year. Schmutz's system is patterned after Martin's (1973) 3-pasture system. Both utilize one herd; however, Martin's provides 12 months, instead of 16 months of nonuse. Merrill's (1954) deferred rotation system differs. It utilizes three herds, and each pasture is grazed 12 months, then rested 4 months.

In the early 1900's, the life cycle of forage plants was tied to grazing management (Sampson 1913). These principles were formulated into the rest-rotation grazing system by Hormay and associates (Hormay and Evanko 1958; and Hormay and Talbot 1961). Rest-rotation is a grazing system in which at least one range unit is left ungrazed for 1 year, and then this rest is rotated among units in succeeding years (Range Term Glossary Committee 1964, Soil Conservation Society 1976; and Gifford and Hawkins 1976).

Rest-rotation systems have been extended to areas where they do not apply. Land management agencies are implementing rest-rotation grazing systems in regions with yearlong grazing seasons, although Hormay and associates (Hormay and Evanko 1958; and Hormay and Talbot 1961) designed the system for bunch grass ranges with a 3- to 6-month grazing season. This has created a terminology problem. Depending on locale, rest-rotation grazing may imply growing season or yearlong nonuse.

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Some authors have used the rest-rotation terminology to describe different systems. Gibbens and Fisser (1975) discussed results of a system where some pastures were not used from May through October, but were winter-grazed by sheep. Their system was termed a rest-rotation system; however, it did not include a period of yearlong nonuse. The rest-rotation system described by Edwards (1972) contained yearlong nonuse. It also contained a management technique which separates it from other rest-rotation systems. Rather than systematically rotating rest among pastures, rest was scheduled on the basis of need. Pastures in poor condition received more rest than did the pastures that were in higher condition classes.

Proposed Solution

This paper is not intended to "correct" anyone. Each of the authors cited fully understands his system. However, the above review does illustrate the need for a certain degree of standardization in grazing system terminology. The standardization would minimize misunderstanding and facilitate communication. We feel that a dichotomous key¹ can be used to consistently classify grazing systems. For example, when use and nonuse periods in Schmutz's (1973) deferred-rotation grazing system are analyzed, the 16-month periods of nonuse become evident (Fig. 1).

Thus, according to the key, (Table 1), the system is identified as a rest-rotation grazing system.

¹ This concept came from James K. Lewis, South Dakota State University.

Table 1. Dichotomous key for classifying grazing systems.

1. Grazing a unit ¹ for an entire year	
2. No rotation among pastures	yearlong
2. One or more pastures rested yearlong	
3. Scheduled, systematic rotation	rest-rotation
3. Flexible selection of pasture to rest	selected-rotation
2. One or more pastures rested less than yearlong	
3. All pastures grazed once or twice per year	
4. Scheduled grazing	
5. Systematic rotation during growing season	deferred-rotation
5. Systematic rotation during non-growing season	rotational-deferment
4. Flexible rotation without regard to season	intermittent-rotation
3. All pastures grazed 3 or more times per year	short duration-rotation
1. Grazing a unit less than a full year	
2. No rotation among pastures	continuous-seasonal
2. One or more pastures rested seasonlong	
3. Scheduled, systematic rotation	rest-seasonal
3. Flexible selection on unit to rest	selected-seasonal
2. One or more pastures rested less than seasonlong	
3. All pastures grazed once or twice per season	
4. Scheduled grazing	
5. Systematic rotation during growing season	deferred-seasonal
5. Systematic rotation during nongrowing season	rotational-seasonal
4. Flexible rotation	intermittent-season
3. All pastures grazed more than twice per season	short duration-seasonal

¹ An entire ranch or grazing allotment.

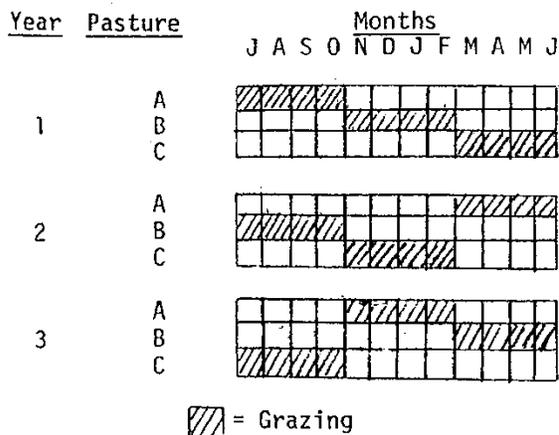


Fig. 1. Grazing scheme outlined by Schmutz (1973.)

It is interesting to classify other grazing systems that are described in literature. The "rest-rotation" system described by Gibbens and Fisser (1975) becomes a deferred-rotation. The system described by Edwards (1972) becomes a selected-rotation. The best-pasture system advocated in the Southwest (Herbel and Nelson 1969) is identified as an intermittent-rotation. When Merrill's (1954) "deferred-rotation" system is classified in the key, it remains identified as a deferred-rotation.

A fine distinction separates deferred-rotation grazing from rotational deferment systems in the key. A grazing system is classified as a deferred rotation if livestock are rotated into a fresh pasture during the major growing season. If livestock are rotated during the nongrowing season, the system is classified as a rotational-deferment.

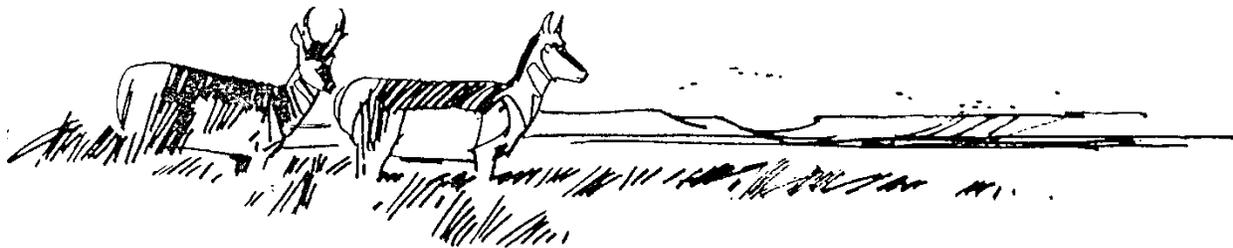
Conclusion

In summary, dichotomous keys can be used to consistently classify grazing systems. Keys may be designed to apply to large geographical areas, such as the Southwest, or modified to fit the specific needs of an area. Yet, if more keys are developed for localized

situations, the confusion will probably be perpetuated. Thus a universal key is needed if the multiplicity of terms and confused terminology are to ultimately disappear. This would be accomplished with the proposed key.

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APPENDIX 5 GRAZING TREATMENTS

Fifteen grazing treatments (A through O) are proposed. Map 2-2 shows use areas within the allotment. Table 4-3 describes the phenology of key forage species in each use area of the allotment.

Treatment A: Graze from May 1 or May 15 until seed ripe of key species (July 15 or August 1), then rest until winter grazing. Cattle movement would be controlled by topography, placement and operation of water developments, partial use area or riparian pasture fences, prescribed placement of salt and mineral supplement, and herding. Sheep movement would be controlled by herding. Sheep bands would be required to be moved at least every seven days a minimum of 1.5 miles in the Happy Springs and Alkali Creek Sheep Use Areas, the Alkali Creek and Granite Creek-Rocks Pastures of the Antelope Hills-Picket Lake Use Area, and the East Alkali Creek and Bare Ring Butte Pastures of the Arapahoe Use Area, and moved three miles in the Daley Lake and Picket Lake Pastures of the Antelope Hills-Picket Lake Use Area and the Eagles Nest Draw and Lost Creek Pastures of the Arapahoe Use Area. The minimum distance is determined by computing the radius of an area of a given grazing capacity that would be properly grazed in seven days by a band of sheep. The minimum distance the band must be moved is twice that radius, assuring that the same area would not receive continuous use.

Treatment B: Rest until seed ripe of key species (July 15 through August 1), then graze to trample seed into soil until October 1 or 31. This treatment would defer grazing in a pasture until the important key forage species have produced mature seeds.

Treatment C: Graze season-long through the spring (April 1 or May 1 through June 15). This treatment would be used with sheep, which would be moved as described in treatment A.

Treatment D: Graze season-long through the summer (July 16 through September 15). This treatment would be used by both sheep and cattle in the Crooks Mountain Pasture and by cattle only in the Green Mountain and Willow Creek Pastures.

Treatment E: Graze season-long through the late summer/early fall (August 1 or 15 through September 30). This treatment would be used with cattle and sheep. The sheep would be moved as described in treatment A.

Treatment F: Graze November 1 through December 31. This fall season treatment would be used with cattle and sheep. The sheep would be moved as described in treatment A.

Treatment G: Rest summer-long (June 16 through September 15). Under this treatment, the Alkali Creek Sheep and Long Slough Use Areas/Pastures would not be grazed by sheep or cattle during the hot season for riparian area improvement.

Treatment H: Graze during the period of January 1 through February 28 or March 31. This winter season treatment would be used with cattle and sheep. The sheep would be moved and controlled as described in treatment A.

Treatment I: Graze season-long through the spring (May 1 or May 15 through June 15). This treatment would be used with cattle in the Long Slough Use Area/Pasture and the Stratton Rim Pasture within the Green Mountain Use Area during the grazing year. The season of use would not exceed 31 days in the riparian pastures. Riparian pastures would be managed to maintain a minimum of a six-inch stubble height on herbaceous vegetation in the fall.

Treatment J: Graze September 16 or October 1 through October 31 or November 15. This fall season treatment would be used by cattle in the Long Slough Use Area/Pasture and the other riparian pastures without willow plant communities. This fall season treatment would also be used by cattle and sheep in the upland pastures of the Arapahoe, Happy Springs, Antelope Hills-Picket Lake, and Green Mountain Use Areas during the grazing year. The season of use would not exceed 31 days in the riparian pastures. Riparian pastures would be managed to maintain a minimum of a six-inch stubble height on herbaceous vegetation after the fall grazing season.

Treatment K: Graze season-long after range readiness date of June 1 for lower elevation pastures (similar to treatment A except for later turnout date.)

Treatment L: Graze key upland sites at a proper use level of 30-40 percent. This is the proper use on key upland species during the critical growth period of May 1-July 15. A use level of 50 percent on key upland species is proper after the critical growth period (Holechek 1988, Clary 1989).

Treatment M: Graze key riparian sites at a proper use level of 50 percent on meadow riparian areas in the Antelope Hills-Picket Lake Use Area. This is the proper use level when grazing use occurs early in the summer and there is the opportunity for regrowth prior to fall dormancy. A use level of 30-40 percent is proper in those years when the grazing period runs to September 1 and there is little opportunity for regrowth to occur after grazing use. A stubble height of four-inch or more would be maintained on key riparian sites within the Alkali Creek and Granite Creek-Rocks Pastures of the Antelope Hills-Picket Lake Use Area after planned grazing use (Clary 1989, Clary 1990, Myers 1989).

Treatment N: Graze key riparian sites at a proper use level of 50 percent on meadow riparian areas in the Green Mountain, Happy Springs, and Arapahoe Use Areas. This is the proper use level when grazing use occurs early in the summer and there is the opportunity for regrowth prior to fall dormancy. A use level of 30-40 percent is proper in those years when the grazing period runs to September 1-15 and there is little opportunity for regrowth to occur after grazing use. A stubble height of three to four inches would be maintained on key riparian sites within these use areas after planned grazing use (Clary 1989, Clary 1990, Myers 1989).

Treatment O: Rest yearlong for one to three years to initiate the recovery process on degraded riparian areas within the Ice Slough, Long Slough, Warm Springs Creek, Sweetwater River, and West Fork Crooks Creek Riparian Management Pastures.

Treatment P: Rest yearlong (for one year) to allow plants to make and store carbohydrates; provide for root growth and recover vigor; allow for seedling establishment; and litter accumulation between plants.

Treatment Q: Graze early for livestock production -Graze season long through late spring (May 1 through June 4 = 35 days). This treatment would be used with cattle and sheep in Alternative Number Four within the proposed Alkali Creek Common Allotment.

Treatment R: Defer for improved plant vigor -Graze season long through early summer (June 5 through July 9 = 35 days). This treatment would be used with cattle and sheep in Alternative Number Four within the proposed Alkali Creek Common Allotment.

Treatment S: Defer for improved plant vigor, seed production and trampling - Graze season long through mid - summer (July 10 through August 13 = 35 days). This treatment would be used with cattle and sheep in Alternative Number Four within the proposed Alkali Creek Common Allotment. The season of use would not exceed 35 days. Riparian areas would be managed to maintain a minimum of a six-inch stubble height on herbaceous vegetation within key areas. Riparian areas with willows would be managed for 35-45 percent use on current year's leader growth within designated key areas. Upland vegetation utilization would be managed for 35-45 percent use on herbaceous key species within designated key areas.

Treatment T: Defer for improved plant vigor, seed production and trampling and litter accumulation between plants - Graze season long through the late summer (August 14 through September 17 = 35 days). This treatment would be used with cattle and sheep in Alternative Number Four within the proposed Alkali Creek Common Allotment. The season of use would not exceed 35 days. Riparian areas would be managed to maintain a minimum of a six-inch stubble height on herbaceous vegetation within key areas. Riparian areas with willows would be managed for 35-45 percent use on current year's leader growth within designated key areas. Upland vegetation utilization would be managed for 35-45 percent use on herbaceous key species within designated key areas.

Wyoming Interim Reclamation Policy

The Wyoming Interim Reclamation Policy applies to all surface disturbing activities. These activities include all BLM and non-BLM initiated Federal actions that disturb vegetation and the mineral /soil resources on the public lands (both the surface and subsurface estate). Disturbances caused by over-grazing, flooding, fire, or other natural events are addressed in other program guidance. This policy is generally compatible with those program objectives.

A reclamation plan shall be developed for all projects, as part of the project proposal. The reclamation plan shall contain sufficient detail to implement the reclamation activities. The level of detail for the reclamation plan shall reflect: the complexity of the project, the environmental concerns generated during project review, and the reclamation potential for the site. In many situations a simple, generalized reclamation plan can accompany a development proposal followed up with a specific reclamation plan prior to abandonment. These plans shall also incorporate any program specific requirements for reclamation. Best Management Practices shall be integrated into the project proposal “up-front” to facilitate successful reclamation. The Reclamation Plan is deemed complete when all the Reclamation Objectives described below have been adequately discussed, the techniques needed to meet the Reclamations Standards described in appropriate detail, and the BLM confident that the reclamation proposal will be successful.

Areas having Low Reclamation Potential (LRP) (such as badlands, dunes, rock outcrops, etc.) are more difficult to reclaim than most landscapes. LRP areas are characterized by highly erosive soils, soils or sites which have physical, biological and/or chemical limitations, low precipitation rates, or areas which have characteristics that make traditional reclamation practices impractical or unfeasible. Areas of LRP should be identified and delineated, in advance, by the Field Offices. Disturbance of LRP areas should be avoided whenever possible. Prior to development in these areas, a much more detailed site analysis and reclamation plan must be submitted and reviewed prior to project approval. Alternatives to the proposed action should be carefully analyzed using the information from the reclamation plan and documented through the NEPA process.

A. GOAL STATEMENT

The Wyoming BLM’s primary long-term goal for reclamation is to prevent any long term unnecessary and undue degradation and provide for eventual ecosystem reconstruction. This means to return the land to a condition approximate or equal to that which existed prior to disturbance or to a stable and productive condition compatible with that prescribed in the land use plan.

Our short-term reclamation goal is to immediately stabilize disturbed areas and to provide the necessary conditions to achieve our long term goal.

B. REQUIRED OBJECTIVES (SUB-GOALS)

1. Ensure that all undesirable materials (e.g., poor subsoil, contaminated soil, drilling fluids, etc.) are isolated, removed, and/or buried, as appropriate, and require the area be protected from contamination.

2. Maintain subsurface (geologic and hydrologic) integrity. Minimize subsidence and eliminate ground water co-mingling and contamination.
3. Establish overall slope stability with appropriate re-contour and earthwork efforts. Reestablish and stabilize water courses and drainage features.
4. Practice soil conservation through various surface manipulations, earthwork, and water management techniques.
5. Re-vegetate to stabilize surface soils, establish natural plant composition, and a self-perpetuating plant community capable of supporting the post-disturbance land use.
6. Establish the basis for mitigating the visual contract created by the surface disturbance, by integrating post reclamation site into the surrounding landscape.
7. Develop and implement a proponent-sponsored reclamation monitoring and management program to evaluate and direct continuing reclamation success.

**Note:*

In areas with Low Reclamation Potential not all of the above objectives will be achievable (e.g., re-vegetation standards may not be appropriate for naturally barren soils). LRP areas should be evaluated using alternative and/or site specific reclamation objectives.

C. RECLAMATION STANDARDS

Use the following standards as a guideline to determine whether a reclamation effort is successful and whether the reclamation liability (i.e., bonds) should be released.

1. There shall be no contaminated materials remaining at or near the surface. All buried undesirable materials shall be physically isolated, using proven methods, for long-term stabilization, consistent with state and other Federal regulations.
2. The subsurface shall be properly stabilized; holes, and underground workings (wells, shafts, etc.) properly plugged, and subsurface integrity and long term stability ensured. The following conditions shall not be identifiable:
 - a. Open or unplugged holes/shafts.
 - b. Unprotected underground workings.
 - c. Subsidence, slumping, or significant downward movement of surface soil materials.
 - d. Co-mingling of low quality ground water with other surface and/or ground waters.
3. The final reclaimed area shall be stable and exhibit none of the following characteristics:
 - a. Unnaturally large rills or gullies.
 - b. Perceptible soil movement, mass wasting, or head cutting on disturbed slopes.

- c. Slope instability adjacent to the reclaimed area.
 - d. Drainages showing signs of active down cutting or deposition.
 - e. The overall landscape contour shall be appropriate and useable for the planned post reclamation land use.
4. The soil surface must be stable and have adequate surface roughness to reduce run-off and capture rainfall and snow melt. Additional short-term measures, (such as the application of mulch or mechanical surface roughening), shall be used to limit surface soil movement.
5. Vegetation production and relative species diversity shall approximate the surrounding undisturbed area. The vegetation shall stabilize the site and support the planned post-disturbance land use, provide for natural plant community succession and development, be self-perpetuating, and free of noxious weeds. This shall be demonstrated by:
 - a. Successful onsite establishment of species included in the planting mixture and/or other desirable native species.
 - b. Evidence of desirable vegetation reproduction, either spreading by rhizomatous species or seed production.
 - c. Generally, native species shall be used in all re-vegetation efforts. However, *BLM Manual 1745*, describes those situations where non-natives may be substituted.
 - d. Integrate with the adjacent undisturbed vegetation and be compatible with the post disturbance land use.
6. The reclaimed landscape shall blend with the visual composition and characteristics of the adjacent area and not result in a change in the Scenic Quality Rating of the existing landscape. Consider overall location, landform, scale, shape, color, and orientation of major landscape features, and meet the needs of the planned post disturbance land use.
7. The proponent shall conduct routine monitoring during and following reclamation activities, in compliance with an approved reclamation monitoring plan. Monitoring shall attempt to identify problems and protect the reclaimed landscape to ensure reclamation success and meet land use planning objectives. This monitoring shall continue until the reclamation liability and bond are released. Each of the previous seven standards shall be achieved and maintained before the reclamation effort can be deemed successful.

***Note:**

Where LRP areas or other critical sites identified by the Authorized Officer (AO), cannot be avoided, the proponent shall provide a detailed reclamation plan for evaluation. The plan shall include a site specific reclamation analysis, a qualified reclamation specialist or engineers' estimate of reclamation costs, and all appropriate mitigation and reclamation strategies planned for the project. The AO has the discretion to approve or deny the plan. If the reclamation plan is approved, a reclamation bond may be required.

APPENDIX 7

SURFACE WATER CLASSES

Section 4. Surface Water Classes and Uses. There are four classes of surface water in Wyoming (see Appendix A for listing):

(a) Class 1 - Those surface waters in which no further water quality degradation by point source discharges other than from dams will be allowed. Nonpoint sources of pollution shall be controlled through implementation of appropriate best management practices. In designating class 1 waters, the Environmental Quality Council shall consider water quality, aesthetic, scenic, recreational, ecological, agricultural, botanical, zoological, municipal, industrial, historical, geological, cultural, archaeological, fish and wildlife, the presence of significant quantities of developable water and other values of present and future benefit to the people.

(b) Class 2 - Those surface waters, other than those classified as class 1, which are determined to:

(i) Be presently supporting game fish; or

(ii) Have the hydrologic and natural water quality potential to support game fish; or

(iii) Include nursery areas or food sources for game fish.

(c) Class 3 - Those surface waters, other than those classified as class 1, which are determined to:

(i) Be presently supporting nongame fish only; or

(ii) Have the hydrologic and natural water quality potential to support nongame fish only;
or

(iii) Include nursery areas of food sources for nongame fish only.

(d) Class 4 - Those surface waters, other than those classified as class 1, which are determined to not have the hydrologic or natural water quality potential to support fish and include all intermittent and ephemeral streams. Class 4 waters shall receive protection for agriculture uses and wildlife watering.

(e) Prior to proposing any changes in water classifications, the Department of Environmental Quality shall notify in writing local users including the water commissioner, soil conservation committee, irrigation districts, county commissioners, and county ASCS. In addition, the Department of Environmental Quality shall notify in writing the Wyoming State Engineer, the Wyoming Water Development Commission, and the Wyoming Game and Fish Department.

All class 1 and 2 waters are designated as coldwater game fisheries unless identified as a warm water game fishery by a "ww" notation in Appendix A.

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APPENDIX 8

BLM LANDER FIELD OFFICE, SWEETWATER WATERSHED

PROPER FUNCTIONING CONDITION ASSESSMENT SUMMARY

NON-FUNCTIONING SEGMENTS

Waterbody Number	Waterbody name	Allot. No.	Public Stream Miles	PFC Segment No.'s
WYNP10180006-	Black Rock Creek	1636	0.10	S30
WYNP10180006-	Antelope Creek	1716	0.23	S22
WYNP10180006-	Long Gulch	1901	2.5	S1, S2
WYNP10180006-146	Deep Creek	1903	1.00	S2
WYNP10180006-146	Deep Creek tributary	1903	0.57	
WYNP10180006-531	Silver Creek	1903	1.72	S1, S2
WYNP10180006-	Cottonwood Creek	2001	4.00	S4
WYNP10180006-556	East Alkali Creek	2001	0.60	S2
WYNP10180006-	Happy Spring Creek	2001	5.00	S1
WYNP10180006-	Haypress Creek	2001	4.5	S5
WYNP10180006-553	Ladysmith Draw	2001	0.20	S3
WYNP10180006-	Nancy Creek	2001	3.70	S3, S4, S5
WYNP10180006-	Maggie Creek	2001	0.50	S3
WYNP10180006-551	South Fork Sulphur Creek	2001	7.10	SP4
WYNP10180006-	Soap Holes Creek	2001	3.75	S1
WYNP10180006-558	West Cottonwood Creek	2001	1.00	S5

FUNCTIONING-AT-RISK

DOWNWARD (d) AND NO APPARENT (n) TREND SEGMENTS

Waterbody Number	Waterbody Name	Allot. No.	Public Stream Miles	PFC Segment No.'s
WYNP10180006-	E. Fork Sage Hen Creek Trib.	1614	1.80n	S45
WYNP10180006-526	Buffalo Creek	1636	2.20d	S26
WYNP10180006-527	E. Fork Long Creek	1636	0.38d	S23
WYNP10180006-	Little Antelope Creek	1701	0.25n	S1
WYNP10180006-	Elkhorn Spring Draw	1703	0.50d	S18
WYNP10180006-	Government Meadows Draw	1703	3.28n	S1, S2, S3, S4
WYNP10180006-217	Long Creek	1703	0.57n	S17
WYNP10180006-	W. Fork Long Creek Trib.	1703	3.48n	S5, S6, S14
WYNP10180006-	W. Fork Long Creek	1703	5.00d 4.14n	S9, S10, S11 S7, S8, S12, S15
WYNP10180006-	Basket Gulch	1901	0.66n	S1
WYNP10180006-	Big Atlantic Gulch	1901	0.78d 1.02n	S1 S2
WYNP10180006-	Big Hermit Gulch	1901	1.88d	S2, S3
WYNP10180006-	Crow's Nest Gulch	1901	0.93n	S1
WYNP10180006-	Deep Gulch	1901	1.62n	S1
WYNP10180006-	Horace Gulch	1901	2.34n	S1, S3
WYNP10180006-	Lame Jack Gulch	1901	2.16n	S1
WYNP10180006-	Little Atlantic Gulch	1901	1.10n	S2, S3
WYNP10180006-	Omera Gulch	1901	0.49d	S1
WYNP10180006-221	Pine Creek	1901	0.47d 1.29n	S1 S2
WYNP10180006-533	Rock Creek	1901	3.60d	S1
WYNP10180006-	Slaughterhouse Gulch	1901	0.51n	S1
WYNP10180006-	Slaughterhouse Gulch	1901	1.28d	S2, S3
WYNP10180006-	Smith Gulch	1901	0.44n	S1
WYNP10180006-	Spring Gulch	1901	0.30d	S1
WYNP10180006-	Sweetwater River	1901 1903 2001	2.95d 5.67n 1.88n 0.95d	S2 WSA1, WSA3 S3, S5 S6

WYNP10180006-534	Willow Creek	1901	4.30n	S2, S7
		1903	2.06d	S3, S5, S6
			1.10n	S1
WYNP10180006-	Burr Gulch	1903	2.08d	S1
WYNP10180006-	Chimney Spring	1903	0.55d	entire
WYNP10180006-146	Deep Creek	1903	0.78n	S1
			1.11d	S3
WYNP10180006-	Granite Creek	1903	1.83n	S1, S2
WYNP10180006-549	Mormon Creek	1903	0.49d	S1
			0.72n	S2
WYNP10180006-531	Silver Creek	1903	0.38n	S4
			1.40d	S5, S6
WYNP10180006-532	Strawberry Creek	1903	2.50n	S4, S5
		1920	1.99n	S1
WYNP10180006-532	Strawberry Creek Trib.	1903	1.70d	S7
WYNP10180006-	Big Diamond Springs	1509	1.80d	S39
WYNP10180006-	West Diamond Spring	1509	0.30d	S37
WYNP10180006-523	West Sage Hen Creek	1509	0.13d	S31
WYNP10180006-522	E. Fork Sage Hen Creek	1513	2.10d	S46, S47
WYNP10180006-	Middle Fork Sage Hen Creek	1513	0.50n	S33
			3.00d	S34, S35, S36
WYNP10180006-	Abel Creek	2003	1.80n	S3
WYNP10180006-	Coal Creek	2003	1.19n	S1, S2
			0.80d	S3
WYNP10180006-	Cooper Creek	2003	0.10d	R8
WYNP10180006-555	Corral Creek	2003	3.50n	S1, S4, S5
WYNP10180006-	Murphee Creek	2003	5.23n	S1, S2, S3, S5
WYNP10180006-	Laundry Draw	2003	0.13n	S1
WYNP10180006-	Reed Creek	2003	0.75n	S1
WYNP10180006-	Spring Creek	2003	1.85n	S4
WYNP10180006-555	Corral Creek Trib.	2003	1.18n	S1, S2, S3
WYNP10180006-534	Willow Creek	2003	0.60n	R3
WYNP10180006-	Bull Canyon	2001	1.30n	S1, S2
WYNP10180006-	Cottonwood Creek	2001	0.50d	S1
			1.20n	S2, S3
WYNP10180006-552	Coyote Gulch	2001	2.35d	S75, S76
	L. Coyote Gulch		0.20n	S78
WYNP10180006-678	Crooks Creek	2001	0.30d	S1
WYNP10180006-	Haypress Creek (See also the NF list above.)	2001	1.45n	S1, S2, S3, S4
WYNP10180006-	Magpie Creek	2001	0.60d	S2
WYNP10180006-(see 219)	M. Fork Sulphur Creek	2001	3.39d	S2, S3, S4, S5, S6
WYNP10180006-	Nancy Creek (See also the NF list above.)	2001	0.35n	S2
	Nancy Creek Trib.		0.50d	S1
WYNP10180006-550	N. Fork Sulphur Creek	2001	1.21d	S15, S13
WYNP10180006-551	S. Fork Sulphur Creek	2001	0.76d	S24
WYNP10180006-	Soap Holes Creek	2001	1.00d	S2
			0.40n	S3
WYNP10180006-	Stinking Springs Draw	2001	1.05n	S1, S2
WYNP10180006-219	Sulphur Creek	2001	0.95d	S14
WYNP10180006-	Sweetwater River	2001	1.88n	S3, S5
			0.95d	S6
WYNP10180006-	Willow Creek	2001	0.10d	S61
	Willow Creek Trib. (See also....)		0.45d	S60
WYNP10180006-558	West Cottonwood Creek (See also NF list above.)	2001	0.80n	S2
WYNP10180006-	W. Fork Middle Cottonwood Creek	2001	0.23d	S2
			0.10n	S3
WYNP10180006-	Warm Springs Creek	2001	1.10n	S1, S2
			1.00d	S3
WYNP10180006-218	West Alkali Creek	2001	12.45d	S34, S35, S36, S38
WYNP10180006-548	Picket Creek	2001	1.52d	S32
WYNP10180006-669	Arnold Spring	2001	0.67d	S39

APPENDIX 9

55. Green Mountain Common (2001) Allotment - Range Condition and Trend

a. Any meaningful discussion of condition and trend in this allotment must start by dividing it into smaller segments based on topographic and/or climatic similarities. When one considers that this allotment is 60 miles by 20 miles along its greatest axes and ranges from 6,000 feet to 9,000 feet in elevation, the reasons behind segmenting it become self-evident. Therefore, the discussion of condition and trend will focus on the following units:

- (1) Antelope Hills - That portion of the allotment west of the Bison Basin Road.
- (2) Green Mountains - From Crooks Mountain east to and including Green Mountain above 7,500'.
- (3) Green Mountain Watershed - The remainder of the allotment.

For similar reasons, the discussions will center on those cover types other than sagebrush. These smaller types within the "sea of sagebrush", and the changes they are undergoing, provide significant insight into what is happening to the entire range.

Antelope Hills

There are four major cover types within this segment of the allotment - meadow, grass, sagebrush and greasewood. The major meadows are located along the Sweetwater River and in the Harris Slough - Long Slough basin at the far western tip of the allotment. Smaller meadows and thin riparian zones are also located along Granite, Mormon and Willow Creeks and Ladysmith Draw. Grass types are located scattered throughout the Antelope Hills and are relatively common on the ridge system forming North Bear Mountain. They are not extensive, averaging less than 1,000 acres each, and appear to occur on rocky ridges with soils too thin to support perennial shrubs. The principal greasewood concentration is along Alkali Creek, and that portion of its tributary, Sulphur Creek, included in the allotment south of the Antelope Hills. Small patches of greasewood are scattered wherever alkaline soil conditions coincide with adequate moisture, but Alkali Creek has the only concentration large enough to be considered a type. The remainder of the segment is covered by various species and associations of sagebrush.

The meadows, especially those of the Harris Slough-Long Slough area, receive very intense livestock use. Ocular estimates of utilization in excess of 80% are nearer than norm than any extreme case. Transect data rates these meadows in good condition under the criteria discussed in the introduction. Using SCS site method, they rate high fair to low good in composition, but poor with respect to production.

Major hummocking is characteristic throughout the meadows, as is invasion by dry site species into the hummock tops. The adjacent sagebrush type, with a very strong rabbitbrush component, is encroaching on all meadow perimeters. As indicated by the remnant meadow population under the sagebrush, this encroachment has progressed fifty to sixty yards in extreme instances - ten yards being a rough average.

Wet site invaders, thistle and iris, along with a significant increaser population of wiregrass and muhly further define the picture of a seriously declining trend number of "change agents" are at work creating the picture described above. Wild horses and antelope congregate on the meadows as soon as the snow is gone and plant growth begins. This places the plants under immediate stress then shortly after the first of May the cattle arrive and add their concentrated numbers to those of the horses and antelope. This continues throughout the growing season and well into the fall. The cattle are removed around the first of November, but horse and antelope use continues until the meadows are completely snow covered. Three consecutive open winters have allowed near yearlong use. These relatively snowless winters have also decreased the available moisture and shortened the growing season by placing the plants under moisture stress earlier - inducing dormancy by mid-July.

The grass type within this segment of the allotment is principally a bluebunch wheatgrass dominated association. Nearly every other dry site grass species occurs under this dominance in response to varying site parameters. Except where this grass type occurs close to a water source, as around Coyote Lake and Buffalo Gulch, this type is in good condition with a static trend. Again, with the exceptions noted above, the type receives only light to moderate livestock use. The principal forage consumption occurs during fall in normal years, winter long in open years, by bands of wild horses. Under present use, the type can be considered as climax. Near water sources a community displacement toward rhizomatous wheatgrass and bluegrass increasers has occurred.

The greasewood dominated community along Alkali Creek is, in itself, an indication of a total shift to an increaser community, as its maximum occurrence in a climax community is 5% or less. The type shows a total shift towards the increasers (greasewood, alkali muhly, wiregrass, saltgrass, and western wheatgrass) with only remnant or at most

very sub-dominant stands of decreaseers (alkali sacaton and basin wildrye). This type still rates as good under the integrated study procedures, but the trend is very obviously declining. The principal impact is from concentrated cattle and sheep use during the entire growing season. Alkali Creek has the only reliable water for the eastern third of the segment.

Conditions could stabilize if it were not for the sheep bands. The cattle operators make an attempt to dispense their herds to the more ephemeral water sources at the start of the grazing season - figuring that the cattle will drift down to the permanent water on Alkali Creek as these dry. The sheep herders, on the other hand, keep their bands right on the creek, or at most, one day's trailing away, for the entire season.

The bulk of this segment is under a very diverse sagebrush cover type. It is composed of various sub-types and intergrading of big, black, silver and three-tip sagebrush, with a secondary shrub component of green and rubber rabbitbrush. The herbaceous element is equally varied, with all stages from a decreaseer (bluebunch wheatgrass, needle and thread, Indian ricegrass) dominated site through the palatable increaseers (western and thickspike wheatgrass, junegrass) to those sites dominated by increaseers of only moderate palatability (bluegrass, sedges, squirreltail). Generally, west of Willow Creek is in fair condition and Willow Creek to the Bison Basin Road is in good condition. Information for specific sites can readily be found on the overlays for this section and the Condition Summary sheets.

Green Mountains

This segment of the allotment has examples of every cover type found within the allotment - meadow, grass, sagebrush, mountain shrub, conifer and deciduous trees. The sagebrush type, naturally, is the most extensive and diverse. It can be found at all elevations and aspects, from 9,000 feet at Sagebrush Park to the lower ridges and valleys of 7,000 feet. The conifer type shows much the same range, but varies from discontinuous juniper stands at lower elevations to closed canopy lodgepole and mixed lodgepole-spruce stands on top the mountain. The deciduous tree type is composed of willows and cottonwoods along the perennial creeks at lower elevations and shifting to water birch and aspen on top. Aspen stands are also found scattered throughout the conifers on moist and/or disturbed timber sites. The grass dominated sites are of two kinds - small parks in the timber, and along steep ridges. Mountain shrub areas are scattered throughout.

Range condition and trend has no meaning in relation to the conifer stand over most of the mountain range. Except where opened by logging, fire or mineral exploration, the stands are over-mature, have a closed canopy and very little herbaceous understory. The shade tolerant shrub understory that does exist, prostrate juniper and grouse whortleberry, is of no forage value. This is contrasted to the timber's edge and those areas where the stand has been opened without near total loss of soil. These areas have a diverse and productive herbaceous understory of bromes, bluegrasses and spike fescue. Where livestock and wild horse access is possible, as in the series of clear cuts just northeast of the administration site, heavy use is eliminating the palatable grasses and allowing regeneration of the timber.

The sagebrush type is composed of an association of various big sagebrush sub-types, the herbaceous component being determined by soil, aspect and intensity of past use. These sub-types are listed on the attached Range Condition Summary. Throughout nearly the entire type there has been a shift from decreaseers to increaseers, and this shift has progressed from palatable to moderately palatable increaseers in any area accessible to livestock and wild horses. The type, on the whole, is characterized by low good to medium fair condition and static to declining trend. Site specific data on condition and trend can be found on the condition and trend summary sheets.

The meadow and grass types of this segment of Green Mountain Common are relatively unused and unusable by domestic livestock. The meadows are generally within the timber, in low, boggy spots, and the grass types along sharp ridges. Wild horse use does not appear to be a change agent, though heavy utilization has been observed. Condition ranges well into the good with a static trend.

Related to the above, but difficult to characterize as being truly either grass or sagebrush type are the large parks on top of Green Mountain - Sagebrush, Round, Long and Sheep Creek Parks. However, what type they are or should be is rapidly becoming a moot point. Concentrated cattle, elk, and wild horse use, resulting in near total consumption of all forage species, is converting them to mono-specific sagebrush stands - the upper parks supporting big sagebrush, the lower a variety of 3-tip. This use is so heavy that in October of 1976 and 1977 there was no grass component to the communities visible above a quarter inch skiff of snow. The grass plants are there, hence the fair condition rating, but utilized to the ground every year. In Sheep Creek Park utilization is so continuous and complete as to raise questions about the reliability of species identification on the study transects run there.

The deciduous tree type, with its highly palatable understory of bromes, bluegrasses, spike fescue, young trees and scattered shrubs receives as heavy an amount of livestock and wild horse use as any cover type in the segment. This is evidenced by bare spots in the ground cover, displacement along the perimeter by increasers and sagebrush, lack of any age class structure in the tree population, and bank crumbling where the type forms a riparian zone. Condition is medium fair at best and the trend declining. The stands of aspen isolated within the conifer type are an exception to the above because the "dog hair" lodgepole stands keep livestock out.

Green Mountain Watershed

This segment of the allotment is almost entirely dominated by a sagebrush cover type. Exceptions occur along the streams as a mixed meadow and deciduous type along their upper two thirds, and greasewood type along the remainder.

Throughout the sagebrush type there is a very definite shift away from the decreaser grass species (bluebunch wheatgrass, sand dropseed, Indian ricegrass, needle and thread) toward increasers (western and thickspike wheatgrass, Sandberg bluegrass, dry site sedges). Utilization throughout the type averages in excess of 60%, by ocular estimate. Only near water and salt concentrations has this shift progressed to the unpalatable end of the increasers and into invader grasses. The shrub component shows a vigorous increaser and invader element. Condition is highly variable throughout the type - for specific areas the attached Condition Summary and Range Condition overlay should be consulted. Trend is static to declining - from visual observations, more of the latter. From the utilization estimates mentioned above, the prime change agents can be assumed to be domestic livestock and wild horses. No data or parameters, however, exist to evaluate their relative importance in the changes noted.

Similarly, for the smaller secondary types of the segment no "hard" data exists to evaluate either condition or trend. Visual observations are contradictory and form no clear subjective impression.

b. Beyond the habitat problems mentioned incidental to the above discussion, one exists throughout the allotment that is having a definite negative impact on the life functions of both livestock and wild horses. This problem is the total destruction of a thousand acres of habitat in the course of mineral exploration and development.

c. No ecologically unique areas were identified during the resource inventories conducted in preparation for this planning effort. Obviously, it is not possible to extrapolate this lack of unique areas to the land devoid of ecological inter-relations by mining activity.

RANGE CONDITION SUMMARY
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Allotment 2001

Vegetation Type	NRM #	Acres of Type	Number of Transects	% Desirable	% Intermediate	% Least Desirable	SSF	Acres/ Transect	Rating
Artr Cafi Stco	346	1,505	1	51	37	12	44	1,505	Fair
Artr Cafi Agda	347	1,401	1	27	43	30	20	1,401	Good
Artr Stco Cafi	351	41,823	17	26	29	45	32	2,460	Good
Stco Orhy Cafi	359	1,003	1	33	12	55	31	1,003	Good
Artr Agda Cafi	363	3,314	0						
Artr Cafi Stco	387	748	1	13	47	40	17	748	Fair
Artr Cafi Stco	388	9,011	4	37	17	46	46	2,252	Fair
Artr Cafi Stco	389	1,307	1	8	8	84	29	1,307	Fair
Artr Poa Feid	393	4,233	1	4	26	70	29	4,233	Poor
Artr Agsm Poa	394	496	1	17	38	45	34	496	Fair
Artr Kocr Agsp	396	8,431	3	17	13	70	37	2,810	Fair
Artr Poa Agda	397	153	0	--	--	--	--	0	?
Artr Poa Agsp	398	603	1	6	15	79	42	603	Fair
Artr Agda Poa	399	2,212	1	--	--	--	--	0	?
Artr Agda Poa	400	2,594	1	14	16	70	38	2,594	Fair
Artr Agda Poa	401	1,590	0	--	--	--	--	0	?
Artr Kocr Poa	402	6,974	1	21	3	76	41	6,974	Fair
Artr Stco Agda	403	920	0	--	--	--	--	0	?
Care Poa Juba	404	351	1	24	15	61	43	351	Fair
Artr Poa Kocr	405	1,110	2	22	15	63	36	555	Fair
Artr Chna Agda	406	5,112	1	21	31	48	26	5,112	Good
Artr Stco Poa	407	1,321	1	27	12	61	31	1,321	Fair
Artr Agda Poa	408	721	0						
Artr Agsp Stco	409	430	0						
Artr Kocr Stco	410	225	0						
Arno Poa Stco	411	1,178	1	18	12	70	24	1,178	Fair
Arno Spcr Orhy	412	1,593	0						
Artr Heki Poa	413	2,002	4	10	20	70	19	500	Fair
Care Caaq Muri	021	1,614	0						
Muri Junc Care	022	1,522	0						
Junc Care Deca	105	414	0						
Caaq Spai Care	025	1,965	0						
Cafi Artr Agda	BM-8	180	0						

RANGE CONDITION SUMMARY
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P.U. Sweetwater

Allotment 2001 cont'd

Vegetation Type	NRM #	Acres of Type	Number of Transects	% Desirable	% Intermediate	% Least Desirable	SSF	Acres/ Transect	Rating
Artr Agsm Poa	414	3,719	3	22	3	75	8	1,239	Fair
Artr Heki Poa	415	4,882	5	30	5	65	17	976	Fair
Artr Agsm Cafi	416	250	1	24	10	66	32	250	Fair
Artr Agsm Poa	417	3,832	3	20	32	48	29	1,277	Good
Arno Agda Poa	418	607	0						
Artr Agsp Poa	419	1,782	2	24	10	66	32	250	Fair
Artr Agsm Poa	417	3,832	3	2	27	17	56	891	Good
Arno Cafi Stco	420	3,668	3	31	14	55	26	1,222	Good
Pinu Vacc Care	421	6,904	6	27	18	55	9	1,150	Good
Artr Poa Agda	422	1,909	0						
Poa Juba Care	423	278	0						
Artr Feid Poa	424	221	0						
Arno Feid Agsp	426	1,299	0	41	4	55	12	1,299	Good
Artr Kocr Poa	427	938	2	22	8	70	22	469	Fair
Artr Poa Agda	428	497	0	--	--	--	--	0	?
Artr Agda Orhy	440	960	0	--	--	--	--	0	?
Artr Agda Poa	441	3,145	0						
Artr Poa Agda	442	6,408	1	27	19	54	34	6,408	
									Go
Artr Agda Stco	443	2,593	0	--	--	--	--	0	od
Save Disp Spai	444	3,768	0	--	--	--	--	0	?
Artr Poa Agsp	445	5,717	2	16	26	58	44	2,858	Fair
Artr Agda Poa	446	17,793	6	21	24	55	48	2,965	Fair
Artr Agsp	447	408	0						
Artr Agda Poa	448	1,010	0						
Artr Agda Agsp	449	21,367	10	20	26	54	35	2,165	Good
Artr Agda Poa	450	411	0						
Artr Agsp Cafi	451	393	1	25	20	55	34	393	Good
Artr Agda Agsp	452	3,352	3	20	8	72	23	1,117	Fair
Artr Agda Poa	453	1,347	2	26	39	35	29	673	Good
Artr Agda Cafi	454	884	1	11	13	76	23	884	Fair
Artr Cafi Agda	456	540	1	13	43	44	26	504	Fair
Artr Agsp Agda	BM-14	13	0						
Agda Artr Agsy	BM-16	4	0						
Artr Arpe Agda	JM-33	6	0						
Arpe Artr Agda	JM-35	86	0						
Artr Pose Agda	JM-37	151	0						

RANGE CONDITION SUMMARY
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P.U. Sweetwater

Allotment 2001 cont'd

Vegetation Type	NRM #	Acres of Type	Number of Transects	% Desirable	% Intermediate	% Least Desirable	SSF	Acres/Transect	Rating
Artr Agda Agsp	457	2,427	1	10	33	57	25	2,427	Fair
Artr Agda Poa	458	595	1	32	5	63	20	595	Fair
Artr Agsp Poa	459	1,303	1	4	37	59	22	1,303	Poor
Artr Cafi Agda	460	3,004	1	9	22	69	22	3,004	Fair
Artr Cafi Orhy	461	812	1	16	26	58	25	812	Fair
Agsp Artr Poa	462	1,138	0	--	--	--	--	0	?
Agsp Artr Poa	463	3,300	2	24	14	62	39	1,650	Fair
Artr Agda Poa	464	24,030	15	23	24	54	30	1,602	Good
Artr Agsp Poa	465	5,147	4	21	44	35	41	1,286	Fair
Artr Agsp Poa	466	8,596	5	12	37	51	31	1,719	Fair
Artr Agda Poa	467	3,557	2	10	40	50	23	1,778	Fair
Artr Poa Sihy	492	1,686	1	9	22	69	54	1,686	Fair
Artr Pose Cafi	493	8,500	16	20	64	18		1,614	Good
Artr Dist Pose	494	3,241	2	8	36	56	24	1,620	Fair
Artr Poa Agsp	495	1,702	1	20	33	47	26	1,702	Good
Artr Agsp Feid	496	227	1	42	8	50	26	227	Good
Artr Poa Agsp	497	946	1	8	12	80	26	946	Fair
Stco Chvi Poa	351A	590	1	24	20	56	24	590	Good
Artr Cafi Stco	358A	721	1	42	29	29	23	721	Good
Artr Agda Agsm	388A	959	1	27	33	40	35	959	Good
Artr Stco Kocr	389A	4,860	3	39	13	48	33	1,620	Good
Artr Agda Stco	441A	5,107	0	--	--	--	--	0	?
Artr Agda Agsp	442A	863	0	--	--	--	--	0	?
Agda Artr Poa	443A	584	0	--	--	--	--	0	?
Artr Stco Agsp	444A	414	0	--	--	--	--	0	?
Artr Stco Kocr	445A	5,766	2	20	26	54	36	2,883	Good
Artr Agsp Poa	449A	75	0	--	--	--	--	0	?
Cafi Artr Orhy	450A	868	1	24	63	13	37	868	Good
Artr Stco Cafi	451A	2,071	2	25	8	67	24	1,035	Fair
Carex Poa Agda	493A	45	0						
Artr Agsp Pose	JM-39	109	0						
Artr Agsp Stco	JM-48	310	0						
	PJ-1	272	0						
Artr Stco Agda	390	153	0						
Junc Cype Agda	392	133	0						

Sweetwater

cont 'd

RANGE CONDITION SUMMARY
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P.U.

Allotment 2001

Vegetation Type	NRM #	Acres of Type	Number of Transects	% Desirable	% Intermediate	% Least Desirable	SSF	Acres/Transect	Rating
Artr Poa Agda	494A	1,411	0						
Artr Cafi Agda	497A	412	1	14	31	55	26	412	Fair
	7T	633	0						
	7I	1,833	0						
	7R	512	0						
	8B	<u>383</u>	<u>0</u>						
	308,087	156						1,975 Ac/Transect	
Sections/Transects)			144,132	Good	= 46.8%				(3
			111,464	Fair	= 36.2%				
			5,536	Poor	= 1.8%				
			46,955	Unsampled	= <u>15.2%</u>				
					<u>100%</u>				
			5,648	Acres - Riparian/Meadow Types - 0 Transects Completed					

APPENDIX 10

Seven Lakes Incommon Allotment

Sheep and cattle are presently authorized to graze in what is named the Seven Lakes incommon allotment. This allotment is an unfenced area of approximately 600,000 acres, traditionally a winter sheep area, which includes the Stewart Creek and Cyclone Rim allotments of the proposed action as well as portions of two additional grazing allotments (Green Mountain and Arapahoe Creek). Map 2-19 shows the relative locations of these allotments.

Twenty-one livestock operations (seven cattlemen and fourteen sheepmen) hold grazing privileges in the Seven Lakes incommon allotment (Table 2-35).

The existing Seven Lakes incommon allotment is a vast area (roughly 25 miles north to south and 45 miles east to west) that is virtually without interior fencing. Livestock operators are not restricted to specific areas within the allotment. These situations have made effective livestock grazing management extremely difficult for livestock operators and BLM. Some cattle operators experience difficulty in keeping track of the whereabouts of their stock, and BLM personnel have difficulty with use supervision. Some unauthorized livestock grazing takes place, but exactly how much is not known.

It is estimated that 30 percent of the existing active licensed cattle use occurs in the area of the proposed Cyclone Rim allotment and 10 percent is estimated to be used in the location of the proposed Stewart Creek allotment. The remaining 60 percent of the active licensed cattle use in the Seven Lakes incommon allotment is taken outside the ES area.

The Seven Lakes incommon allotment suffers from the problem of summer cattle drifting into it from its neighboring allotment to the north (Green Mountain). There are no data showing the magnitude of the drift problem, but it is estimated that cattle drift adds 30 percent more use (3,077 AUMS) above the total licensed use in the Seven Lakes incommon allotment. Above and beyond the drift from Green Mountain, trespass is a serious problem in the Seven Lakes allotment. Several users have indicated trespass sheep and cattle can frequently be found in the allotment. One trespass action was pursued by BLM in 1976.

Both cattle and sheep use this allotment, with the majority of use by sheep. During the past 10 years, the trend has been that many of the established sheep operators are going out of business or desire to change their operations to run cattle. Subsequently, they have taken about 66 percent nonuse (35,158 AUMS) annually (Table 1-1). All livestock operators who use the Seven Lakes incommon allotment use it to complement their livestock operations on other BLM grazing allotments, U.S. Forest Service lands, state grazing leases, and/or private lands.

The seasonal patterns of grazing by livestock are based on the operators' historical use and desires rather than on physiological needs of plants and range readiness criteria. Cattle use is taken from May 1 to December 31. Sheep use is yearlong, but most is taken from October to May.

In the Seven Lakes ES area, excluding the Ferris allotment, an estimated use of 4,460 cattle AUMs and 18,101 sheep AUMs is made each year. This estimate was based on the licensed active use in the Seven Lakes incommon allotment and the amount of unauthorized use believed to be drifting into the allotment (Appendix B-2-15 and B1-3).

One rancher has requested that some of his use be changed from winter sheep to winter cattle. Cattle are presently found during the winter in allotments adjacent to and south of the Seven Lakes ES area; nevertheless, winter weather makes winter cattle operations risky ventures. At times, bulldozers have been needed to rescue bands of sheep from winter snows. Riddle and Oakley (1972) reported that a 1971 blizzard in the Seven Lakes ES area lasted 4 days, covered 18 inch tall sagebrush with snow, and was immediately followed by over 2 weeks of subfreezing temperatures and ground blizzards.

Bad winters resulting in unusually high livestock mortality apparently hit about every 20 years-1927, 1949, 1971 (personal communication, Bernard Sun 1977). Table 1-1 and Figure 1-1 show the large amount of cattle nonuse that followed the most recent bad winters, those of 1971-1972 and 1972-1973.

The Seven Lakes incommon allotment was adjudicated in 1958. The major problems associated with the adjudication were that no forage was reserved for wild horses, no season of use or class of livestock was specified, and no consideration of the area's suitability for grazing was made. Presently, cattle concentrate around the limited watering sites, leaving much of the allotment ungrazed.

APPENDIX 10, continued
TABLE 1-1
PRESENT CLASS AND FEDERAL AUMS OF
LIVESTOCK OPERATIONS IN EIS AREA

Operations	Present Class	Present Qualifications (AUMs)
FERRIS COMMON ALLOTMENT		
A	Sheep	1,023
B	Sheep	1,763
C	Sheep	1,245
D	Sheep	746
E	Sheep	155
F	Sheep	532
G	Cattle	165
H	Cattle	176
Wyoming Game & Fish Commission	Sheep	11,000*
		Total Cattle = 341 AUMs Total Sheep = 6,464 AUMs
SEVEN LAKES INCOMMON ALLOTMENT**		
A+++	Cattle	529
B+++	Cattle	2,661
C+++	Cattle	662
D+++	Cattle	530
E+++	Cattle	3,280
F+++	Sheep	5,714
G	Cattle	1,836
H	Cattle	758
I	Sheep	2,618
J	Sheep	16,809
K	Summer Sheep	1,000
L	Sheep	3,340
M	Sheep	4,375
N	Sheep	3,602
O	Sheep	1,455
P	Sheep	1,253
Q	Sheep	1,144
R	Sheep	2,423
S	Sheep	7,651
T	Summer Sheep	951
U	Sheep	1,142
Wyoming Game & Fish Commission	Sheep	4,341*
		Total Cattle = 10,256 AUMs Total Sheep = 57,818 AUMs

*Reserved for wildlife.

**The existing Seven Lakes incommon allotment is a large grazing allotment which includes all of the proposed Cyclone Rim allotment, most of the proposed Stewart Creek allotment, as well as significant portions of the Green Mountain allotment and the Arapahoe Creek allotment which lie outside the ES area (refer to Map 2-19).

+++These operations would take their use outside the ES area once the proposed action is implemented.

Appendix 11

GMCA 1999 POINT-INTERCEPT TRANSECTS

GROUND COVER SUMMARY J.C. LIKINS 3-11-02

DATE	ESTABLISHED	8-10-99	8-11-99	8-12-99	8-17-99	8-17-99	8-16-99	8-19-99	8-23-99	1999	1999
SYMBOL	GROUND LEVEL COVER CATEGORY	T-1 % COVER	T-2 % COVER	T-3 % COVER	T-4 % COVER	T-5 % COVER	T-6 % COVER	T-7 % COVER	T-8 % COVER	TRANSECT TOTAL	TRANSECT TOTAL
B	BARE GROUND	34	8	14	20	19	14	33	19	161	20
L	LITTER	55	85	80	75	76	82	42	77	572	72
G	GRAVEL (2MM-10")	0	0	0	0	0	0	18	0	18	2
S	STONE (>10")	0	0	0	0	0	0	0	0	0	0
V	VEGETATION (BASAL COVER)	11	7	6	5	5	4	7	4	49	6
	TOTALS	100%	100%	100%	100%	100%	100%	100%	100%	800	100%

**GMCA 1999 POINT-INTERCEPT TRANSECTS
PERCENT SPECIES COMPOSITION - RANGE SIMILARITY INDEX (RSI)**

4-11-02
J.C. LIKINS

PLANT SYMBOL	RANGE SITE SYMBOL PLANT NAME	T-1 Swly		T-2 Ly		T-3 Ly		T-4 Ly		T-5 Ly		T-6 Sy		T-7 Swly		T-8 Ly	
		% COMP	RSI	% COMP	RSI	% COMP	RSI	% COMP	RSI	% COMP	RSI						
STCO4	NEEDLE AND THREAD	6.8	6.8	13.5	13.5	9.2	9.2	10.3	10.3	17.86	17.86	8.81	8.81	2.4	2.4	10.16	10.16
SIHY	BOTTLEBRUSH SQUIRRELTAIL	0.7	0.7	0.3	0.3	6.5	6.5	0.2	0.2	0.22	0.22	1.55	1.55	-----	-----	0.68	0.68
AGSM	WESTERN WHEATGRASS	17.6	17.6	10.0	10.0	15.6	15.6	28.4	28.4	22.77	22.77	26.68	10.0	12.1	12.1	30.70	30.00
AGSP	BLUEBUNCH WHEATGRASS	9.8	9.8	-----	-----	1.0	1.0	-----	-----	-----	-----	-----	-----	6.1	6.1	-----	-----
DIST	INLAND SALTGRASS	-----	-----	2.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	6.1	6.1	-----	-----
PONE	NEVADA BLUEGRASS	-----	-----	10.5	5.0	0.7	0.7	-----	-----	0.22	0.22	-----	-----	-----	-----	-----	-----
POSE	SANDBERG BLUEGRASS	14.3	5.0	5.6	5.0	20.9	5.0	10.3	5.0	15.85	5.00	8.81	5.0	7.3	5.0	4.06	4.06
POFE	MUTTON BLUEGRASS	3.9	----	0.3	0.3	----	----	5.5	5.0	1.12	1.12	----	----	20.2	10.0	-----	-----
KOCR	PRAIRIE JUNEGRASS	0.3	0.3	0.3	0.3	----	----	-----	----	0.22	0.22	3.63	3.63	1.2	1.2	-----	-----
CAEL2	NEEDLELEAF SEDGE	0.3	0.3	5.6	5.0	----	----	0.5	0.5	1.12	1.12	3.11	3.11	1.2	1.2	2.93	2.93
ORHY	INDIAN RICEGRASS	-----	-----	-----	-----	0.2	0.2	-----	----	0.22	0.22	0.26	0.26	0.8	0.8	-----	-----
	GRASS TOTAL	53.7	40.5	48.7	39.4	54.1	38.2	55.2	49.4	59.60	48.75	52.85	32.36	51.3	38.8	48.53	47.83
PPFF	PERENNIAL FORBS	5.9	5.9	6.1	6.1	1.7	1.7	6.3	6.3	1.79	1.79	2.33	2.33	1.41	10.0	0.90	0.90
AAFF	ANNUAL FORBS	0.3	----	----	----	0.2	----	0.5	----	2.01	----	0.26	----	0.4	----	0.45	----
	FORB TOTAL	6.2	5.9	6.1	6.1	1.9	1.7	6.8	6.3	3.80	1.79	2.59	2.33	14.5	10.0	1.35	0.90
ARTR2	WY BIG SAGEBRUSH	28.7	5.0	45.2	15.0	34.4	15.0	26.0	15.0	30.57	15.0	32.90	10.0	18.1	5.0	30.26	15.0
OPPO	PLAINS PRICKLYPEAR	0.7	----	----	----	----	----	-----	----	-----	-----	-----	----	-----	----	-----	-----
ARNO	BLACK SAGEBRUSH	1.3	1.3	----	----	----	----	-----	----	-----	-----	0.26	-----	13.7	10.0	-----	-----
CHVI8	DOUGLAS RABBITBRUSH	9.4	5.0	-----	----	9.4	5.0	12.0	5.0	6.03	5.0	11.40	5.0	1.6	1.6	16.70	5.0
EULA	WINTERFAT	-----	-----	-----	----	----	----	-----	----	-----	----	-----	-----	0.8	0.8	-----	-----
CHNA2	RUBBER RABBITBRUSH	-----	-----	-----	----	0.2	----	-----	----	-----	-----	-----	-----	0.8	0.8	3.16	-----
	SHRUB TOTAL	40.1	11.3	45.2	15.0	44.0	20.0	38.0	20.0	36.60	20.0	44.56	15.0	34.2	17.4	50.12	20.0
	TOTALS	100	57.7	100	60.5	100	59.9	100	75.7	100	70.54	100	49.69	100	66.2	100	68.73

Appendix 12

GMCA Ecological Sites

Ecological Site Name (MLRA)	Public Acres Fremont County	Percent Fremont County	Public Acres Sweetwater County	Percent Sweetwater County	Total Public GMCA Acres	Total GMCA Percent
Unclassified	9,056	2.60			9,056	1.93
Clayey (10-14 SE)	4,132	1.20			4,132	0.88
Coarse Upland (10-14 E)	3,623	1.05			3,623	0.78
Coarse Upland (10-14 SE)	9,225	2.70			9,225	1.97
Coarse Upland (15-19 SE)	7,308	2.10			7,308	1.56
Gravelly (10-14 SE)	25,150	7.30			25,150	5.37
Impervious Clay (10-14 SE)	11,336	3.30			11,336	2.42
Loamy (10-14 E)	481	0.14			481	0.10
Loamy (10-14 SE)	23,364	6.80	4,069	3.30	27,433	5.86
Loamy (15-19 E)	5,982	1.73			5,982	1.28
Loamy (7-9 GR)			43,202	35.20	43,202	9.23
Loamy Overflow (10-14 SE)	23,807	6.90	4,068	3.30	27,875	5.95
Saline Loamy (7-9 GR)			477	0.40	477	0.10
Saline Lowland (10-14SE)	69	0.02	4,068	3.30	4,137	0.88
Saline Lowland (7-9 GR)	26	0.01			26	0.01
Saline Subirrigated (10-14 SE)	3,395	0.98			3,395	0.73
Saline Upland (10-14 SE)	5,682	1.62	4,069	3.30	9,751	2.08
Saline Upland (7-9 GR)			3,447	2.90	3,447	0.74
Sands (10-14 SE)	1,883	0.50			1,883	0.40
Sandy (10-14 SE)	123,279	35.7	17,963	14.60	141,242	30.17
Sandy (7-9 GR)			31,293	25.50	31,293	6.68
Shallow Clayey (10-14 SE)	4,436	1.30			4,436	0.95
Shallow Igneous (10-14 W)	10,225	3.00			10,225	2.18
Shallow Loamy (10-14 SE)	37,738	10.90			37,738	8.06
Shallow Loamy (10-14 E)	11,054	3.20			11,054	2.36
Shallow Loamy (7-9 GR)			4,985	4.00	4,985	1.06
Shallow Sandy (10-14 SE)	23,222	6.70	259	0.20	23,481	5.01
Shallow Sandy (7-9 GR)			2,492	2.00	2,492	0.54
Subirrigated (10-14 SE)	41	0.01			41	0.01
Very Shallow (7-9 GR)			2,492	2.00	2,492	0.54
Wetland (10-14 SE)	817	0.24			817	0.17
TOTALS	345,331	100.00	122,884	100.00	468,215	100.00

Appendix 13

GREEN MOUNTAIN EIS METHODOLOGY USED TO DETERMINE FORAGE DEMAND AND SUPPLY

An inventory of the BLM Lander Resource Area was conducted from June 1977 to October 1979, and the data collected were used to calculate the average annual forage production to be distributed among livestock, wild horses, and wildlife. The soil vegetation inventory method (SVIM) used is described in the BLM Manual, Section 4412.14D3C(1). Study data, maps, and reference from the inventory and forage designation process are available for inspection at the BLM Lander Resource Area Office.

Existing vegetation was mapped for each allotment. Within each allotment, vegetation transects were laid out to sample each vegetation type. Each transect consisted of ten to twenty weight-estimate plots. With this number of plots per transect, it was estimated that for 75 percent of the transects, the average weight of vegetation in the plots was within 25 percent of the true average weight for the vegetation type.

The data were processed by the BLM Denver Service Center. Data from weight-estimate plots were adjusted to maximum production for the season, using data from a plant phenology study conducted in 1979. Production figures were based on mature dry weights. The production figures were further adjusted to reflect the conditions of an average year for plant growth by using a climate adjustment factor based on precipitation and production data collected from 1965 to 1979, by the University of Wyoming, at study exclosures in the Green Mountain EIS area. The forage production was apportioned among livestock, wildlife, and wild horses, using a forage distribution computer model to process the weight-estimate data. For this model, the use of forage available for grazing allowable use factor (AUF) was maximized, subject to proper use factor (PUF), dietary, animal numbers, and management constraints.

An AUF for each type of grazing animal was applied to the production of each plant species to arrive at the total pounds of herbage and the percent of the plant that could be removed by grazing animals without affecting the viability of the plant. The AUFs were adjusted according to the following seasons of use: spring-March 21 through June 20, summer-June 21 through September 20, fall-September 21 through December 20, winter-December 21 through March 20.

PUFs used in the determination of forage distribution were obtained from PUF tables prepared by the BLM Lander Resource Area Office. PUFs were applied to each plant. PUFs include the amount of herbage that can be removed without damaging the plant and the preference of the grazing animal for that particular species. PUFs vary with the season of use, because plant defoliation anytime during the growing period is harmful to the plant. PUFs did not exceed 50 percent of the current year's growth.

Wildlife numbers from the Wyoming Game and Fish Department's strategic plan were used in the forage distribution process. The pounds of forage required by the following animals for one month are: cattle-780, horses-900, mule deer-103, antelope-74, sheep-150, elk-374, moose-652, and bighorn sheep-116. These figures were used to determine total forage consumed for each allotment.

The percent of suitable, potentially suitable, and unsuitable land for each vegetation type was also determined. Suitable land criteria were established only for livestock and wild horses; wildlife use was restricted to seasonal ranges, not allotment boundaries. The criteria were based on distance from water, slope, and production. Vegetation types with a production of 25 pounds per acre or less (32 acres per AUM) were considered unsuitable due to low production.

Amounts of consumptive and nonconsumptive vegetation were obtained from the forage distribution process. Forage supply as herein presented is the best currently available estimate of the present situation. Forage supply could increase or decrease, depending on management actions implemented.

APPENDIX 14
DESCRIPTIONS AND SPECIFICATIONS FOR CHEMICAL SPRAYING AND RELEASE OF
BIOLOGICAL CONTROL AGENTS

ITEM 1 - CHEMICAL SPRAYING

A. General Requirements

1. The services covered in this contract include the furnishing of all labor, equipment, supervision, transportation, operating supplies, and incidentals to perform all work necessary to complete spraying for leafy spurge and diffuse knapweed.

2. Not less than one week prior to performing the herbicide application on public land, the County Weed and Pest Supervisor (Supervisor) shall contact the Contracting Officer's Representative (COR) and advise him of the proposed treatment area so that any critical areas may be identified. The Government may request that the Supervisor conduct a field inspection, if required, so that on-the-ground impacts may be identified and mitigated or areas may be deleted from the proposed treatment area.

After the treatment of an area has been completed, the Supervisor shall submit to the COR a map of the area that was actually treated as well as those items described under section F. Reporting below.

3) The application of herbicides is performed on some isolated parcels of land in the GMCA. The currently known noxious weed treatment areas are: Lost Creek Reservoir (tamarisk), Picket Lake and Bison Basin Road (Canada thistle), and adjacent to the GMCA along the State highway, downstream along the Sweetwater River, and the upper reaches of tributaries of the Crooks Creek drainage (spotted knapweed, sow thistle, hoary cress, perennial pepperweed, and Canada thistle). Though not a designated noxious weed by the state of Wyoming, black henbane also occurs along the Wamsutter Road, some pipelines near the road, and the road to the Kennecott Uranium mine on the south side of Green Mountain, and it receives treatment by the BLM and energy companies.

B. Execution

1. Application Procedures

All chemical herbicides shall be administered and applied in accordance with the Final Environmental Impact Statement: Vegetation Treatment on BLM Lands In Thirteen Western States, 1991 (BLM-WY-ES-91-022-4320) and the Record of Decision for this document, and with current EPA and State supplemental label restrictions, and the following restrictions and procedures:

a. The following formulations and application rates shall be used to spray the target species:

Leafy spurge; Dalmation Toadflax; Whitetop; Spotted, Russian, and Diffuse Knapweeds; Various Thistles, and Black Henbane:

Herbicide Name	Formulation	Application Rate
Tank Mix:		
Picloram (Tordon 22K)	2 lbs. ai	½ lbs. ai/acre
or 2,4-D (Solution)	96.9% ai	1 lb. ai/acre
Glyphosate (Rodeo)	4 lbs. ai/gal	8 lbs. ai/acre
or (Roundup)	5.4 lbs. ai/gal	10.8 lbs./acre
2,4-D and Dicamba (Weedmaster)	4 lbs. ai/gal	1.5 lbs. ai/acre
Clopyralid (Transline)	3 lbs. ai/gal	0.5 lbs. ai/acre
Escort (Metsulfuron methyl)	4.8 lbs. ai/gal	1 oz. ai/acre
2,4-D (Solution)	96.9%	2 lbs. ai/acre

b. Attached, following the List of Locations, is a list of Surfactants and Dyes Approved for Use on BLM lands. These are the only spray additives approved for use at this time.

c. All application of herbicides will be done under the supervision of a certified applicator.

d. The Supervisor is responsible for preventing any water contamination from reaching problem levels and causing adverse affects to sensitive crops, desirable plants, drinking water, or fisheries. The Supervisor is responsible for assuring that treatment of Public Lands is not the source of, nor contributes to, water contamination problems.

e. Accidental spills shall be contained and immediately reported to authorized BLM representative and to the Water Quality Division of the Wyoming Department of Environmental Quality.

f. The Supervisor is responsible for assuring employee and public health and safety through adequate control of the spray program (through proper safety procedures, public notification signing, individual contracts, etc.) on Public Lands under this authorization.

g. Vehicle travel of existing vehicle routes is permitted only as needed when applying herbicides, and only if such travel does not result in resource damage. Resource damage is defined as leaving long-term signs of vehicle routes (ruts) or causing erosion or water pollution creating undue degradation of other vegetative resources.

Herbicides will be applied by hand only in areas of sensitive cultural resources (T32N, R100W Section 25 E½NE¼). Vehicle travel is restricted to existing roads in this area.

h. Woody riparian shrubs and trees (e.g., cottonwoods, willows, aspen, water birch, dogwood, currants roses, silver buffaloberry, elderberry, etc.) shall be considered desirable and valuable, and EPA label directions regarding herbicide application methods to prevent mortality to valuable plants shall be followed.

i. Adjacent private landowners and individuals leasing the grazing on Public Lands being treated shall be notified by the Supervisor prior to treatment.

j. When possible, herbicide treatment shall be made after ground nesting birds have hatched and fledged. Herbicides shall not be applied within 10 feet of occupied nests.

k. Boom sprayers and hand gun sprayers shall not be used to apply herbicide within 25 feet of surface water.

l. Broadcast backpack spraying shall be done no closer than within 10 horizontal feet of surface water.

m. Only wipe applications (or hand-directed of individual plants with a backpack sprayer) shall be allowed within 10 horizontal feet of surface water.

n. Hand gun spray units shall use a flat fan tip.

o. Maximum pressure of sprayer shall not exceed 30 pounds.

p. The use of Plateau herbicide shall only be allowed in areas excluded from livestock grazing.

C. Mixing and Loading

1. Water intake systems for mixing shall be arranged so that an air gap or reservoir (or anti-siphon valve) shall be placed between water intake and mixing tank to prevent backflow of chemical into the water source.

2. Herbicides shall be mixed and loaded in an area where an accidental spill cannot flow into a stream or waterbody or contaminate groundwater.

3. All mixing of herbicides shall be done under the supervision of a certified applicator.
4. Mixers and Loaders shall follow instructions indicated on the label during mixing and loading operations.

D. Cleaning and Disposal

1. Spray tanks, or other equipment, shall not be cleaned in or near streams, ponds, or lakes.
2. Herbicide containers shall be disposed of in a manner consistent with label instructions in an approved sanitary landfill facility. Generally, this involves triple rinsing the container and puncturing it to prevent its reuse.

E. Maximum Wind Velocities

1. Wind velocities for all spraying of herbicides must be below 8 mph.
2. In riparian areas wind speed must be 5 mph, or less, during spraying.

F. Reporting

Individual site treatment records must be completed within 24 hours for each site treated. After all treatments covered under this contract have been completed a final report must be submitted to the COR no later than September 30th of the same year as the treatment has occurred in. The final report shall include: exact sizes and locations of treated areas, herbicide formulation used, herbicide application rate, amount of herbicide used, treatment date(s), and whether treatments were initial an application or re-treatment.

ITEM 2 - RELEASE OF BIOLOGICAL CONTROL AGENTS

A. General Requirements

1. The services covered in this contract include the furnishing of all labor, equipment, supervision, transportation, operating supplies, and incidentals to perform all work necessary to complete the release of biological control agents.
2. Location: The releases of biological control agents shall be allowed on the Public Lands listed below:

B. Execution

1. All biological control shall be administered in accordance with the in accordance with the Final Environmental Impact Statement: Vegetation Treatment on BLM Lands In Thirteen Western States and the Record of Decision for this document. The Supervisor shall specifically follow the procedures and stipulations described in the above referenced document.
2. New insect introductions to the project area will require an approved Biological Control Release Proposal.

C. Reporting

After releases have been completed, a final report must be submitted to the COR no later than September 30 of the year in which the releases were performed. This final report shall include: the species and numbers released, a list and map of locations treated, and an evaluation (i.e., success or failure) of releases made in the past several years.

PESTICIDE USE

The use of pesticides shall comply with the Federal and state laws governing their proper use and storage, and disposal. Further their use shall only occur within any limitations imposed by the Secretary of the Interior.

The following is the sequence of events to be followed for using pesticides on BLM administered lands:

1. An onsite reconnaissance shall occur between the company personnel, or their contractor, and Bureau personnel certified in pesticide application. The Fremont County Weed & Pest District will also be consulted. A treatment plan will be formulated.
2. A Pesticide Use Proposal (PUP) form will be completed by the permit holder annually and submitted to the BLM certified pesticide applicator (authorized officer) at the Lander Resource Area office. A current label of the proposed pesticide(s) to be used will be attached to the PUP.
3. The permit holder will be notified by this office of approval of the PUP and be furnished a copy of the document with any changes noted and explained. Any special conditions, such as sign posting requirements or notice to livestock grazers, will be noted.
4. At least 72 hours prior to pesticide application the permit holder shall give notice to this office so that application operations can be inspected.
5. All pesticides, both restricted use and nonrestricted use, shall be applied only by personnel certified in the use of these pesticides or under the direct supervision of certified applicators (State of Wyoming Commercial Applicator's License). A Pesticide Application Record (PAR) form shall be completed within 24 hours of ceasing field operations. The PAR shall be submitted by the permit holder to the authorized officer, or certified BLM pesticide applicator, within 7 days of completion of field treatment operations for the season.

RESPONSIBILITY

The permit holder is responsible for weed control on disturbed areas within the limits of the right-of-way. The permit holder is responsible for consultation with the authorized officer for planning acceptable weed control on all noxious weed infestations within the limits of the right-of-way.

APPENDIX 15

**GREEN MOUNTAIN COMMON ALLOTMENT
GRAZING PREFERENCE SUMMARY (01/24/08)**

Permittee	GR.	Livestock (cattle)	Livestock (sheep)	Kind of Livestock	Authorized Use Period	% P.L.	AUM's Active Preference
Abernathy Ranches, LLC (Farmland Reserve Inc. Lease) c/o Tom Abernathy	3821	995		cattle	05/01-10/31	81	4,878
Abernathy Ranches, LLC (Mitten Ranch Lease) c/o Tom Abernathy	3794	47		cattle	05/10-10/20	100	252
	3794	216		cattle	05/10-10/20	Exch/ Use	1,173
Anderson, Chris	0240	402		cattle	05/01 – 10/31	100	2,434
Anderson, Chris and Susan	3713	631		cattle	05/01-10/31	100	3,817
Arapaho Grazing Association, LLC c/o Dick Smith	3791	127		cattle	05/16-10/16	66	424
Armstrong Ranch Inc. c/o Jean Armstrong	3703	194		cattle	05/16-09/30	100	880
Walking S Grazing Assoc., LLC c/o W.S. Baldwin	3841	392		cattle	05/10-10/16	91	1,880
	3841		1457	sheep	10/01-02/28	91	1,317
Alkali Creek Grazing Association, LLC c/o Stan Cole, Manager	3771		4,222	sheep	03/01 – 02/28	100	10,134
	3771		480	sheep	03/01 – 02/28	Exch/ Use	1,151
Armstrong, John D. & or William L. Bregar	3833	105		cattle	05/10-10/15	35	192
Jolley Livestock Grazing Assoc., LLC c/o William Jolley	3043	60		cattle	06/01-10/31	72	217
Quarter Circle Block, LLC (Claytor Lease) c/o Charles T. McIntosh	3854	260		cattle	05/01-09/29	100	1,300
Quarter Circle Block, LLC c/o Charles T. McIntosh	3851	670		cattle	05/01-12/30	92	4,943
Green Mountain 46 Ranch, Inc. c/o George Weston	3783	362		cattle	05/01-11/16	83	1,975

Permittee	GR.	Livestock (cattle)	Livestock (sheep)	Kind of Livestock	Authorized Use Period	% P.L.	AUM's Active Preference
David, Lyle E. & Colleen M. (Finlayson, Hyde/Harris Family Lease)	3747	144		cattle	05/10-10/14	99	744
Poor Farm LLC c/o Don Abernathy	3756	496		cattle	05/01-10/30	95	2,834
Fox, Ellen M.	0264	618		cattle	05/16 – 11/15	94	3,515
Stewart Creek LLC c/o Tena Sun	3092	147		cattle	05/15-11/30	100	965
Anderson, Chris (John Whipp Lease)	3792	182		cattle	05/10-10/31	100	1,050
	3795	676		cattle	05/16-10/30	90	3,360
Whitlock, Robert or Judy (Charles T. McIntosh Lease)	3795	12		cattle	05/01 – 12/31	100	100
TOTALS		6,520 216	5,679 480			Exch/ Use	47,361 2,324

APPENDIX 16

LIFE HISTORY AND HABITAT NEEDS OF THE GREATER SAGE-GROUSE

Introduction

Sage grouse are of great interest to many individuals in Wyoming. No other bird is so habitat specific to one particular plant type in meeting its annual life requirements. During the last 20 to 25 year period sage grouse have undergone a severe decline in numbers rangewide. The purpose of this discussion is to provide guidelines that describe high quality habitat to stem the downward trend of sage grouse population numbers.

Life History and Habitat Requirements

Sage grouse are dependent upon sagebrush (*Artemisia* spp.), primarily big sagebrush (*A. tridentata*) and do not occur throughout the year in areas where an abundance of this shrub is absent. Breeding activities generally occur from early March to early May in Wyoming. Sage grouse males have been observed displaying as early as February 9 and as late as May 19 in the Red Desert. Sage grouse males display on leks (strutting grounds) in early morning and late evening to attract hens. The mating system is polygamous where only a few males actually breed. Average numbers of males per lek varies greatly but in areas of good habitat over 200 males have been counted on individual leks in the Great Divide Basin.

Sites chosen for display are openings with an abundance of sagebrush within 300-650 feet for escape cover. These sites may be in low swales or broad ridges and benches. Sites used generally are close to or in large expanses of sagebrush and have good visibility (for predator detection) and acoustical qualities (so sounds of breeding displays will carry). After breeding in March-April (later for hens unsuccessful in their first nest attempt), hens disperse from lek sites and choose nest sites from 650-980 feet to over 5 miles from lek of mating. Recent studies have shown that about 70-80 percent of all hens nest within 5 miles of lek of mating. Nest sites are in taller (> 20 inches), more dense (> 25 percent canopy cover) than average sagebrush areas that have an abundance of forbs (>5-8 percent) and grasses (>20 percent). Residual cover of grasses and forbs is important for nesting hens as few herbaceous plants are growing in mid to late April when hens initiate nesting activities.

Nests are typically placed at the base of a live sagebrush bush. Other shrubs and even clumps of grass have been used for nest cover but sagebrush cover has predominated in all nest studies. Nests occurring under other shrubs or grasses are rarely successful in hatching clutches due to increased predation. Clutch size ranges from 6 to 10 eggs with 7-9 being most common.

Incubation occurs for 27-28 days with sage grouse hens, unlike most grouse, not being determined nesters. Thus, nest abandonment is common if the hen is disturbed during nesting. Extent of re-nesting if the initial clutch is depredated or abandoned varies with population and, probably, with moisture/vegetative conditions. If re-nesting occurs, most hens will re-nest within .6 miles of the original nest site. Clutch size of second nest attempts varies from 4-7 eggs.

Hatching of eggs can start by May 5-10 but most eggs hatch in June with a peak between June 6 and June 23. Clutches hatching after July 1 are usually the result of re-nesting attempts by hens unsuccessful in their initial attempt. Few clutches hatch in July.

Upon hatching their clutches, hens with chicks remain in sagebrush uplands so long as vegetative conditions are adequate. Ideal conditions are those where succulent green forbs and associated insects are abundant, grass cover is sufficiently tall to hide hens and chicks, with some live sagebrush plants for shade and cover. Free water is not required but will be used if available. As chicks mature and vegetation in the sagebrush uplands becomes desiccated, hens with broods, move towards wet meadow areas which may be irrigated hay meadows or riparian areas. Preferred areas are those with an abundance of forbs, grasses for hiding cover, and with live sagebrush along the periphery for escape cover.

The importance of wet meadow and riparian habitats for sage grouse has been repeatedly demonstrated throughout

their range. The results of early studies were used by Colorado Division of Wildlife to recommend leaving a 325 foot strip of live sagebrush around the edges of meadows. More recent study of sage grouse summer habitat use in northwest Colorado indicated that 325 feet was inadequate as sage grouse consistently used a 650 foot strip around wet meadows. They also recommended use of 325 to 700 foot guideline for the interspersion of stand and cover types on sage grouse summer range.

Groups of unsuccessful hens and male flocks follow the same pattern but are less dependent on wet meadows and riparian areas than hens with broods. Summer rainfall decreases use of wet meadows and riparian areas as sage grouse disperse into sagebrush uplands for several days following significant (> 0.2 inches) moisture events. Movements of sage grouse to and from areas with succulent green vegetation are common from July into September.

Cohesion of broods and family units (hens with chicks) decreases in July and August depending upon age of the chicks. Intermixing of broods and flocks is common and becomes pronounced by late August. By early to mid September flocks typically include unsuccessful and successful hens, and chicks from several broods. Adult and yearling males usually occur in separate flocks on benches and along ridges some distance from wet meadows. Areas preferred by all sage grouse from mid September into November are those with denser (>20 percent canopy cover) sagebrush and some green forbs (especially *Eriogonum* spp., *Trifolium* spp., *Taraxacum* spp.)

Movements of sage grouse in the fall and early winter (September-December) can be extensive with some movements exceeding 20 miles. Movements by sage grouse in this allotment are probably not this great. Areas used are extensive stands of sagebrush from north facing slopes (early) to broad flat benches. Leaves of sagebrush are the primary food with preference shown for *Artemisia tridentata wyomingensis*. As winter progresses and, if snow cover becomes extensive (>80 percent) and deep (>12 inches), sage grouse forage in tall (>16 inches) sagebrush and lower flat areas and roost in shorter sagebrush along ridge tops. In periods of extreme cold and deep snow, sage grouse will spend nights and portions of the day when not foraging in snow roosts/burrows which they dig by scratching with their feet or wing movements if the snow has the proper texture. Flock size in winter is variable (15-100+ birds) with flocks frequently being unisexual. Flocks of males are smaller than those of hens but both sexes may make extensive movements to locate suitable foraging and roosting areas. By early March, flocks of sage grouse are usually within 2-3 miles of breeding areas used the previous year.

Appendix 17

Natural Resource Recreation Setting: Range, Condition, and Trend for the GMCA

Bold Type = setting range
= dominant setting
Bold Italic Type = setting decreasing in availability
Red Type = setting increasing in availability

Physical - Resources and facilities: character of the natural landscape.

	Pristine	Primitive	Transition	Back Country	Middle Country	Front Country	Rural	Urban
a. Remoteness:	More than 10 miles from any road.		More than 3 miles from any road.	<i>More than 1/2 mi. from any road, but not as distant as 3 miles, and no road in sight.</i>	<i>On or near 4-wheel drive roads, but at least 1/2 mile from all improved roads, though they may be in sight.</i>	On or near improved country roads, but at least 1/2 mile from any highway.	On or near primary highways, but still within a rural area.	On or near primary highways, municipal streets, and roads within towns or cities.
b. Naturalness:	Undisturbed natural landscape			<i>Naturally appearing landscape having modifications not readily noticeable.</i>	<i>Naturally appearing landscape except for obvious primitive roads.</i>	Landscape partially modified by roads, utility lines, fencelines, etc., but none that overpower natural landscape features.	Natural landscape substantially modified by agriculture or industrial development.	Urbanized developments dominate this landscape.
c. Facilities:	No facilities			<i>Some primitive trails made of native materials, such as log bridges and carved wooden signs.</i>	Maintained and marked trails, simple trailhead developments, improved signs, and very basic toilets.	Improved yet modest, rustic facilities such as campsites, restrooms, trails, and interpretive signs.	Modern facilities such as campgrounds, group shelters, boat launches, and occasional exhibits.	Elaborate, full-service facilities such as laundry, groceries, and book sales.

Social - Visitor use and users: character of recreation and tourism use.

	Pristine	Primitive	Transition	Back Country	Middle Country	Front Country	Rural	Urban
d. Contacts (with other groups):	<i>Fewer than 3 encounters/day at campsites, and fewer than 6 encounters/day on travel routes.</i>			<i>3-6 encounters/day off travel routes (e.g., campsites), and 7-15 encounters/day on travel routes.</i>	<i>7-14 encounters/day off travel routes (e.g., staging areas), and 15-29 encounters/day en route.</i>	15-29 encounters/day off travel routes (e.g., campgrounds), and 30 or more encounters/day en route.	People seem to be everywhere, but human contact remains intermittent.	Other people constantly in view.
e. Group Size:	<i>Fewer than or equal to 3 people/group.</i>			<i>4-6 people/group.</i>	<i>7-12 people/group.</i>	13-25 people/group.	26-50 people/group.	Greater than 50 people/group.
f. Evidence of Use:	<i>Only footprints observed</i>			<i>Footprints and slight vegetation trampling at campsites and travel routes; litter only infrequent.</i>	Vehicle tracks and occasional litter and soil erosion; vegetation becoming worn.	Well-worn soils and vegetation, but often gravel-surfaced for erosion control. Litter may be frequent.	Paved routes protect soils and vegetation, but noise, litter, and facility impacts are pervasive.	A busy place with what seems like constant noise. Unavoidable litter seems to be a lifestyle choice.

Administrative - Management controls and service setting: how public land agencies, county commissioners, private sector service providers, and open space managers care for the area and manage public use.

	Pristine	Primitive	Transition	Back Country	Middle Country	Front Country	Rural	Urban
g. Mechanized Use:	<i>None whatsoever.</i>			<i>Mountain bikes and perhaps other mechanized use, but all is non-motorized.</i>	<i>4-wheel drive vehicles, ATVs, dirt bikes, or snowmobiles in addition to non-motorized mechanized use.</i>	2-wheel drive vehicles predominant, but also 4-wheel drive vehicles and non-motorized mechanized use	Ordinary highway auto and truck traffic is characteristic.	Wide variety of street vehicles and highway traffic is ever-present.
h. Visitor Services:	<i>None available on-site</i>			<i>Basic maps, but area personnel seldom available to provide on-site assistance.</i>	<i>Area brochures and maps, plus area personnel occasionally present to provide on-site assistance.</i>	Information materials describe recreation areas and activities. Area personnel are periodically available.	Information described to the left, plus experience and benefit descriptions. Area personnel interpret on-site education	Information described to the left, plus regularly scheduled, on-site outdoor skills demonstrations and clinics.
i. Management Controls:	<i>No visitor controls apparent. No use limits. Enforcement presence very rare.</i>			<i>Signs at key access points, on basic user ethics. May have Back Country use restrictions. Enforcement presence rare.</i>	<i>Occasional regulatory signing. Motorized and mechanized use restrictions. Random enforcement presence.</i>	Rules clearly posted with some seasonal or day-of-week use restrictions. Periodic enforcement presence.	Regulations prominent. Total use limited by permit, reservation, etc. Routine enforcement presence.	continuous enforcement to redistribute use and reduce user conflicts, hazards, and resource damage

APPENDIX 18

Description of the Methodology Used to Determine the Forage Production in the Seven Lakes ES Area

During the summer months of 1975 and 1976, BLM temporary employees (college students in the natural resources field) under the supervision of a BLM range conservationist collected field data using the BLM Weight Estimate Forage Inventory Method (BLM Manual 4412.11B). Prior to the field work, the vegetation was grouped into relatively homogeneous types using color infrared aerial photographs and a 1958 range survey of the area. Vegetative type boundary lines later were further refined in the field as necessary. Delineation of vegetation types was based on differences in vegetative species, slope, exposure, or abundance of the vegetation. Field work was done from June to October.

Within each vegetation type, transects were established which would be a representative sampling of the vegetation type. Circular frames measuring 9.6 square feet were located at equal intervals along the predetermined transect. The 9.6 square foot area of the frame was considered to be one plot from which clipping takes place and was used because measurements in grams per 9.6 square feet convert directly to pounds per acre. Initially, all of the current year's vegetative production was clipped and weighed in grams by plant species. The weight of the forage production in subsequent plots was estimated based on the findings of the clipped and weighed plots. A minimum of 10% of the plots were actually clipped, and approximately three plots were distributed per square mile, but each type contained at least one plot. Vegetation types smaller than 160 acres were not mapped except for some high production areas (meadows).

For each range vegetation type delineated a type writeup was made on BLM Standard Form 4412.4 (see Example A) and summarized on a vegetation type data work sheet (see Example B). Each type was given an identification label derived from the examiner's initials plus a number. For example, Lucy Malin and Bruce Easton would designate the types they examined as ME-1, ME-2, ME-3, etc. Generally, two employees would work together as a team, and there were three teams each year. The teams surveyed all the vegetation types found on private or state lands. They used 7.5 minute USGS topographic quadrangles to determine precise locations.

Clipped vegetation of each species was saved, weighed, air dried for one week, and then weighed again in order to determine the dry weight production. Clipping and weighing measurements were done on a weekly basis for each species because of changes in moisture status of the range plants, except in Fremont County which was clipped on a 10-day basis.

Based on the information collected as described previously, the number of pounds per acre (on a dry weight basis) of production of each species in a given vegetation type was computed. Next a proper use factor (PUF), which represents the average weight percentage of a particular plant species' current year's growth which can be safely grazed by a specific animal species without harming the plant production, was multiplied by the production figure in pounds, dry weight, per acre (LBS. DW/AC) for a given species in a particular vegetation type. The attached proper use table was used to determine the correct factor to use.

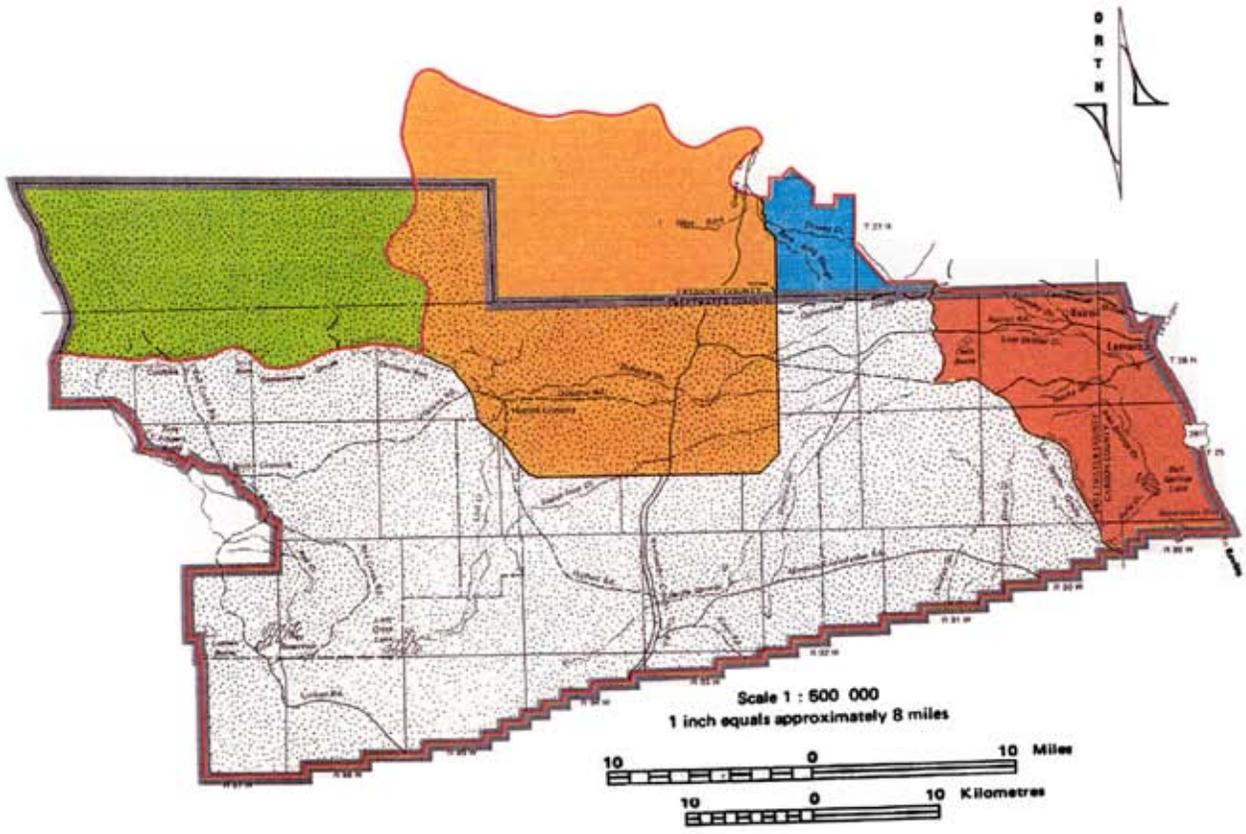
Because the summer grazing season in the ES area is from May through October, the summer and fall values from the table were averaged together to derive a summer use factor. In many cases, professional judgement was required when

the average between the spring and fall values did not indicate the correct proper use factor. For example, some use of *Artemisia tridentata* by cattle in the summer is normal, so instead of the zero value found in the table, 5% was substituted. Similarly, 50% was used as the proper use factor of *Sitanion hystrix* for winter sheep, and 20% was used as the proper use factor of *Eurotia lanata* for year long horses. Thus, the pounds of properly usable forage per acre in each vegetation type were calculated by multiplying the PUF times the pounds per acre of each species and totaling the products of all the species. The acreages of each type were determined using 7.5 minute USGS topographic quadrangles, and these acreages were then used to compute the total production of usable forage in pounds for each vegetation type by multiplying the number of acres that a vegetation type covered times the pounds of properly usable forage per acre which occurred in that type. Portions of the ES area were not available in 7.5 minute USGS topographic quadrangles; therefore, the existing 15 minute USGS quadrangles were expanded to the 7.5 minute scale.

The usable forage production (in pounds) of each type was divided by the number of pounds needed for an animal unit month (AUM) of a specific class and season of livestock. Seven hundred and eighty pounds of properly usable forage was used as an equivalent for one summer cattle AUM, 450 pounds equaled one winter sheep AUM (this represents 90 pounds per head of sheep), and 900 pounds equaled one year long wild horse AUM. Seven hundred and fifty pounds was used to equal one summer sheep AUM (this represents 150 pounds per head of sheep) and 780 pounds was used to equal one winter cattle AUM. AUMs for summer cattle, winter sheep, summer sheep, winter cattle, and year long horses were calculated separately for each vegetation type.

Finally, all the data were compiled on maps, and tabulated both by vegetation type and by section for each of the proposed pastures in the allotments. An overlay for each topographic map was prepared which displays the acreage for each vegetation type in each section per land status. Current grazing capacity for summer cattle, winter cattle, summer sheep, winter sheep, and year long horses expressed in AUMs is also displayed in a like manner. These overlays and maps, as well as the type writeups are available for public inspection in the Rawlins District Office.

The amount of properly usable forage determined by the survey is expressed as AUMs for one of the following: cattle grazing in the summer or cattle grazing in the winter or sheep grazing in the summer or sheep grazing in the winter or horses grazing year-round. The properly usable AUMs vary with the season of use and the class of grazing animal because the proper use factors discussed above and the forage requirements of the animals vary with the season of use and the class of grazing animals. The properly usable AUMs have been expressed on a common basis throughout this environmental statement where it was necessary to do so in order to make comparisons between use by different classes of grazing animals. Winter sheep AUMs were chosen as the common basis because winter sheep constitute the greatest use under the present and proposed action. For example, if an allotment was shown in the range survey to have 20,000 AUMs of forage for winter sheep grazing or 10,000 AUMs of forage for summer cattle grazing, the ratio of properly usable winter sheep AUMs to summer cattle AUMs is 2:1. This would represent an approximate ratio of 8-10 head of sheep to one cow. To express cattle use in that allotment on a winter sheep basis, the proposed cattle use in AUMs would be multiplied by two (see Appendix B-1-1). Two thousand AUMs of summer cattle use would be expressed as 4,000 winter sheep AUMs.



LEGEND

-  **FERRIS ALLOTMENT IN THE SEVEN LAKES PLANNING UNIT, DIVIDE RESOURCE AREA. (ALLOTMENT BOUNDARIES HAVE REMAINED CONSTANT.)**
-  **THE FORMER SEVEN LAKES INCOMMON ALLOTMENT.**
-  **PORTION OF THE GREEN MOUNTAIN PLANNING UNIT, LANDER RESOURCE AREA TRANSFERRED TO THE SEVEN LAKES PLANNING UNIT, DIVIDE RESOURCE AREA. IT IS THE NORTHERN PORTION OF THE PROPOSED STEWART CREEK ALLOTMENT.**
-  **THE NEW ARAPAHOE ALLOTMENT CREATED BY COMBINING PORTIONS OF THE GREEN MOUNTAIN PLANNING UNIT AND THE SEVEN LAKES PLANNING UNIT. THE ARAPAHOE ALLOTMENT IS NOT INCLUDED IN THE SEVEN LAKES E. S. BUT WILL BE COVERED IN THE GREEN MOUNTAIN GRAZING ENVIRONMENTAL STATEMENT.**
-  **PORTION OF THE FORMER SEVEN LAKES PLANNING UNIT, TRANSFERRED TO THE GREEN MOUNTAIN PLANNING UNIT.**
-  **PRESENT SEVEN LAKES GRAZING ENVIRONMENTAL STATEMENT**
-  **NEW PLANNING UNIT BOUNDARY**
-  **FORMER PLANNING UNIT BOUNDARY**

PRESENT AND PROPOSED BOUNDARIES

Seven Lakes Grazing
Environmental Statement

APPENDIX 19

METHODS OF COMPUTING AFFECTED AREA

1. Spring developments

a. $\frac{(a+b+c)}{d}$ = area affected by development = **1.0 acre**

where a = 40,000 square feet; 200 feet by 200 feet area fenced around the spring to prevent damage from livestock,

b = 1,200 square feet; 60 feet of pipeline with a 20 foot width of disturbance for installation with a backhoe,

c = 28 square feet area displaced by a trough 2 feet in width by 14 feet in length,

d = 43,560 square feet, the number of square feet in one acre.

b. $\frac{\pi r^2}{d}$ = acres disturbed by "sacrifice area" = **1.6 acres**

where $\pi = 3.14$ and $r^2 = 50$ yards (150 feet), the radius of the "sacrifice area,"

d = 43,560 square feet, the number of square feet in one acre

c. Total affected area for the spring development would be 1.0 acre + 1.6 acres = **2.6 acres.**

2. Water Well Developments

a. $\frac{(a+b+2c+d)}{e}$ = area affected by development = **.2 acre**

where a = 5,000 square feet; affected area by well and storage tank,

b = 28 square feet; a water trough 2 feet in width by 14 feet in length,

c = 1,000 square feet; 50 feet of pipeline with a 20 foot width of disturbance for installation with a backhoe,

d = 2,500 square feet; 50 feet by 50 feet affected area of an overflow pond,

e = 43,560 square feet, number of square feet in one acre.

b. $\frac{\pi r^2}{d}$ = acres disturbed by "sacrifice area" = **1.6 acres**

where $\pi = 3.14$ and $r^2 = 50$ yards (150 feet), the radius of the "sacrifice area,"

d = 43,560 square feet, the number of square feet in one acre.

c. Total acres affected by a water well development would be .2 acres + 1.6 acres = **1.8 acres.**

3. Fencing - BLM three-wire cattle fence and riparian pasture fence

$\frac{axb}{c}$ = total affected area = **1.5 acres/mile**

where a = 12 feet, this includes a two-tracked trail, produced by motor vehicles, on each side of the fence.

b = 5,280 feet, the number of feet in one mile.

c = 43,560 square feet, the number of square feet per acre.

a. $12 \text{ feet/mile} \times 5,280 \text{ feet/mile} = 63,360 \text{ square feet/mile} \div 43,560 \text{ square feet/acre} = 1.45 \text{ acres/mile}$

4. Pasture Boundary signs

Assumed to be 5 percent of the total affected area, the BLM three-wire cattle fence requires repeated travel along the previously constructed fence, thus causing additional disturbances. Construction of a pasture boundary fence would require a single trip, thus causing a minimal amount of disturbance. Partial construction of the Stratton Rim Pasture Boundary Fence would take place along an existing road; therefore, the disturbance to the area would already have taken place.

5. Cattleguards

All proposed cattleguards would be constructed on an existing road; therefore, no additional disturbance would take place.

6. Artesian Well (wetland fencing)

a. $600 \text{ feet} \times 6 \text{ feet} = 3,600 \text{ square feet}$

$600 \text{ feet} \times 12 \text{ feet} = \underline{7,200 \text{ square feet}}$

$10,800 \text{ square feet} \div 43,560 \text{ square feet/acre} =$

0.2 acres on fenceline

b. $200 \text{ feet} \times 200 \text{ feet} = 40,000 \text{ square feet} \div 43,560 \text{ square feet/acre} =$

0.9 acres inside permanent enclosure.

7. Pipelines

$1 \text{ foot} \times 5,280 \text{ feet/mile} = 5,280 \text{ square feet/mile} \div 43,560 \text{ square feet/acre} = \mathbf{0.1 \text{ acre/mile}}$

Appendix 20

Evaluation and Rating of Grazing Strategies for Stream Riparian Habitats (Platts and Nelson 1989).

Strategy	Level to which riparian vegetation is commonly used	Control of animal distribution (allotment)	Streambank stability condition	Brushy species regrowth potential	Seasonal plant rehabilitative	Stream-riparian	Rating
Continuous season-long (cattle)	heavy	poor	poor	poor	poor	poor	1 ^a
Holding (sheep or cattle)	heavy	excellent	poor	poor	fair	poor	1
Short duration-high intensity (cattle)	heavy	excellent	poor	poor	poor	poor	1
Three herd-four pasture (cattle)	heavy to moderate	good	poor	poor	poor	poor	2
Holistic (cattle or sheep)	heavy to light	good	poor to good	poor	good	poor to excellent	2-9
Deferred (cattle)	moderate to heavy	fair	poor	poor	fair	fair	3
Seasonal suitability (cattle)	heavy	good	poor	poor	fair	fair	3
Deferred-rotation (cattle)	heavy to moderate	good	fair	fair	fair	fair	4
Stuttered deferred-rotation (cattle)	heavy to moderate	good	fair	fair	fair	fair	4
Winter (sheep or cattle)	moderate to heavy	fair	good	fair	fair to good	good	5
Rest-rotation (cattle)	heavy to moderate	good	fair to good	fair	fair to good	fair	5
Double rest-rotation (cattle)	moderate	good	good	fair	good	good	6
Seasonal riparian preference (cattle or sheep)	moderate to light	good	good	good	fair	fair	6
Riparian pasture (cattle or sheep)	as prescribed	good	good	good	good	good	8
Corridor fencing (cattle or sheep)	none	excellent	good to excellent	excellent	good to excellent	excellent	9
Rest rotation with seasonal preference (sheep)	light	good	good to excellent	good to excellent	good	excellent	9
Rest or closure (cattle or sheep)	none	excellent	excellent	excellent	excellent	excellent	10

^a Rating scale based on 1 (poorly compatible) to 10 (highly compatible with fishery needs).

**APPENDIX 21
RIPARIAN PASTURE ACRES AND MILES OF FENCE
INCLUDED IN RIPARIAN PASTURES**

**TABLE 1
RIPARIAN PASTURE ACRES**

RIPARIAN PASTURE	PUBLIC RIPARIAN ACRES	ESTIMATED STATE/PRIVATE RIPARIAN ACRES	TOTAL ACRES INCLUDING UPLAND HABITAT
Bare Ring Slough	20	0	142
West Fork Crooks Creek	30	24	1,451
Ice Slough	62	0	743
Warm Springs Creek	4	678	4,224
Long Slough	254	1,126	4,488
Lost Creek (not completed)	14	19	548
Sweetwater River (not completed)	178	26	6,551
TOTALS	562	1,873	18,147

**TABLE 2
MILES OF FENCE IN EACH RIPARIAN PASTURE**

RIPARIAN PASTURE	MILES
Bare Ring Slough	7.2
West Fork Crooks Creek	6.4
Ice Slough	5.0
Warm Springs Creek	6.0
Long Slough	1.9
Lost Creek (not completed)	12.4
Sweetwater River (not completed)	9.1
TOTAL MILES	48.0

**APPENDIX 22
GOALS AND OBJECTIVES**

**GOAL #1
RIPARIAN AREAS**

GOAL: Improve or maintain riparian areas.

OBJECTIVES:

1. Establish or maintain diverse willow stands within the Green Mountain Common Allotment where these stands have historically and are currently able to occur by the year 2007. Key areas, components (number, age-class, and height of willows), and percent of improvement of components will be established following collection of data on existing willow communities.
2. Maintain or improve native sedge communities within the Green Mountain Common Allotment by the year 2007. Key areas, percent improvement by key area, the component (presence or absence of species or litter), and the current sedge community will be established or described following collection of data on existing sedge communities.
3. Restore or maintain shallow ground water tables in association with riparian areas by the year 2007. Key areas, percent improvement (or increase in elevation) of seasonal water levels, and current seasonal ground water levels will be established following collection of data on current ground water levels.
4. Maintain and preserve quantity and quality of permanent spring sources in the Green Mountain Common Allotment by the year 2007. Identification of sources and methods for protection and management will be an ongoing activity throughout the life of the plan.

STRATEGIES OR MANAGEMENT ACTIONS:

1. Develop and identify site specific management objectives through an interdisciplinary resource management planning process for the GMC Allotment.
2. Discuss with affected interests and interested publics the development of management objectives and proposed riparian projects to help meet these objectives.
3. Develop a new grazing management prescription in conjunction with riparian improvement projects and water development projects.
4. Provide alternative water sources for the use of livestock, wild horses, and wildlife that will enable rest or reduced use of riparian habitats by those species. Alternative water sources may include spring developments, wells, pipe-lines, reservoirs, pits, and guzzlers.
5. Develop riparian (breeding or holding) pastures to provide needed rest or deferment from season long grazing on high value riparian habitats.
6. Utilize herding and/or fencing to provide rest or deferment from livestock grazing during critical periods of plant growth.
7. Protect important spring sources through the installation of protective fencing.

8. Install gradient control structures along important riparian areas to reduce or stop migration of headcuts along riparian areas. Headcuts result in the lowering of water tables.
9. Review current livestock turnout dates and adjust if resource damage in riparian areas is occurring.
10. Alternate livestock turnout dates and location.
11. Maintain wild horse populations within approved AMLs.
12. Develop additional water sources/wetlands to benefit other resources such as fisheries, waterfowl, game and nongame birds.
13. Utilize plantings of woody species (willow) where the potential for establishment of these species naturally occur.

**GOAL #2
WILD HORSES**

GOAL: Maintain wild horses within appropriate management levels (AMLs).

OBJECTIVE: Maintain viable populations of wild free roaming horses in a multiple use setting that will provide for a thriving natural ecological balance within each herd area. The following table depicts the herd areas within the Green Mountain Common Allotment.

Herd Area	AML	Timeframe to reach AML
Green Mountain	170 – 300	1997
Crooks Mountain	65 – 100	1998
Antelope Hills	60 – 82	1998

**GOAL #3
WATER SOURCES**

GOAL: Improve the distribution of water sources

OBJECTIVE: Design, construct, and maintain cost effective water developments that accomplish multiple use objectives.*

STRATEGIES OR MANAGEMENT ACTIONS:

1. Develop and identify management objectives through an interdisciplinary resource management planning process for the allotment.
2. Develop and incorporate site-specific management objectives in the proposed allotment management plan.
- *3. Discuss with interested publics the development of management objectives and the proposed water projects to help meet these objectives.
- *4. Develop a new grazing management prescription in conjunction with water development projects.
5. Consider different types of water developments and their relative costs that would achieve essentially the same management objectives.
6. Inventory existing water developments in the GMC allotment to determine whether new water projects are needed.

7. Develop water sources that will not generate new conflicts in the use of vegetation or habitat.
8. Mitigate potentially adverse impacts through project design and/or operational guidelines.
9. Develop new water sources where it is the most cost-effective strategy of achieving the management objectives.
10. Cost-share the construction and/or reconstruction of water developments wherever feasible.
11. Prioritize the construction and/or reconstruction of water developments according to the management objectives.
12. Conduct site specific technical evaluations and/or feasibility analyses in planning for new water developments.

**GOAL #4
DISTRIBUTION OF GRAZING ANIMALS**

GOAL: Improve the distribution of grazing animals.

OBJECTIVE: "The ideal distribution of any use of rangeland reduces number and area of places damaged by congestion of animals and people, extends the area of proper use as widely as possible. The objective of distribution management is uniform and moderate or maximum use that does not damage soil and vegetation." (Rangeland Ecology and Management, Heady & Child, 1993).

STRATEGIES OR MANAGEMENT ACTIONS:

1. Develop and identify management objectives through an interdisciplinary resource management planning process for the GMC allotment.
2. Develop and incorporate site-specific management objectives in the proposed allotment management plan.
3. Discuss with interested publics the development of management objectives and the proposed distribution practices to help meet these objectives.
4. Develop a new grazing management prescription which incorporates distribution management practices.
5. Consider different types of distribution management practices and their relative costs that would achieve essentially the same management objectives.
6. Mitigate potentially adverse impacts through distribution management practices design and/or operational guidelines.
7. Cost-share the construction and maintenance of distribution management practices wherever feasible.
8. Prioritize the distribution management practices according to the management objectives.

9. Conduct site specific technical evaluations and/or feasibility analyses in planning for new distribution management practices.

GOAL #5 OPEN SPACE

GOAL: Maintain the open spaces and natural character of the allotment and the uses that are dependent on these values.

OBJECTIVE: Minimize adverse affects on open space and the natural character of the area by carefully analyzing this issue at the design and approval phase of project proposals. Emphasize dispersed rather than developed recreational opportunities.

STRATEGIES OR MANAGEMENT ACTIONS:

1. Use Visual Resource Management (VRM) program to evaluate all resource development initiatives. VRM assists land managers to design and locate developments (water developments, roads, etc.) so that they have a minimal impact on an area's visual character.
2. Locate industrial roads and access routes 1/4 mile or the distance to the visual horizon, whichever is less, from the National Historic and National Scenic Trails.
3. Minimize the use of fencing.

GOAL #6 PUBLIC ACCESS

GOAL: Maintain public access and dispersed recreational opportunities while respecting private property in the allotment.

OBJECTIVE: Recreation management will emphasize public access, dispersed recreation and interpretation. No need is anticipated for additional campgrounds or other recreational facilities. Interpretation will focus on National Historic Trails, recreational use ethics and the natural history of the area.

STRATEGIES OR MANAGEMENT ACTIONS:

1. Continue to maintain BLM transportation system and network of primitive roads in the allotment.
2. Utilize positive signing to identify public and private lands.
3. Utilize "Portal Signs" to identify public lands and to convey positive messages about recreational use ethics such as Tread Lightly and Leave No Trace.
4. Support land exchanges that are a benefit to the public and that improve the land ownership pattern in the allotment. "Improvement" means blocking up scattered public land parcels to enhance useability for both public and private lands. Land exchanges are always on an equal value basis and involve two or more willing participants.
5. Obtain public easements across private and state lands when opportunities exist to do so. Easements would only be obtained on a willing buyer/willing seller basis.

6. Motor vehicle use would continue to be limited to existing roads and vehicle routes.

GOAL 7 BIG GAME POPULATIONS

GOAL: Maintain big game populations near objective levels established by the Wyoming Game and Fish Commission.

OBJECTIVE: The Wyoming Game and Fish Department (Department) will use annual hunting seasons to increase or decrease big game herds toward management objectives.

STRATEGIES OR MANAGEMENT ACTIONS:

1. The Department will collect annual herd composition and harvest data to estimate population status for antelope (Red Desert and Beaver Rim Herd Units), mule deer (Chain Lakes, South Wind River, and Sweetwater Herd Units), elk (Green Mountain and Steamboat Herd Units) and moose (Lander Herd Unit).
2. The Department will formulate annual hunting season recommendations using the above data and input from sportsmen, landowners, federal agency personnel, and other interested publics.
3. The Wyoming Game and Fish Commission will review the Department's hunting season recommendations and ultimately set annual hunting seasons.

Goal #8 HABITAT QUALITY

Goal: Maintain or improve habitat quality for plant and animal populations and communities.

Objective: Restore, improve, and maintain habitat conditions to support both plant and animal populations that occur in terrestrial, riparian, and aquatic habitats within the Green Mountain Common Allotment. These habitats will be capable of sustaining viable populations and a diversity of native and naturalized plant and animal species, including threatened and endangered species, species of special concern, and sensitive species for the long-term.

STRATEGIES OR MANAGEMENT ACTIONS:

1. Conduct habitat evaluations to determine current habitat quality and identify areas where improvement is needed.
 - a) Identify habitats that need to be improved.
 - b) Determine specific management needed.
 - c) Identify improvements where needed.
 - d) Plan and implement specific improvements.
2. Develop management practices and actions that maintain or enhance habitat quality.
3. Increase the quality of available habitat that will eliminate or reduce the major limiting factors of plant and animal populations and provide for species diversity.
4. Avoid or minimize adverse impacts on habitats by reviewing proposed projects, plans, and activities. Where needed, develop proper mitigative measures to sustain or improve those habitats.

GOAL #9

PROVIDE FORAGE AND WATER FOR LIVESTOCK, WILD HORSES AND BIG GAME ANIMALS

GOAL: Provide adequate forage and water on a sustained-yield basis to satisfy the present management levels of livestock, wild horses and big game animals.

BACKGROUND: The BLM Lander Resource Management Plan (RMP) states that forage will be provided to meet the wildlife population objectives by herd units as outlined in the Wyoming Game and Fish Strategic Plan. Provide enough forage on a sustained-yield basis to satisfy at least the present demands of livestock, wild horses, and wildlife. Determining approximate wildlife numbers on a certain confined area is difficult at best and these figures will continually be adjusted through the public review process as better information and current habitat needs are identified.

OBJECTIVE: The Green Mountain Common Allotment will manage in such a manner that forage will be provided to support approximately 2,960 deer months, 2,270 elk months, 130 moose months, 2,050 antelope months, 35,910 cattle AUM's, 11,451 sheep AUM's, and 3,550 wild horse AUM's on an annual basis.

GOAL #10

WORKABLE SOLUTIONS

GOAL: Provide workable solutions that encourage positive economic impacts on the multiple uses.

OBJECTIVE: Minimize the negative economic impacts of our multiple use decisions.

STRATEGIES OR MANAGEMENT ACTIONS:

1. Select management alternatives that are the most cost effective and weigh long-term benefits against short-term benefits.
2. For those management actions which could have a negative impact, implementation will be on a time schedule to mitigate economic hardships on the entities directly involved.

GOAL #11

SOILS

GOAL: Maintain and improve soil productivity and minimize soil erosion.

OBJECTIVES

1. Develop erosion and sediment movement prevention and amelioration plans for each grazing unit of the Green Mountain Common Allotment or upon plan establishment.
2. Stabilize whenever economically feasible head cuts that are now affecting or will affect important ground water recharge, upland, riparian, or wetland areas of the Green Mountain Common Allotment, and to have them controlled by the year 2004.
3. Maintain or improve soil organic matter in topsoils, by the year 2004, wherever important ground water recharge, grazing, riparian and wetland habitat, big game habitat, sage grouse rearing areas, or valuable plant assemblages, exist in the Green Mountain Common Allotment.

THE ABOVE OBJECTIVES MEAN THAT:

The hydrologic cycle will be supported by providing for water capture, storage, and sustained release. Adequate energy flow and nutrient cycling through the system will be achieved as optimal plant growth occurs. Plant communities are highly varied within Wyoming.

INDICATORS MAY INCLUDE BUT ARE NOT LIMITED TO:

- Water infiltration rates
- Soil compaction
- Erosion (rills, gullies, pedestals, capping)
- Soil micro-organisms
- Vegetative cover
- Bare ground and litter

Management Strategy: Maintain and/or reclaim surface disturbing activities where soil movement impacts soil productivity and/or water quality water quality is impaired or soil movement is obvious. (Maintenance items will be carried out promptly (within the terms of cooperative management agreements) and reclamation items will be prioritized and reclaimed according to an agreed reclamation schedule.)

GOAL #12 IMPROVE OR MAINTAIN UPLAND PLANT COMMUNITIES

GOAL: Improve or maintain upland plant communities so that they are diverse and able to recover from disturbance.

OBJECTIVE: Evaluate current data and establish studies where data are insufficient to establish parameters for the following objectives.

1. Maintain or increase the frequency of key species, at key areas, selected by a Technical Review Team (TRT). (Evaluation of this objective will be determined by the grazing program selected and grazing cycle developed).
2. Maintain or increase the density of key species, at key areas, selected by a TRT. (Evaluation of this objective will be determined by the grazing program selected and grazing cycle developed).
3. Maintain or improve trend in all upland plants including key browse communities, based on live canopy cover and density measurements. The objective is to maintain or expand live canopy cover and reduce number of decadent plants on key areas by December, 2018.
4. Determine percent cover at key areas by December, 2018. Plant canopy cover supports watershed integrity. The root systems and above ground portions of plants enhance the hydraulic resistance of moving water and directly influences watershed stability, water infiltration into the soil is increased and surface runoff is decreased.
5. Based on determinations in objective #4, percent cover will be maintained (when measured) or improved (when remeasured) by December, 2027.

GOAL #13 WATER QUALITY

GOAL: The public lands will be managed in a manner that will protect and improve the quality of the water resources on the public lands.

OBJECTIVES:

1. Water on public lands will be maintained equal to or above legal water quality criteria.
2. Improve the water quality of those public land waterbodies that are determined to be impaired in their designated beneficial uses by WDEQ following the mandated procedures of the Clean Water Act as carried through under Wyoming State statute.

THE ABOVE OBJECTIVES MEAN THAT:

Natural processes and human actions influence the chemical, physical, and biological characteristics of water. Water quality varies from place to place with the seasons, the climate, and the kind of substrate through which water moves. Therefore, the assessment of water quality takes these factors into account.

INDICATORS MAY INCLUDE BUT ARE NOT LIMITED TO:

- Chemical characteristics (e.g., pH, conductivity, dissolved oxygen)
- Physical characteristics (e.g., sediment, temperature, color)

invertebrates, fecal coliform, and plant and animal species)

Monitoring: Periodically evaluate the Green Mountain Common Allotment (GMC) streams using WDEQ approved/acceptable methods.

GOAL #14 SHARING EXPENDITURES ON RANGELAND IMPROVEMENTS

GOAL: Share expenditures on rangeland improvements by all concerned interests wherever possible.

OBJECTIVE: Distribute the costs associated with existing or new rangeland improvements and management actions to the beneficiary(ies).

STRATEGIES OR MANAGEMENT ACTIONS:

1. BLM, in cooperation with project proponent(s), will accurately measure the benefits of each rangeland improvement and/or management action and seek prior agreement on prorated costs by all concerned interests.
2. BLM shall document all contributions of funds, labor, and materials to ensure proper credit is given to the project contributors. Maintenance responsibility will be agreed to prior to project construction.
3. Beneficiaries may need to be identified for smaller management areas of the allotment.

Goal #15
EDUCATION/INFORMATION

Goal: Maintain open honest and constructive communication within the Green Mountain Common Allotment Committee and the public. Foster understanding, involvement, and cooperation in resource management.

Objective: Increase public and committee awareness of resource management issues, programs, and accomplishments in the Green Mountain Common allotment.

Strategies or Management Actions:

1. Utilize the education/information subcommittee to review all forms of public and media presentations.
2. Utilize media and public presentations to promote awareness of management programs.
3. Utilize signing, viewing sites or other techniques to promote public awareness of management programs.
4. Actively offer presentations to public schools concerning issues on the Green Mountain Common allotment utilizing expertise of the involved parties.

LANDER RMP/RANGELAND PROGRAM SUMMARY GOALS AND OBJECTIVES

The Mission Statement, Goals, and Objectives (Appendix 1) were used in conjunction with management objectives listed in the Lander RMP to develop the various alternatives presented in this analysis.

The GMCA was categorized in the Lander RMP as a moderate priority category I allotment. The following factors were used in the categorization of this allotment:

1. Vegetative Production is not satisfactory.
2. Forage competition between grazing animals.
3. Distribution of grazing animals not satisfactory.
4. Turnout dates not consistent with range readiness.
5. Conflicts with other land uses.
6. Potential for positive economic return on public investments.

The following Management Objectives were developed in the Green Mountain MFP and were later incorporated into the 1987 Lander RMP.

A. Management Objectives

1. Improve distribution of grazing animals to more evenly utilize available forage in the allotment.
2. Manage the wild horses in the allotment at the appropriate management levels (AMLs) for the Green Mountain, Antelope Hills and Crook Mountain herd unit as follows:

Herd Area	Lower Limit	Median Population	Upper Limit
Green Mountain	170	245	345
Antelope Hills	35	45	65
Crooks Mountain	65	73	83
Total	270	363	493

3. Maintain or improve the riparian communities in the allotment.
4. Coordinate all management objectives with wildlife habitat quality and population management objectives.

5. Monitor trend in the allotment to assess the effects of planned actions once they have been implemented.
6. Improve forage production to satisfactory levels.
7. Adjust turnout dates and seasons of use to be consistent with range readiness and sound range management principles.

APPENDIX 23

THE INTERESTED PUBLICS (INCLUDING GRAZING PERMITEES)

Grazing Permittees

Lyle E. and Colleen M. David

Jean Armstrong

John Armstrong

Jim McIntosh

Virginia McIntosh

Charles McIntosh

Dan Miller

Dick Smith

Jim Smith

John Whipp

Tom Abernathy

Rhett Abernathy

Robert Whitlock

Judy Whitlock

Robert Jameran

Chris Anderson

Jim Shepperson

Emily Shepperson

Don T. Abernathy

Sid Baldwin

Nolene Sun

Tena Sun

Tom Sun

Joe Sun

Harmel Jolly

Sally Jolly

W. Ben Iturrian

Stan Cole

Linda Cole

Randy Cole

George Weston

American Lands Alliance

Mark Salvo

Center for Biological Diversity

Daniel Patterson

Wyoming Game and Fish Department

Bill Wickers, Deputy Director

Bob Oakleaf

Dave Dufek

Kent Schmidlin

Stan Harter

Tom Ryder

Greg Hiatt

Tom Collins

Wyoming Department of Agriculture

Jon Etchebarre

Jason Fearneyhough

Jim Schwartz

Wyoming State Grazing Board

Dick Loper

Joel Bousman

Sierra Club

Todd Shuman

Popo Agie Conservation District

Carolyn Hayes

Lander Valley Sportsman's Association

Lloyd Alvis

Wind River Back County Horsemen's Association

Linda Serduke

Office of State Lands and Investments

Chuck Oakley

Wyoming Riparian Association

Mark Gorges

Donn Kesselheim

Wyoming Coordinated Resource Management

Executive Committee

Dennis Sun

Senator John Barrasso Field Office

Pam Buline

Senator Mike Enzi Field Office

Cherie Hildebrand

Congresswomen Barbara Cubin Field Office

Bonnie Cannon

Conservancy of the Phoenix

Reginald D. Atkins

Fremont County Commission

Doug Thompson

Pat Hickerson

Dennis Heckart

Keja Whiteman

Jane Adamson

Edith's Floral Shop

Farm Credit Services of America

Fremont County Public Lands Committee

Al Sammons

First Interstate Bank

Doug Anesi

Gallatin Wildlife Association

Glen Hockett

Greater Yellowstone Coalition

Scott Groene

Lander Valley Sportsmen Association

Lloyd Alvis

NAGA Sage Grouse Conservation Committee

Kent L. Christopher

North American Falconer's Association

J. Timothy Kimmel

Natural Resource Consultants

Dr. D.W. Johnson

Popo Agie Conservation District

Jeri Trebelcock

People For Wyoming

Dorothy Bartholomew

Animal Protection Institute

Nancy Whitaker

Fremont County Extension Office

Ron Cunningham

Fremont County Weed and Pest District

Lars Baker

Green Mountain Permittee Association

Judy Whitlock

Western Watershed Project

Jonathan B. Ratner

Jon Marvel

Wyoming Department of Environmental Quality

Phil Ogle

Chuck Harish

Wyoming Wool Growers Association

Bryce Reece

Wyoming Outdoor Council

Meredith Taylor

Wyoming National Bank

Kent Shurtleff

Wyoming Wildlife Federation

Cathy Purvis

Harold Schultz

Tory Taylor

Wyoming Falconer's Association

Kristie Brown

Wyoming State Land & Farm Loan Office

Jim Whalen

Wyoming State Planning Office

Kyndra Miller

Wyoming Stock Growers Association

Jim Magagna

Riverton Chamber of Commerce

Tim Thorson

Sweetwater County Commission

Wally Johnson

Debby Dellai-Boese

Joe Oldfield

The Peregrine Fund Inc.

Tom J. Cade

Calvin W. Hancock

Carla Crofts

Cathy Meyer

Charles T. Faulkner

Cindy L Thompson

Chris Anderson

Craig A. Koppie

Cork Meyer

Bess Johnson

Barbara Myers

Betty Chapman

Burke Teichert

Carl & Carol Dockery

Carolyn Terry

Doug Thompson

Doug and Linda Hill

Debra L. Donahue

Dennis H. Davison

Dennis Meeks

Dan C. Shatto

Dave Lieb

David Ausem

Derek L. Kelley

Dale & Diane Sackett

Don Stewart

Dr. Jason Howard PC

Ella Hakala

Elizabeth Philp

Ellen Fox

Eugene Thompson

Erle D. Osborne

Frank Deede

Frank Philp

Fred Craft

Greg Heckel

Grace Osborne

Rita Jamerman

Jack Corbett

Jim Fustos

Jim Mcgarvey

Jodee Jamerman

John Farley

John Osborne

John Creer

Justin Jamerman

Jim and Carolyn Terry

Kent Parker

Keith Larsen

Glen Gamble DVM

L. Germans & P Hinds

Lonnie Claytor

Laurie Redland

Louise & Mark Engelstad

Lorin Beel

Linda Z. German

Leo and Rosemary Benson

Matte Wilmes

Marjorie Graham

Margaret Appleby

Mary Roberts

Mac Blewer

Michele Sutter

Michael Kuriga

Mike Hudak

Mike Dvorak

Molly Murphree

Mrs. Shawn Wiley

Nadine Graham

Neal Anderson

Paula Hinds

Patricia Dvorak

Pat Hoopengartner
Pat Realing
Patty Slack
Raymond Chapman
Robert Wiley
Roby Wingert
Ray Neiwert
Rick Wilmes
Richard Larsen
Richard D. Craddock Jr.
Ron Cunningham
Ron And Jackie Lucas
Roy Roathe PHD
Robert C. Croft
Shannon Kelley
Scott Harnsberger
Shirley Townsend
Staff SGT. Ryan German USMC
Stan Moore

Steve Wilson
Suzanne Semich
Teddi Y. Winge
Teresa Fox
Thad Dockery
Tyler Murphree
William & Annette Bregar
William S. Hancock
Williams Porter Day & Neville PC
Wyoma D. Burris
Yvonne Claytor
Jim Hill
Ludlow Clark
Craig Koppie
Steve Platte
Bill Maiers
Lois Herbst
Rev. Floyd Schwiege

Appendix 24

Appendix 24 shows the photos that are referenced on Map 3-9 of the Seminole Cutoff of the Oregon/Mormon/California/Pony Express National Historic Trails (OMCPE Trail).

Map 3-9: Seminoe Cutoff Trail Segments

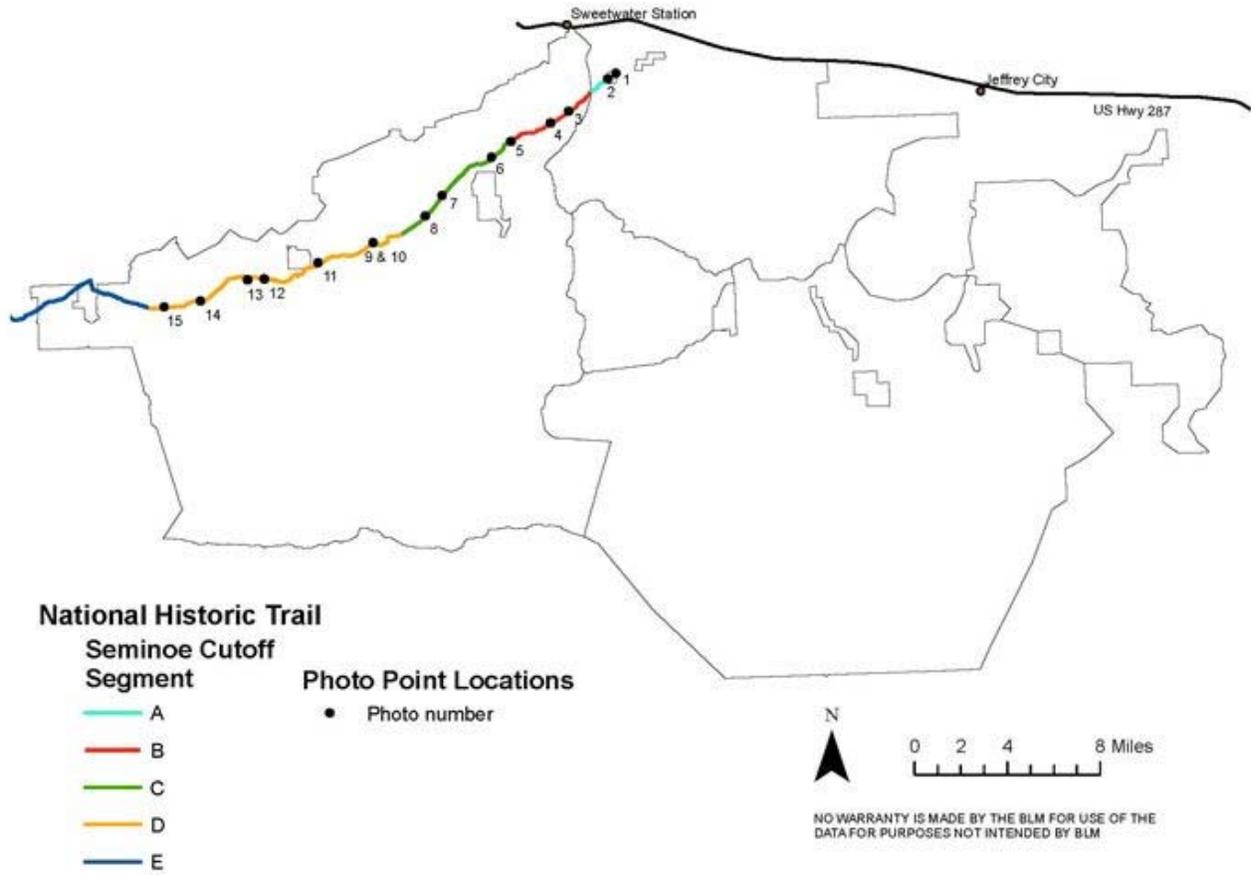




Photo 1: Segment "A" of the Seminoe Cutoff, looking west along Warm Springs Creek. Segment A starts at the beginning of the Seminoe Cutoff and ends at the Bison Basin Road. This 1½-mile long segment condition is considered 'good'. Fences and an upgraded road are modern intrusions along this segment, but they are minor enough that they do not affect the overall 'good' condition of the segment and its settings.



Photo 2: From Segment "A" of the Seminoe Cutoff, looking south along private land fence on Warm Springs Creek. Segment A starts at the beginning of the Seminoe Cutoff and ends at the Bison Basin Road. This 1½-mile long segment condition is considered 'good'. Fences and an upgraded road are modern intrusions along this segment, but they are minor enough that they do not affect the overall 'good' condition of the segment and its settings.



Photo 3: Segment "B" of the Seminoe Cutoff, looking west. Segment B starts at the Bison Basin Road and ends just before the trail descends into the Alkali Creek valley. This 4½-mile long segment's condition is considered 'fair-good': the integrity of its ruts and swales is fair, and the integrity of its historical setting ranges from good to fair. Several old, unreclaimed well pads, the AT&T telephone cable, a fence, evidence of blading along the trail, and a few bladed roads are some of the modern impacts to this segment. Although the segment is still considered significant, the impacts along it have resulted in a 'fair-good' rating.



Photo 4: Segment "B" of the Seminoe Cutoff, looking west. Segment B starts at the Bison Basin Road and ends just before the trail descends into the Alkali Creek valley. This 4½-mile long segment's condition is considered 'fair-good': the integrity of its ruts and swales is fair, and the integrity of its historical setting ranges from good to fair. Several old, unreclaimed well pads, the AT&T telephone cable, a fence, evidence of blading along the trail, and a few bladed roads are some of the modern impacts to this segment. Although the segment is still considered significant, the impacts along it have resulted in a 'fair-good' rating.



Photo 5: Segment “B” of the Seminoe Cutoff, looking west. Segment B starts at the Bison Basin Road and ends just before the trail descends into the Alkali Creek valley. This 4½-mile long segment’s condition is considered ‘fair-good’: the integrity of its ruts and swales is fair, and the integrity of its historical setting ranges from good to fair. Several old, unreclaimed well pads, the AT&T telephone cable, a fence, evidence of blading along the trail, and a few bladed roads are some of the modern impacts to this segment. Although the segment is still considered significant, the impacts along it have resulted in a ‘fair-good’ rating.



Photo 6: Segment "C" of the Seminoe Cutoff, looking west into the Alkali Creek valley. Segment C starts just east of the Alkali Creek valley and ends a little northeast of North Bear Mountain. This six-mile long segment's condition is considered 'good-excellent'. One unreclaimed well pad, the AT&T telephone cable, a windmill, and a trough are the modern impacts visible along this segment, but they are minor enough that they do not affect the overall 'good-excellent' condition of the segment and its settings.



Photo 7: Segment "C" of the Seminoe Cutoff, looking west. Segment C starts just east of the Alkali Creek valley and ends a little northeast of North Bear Mountain. This six-mile long segment's condition is considered 'good-excellent'. One unreclaimed well pad, the AT&T telephone cable, a windmill, and a trough are the modern impacts visible along this segment, but they are minor enough that they do not affect the overall 'good-excellent' condition of the segment and its settings.



Photo 8: Segment "C" of the Seminoe Cutoff, looking west. Segment C starts just east of the Alkali Creek valley and ends a little northeast of North Bear Mountain. This six-mile long segment's condition is considered 'good-excellent'. One unreclaimed well pad, the AT&T telephone cable, a windmill, and a trough are the modern impacts visible along this segment, but they are minor enough that they do not affect the overall 'good-excellent' condition of the segment and its settings.



Photo 9: Segment "D" of the Seminoe Cutoff, looking west.



Photo 10: From Segment "D" of the Seminoe Cutoff, looking northwest at the AT&T telephone line (abandoned).

Segment D begins slightly northeast of North Bear Mountain and ends at the 3 Forks-Atlantic City Road. This 11-mile long segment's condition is considered 'excellent ': this segment possesses excellent integrity of ruts, and mostly excellent integrity of the historical setting around the trail. The historical and scenic settings along this segment are very good, and very few modern intrusions are present. The AT&T telephone cable scar is nearly healed and is often difficult to see, and other than one regular fence (on state land) and one buck and pole fence, the segment is untouched by modern intrusions until it reaches the 3 Forks-Atlantic City Road.



Photo 11: Segment “D” of the Seminoe Cutoff, looking west. Segment D begins slightly northeast of North Bear Mountain and ends at the 3 Forks-Atlantic City Road. This 11-mile long segment’s condition is considered ‘excellent’: this segment possesses excellent integrity of ruts, and mostly excellent integrity of the historical setting around the trail. The historical and scenic settings along this segment are very good, and very few modern intrusions are present. The AT&T telephone cable scar is nearly healed and is often difficult to see, and other than one regular fence (on state land) and one buck and pole fence, the segment is untouched by modern intrusions until it reaches the 3 Forks-Atlantic City Road.



Photo 12: Segment "D" of the Seminoe Cutoff, looking west. Segment D begins slightly northeast of North Bear Mountain and ends at the 3 Forks-Atlantic City Road. This 11-mile long segment's condition is considered 'excellent': this segment possesses excellent integrity of ruts, and mostly excellent integrity of the historical setting around the trail. The historical and scenic settings along this segment are very good, and very few modern intrusions are present. The AT&T telephone cable scar is nearly healed and is often difficult to see, and other than one regular fence (on state land) and one buck and pole fence, the segment is untouched by modern intrusions until it reaches the 3 Forks-Atlantic City Road.



Photo 13: From Segment "D" of the Seminoe Cutoff, looking northwest. Segment D begins slightly northeast of North Bear Mountain and ends at the 3 Forks-Atlantic City Road. This 11-mile long segment's condition is considered 'excellent': this segment possesses excellent integrity of ruts, and mostly excellent integrity of the historical setting around the trail. The historical and scenic settings along this segment are very good, and very few modern intrusions are present. The AT&T telephone cable scar is nearly healed and is often difficult to see, and other than one regular fence (on state land) and one buck and pole fence, the segment is untouched by modern intrusions until it reaches the 3 Forks-Atlantic City Road.



Photo 14: Segment "D" of the Seminoe Cutoff, looking west. Segment D begins slightly northeast of North Bear Mountain and ends at the 3 Forks-Atlantic City Road. This 11-mile long segment's condition is considered 'excellent': this segment possesses excellent integrity of ruts, and mostly excellent integrity of the historical setting around the trail. The historical and scenic settings along this segment are very good, and very few modern intrusions are present. The AT&T telephone cable scar is nearly healed and is often difficult to see, and other than one regular fence (on state land) and one buck and pole fence, the segment is untouched by modern intrusions until it reaches the 3 Forks-Atlantic City Road.



Photo 15: From Segment "D" of the Seminoe Cutoff, looking west. Segment D begins slightly northeast of North Bear Mountain and ends at the 3 Forks-Atlantic City Road. This 11-mile long segment's condition is considered 'excellent': this segment possesses excellent integrity of ruts, and mostly excellent integrity of the historical setting around the trail. The historical and scenic settings along this segment are very good, and very few modern intrusions are present. The AT&T telephone cable scar is nearly healed and is often difficult to see, and other than one regular fence (on state land) and one buck and pole fence, the segment is untouched by modern intrusions until it reaches the 3 Forks-Atlantic City Road.

Segment E starts at the 3 Forks-Atlantic City Road and ends at the GMCA boundary fence near Long Slough. This five-mile long segment's condition is considered 'poor-good': this segment's ruts and swales have been destroyed in several places, and the remaining ruts and settings up to Section 27 have been impacted by the presence of upgraded roads, fences, and corrals. The trail in Section 27, however, has good integrity of ruts, and does not have modern visual intrusions around it; this final portion of trail within this segment is rated as "good".

APPENDIX 25

**Tables and Graphs
Green Mountain Common Allotment
March 17, 2008**

Grazing Section:

Table 1

Sheep AUMs (By Year and Alternative)

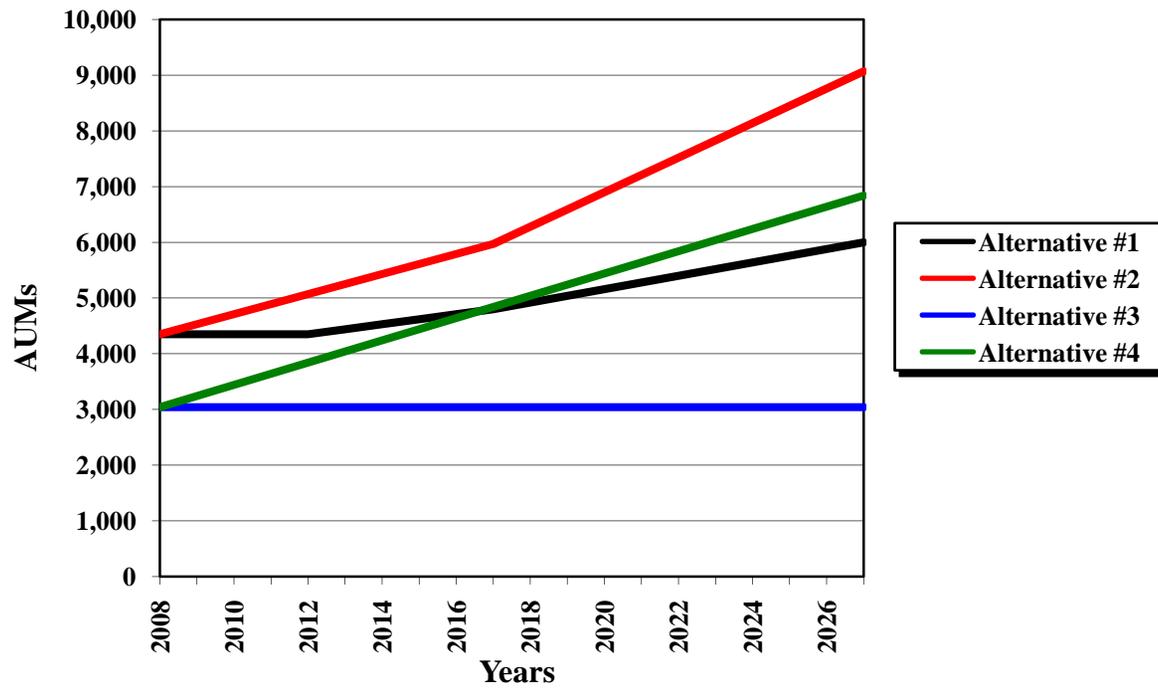
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Alternative #1	4,350	4,350	4,350	4,350	4,350	4,440	4,530	4,620	4,710	4,800
Alternative #2	4,350	4,530	4,710	4,890	5,070	5,250	5,430	5,610	5,790	5,970
Alternative #3	3,040	3,040	3,040	3,040	3,040	3,040	3,040	3,040	3,040	3,040
Alternative #4	3,040	3,240	3,440	3,640	3,840	4,040	4,240	4,440	4,640	4,840

Table 1 (Cont.)

Sheep AUMs (Cont. By Year and Alternative)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Alternative #1	4,920	5,040	5,160	5,280	5,400	5,520	5,640	5,760	5,880	6,000
Alternative #2	6,280	6,590	6,900	7,210	7,520	7,830	8,140	8,450	8,760	9,070
Alternative #3	3,040	3,040	3,040	3,040	3,040	3,040	3,040	3,040	3,040	3,040
Alternative #4	5,040	5,240	5,440	5,640	5,840	6,040	6,240	6,440	6,640	6,840

Sheep AUMs¹



¹BLM specialist estimate

Table 2

Cattle AUMs (By Year and Alternative)

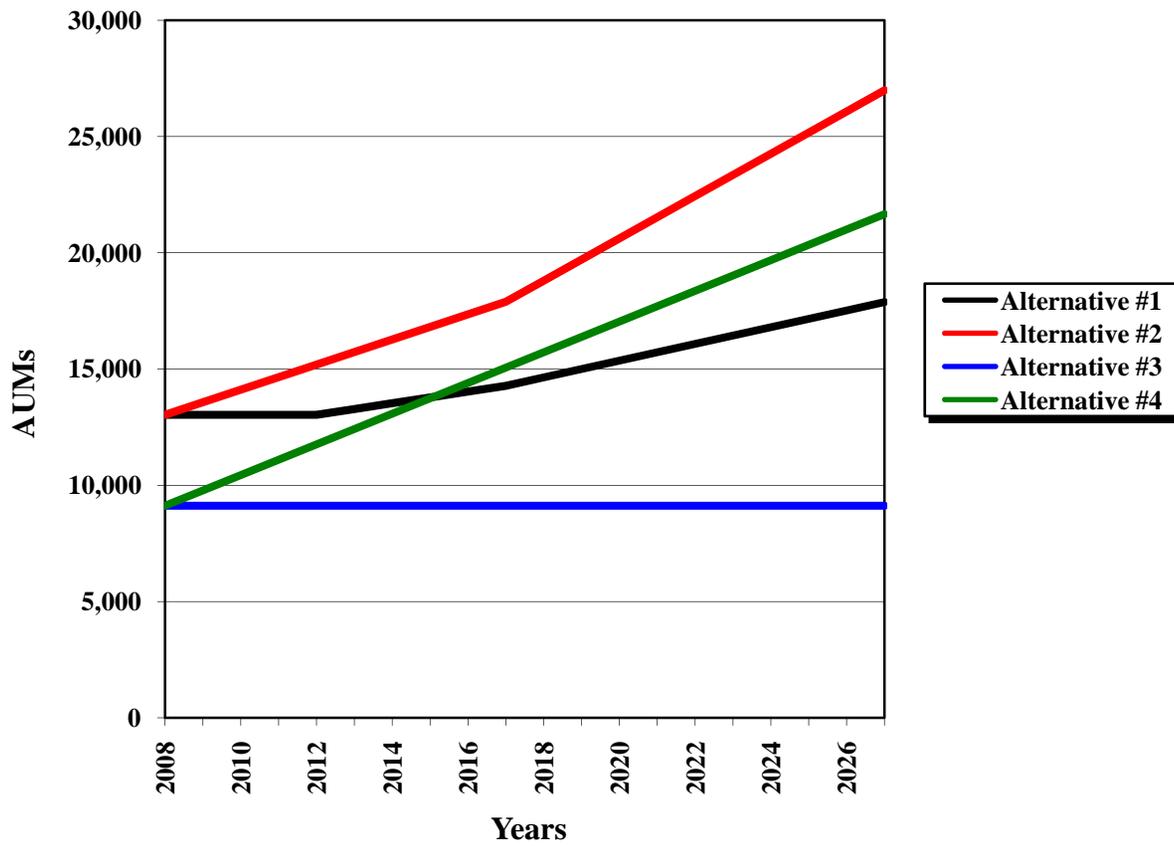
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Alternative #1	13,030	13,030	13,030	13,030	13,030	13,280	13,530	13,780	14,030	14,280
Alternative #2	13,030	13,570	14,110	14,650	15,190	15,730	16,270	16,810	17,350	17,890
Alternative #3	9,120	9,120	9,120	9,120	9,120	9,120	9,120	9,120	9,120	9,120
Alternative #4	9,120	9,780	10,440	11,100	11,760	12,420	13,080	13,740	14,400	15,060

Table 2 (Cont.)

Cattle AUMs (Cont. By Year and Alternative)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Alternative #1	14,640	15,000	15,360	15,720	16,080	16,440	16,800	17,160	17,520	17,880
Alternative #2	18,800	19,710	20,620	21,530	22,440	23,350	24,260	25,170	26,080	26,990
Alternative #3	9,120	9,120	9,120	9,120	9,120	9,120	9,120	9,120	9,120	9,120
Alternative #4	15,720	16,380	17,040	17,700	18,360	19,020	19,680	20,340	21,000	21,660

Cattle AUMs¹



¹BLM specialist estimate

Table 3

Total AUMs (By Year and Alternative)

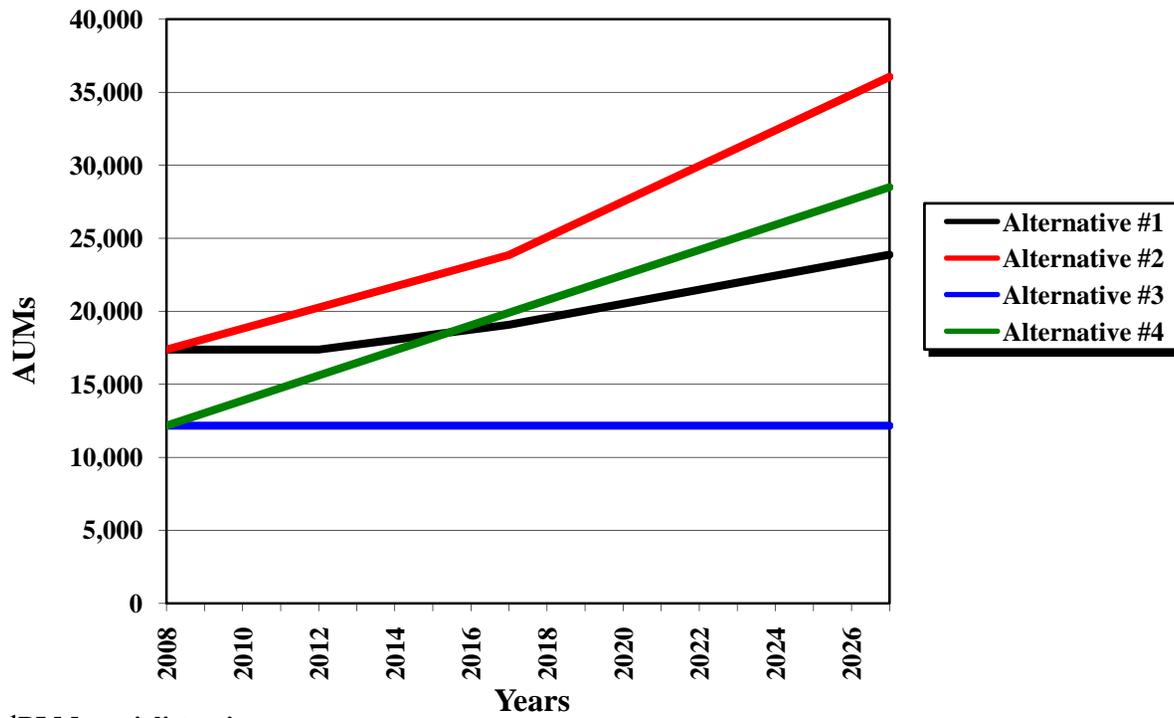
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Alternative #1	17,380	17,380	17,380	17,380	17,380	17,720	18,060	18,400	18,740	19,080
Alternative #2	17,380	18,100	18,820	19,540	20,260	20,980	21,700	22,420	23,140	23,860
Alternative #3	12,160	12,160	12,160	12,160	12,160	12,160	12,160	12,160	12,160	12,160
Alternative #4	12,160	13,020	13,880	14,740	15,600	16,460	17,320	18,180	19,040	19,900

Table 3 (Cont.)

Total AUMs (Cont. By Year and Alternative)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Alternative #1	19,560	20,040	20,520	21,000	21,480	21,960	22,440	22,920	23,400	23,880
Alternative #2	25,080	26,300	27,520	28,740	29,960	31,180	32,400	33,620	34,840	36,060
Alternative #3	12,160	12,160	12,160	12,160	12,160	12,160	12,160	12,160	12,160	12,160
Alternative #4	20,760	21,620	22,480	23,340	24,200	25,060	25,920	26,780	27,640	28,500

Total AUMs¹



¹BLM specialist estimate

Recreation Section:

Table 4

Deer Visitor Days (By Year and Alternative)

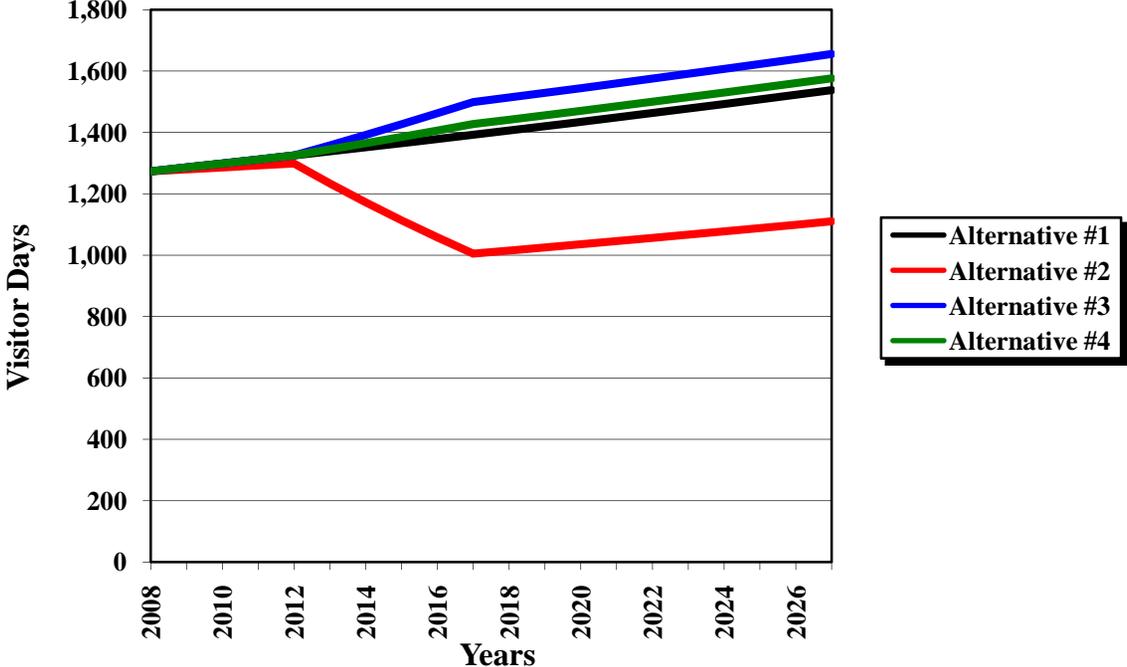
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Alternative #1	1,273	1,286	1,299	1,312	1,325	1,338	1,351	1,365	1,378	1,392
Alternative #2	1,273	1,279	1,286	1,292	1,299	1,234	1,172	1,113	1,058	1,005
Alternative #3	1,273	1,286	1,299	1,312	1,325	1,358	1,392	1,427	1,462	1,499
Alternative #4	1,273	1,286	1,299	1,312	1,325	1,345	1,365	1,385	1,406	1,427

Table 4 (Cont.)

Deer Visitor Days (Cont. By Year and Alternative)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Alternative #1	1,406	1,420	1,434	1,449	1,463	1,478	1,493	1,508	1,523	1,538
Alternative #2	1,015	1,025	1,035	1,046	1,056	1,067	1,077	1,088	1,099	1,110
Alternative #3	1,514	1,529	1,544	1,560	1,575	1,591	1,607	1,623	1,639	1,656
Alternative #4	1,441	1,456	1,470	1,485	1,500	1,515	1,530	1,545	1,561	1,576

Deer Visitor Days¹



¹BLM Specialist estimate

Table 5

Antelope Visitor Days (By Year and Alternative)

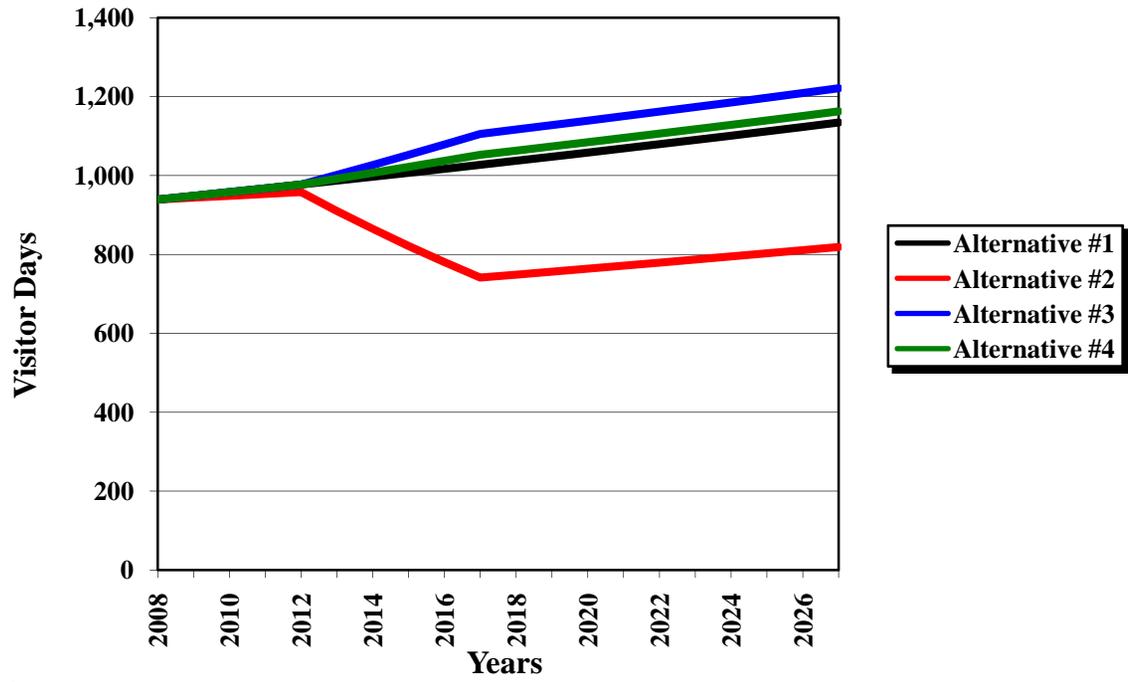
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Alternative #1	939	948	958	967	977	987	997	1,007	1,017	1,027
Alternative #2	939	944	948	953	958	910	865	821	780	741
Alternative #3	939	948	958	967	977	1,002	1,027	1,052	1,079	1,106
Alternative #4	939	948	958	967	977	992	1,007	1,022	1,037	1,053

Table 5 (Cont.)

Antelope Visitor Days (Cont. By Year and Alternative)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Alternative #1	1,037	1,048	1,058	1,069	1,079	1,090	1,101	1,112	1,123	1,134
Alternative #2	749	756	764	771	779	787	795	803	811	819
Alternative #3	1,117	1,128	1,139	1,150	1,162	1,174	1,185	1,197	1,209	1,221
Alternative #4	1,063	1,074	1,085	1,095	1,106	1,117	1,129	1,140	1,151	1,163

Antelope Visitor Days¹



¹BLM Specialist estimate

Table 6

Elk Visitor Days (By Year and Alternative)

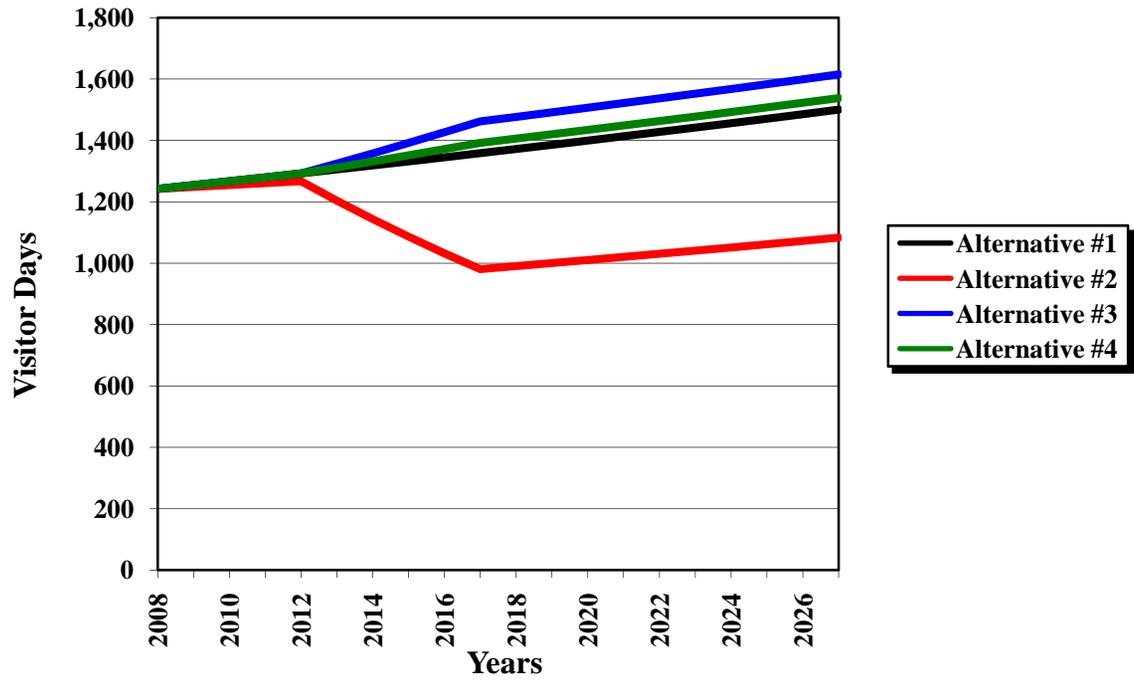
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Alternative #1	1,242	1,254	1,267	1,280	1,292	1,305	1,318	1,332	1,345	1,358
Alternative #2	1,242	1,248	1,254	1,261	1,267	1,204	1,143	1,086	1,032	980
Alternative #3	1,242	1,254	1,267	1,280	1,292	1,325	1,358	1,392	1,427	1,462
Alternative #4	1,242	1,254	1,267	1,280	1,292	1,312	1,331	1,351	1,372	1,392

Table 6 (Cont.)

Elk Visitor Days (Cont. By Year and Alternative)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Alternative #1	1,372	1,386	1,400	1,414	1,428	1,442	1,456	1,471	1,486	1,500
Alternative #2	990	1,000	1,010	1,020	1,030	1,041	1,051	1,062	1,072	1,083
Alternative #3	1,477	1,492	1,507	1,522	1,537	1,552	1,568	1,583	1,599	1,615
Alternative #4	1,406	1,420	1,435	1,449	1,463	1,478	1,493	1,508	1,523	1,538

Elk Visitor Days¹



¹BLM Specialist estimate

Table 7

Upland Game & Waterfowl Visitor Days (By Year and Alternative)

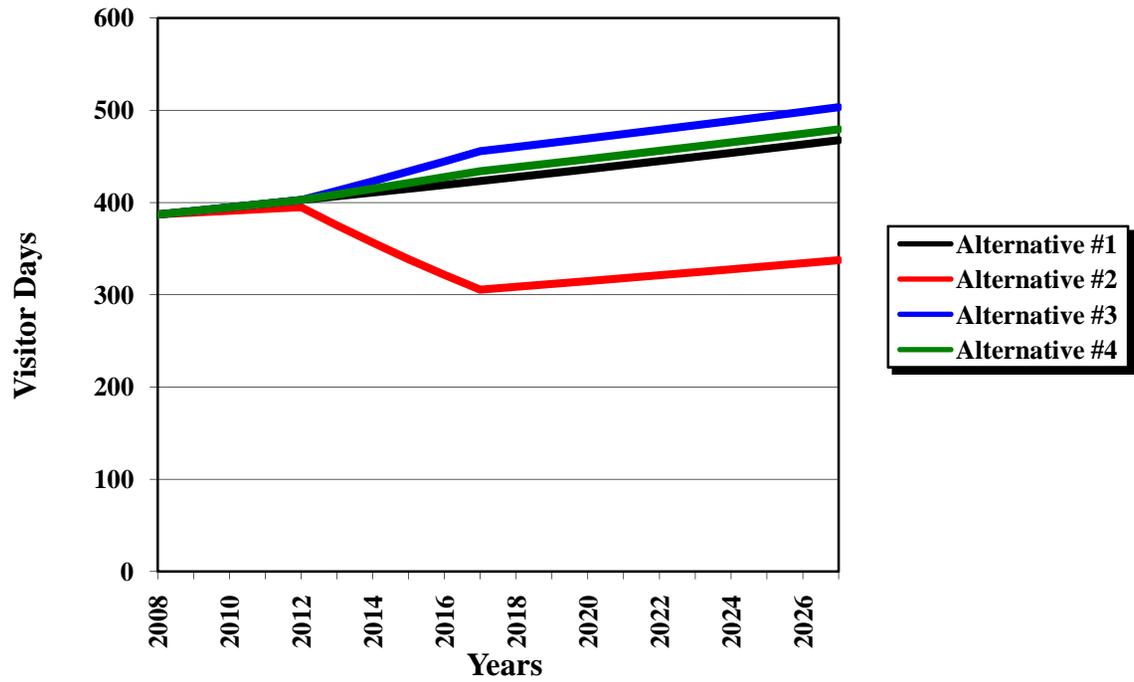
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Alternative #1	387	391	395	399	403	407	411	415	419	423
Alternative #2	387	389	391	393	395	375	356	338	322	305
Alternative #3	387	391	395	399	403	413	423	434	445	456
Alternative #4	387	391	395	399	403	409	415	421	427	434

Table 7 (Cont.)

Upland Game & Waterfowl Visitor Days (Cont. By Year and Alternative)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Alternative #1	427	432	436	440	445	449	454	458	463	468
Alternative #2	309	312	315	318	321	324	328	331	334	337
Alternative #3	460	465	469	474	479	484	489	493	498	503
Alternative #4	438	443	447	451	456	461	465	470	474	479

Upland Game & Waterfowl Visitor Days¹



¹BLM Specialist estimate

Table 8

Small Game Visitor Days (By Year and Alternative)

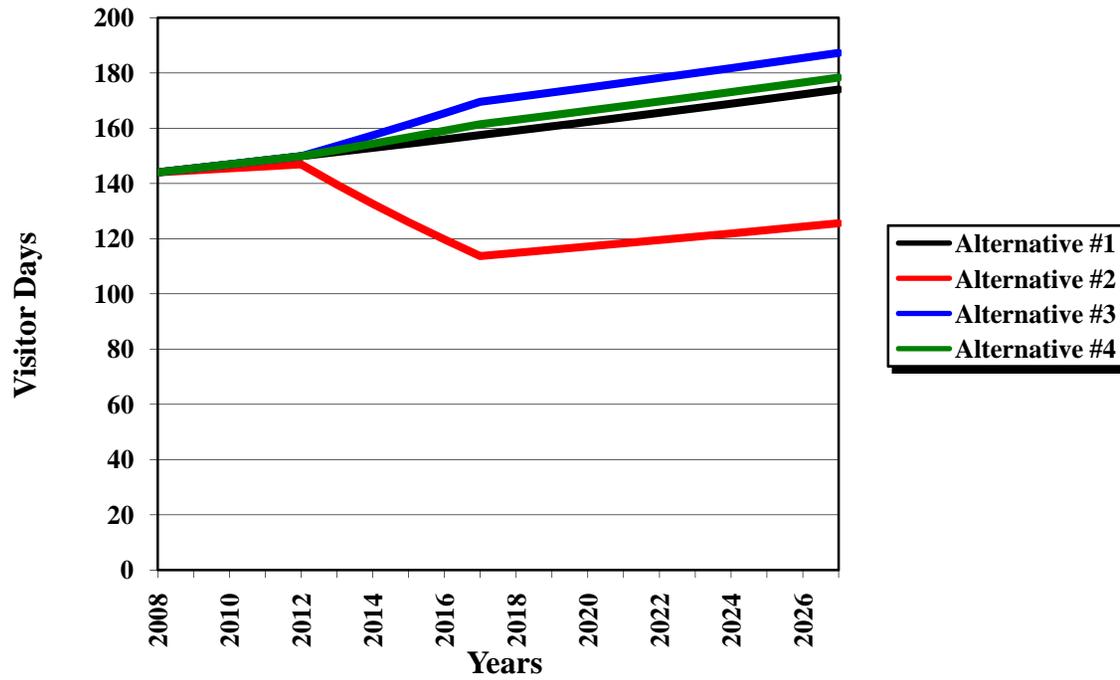
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Alternative #1	144	145	147	148	150	151	153	154	156	157
Alternative #2	144	145	145	146	147	140	133	126	120	114
Alternative #3	144	145	147	148	150	154	157	161	165	170
Alternative #4	144	145	147	148	150	152	154	157	159	161

Table 8 (Cont.)

Small Game Visitor Days (Cont. By Year and Alternative)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Alternative #1	159	161	162	164	166	167	169	171	172	174
Alternative #2	115	116	117	118	119	121	122	123	124	126
Alternative #3	171	173	175	176	178	180	182	184	185	187
Alternative #4	163	165	166	168	170	171	173	175	177	178

Small Game Visitor Days¹



¹BLM Specialist estimate

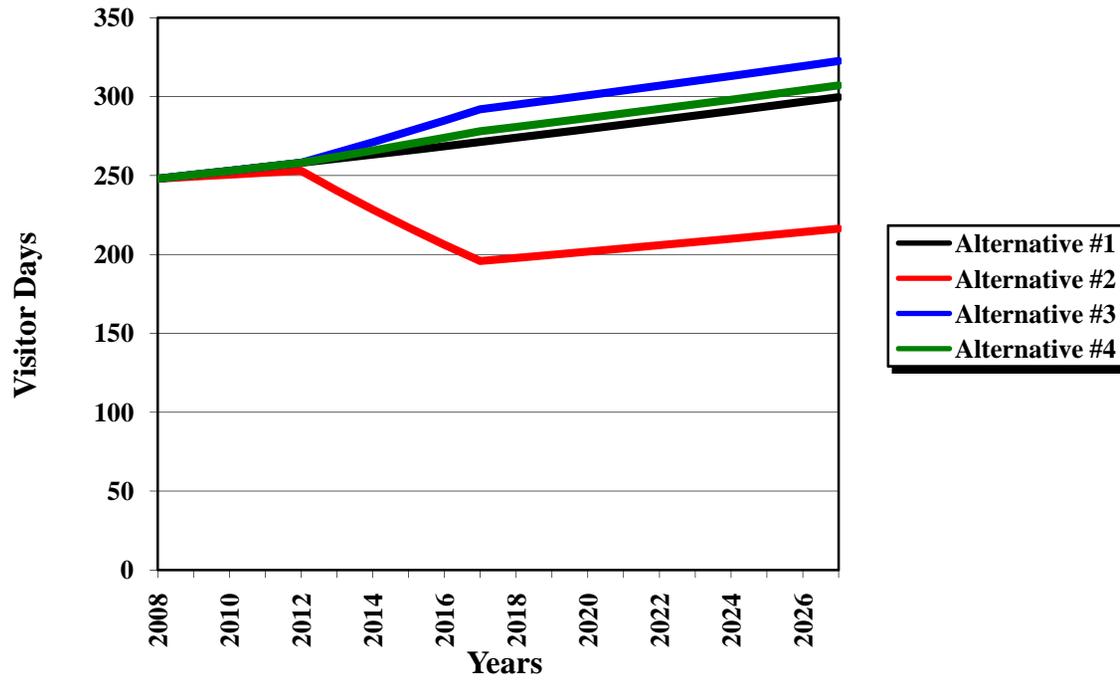
Table 9

Fishing Visitor Days (By Year and Alternative)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Alternative #1	248	250	253	256	258	261	263	266	269	271
Alternative #2	248	249	250	252	253	240	228	217	206	196
Alternative #3	248	250	253	256	258	265	271	278	285	292
Alternative #4	248	250	253	256	258	262	266	270	274	278

Table 9 (Cont.)

Fishing Visitor Days (Cont. By Year and Alternative)	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Alternative #1	274	277	279	282	285	288	291	294	297	300
Alternative #2	198	200	202	204	206	208	210	212	214	216
Alternative #3	295	298	301	304	307	310	313	316	319	323
Alternative #4	281	284	286	289	292	295	298	301	304	307

Fishing Visitor Days¹



¹BLM Specialist estimate

Table 10

Camping Visitor Days (By Year and Alternative)

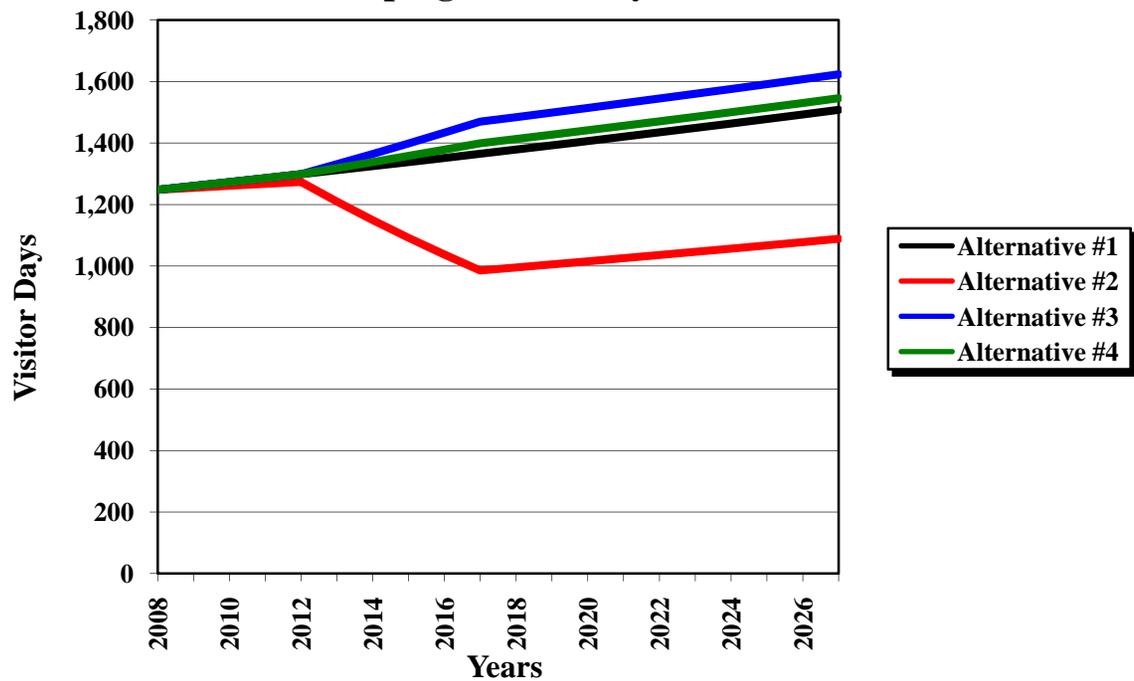
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Alternative #1	1,248	1,260	1,273	1,286	1,299	1,312	1,325	1,338	1,351	1,365
Alternative #2	1,248	1,254	1,261	1,267	1,273	1,209	1,149	1,092	1,037	985
Alternative #3	1,248	1,260	1,273	1,286	1,299	1,331	1,364	1,399	1,433	1,469
Alternative #4	1,248	1,260	1,273	1,286	1,299	1,318	1,338	1,358	1,378	1,399

Table 10 (Cont.)

Camping Visitor Days (Cont. By Year and Alternative)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Alternative #1	1,379	1,392	1,406	1,420	1,435	1,449	1,463	1,478	1,493	1,508
Alternative #2	995	1,005	1,015	1,025	1,035	1,046	1,056	1,067	1,077	1,088
Alternative #3	1,484	1,499	1,514	1,529	1,544	1,560	1,575	1,591	1,607	1,623
Alternative #4	1,413	1,427	1,441	1,456	1,470	1,485	1,500	1,515	1,530	1,545

Camping Visitor Days¹



¹BLM Specialist estimate

Table 11

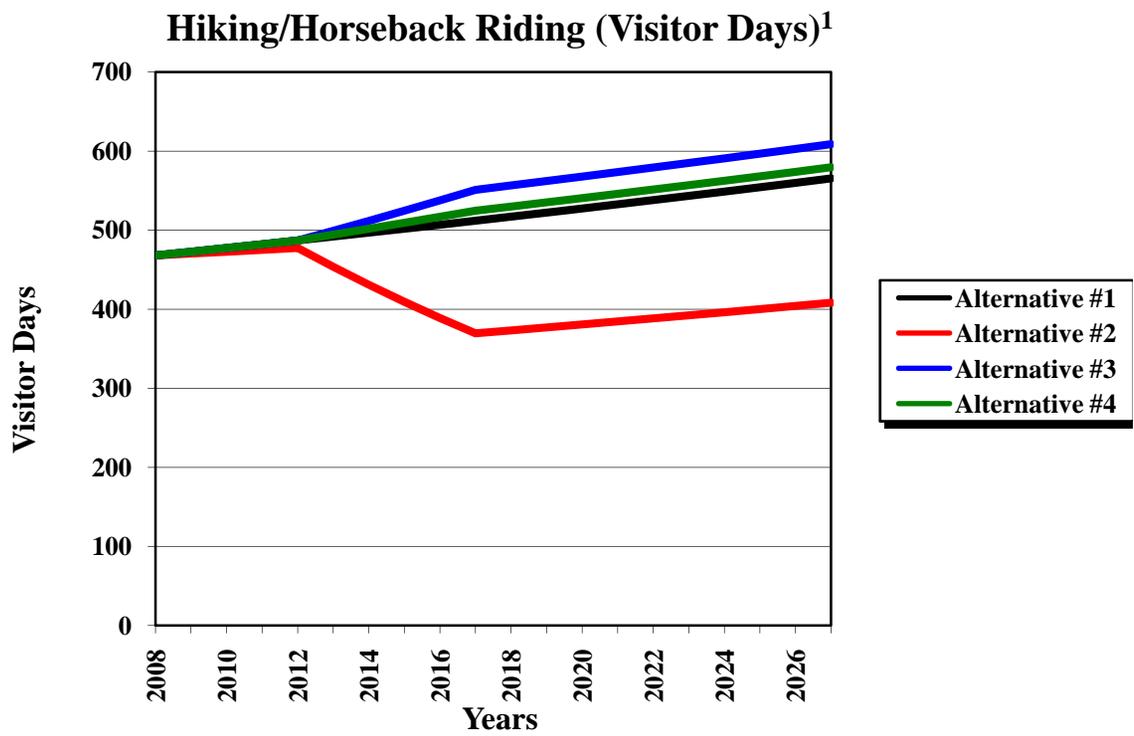
Hiking/Horseback Riding Visitor Days (By Year and Alternative)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Alternative #1	468	473	477	482	487	492	497	502	507	512
Alternative #2	468	470	473	475	477	454	431	409	389	369
Alternative #3	468	473	477	482	487	499	512	524	538	551
Alternative #4	468	473	477	482	487	494	502	509	517	525

Table 11 (Cont.)

Hiking/Horseback Riding Visitor Days (Cont. By Year and Alternative)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Alternative #1	517	522	527	533	538	543	549	554	560	565
Alternative #2	373	377	381	384	388	392	396	400	404	408
Alternative #3	557	562	568	573	579	585	591	597	603	609
Alternative #4	530	535	541	546	551	557	562	568	574	580



¹BLM Specialist estimate

Table 12

Biking Visitor Days (By Year and Alternative)

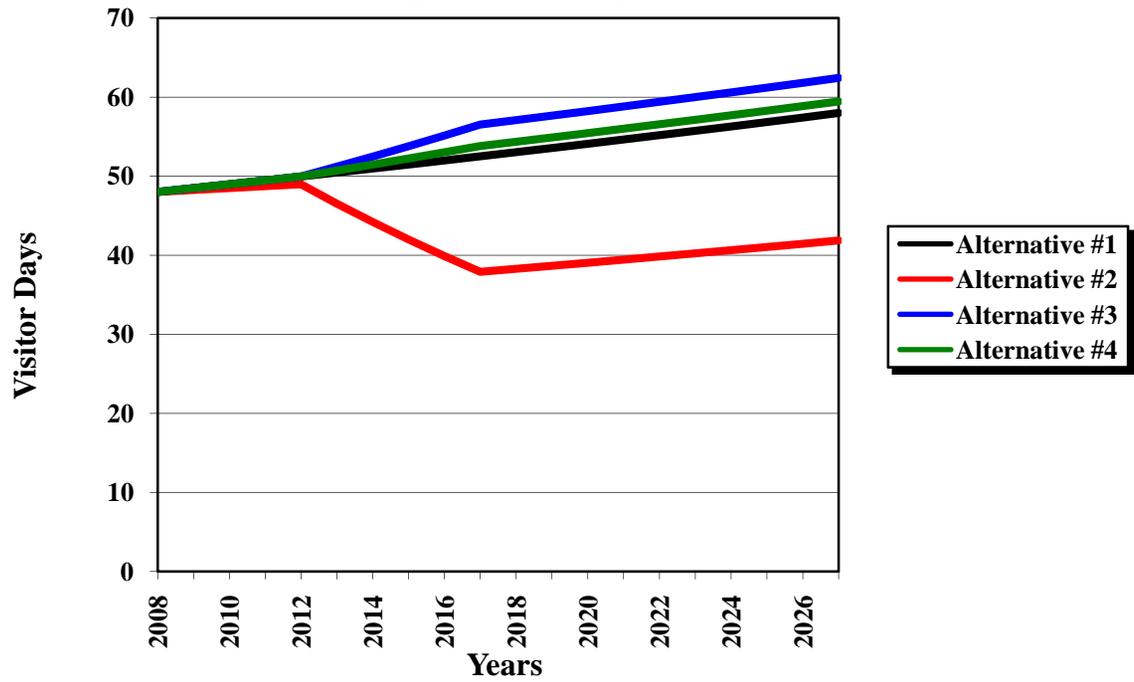
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Alternative #1	48	48	49	49	50	50	51	51	52	52
Alternative #2	48	48	48	49	49	47	44	42	40	38
Alternative #3	48	48	49	49	50	51	52	54	55	57
Alternative #4	48	48	49	49	50	51	51	52	53	54

Table 12 (Cont.)

Biking Visitor Days (Cont. By Year and Alternative)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Alternative #1	53	54	54	55	55	56	56	57	57	58
Alternative #2	38	39	39	39	40	40	41	41	41	42
Alternative #3	57	58	58	59	59	60	61	61	62	62
Alternative #4	54	55	55	56	57	57	58	58	59	59

Biking (Visitor Days)¹



¹BLM Specialist estimate

Table 13

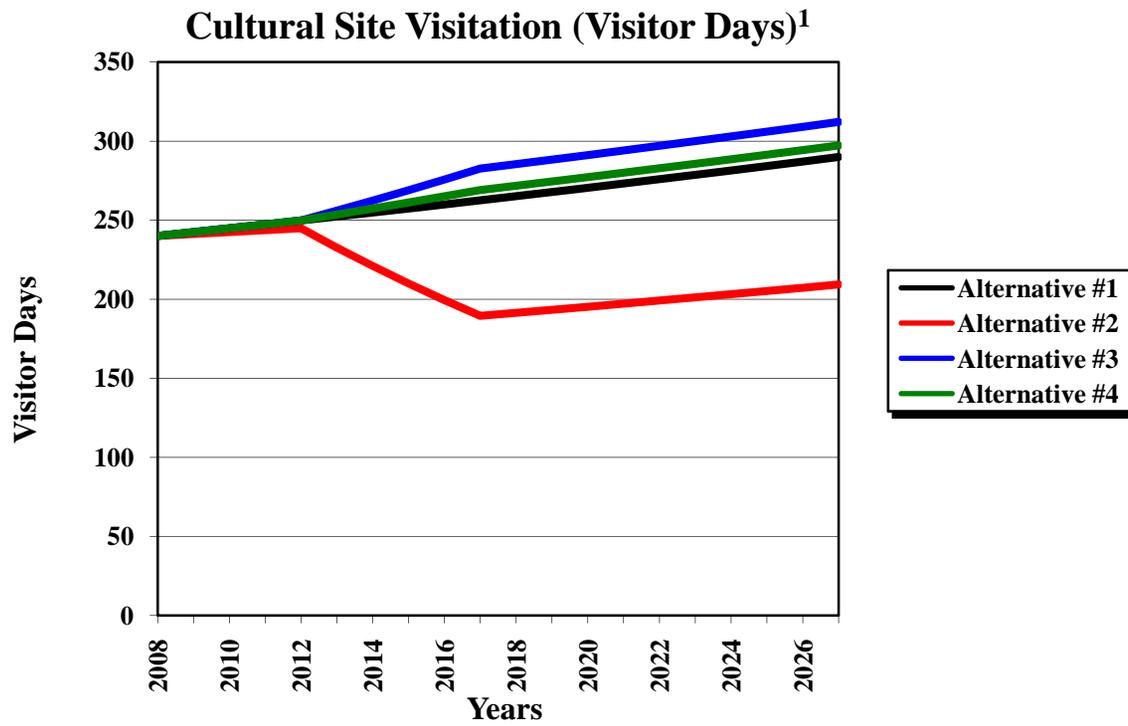
Cultural Site Visitor Days (By Year and Alternative)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Alternative #1	240	242	245	247	250	252	255	257	260	262
Alternative #2	240	241	242	244	245	233	221	210	199	189
Alternative #3	240	242	245	247	250	256	262	269	276	283
Alternative #4	240	242	245	247	250	253	257	261	265	269

Table 13 (Cont.)

Cultural Site Visitor Days (Cont. By Year and Alternative)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Alternative #1	265	268	270	273	276	279	281	284	287	290
Alternative #2	191	193	195	197	199	201	203	205	207	209
Alternative #3	285	288	291	294	297	300	303	306	309	312
Alternative #4	272	274	277	280	283	286	288	291	294	297



¹BLM Specialist estimate

Table 14

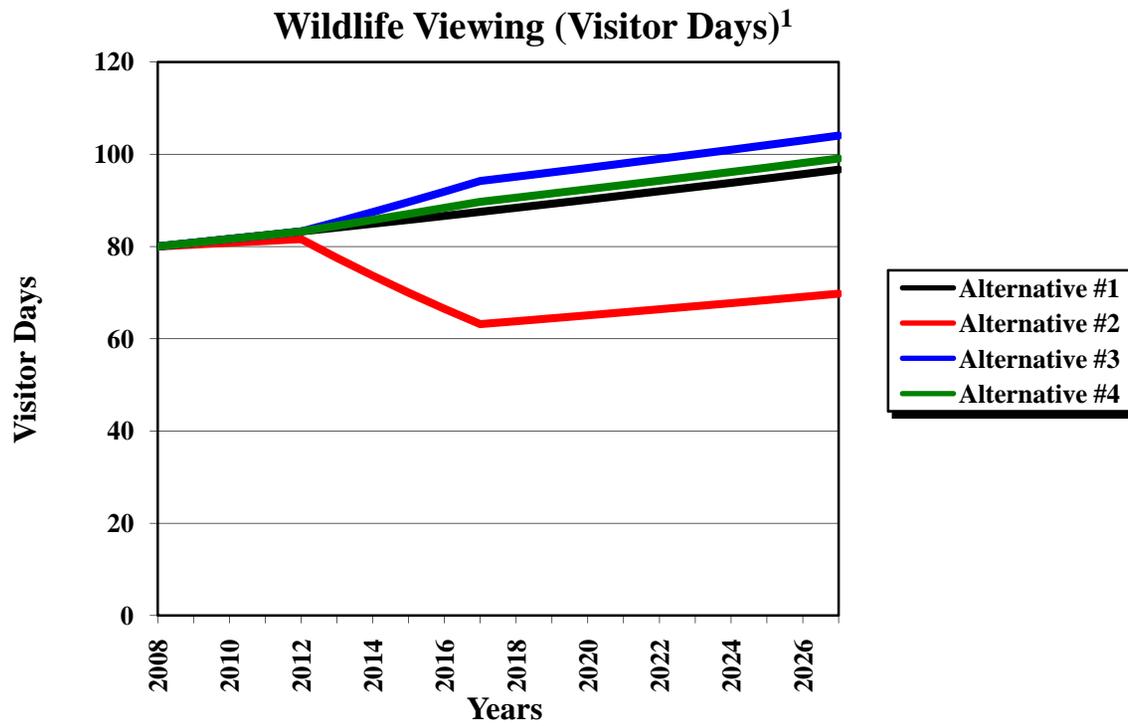
Wildlife Viewing Visitor Days (By Year and Alternative)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Alternative #1	80	81	82	82	83	84	85	86	87	87
Alternative #2	80	80	81	81	82	78	74	70	66	63
Alternative #3	80	81	82	82	83	85	87	90	92	94
Alternative #4	80	81	82	82	83	84	86	87	88	90

Table 14 (Cont.)

Wildlife Viewing Visitor Days (Cont. By Year and Alternative)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Alternative #1	88	89	90	91	92	93	94	95	96	97
Alternative #2	64	64	65	66	66	67	68	68	69	70
Alternative #3	95	96	97	98	99	100	101	102	103	104
Alternative #4	91	91	92	93	94	95	96	97	98	99



¹BLM Specialist estimate

Table 15

Wild horse Viewing Visitor Days (By Year and Alternative)

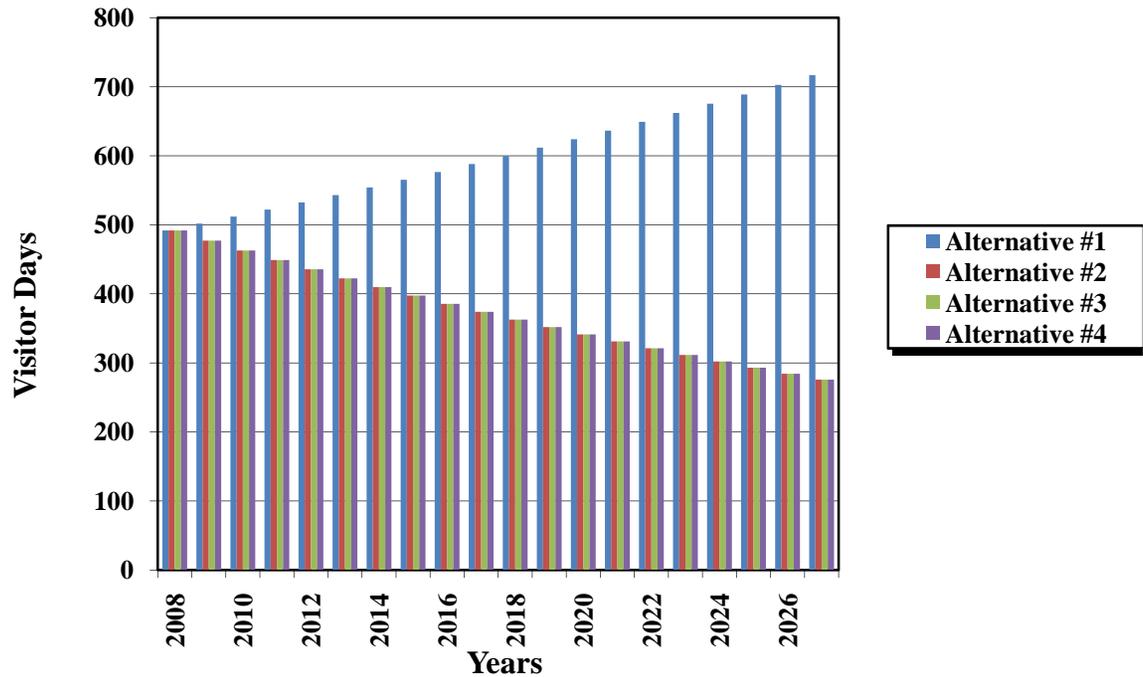
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Alternative #1	492	502	512	522	533	543	554	565	576	588
Alternative #2	492	477	463	449	436	422	410	398	386	374
Alternative #3	492	477	463	449	436	422	410	398	386	374
Alternative #4	492	477	463	449	436	422	410	398	386	374

Table 15 (Cont.)

Wild horse Viewing Visitor Days (Cont. By Year and Alternative)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Alternative #1	600	612	624	636	649	662	675	689	703	717
Alternative #2	363	352	341	331	321	312	302	293	284	276
Alternative #3	363	352	341	331	321	312	302	293	284	276
Alternative #4	363	352	341	331	321	312	302	293	284	276

Wild Horse Viewing (Visitor Days)¹



¹BLM Specialist estimate

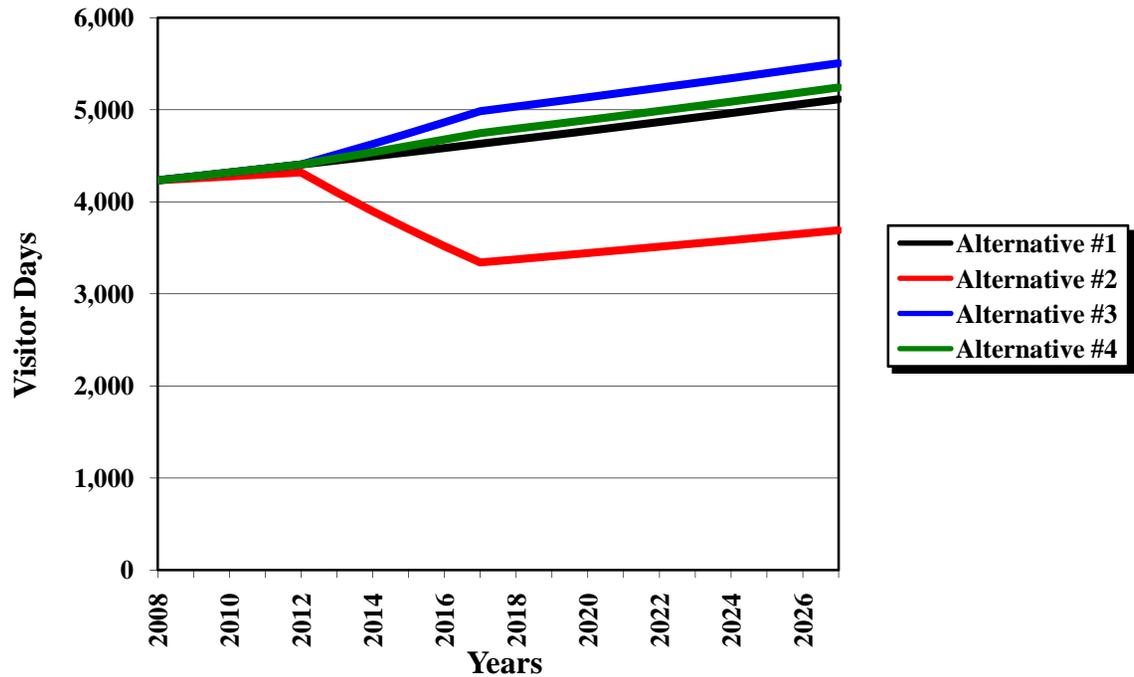
Table 16

Total Consumptive Visitor Days (By Year and Alternative)										
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Alternative #1	4,233	4,275	4,318	4,361	4,405	4,449	4,493	4,538	4,584	4,630
Alternative #2	4,233	4,254	4,275	4,297	4,318	4,102	3,897	3,702	3,517	3,341
Alternative #3	4,233	4,275	4,318	4,361	4,405	4,515	4,628	4,744	4,862	4,984
Alternative #4	4,233	4,275	4,318	4,361	4,405	4,471	4,538	4,606	4,675	4,745

Table 16 (Cont.)

Total Consumptive Visitor Days (Cont. By Year and Alternative)										
	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Alternative #1	4,676	4,723	4,770	4,818	4,866	4,914	4,964	5,013	5,063	5,114
Alternative #2	3,375	3,409	3,443	3,477	3,512	3,547	3,582	3,618	3,654	3,691
Alternative #3	5,034	5,084	5,135	5,186	5,238	5,290	5,343	5,397	5,451	5,505
Alternative #4	4,793	4,841	4,889	4,938	4,987	5,037	5,088	5,138	5,190	5,242

Total Consumptive Visitor Days¹



¹BLM Specialist estimate

Table 17

Total Nonconsumptive Visitor Days (By Year and Alternative)

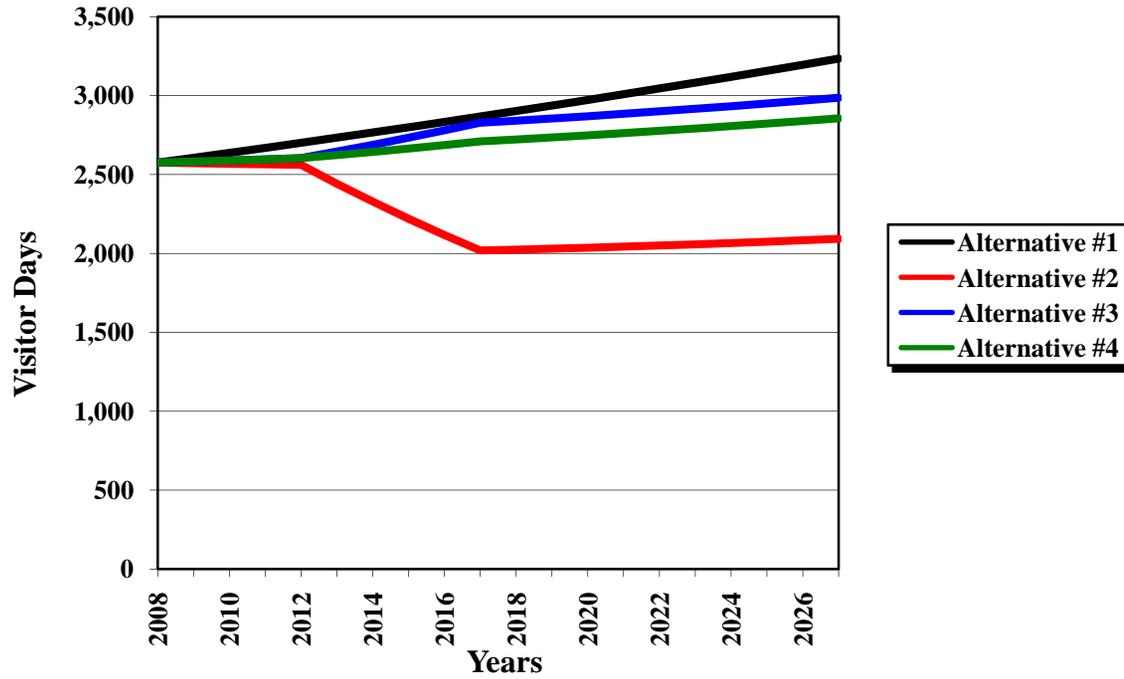
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Alternative #1	2,576	2,607	2,638	2,669	2,701	2,734	2,766	2,799	2,833	2,867
Alternative #2	2,576	2,572	2,568	2,564	2,562	2,442	2,329	2,220	2,117	2,019
Alternative #3	2,576	2,582	2,589	2,596	2,604	2,645	2,688	2,733	2,779	2,828
Alternative #4	2,576	2,582	2,589	2,596	2,604	2,624	2,644	2,665	2,687	2,710

Table 17 (Cont.)

Total Nonconsumptive Visitor Days (Cont. By Year and Alternative)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Alternative #1	2,902	2,937	2,972	3,008	3,045	3,082	3,119	3,157	3,195	3,234
Alternative #2	2,024	2,030	2,036	2,043	2,050	2,058	2,066	2,075	2,084	2,093
Alternative #3	2,841	2,855	2,869	2,884	2,900	2,916	2,933	2,950	2,968	2,986
Alternative #4	2,722	2,735	2,748	2,762	2,777	2,792	2,807	2,823	2,839	2,856

Total Nonconsumptive Visitor Days¹



¹BLM Specialist estimate

Table 18

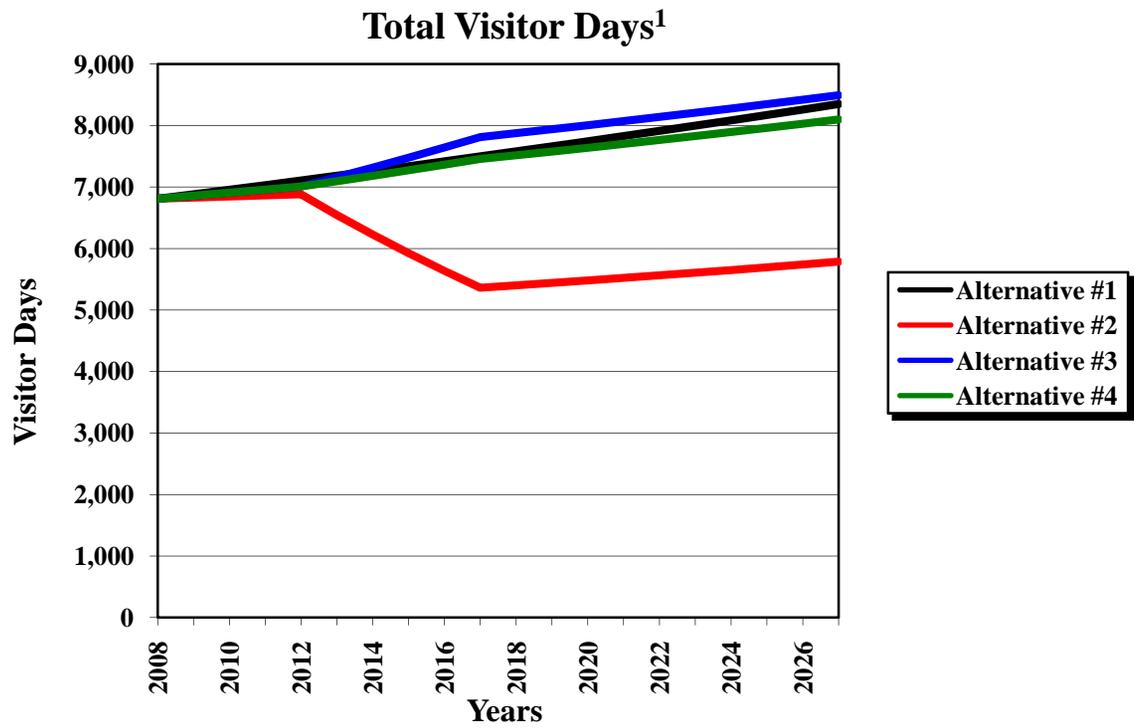
Total Visitor Days (By Year and Alternative)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Alternative #1	6,809	6,882	6,956	7,031	7,106	7,182	7,260	7,338	7,417	7,497
Alternative #2	6,809	6,826	6,843	6,861	6,880	6,545	6,226	5,923	5,635	5,361
Alternative #3	6,809	6,857	6,907	6,957	7,009	7,160	7,316	7,476	7,642	7,811
Alternative #4	6,809	6,857	6,907	6,957	7,009	7,095	7,182	7,271	7,362	7,456

Table 18 (Cont.)

Total Visitor Days (Cont. By Year and Alternative)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Alternative #1	7,578	7,659	7,742	7,826	7,910	7,996	8,083	8,170	8,259	8,348
Alternative #2	5,399	5,439	5,479	5,520	5,562	5,605	5,648	5,693	5,738	5,784
Alternative #3	7,874	7,939	8,004	8,070	8,138	8,206	8,276	8,347	8,418	8,491
Alternative #4	7,515	7,576	7,637	7,700	7,764	7,829	7,895	7,961	8,029	8,098



¹BLM Specialist estimate

Hydrology Section:

Table 19

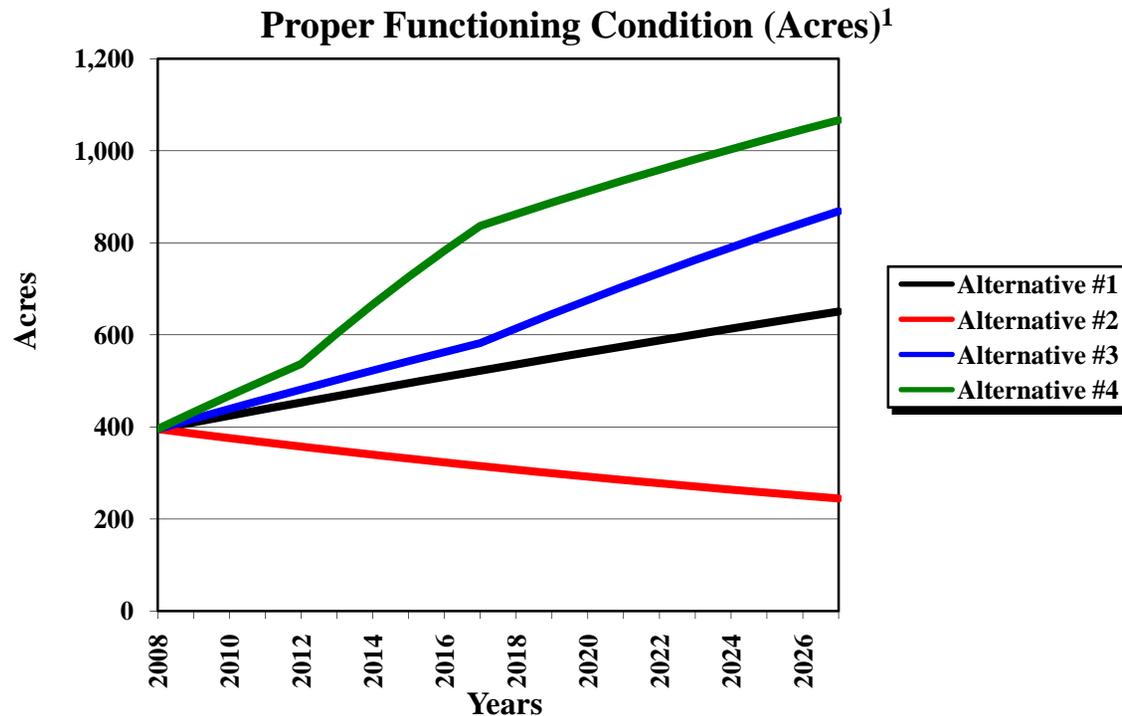
Proper Functioning Condition-acres (By Year and Alternative)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Alternative #1	395	410	425	439	453	467	481	495	509	522
Alternative #2	395	385	376	366	357	348	340	331	323	315
Alternative #3	395	417	439	460	481	502	523	543	563	582
Alternative #4	395	432	468	503	537	603	666	726	783	837

Table 19 (Cont.)

Proper Functioning Condition-acres (Cont. By Year and Alternative)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Alternative #1	536	549	562	575	588	601	613	626	638	650
Alternative #2	307	299	292	284	277	270	264	257	251	244
Alternative #3	614	645	676	705	734	763	790	817	843	869
Alternative #4	862	887	912	936	959	981	1,003	1,025	1,046	1,066



¹BLM Specialist estimate

The above graph reflects the expected impacts to the riparian/wetland acreage of the allotment. A Proper Functioning Condition (PFC) Inventory is the source of data for inventoried riparian habitat within the allotment. At present there are almost 400 acres of properly functioning riparian/wetland acres in the GMCA. This acreage is represented by the point of origin in the graph in year 2008 for all four alternatives. In addition to these 400 acres, there are nearly 1,468 acres classified as Functional-at-Risk and about 230 acres in the Non-Functional category.

Alternatives One, Three, and Four are variations of herded grazing systems where animal control will be exercised to limit livestock grazing, and resulting impacts, to riparian zones. That is why all of these alternatives show varying upward expected trends in the long-term. Alternative Four has the most successful PFC projection due to the rest rotation grazing system, coupled with active herding. While Alternative Three projects lower overall utilization than Alternative Four, it does not include a rest rotation grazing system, so it is not expected to have as beneficial an effect on PFC. Alternative One has a higher utilization than Alternatives Three or Four but some of the impacts of the higher utilization are offset by the active herding required under Alternative One.

Alternative Two proposes a deferred grazing system with no herding. Under Alternative Two, livestock would be moved between several pastures throughout the grazing season, with no double grazing intended. Presently unfenced range would be fenced into allotment and pasture subdivisions. Livestock would be now forced, because of new fences, to use riparian areas that are presently ungrazed or lightly used. No initial rest periods are planned for the riparian areas outside of the existing and planned riparian pastures, and the time on these riparian areas will generally run from 30 to 60 days, depending on size of the pasture and number of livestock. Improvement of the riparian zones under this prescription is not expected to occur and there is a high likelihood of deterioration of riparian areas that are presently in PFC.

Table 20

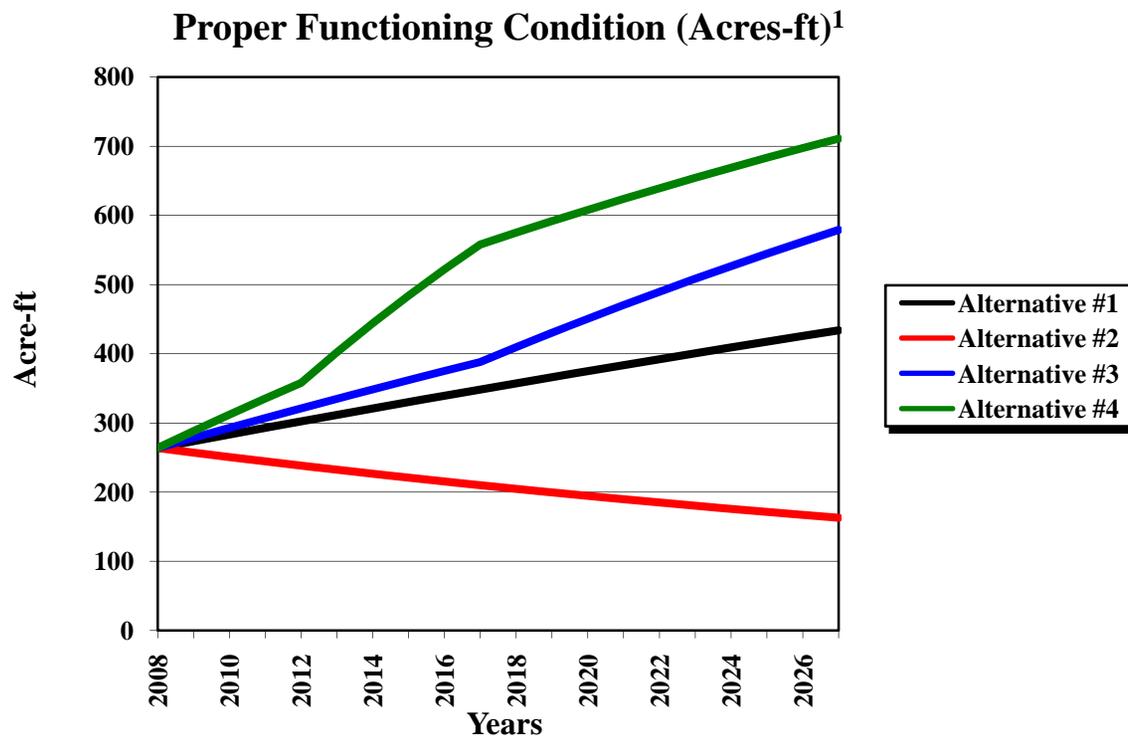
Proper Functioning Condition-acres-ft. (By Year and Alternative)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Alternative #1	264	273	283	293	302	312	321	330	339	348
Alternative #2	264	257	251	244	238	232	226	221	215	210
Alternative #3	264	278	293	307	321	335	348	362	375	388
Alternative #4	264	288	312	335	358	402	444	484	522	558

Table 20 (Cont.)

Proper Functioning Condition-acres-ft. (Cont. By Year and Alternative)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Alternative #1	357	366	375	383	392	400	409	417	425	434
Alternative #2	205	200	195	190	185	180	176	171	167	163
Alternative #3	409	430	450	470	490	508	527	545	562	579
Alternative #4	575	592	608	624	639	654	669	683	697	711



¹BLM Specialist estimate