Chapter 3

Affected Environment

AFFECTED ENVIRONMENT

INTRODUCTION

This chapter describes existing conditions of cultural, physical, biological, and socioeconomic resources in the GMCA that are needed to understand the environmental impacts of the alternatives. The following critical elements of the human environment are either not present in the GMCA 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
The GMCA 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).

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, current AUMs, and percent of AUMs within the GMCA:

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

Land Status	Acres	AUMs	Percent of AUMs
Public	468,407	47,361	86
State	35,058	4,995	9
Private	18,825	3,024	5
Totals:	**522,290**	**55,380**	**100**

The total numbers of acres are approximate, and are based on information generated through the BLM's Geographic Information System (GIS). The 522,290 acres include some acres not in the GMCA but located within the GMCA's perimeter.

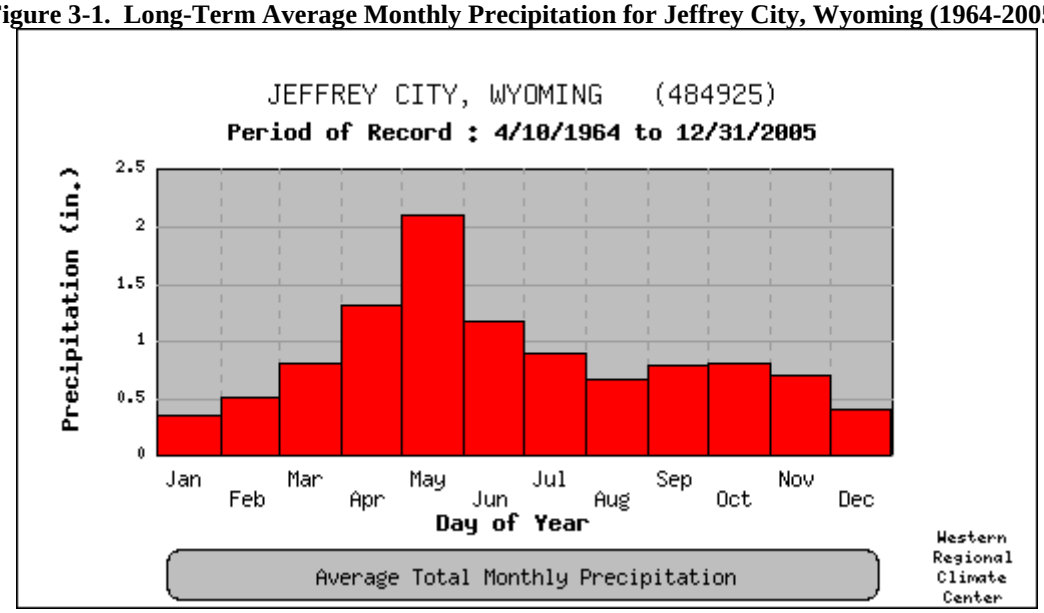
Topography and Elevation
General topography in this allotment varies from flatlands to mountains with drainages and rolling hills throughout. Elevations range from 6,361 feet near Cottonwood Creek in the northeast corner of the allotment to 9,072 feet at Sagebrush Park on Green Mountain. Green Mountain 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 sub-humid continental climate. Temperatures can range from winter lows of almost -50 degrees Fahrenheit to summertime highs of in excess of 100 degrees. The annual air temperatures on the sagebrush-covered rangelands average 33 to 45 degrees Fahrenheit. 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 5.16 inches at Lost Creek Reservoir, 5.61 inches at Picket Lake, 6.23 inches at Bison Basin, 8.51 inches (1960-2010) at the Sweetwater Exclosure (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; see Figure 3-1. Much of the precipitation occurs as snow.

Figure 3-1. Long-Term Average Monthly Precipitation for Jeffrey City, Wyoming (1964-2005)



In the period between 1985 and 1995, the Sweetwater Exclosure 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 Exclosure 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 Exclosure 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 Exclosure 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.

At the Sweetwater Exclosure two of the years from 2008 through 2010 have shown some dramatic improvement; with above average precipitation occurring in both 2009 and 2010. In 2008, the exclosure received only 6.64 inches of total precipitation, which is 78 percent of the long-term average (LTA) and the drought in years of 2005, 2006, and 2007 continued into 2008. In 2009 and 2010, the exclosure received 9.68 (114% LTA) and 9.74 (115% LTA) inches of total precipitation, respectively.

The allotment experienced severe drought conditions beginning in 2000 and abating in 2009, with only the years 2003 and 2004 achieving levels of precipitation near, and slightly above, the average. These past conditions, including poor forage production, are reflected in the voluntary and negotiated non-use, and decreased levels of use, by the livestock operators over this period. Jeffrey City, in the recent years of 2009 and 2010, has seen precipitation levels of 13.21 inches and 10.78, respectively. This, in turn, has led to a positive vegetative response and good growth on most areas of the allotment.

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 14). Precipitation patterns directly impact soil resources. 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 helps to improve water infiltration instead of running off as waste and/or leading to erosion.

Soils in the western portion of the allotment are commonly underlain by granitic rocks. 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 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 from the 1970s data, located in the Lander Field Office files, contain 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, 7 to 9-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. (Though the SSF method tended to over-estimate soil erosion, especially on low precipitation upland sites with naturally sparse vegetation and is no longer used as a soil erosion monitoring method, the trend is useful for assessing future conditions.) The Phase 1 WC&D inventory indicates that upland erosion was at acceptable levels several decades ago. The consensus of BLM personnel who have several decades working in this allotment, and the findings of the Rangeland Health Assessment are 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 the GMCA, 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 gullying (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.

Map 15, Water Erosion Potential, and Map 16, 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 experience erosion, 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.

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), the Lander RMP/EIS (1986), and most recently in the WDEQ's Wyoming Water Quality Assessment report of 2010.

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. This document and the 1986 RMP/EIS both 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.

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 the303 (d) List, water quality standards and water quality classification changes would be incorporated into the management of the allotment. These streams can be found on the 2010 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; however 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 2010, 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 (p.55 of the list). This stream was scheduled for TMDL development in 2010 (p. 107 of the list). While this stream is in the same watershed as part of the GMCA, the source of the impairment is not related to livestock grazing.

Several streams, either occurring in the allotment, or with watershed portions that occur in the allotment, 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 3-2.

Table 3-2. 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.

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 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 1, is on file in the Lander Field Office. Also located in the Lander Field Office are the identification "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 1, 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 interchangeably with salinity. Other types of water quality indicators in the area are less easy to measure. Since although there are few industries and oil and gas operations are required to notice the BLM of any spills, soil erosion and the resulting sediment generated by it are the largest contributors to poor water quality on public lands. Measuring nonpoint source pollutants such as coliform bacteria and monitoring water temperature is more problematic because of timing of monitoring and lab analysis is critical.

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. No additional PFC ratings have been done since then. Map 17 identifies the location of the streams assessed.

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 3-3, Forage Condition and Apparent Trend Summary, and Table 3-4, Forage Condition and Apparent Trend Summary, illustrate 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 3-3. Forage Condition and Apparent Trend Summary[1]
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 3-4. 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%

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

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.

2010 Evaluation Update of Vegetation Condition

Introduction

In August 1999, eight permanently located point/line intercept monitoring transects were established by Lander BLM range and wildlife staff. Six of the monitoring 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 were read again in July 2010. 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 (see Appendix 11) summarizes the percent ground-level cover for all eight of the point intercept transects in 1999 and 2010. Each transect represents approximately 4,000 acres. The data indicate that there is sufficient ground cover, primarily litter, to protect the soil surface from water and wind erosion at six of these sites, representing approximately 24,000 acres of upland rangeland. Two transects near the

Wamsutter Road Well and Section 3 Well, representing approximately 8,000 acres of upland rangeland measured relatively high levels of bare ground at 42% and 38 % respectively. However, the remaining six transects measured relatively low bare ground that ranged from 16% to 29%. Point-intercept data indicate ground cover at these eight sites in 2010 range from 58% to 84%. Research from a similar sagebrush steppe area in Wyoming has shown that 60-65% ground cover is needed to limit water and wind erosion. Wamsutter Road Well and Section 3 Well locations both show increases in bare ground since 1999 that now exceed 35%. The Percent Species Composition Table (see Appendix 11) 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. Recent allotment field inspections have shown that upland rangeland health is currently not an issue on GMCA. The light to low moderate utilization levels that have been observed during and after the 2008-2010 grazing seasons in areas approximately 300 feet (depending on slope) from existing water (see GMCA photos in One) have provided for adequate residual cover for watershed protection and plant maintenance requirements.

Further, the conditions and trends described in the allotment-wide description of rangeland conditions and trends found on pages 260-262 of the Range Management Unit Resource Analysis (URA) Step III for the Sweetwater Planning Unit (discussed above) have changed in the Green Mountains and Green Mountain Watershed areas of the allotment. In particular, the heavy to severe utilization levels observed in the several parks on the top of Green Mountain proper and the wide-spread high moderate (60%) use levels described throughout the upland sagebrush type for the Green Watershed area have not been observed since 2002. Livestock actual use has averaged only 14,245 AUMs since 2002, compared with 22,923 since 1980, and 47,361 AUMs of permitted use. The stocking rate of 14,245 AUMs computes to 32.9 acres per AUM which is exceptionally light and is only 62% of long term (1980-2010) actual use and 30% of current permitted use. Upland rangeland health issues associated with livestock grazing have been substantially reduced. Reasons for this lower level of actual use are discussed further in the Livestock Grazing section of this chapter.

Summary

The 1999 and 2010 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 and after the completion of water wells that were drilled within ½ to one mile from the transects. However, two locations, Wamsutter Road Well and Section 3 Well did show increases in bare ground. 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 meeting the standard. The remainder of the revised unknown category, 253-263,000 acres, has been estimated at this time to be providing adequate residual cover for watershed protection and plant growth. Additional information is needed for the remaining portion of the upland rangeland to be fully evaluated prior to the next evaluation, scheduled for winter 2015-2016.

Conclusion

Given the landscape scale of the GMCA, there is an enormous variation in upland rangeland conditions. Based on the best available information summarized above, the following general conclusions regarding rangeland health have been reached:

1. Many upland sites immediately adjacent to riparian areas are not meeting the standard. An earlier estimate placed this acreage at 3-5 percent (15-25,000 acres) of the GMCA. An exact acreage is very difficult to determine as it requires calculating riparian zone width and steepness of the adjacent slopes. Those affected upland areas on mountain slopes will be narrower and on the flatter areas they will be wider. Recent analysis, based on a 300-foot buffer around all riparian zones has yielded a figure of 9,050 acres of heavily grazed adjacent uplands which is 1.9% of GMCA.

2. Approximately 47 percent (244, 000 acres) of the upland ecological (range) sites are meeting the standard.

3. The status of the remaining approximately 48-50 percent (253-263,000) of the upland ecological (range) sites still needs to be determined using Indicators of Rangeland Health protocol. However, at the present time, it is the BLM's judgment that they are generally meeting the standard. This judgment is based on the substantially lower levels of livestock actual use since 2002 and BLM staff field observations of adequate residual cover remaining after the livestock grazing season for watershed protection and plant maintenance requirements.

4. Rangeland health assessments (BLM Technical Reference 1734-6) including indicators of upland erosion condition, vegetative cover, and desired plant community need to be conducted and developed. Allotment field inspections will continue and additional monitoring studies need to be established to assess the remaining area.

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 3-5 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 3-5. 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**		
Average Current Production	**Shrubs**	**Forbs**	**Grasses**	**Shrubs**	**Forbs**	**Grasses**
	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**		
Average Current Production	**Shrubs**	**Forbs**	**Grasses**	**Shrubs**	**Forbs**	**Grasses**
	265	**50**	**175**	**70**	**410**	**1,800**
Potential Production[2]	**110-180**	**90-110**	**630-800**	**300-690**	**230-500**	**1,380-4,000**

[1]Average 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)

[2]Production potential varies from site to site.

Table 3-6, Selected GMCA Ecological Sites, lists ten of the most important ecological sites within the allotment. 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 long term (1980-2010) authorized/actual use for GMCA has been calculated at 20.4 acres per AUM for public lands (see Figure 3-2). This is a light stocking rate considering the current upland range conditions. 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. The soils data contribute to determining the ecological site including texture, depth to bedrock, and thickness of various diagnostic horizons. In the absence of a BLM Ecological Site Inventory, BLM policy is to use the USDA-NRCS Ecological Site Guides:

Table 3-6. 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 present allotment vegetation production is shown in Table 3-7. The production figures were determined from weight estimate range surveys conducted in 1979-80 (See Appendix Nine) for the former Green Mountain Common Allotment (approximately 60 percent of the GMCA) and 1975-76 (See Appendix10) for the former Seven Lakes Allotment (approximately 40 percent of the GMCA).

Table 3-7. Estimated Allotment Production

ESTIMATED 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 permitted use (formerly grazing preference) for cattle and sheep, the maximum appropriate management level (AML) for wild horses, and the current WGFD population objectives for big game. This situation would only occur if all the grazing permittees were allowed to make full use of their full permitted use.

The maximum consumptive forage use of forage by livestock, wild horses, and big game animals is within three percent of the total estimated production. The GMCA contains 522,290 total acres producing an estimated 55,748 AUMs of forage (which is an average stocking rate is 9.4 acres per AUM). However, it should be emphasized the long term (1980-2010) authorized/actual use for GMCA has been calculated at 20.4 acres per AUM for public lands (see Figure 3-2).

Table 3-8. 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**

Noxious Weeds

The BLM Lander Field Office contracts annually with the Fremont County Weed and Pest Control District (WPCD) for control (i.e., inventory, spraying, releasing insect vectors, and monitoring) of weeds on BLM-administered lands. 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 WPCD to assist the landowners in the area with controlling noxious weeds.

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 including quarantining of products from infested properties.

The following noxious weeds are present in or nearby the GMCA (see Map 18): While noxious weeds are not an extensive problem in the GMCA, they are present and diligent control work by BLM, Fremont Co. W&PCD, and the minerals industry serve to keep things in check. If these cooperative efforts were not taking place, noxious weeds would be a greater problem.

- **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 isolated infestations of 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 within the allotment boundary.

- **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 Salt cedar** 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.

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).

Currently, BLM Lander Field Office 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 1987 RMP does not address the use of certified weed-free hay, straw, mulch, and seed on BLM public lands. The new Lander Draft RMP will require the use of weed free feed under all alternatives to prevent the spread and introduction of State of Wyoming declared weeds, in accordance with BLM Washington Instruction Memoranda (IM): W.O. IM No. 1999-076, BLM Policy on the Use of Certified Weed-Free Hay, Straw, and Mulch on BLM Lands; and W.O. IM No. 2006-073, Weed-Free Seed Use on Lands Administered by the BLM.

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 percent of the vegetation types in the allotment or less than 2,000 acres, 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 over story 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 over story 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 (GIS) land ownership themes. Map 3-3 identifies the location of wetlands in the allotment. Table 3-9 depicts the ownership of public, state, and private wetlands within the allotment. See the Glossary for the definition of wetlands.

Table 3-9. GMCA National Wetlands Inventory (NWI)

LENGTH

Miles	Ownership	Percentage
47.23	**BLM Administered Public Lands**	62.56
14.82	**Private Lands**	19.63
13.45	**State Administered Public Lands**	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 (See Table 3-10). 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 3-10 summarizes the amount of riparian acres and miles by assessment rating. See the Glossary for the definition of riparian areas. Map 17 shows the different PFC assessments.
Prior to initiating the 1999 prescribed management, Proper Functioning Condition (PFC) assessments, frequency transects, willow density transects, photographs, and professional observation indicated that riparian habitats were generally in a low seral stage and were not producing near their potential.

Since the 2002 evaluation was completed and the early fall of 2008 (which was the last year the frequency and willow density data were collected); there has been no improvement outside of lightly used riparian management pastures or riparian exclosures. The frequency transects and photos showed only ephemeral improvement that was not maintained, at all sites located outside of lightly used riparian management pastures and exclosures. More recent stubble height and utilization data from 2009 and 2010 do show stubble height objectives generally being met on the west side of GMCA. This recent attainment of stubble height objectives can be attributed to a documented increase in herding frequency and intensity by the west side permittees.

All willow transects and photos, with the exception of Crooks Creek-1, indicated that willows were receiving heavy utilization which was adversely affecting available leader growth. These transects also indicated high amounts of physical damage caused by grazing animals using mature willows for shade throughout the monitoring period.

Between the 2002 evaluation and the early fall of 2008 when new monitoring data was collected (with the above noted exceptions). The data is provided in Table 3-11 below. The overall indications are:

- Adequate regrowth of riparian vegetation to promote reproduction and improve vigor of desirable species did not occur following grazing; again exceptions to this can be found in the 2009 and 2010 stubble height and utilization data and transect photos. Data showing the 2009 and 2010 are provided below in Table 3-12.
- Residual stubble height of riparian vegetation remains below adequate levels for soil stability and structure for species diversity (see Rangeland Health Standard No. 4).

- Bare ground is higher than expected, and has increased slightly, over this period in the riparian areas indicating declining levels of cover for soil stability.
- There are slightly increased amounts of litter at most of the monitoring locations, except where grazing is light or has been excluded. The litter included vegetative matter that appeared to come from the current growing season and abundant cattle manure which is indicative of heavy utilization of the riparian vegetation. This heavy utilization has prevented riparian area recovery.
- There remain high amounts of upland species occurring in riparian habitats indicating drying of riparian areas. Juniper encroachment has been observed in several riparian areas further indicating a shift in species composition to an upland plant community.
- Vigor of young and mature willows remained poor throughout this recent evaluation period.
- Canopy cover remained largely unchanged throughout the evaluation period.
- Density of willows remained nearly constant throughout the period. The drought years of the past decade and inadequate control of cattle grazing in the willow habitats combined to inhibit new willow establishment.

Table 3-10. Proper Functioning Condition Assessment[1]
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

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

Table. 3-11 Percentage of Frequency Change in the Vegetation Classes between the Years 2000 and 2008[1].

Transect	Bunch-grass	Sod-formers	Sedges	CANE[2]	Forbs	Willows	Shrubs	Litter	Bare Ground
Weasel Springs	+20	-3.5	-29.5	-10.25	+6.25	NP	NP	+2	+4.5
PB Spring-BLM	+5.75	-6.75	-4.75	-6	+4	NP	NP	-6.5	+8.25
PB Spring-Private[3]	+1.25	+3	-10	N/A	+0.5	NP	NP	+3.75	+1.5
Sulphur Bar Spring	-2.75	NP	-10	-9.75	+4.75	NP	NP	0 same	+17.5
U. Haypress Creek	+3.75	-7.25	-0.75	-5.75	+13	NP	NP	-9.75	+5
Lost Creek	-8.5	+0.75	+27	-13.5	+10.25	NP	NP	-7.5	+4.5
E. Arapahoe Creek	+9.75	+0.25	+23.75	+8.5	0 same	NP	NP	-1.25	-2
West Fork Crooks Cr.	+27.25	-34.75	+22	+2	+4.25	NP	NP	+1	-5.25
Arapahoe Creek	+3.75	+2	+34.75	+10.5	NP	NP	NP	+0.50	+3
Sheep Creek	+2	+1	-16.5	-16.25	+24.5	+0.5	+0.25	+9.25	+5
Soap Holes	+19.25	+4.25	-9.25	-12.75	-4.25	NP	-1.25	+1.25	+2.25
Harris Slough	-18	NP	-10.25	-7.75	+14.75	NP	NP	+13	+8.5
Mormon Springs	+27.5	-8.5	-6	+1.5	+7	NP	NP	+0.75	-2.75
Crooks Creek-1[4]	+2.25	-1.5	+28.5	N/A	-4.5	+2	NP	-19.25	-6
Crooks Creek-2[4]	+17	-15.25	-27.8	N/A	-11.75	+15	NP	+19	+20.75
Bare Ring Slough	+4	+4.25	+7	+10.75	-3.5	NP	NP	-4.75	-7
Scotty Lake	+18	NP	+0.5	-8	-3.5	NP	NP	-8.5	+1.5
Sum Total Percent Change	+110.25 +14t -3t	-62 +7t -7t	+18.7 +8t -9t	-51 +5 -9t	+38 +10t -5t	+17.5 +4t	-1 +1t -1t	-7 +9t -7t	+59.25 +12t -5t

[1] The 2002 Rangeland Standards evaluation summarized change for the years 1997 to 2002. Note that this sampling intensity cannot detect actual changes unless they are greater than 10 – 15%.

[2] CANE (*Carex nebraskensis*) is a portion of the overall sedge percentage. Its occurrence is being tracked because it is a key management species.

[3] In the absence of 2000 data, 1999 data was used for the initial year. This is considered a "control" location as it is rarely grazed.

[4] In the absence of 2000 or 1999 data, 1997 data was used for the initial year. Crooks Creek #1 is considered a "control" location as it does not receive hot-season use.

N/A= No data available. NP = Not present since the initiation of the transect.

Much of the concluding summary paragraph of the 2002 evaluation still applies when compared to this 2008 evaluation of GMCA riparian area conditions:

> "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 essentially been season long grazing on most riparian areas resulting in heavy and severe utilization".

These changes are discussed further in Appendix Four in the titled "Riparian Frequency and Willow Density Transect Data – A Comparison to the 2002 GMCA Riparian Area Evaluation"

Exceptions (see Appendix One - GMCA Photos) were observed in many (but not all) areas in 2009 and 2010. Riparian stubble height and utilization objectives were attained due to good precipitation years and an intensified herding effort. Table 3-12 displays the change in frequency transects between the years 2000 and 2010.

Table 3-12. Riparian Stubble Height/Utilization History 2000 to 2010

Transect Name	Stubble Height[1] Measured by Year										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Weasel Spring				-	-	-		-			+
PB-BLM				-	-	-		-			+
PB-PVT					+	+		+			+
Sulphur Bar				-	-	-		-			+
Upper Haypress Cr			-		-		-	-	-		-
Lost Cr			-		-	-		-	-	-	-
E. Arapahoe Cr			-		-	-	-	-	-	-	-
W. Fork Crooks Cr			+			-	+	-	+	+	+
Arapahoe Cr			+			+	+	+	+	+	+
Sheep Cr			-		-	-	-	-			-
Soap Holes			-		-		-	-		-	-
Harris Slough				-	-	+		+			
Mormon Springs								-			+
Crooks Cr 1							+	+	+	+	+
Crooks Cr 2							-	-	-	-	-
Bare Ring Slough					+	+	+	-	+		+
Scotty Lake				-		-		-			
Warm Springs											+
Ice Slough											+

[1] The following symbol (+) implies the stubble height goal was met and (-) implies it was not met at the end of the grazing season.

LIVESTOCK GRAZING

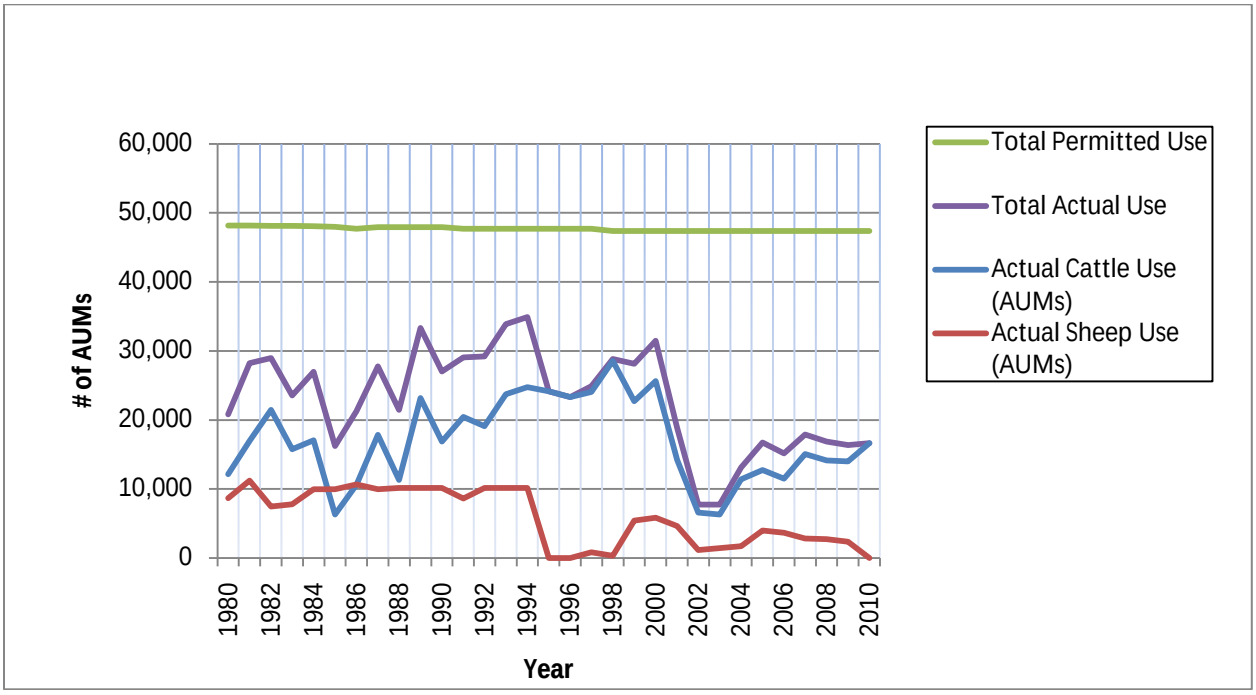
General

The GMCA has 16 livestock operators who hold 19 grazing permits. Cattle and sheep are both grazed in the allotment, with a total permitted use (formerly 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 or 15 through November 1 or 15, and sheep may graze yearlong.

Utilization varies throughout the allotment with light to moderate use on the upland rangeland and moderate to heavy use along the riparian zones. Many water developments have been constructed over the past ten years. Lack of reliable water continues to limit proper livestock distribution on the upland range sites within the allotment.

Livestock actual use has averaged only 14,245 AUMs since 2002, compared with 22,923 since 1980, and 47,361 AUMs of permitted use as shown on the table below. Actual use is substantially below the permitted use for several reasons. The long term actual use must average out at some level less than the permitted use. Independent of the permitted use, the BLM will occasionally take administrative actions, such as early closure of the allotment, that result in less than the permitted AUMs are being used. Similarly, the permittees will invariably run less than their maximum permitted use. Sometimes operators do not have enough livestock to run the full amount. It is almost impossible to turn out or gather cattle on the exact turn on and turn off dates. Long term Actual Use in the GMCA is dominated by the need to address riparian health. Because of the focus on riparian health, there has been no consideration in recent years for the total amount of total forage available, hence the large spread between permitted and actual use. While many riparian areas in the allotment remain in unsatisfactory status, the actual use in recent years (Figure 3-2) has been reduced primarily to address riparian issues.

Figure 3-2. Green Mountain Common Actual Use Analysis (AUMs) 1980 to 2010



Historical Situation

The GMCA was categorized in the Green Mountain Grazing EIS as a moderate priority Category I allotment and ranked 13th out of 80 Improve Category allotments in the Lander RMP/ROD for implementation. 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.

Current Situation

The BLM's interim actions, taken while pursuing the long term solution, have been extensive. Numerous riparian exclosures have protected key riparian habitat and provided the means to facilitate better herding practices. Actual use has averaged only 14,245 AUMs since 2002, resulting in a stocking rate of only 32.9 acres per AUM which is exceptionally light. Upland issues associated with livestock grazing have been virtually eliminated. Progress in reducing utilization in riparian areas was been substantial in 2009 and 2010, albeit inconstant from place to place. The attached file "GMCA photos" (Appendix One) shows examples of post grazing success on sensitive riparian areas in the Granite Creek-Rocks pasture over the past two grazing seasons.

However, recent improvements are not consistent across the allotment. The description of existing management in Chapter Two (Alternatives Considered but Not Analyzed in Detail – Existing Management) explains why relying on annual operating plans under the umbrella of the 1999 decision is not a valid approach for long term management. The presence of high resource value riparian areas that cattle prefer severely limits management options.

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 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 3-9 provides an estimate of total acreage of wetland habitat in the allotment from National Wetlands Inventory data. Map 17 identifies the locations of wetlands in the allotment that were assessed for PFC.

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. Appendix 16 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 19. 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. Appendix 16 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 20. 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 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. Appendix 16 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 21.

The Red Desert Pronghorn Herd Unit utilizes the largest proportion of the allotment during the spring, summer, and fall period. Pronghorn generally migrate to the south and 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. Appendix 16 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 22. 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 commonly found in 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 (see Map 25). These include rainbow trout, cutthroat trout, brown trout, brook trout, white sucker, long nose sucker, mountain sucker, creek chub, lake chub, long nose 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 stream banks also offer little cover for trout. Reductions in willow and herbaceous cover along streams reduce water 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. 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 3-13 lists the federally designated threatened and endangered species that are known to occur within the GMCA, or where potential habitat occurs within the GMCA. There is currently one T&E candidate species, the greater sage-grouse, and one proposed species, the mountain plover, within the LFO. Both species are also BLM sensitive species. Canada lynx, grizzly bear, black-footed ferret, and desert yellowhead, while protected under the ESA and are BLM sensitive species, are not analyzed in this document because suitable habitat does not exist in the GMCA.

Table 3-13. Federally Listed Threatened or Endangered Species

Listed species Common Name	Scientific Name	Habitat	Status
Gray wolf (non-essential/experimental)	*Canis lupus irremotus*	General habitats providing abundant ungulate prey secluded denning and rendezvous sites, and relatively little human activity.	Not documented as present but suitable habitat exists.
Ute ladies'-tresses (T)	*Spiranthes diluvialis*	Moist peat, sand, silt, or gravel soils near wet meadows, springs, lakes, ponds, or perennial streams.	Not documented as present but suitable habitat exists.
Blowout penstemon (E)	*Penstemon haydenii*	Sparsely vegetated, early successional sand dunes and blowout depressions created by wind.	Not documented as present but suitable habitat exists.
Platte River water depletion (T&E)	*Various species downstream of the Lander Field Office*	Riverine and wetland habitats used by various federally-listed species in the Platte River drainage downstream from the Lander Field Office.	Water developments that may deplete the Sweetwater River drainage will be analyzed
Mountain plover	*Charadrius montanus*	Short grass prairie/sparse vegetation	This species is known to breed and raise young in the allotment during the spring, summer, and early fall.

BLM Sensitive Species

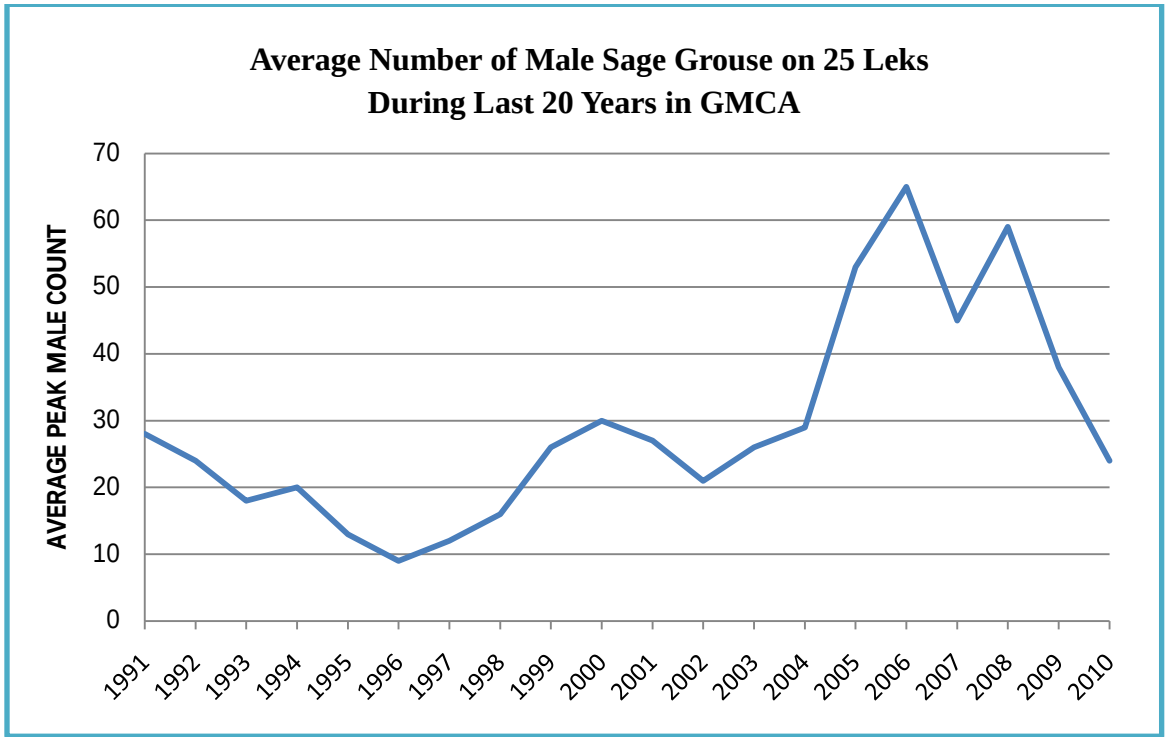
Because the GMCA is so large and contains such a diversity of habitat types, most of the BLM State Sensitive Species can either be found or have the potential to occur on the allotment. These species are identified in Table 3-14.

Greater sage-grouse –In March 2010, the U.S. Fish and Wildlife Service determined that the greater sage-grouse warranted listing as a threatened species under the Endangered Species Act but precluded listing due to higher priority actions. 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 most 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 as a result of road and well pad construction. The net result is that sage-grouse habitat is fragmented by roads, pipelines, and utilities associated with these new and existing developments.

The GMCA has some of the highest lek density in the state of Wyoming. However, there are currently 37 leks within the GMCA boundary (34 on BLM surface). Map 23 shows the locations of these strutting/nesting complexes (leks). Six of the 37 leks have been inactive since 1996 or earlier although they are still considered occupied by WGFD.

Analyses of male sage grouse populations counted on 25 leks in the GMCA over the past 20 years (Wyoming Game and Fish data) indicates that they are cyclic (Figure 3-3). Because of inconsistencies in the number of times that leks were surveyed during any given year, it is not possible to determine trend data. For instance, the highest sage grouse counts occurred during a 4 year period from 2005 to 2008 and averaged 55 males during this period. This higher average count may be due, at least in part, to increased efforts to count males on more than one occasion during the breeding season. The average number of male sage grouse counted on these leks during this period was 29 and ranged from a low of 9 males in 1996 to a high of 65 males in 2006. The highest count on an individual lek was 234 males on the Soap Holes lek in 2006.

Figure 3-3. Average Number of Male Sage Grouse on 25 Leks in Last 20 years.



Having eliminated those species for which no suitable habitat exists in the GMCA, the following Special Status Species will be considered further in Chapter Four, Environmental Consequences section:

Table 3-14. Special Status Species in the Affected Environment

Species	***Status***
Ute ladies' tresses	Threatened
Blowout penstemon	Endangered
Platte River depletion	Threatened and Endangered (downstream)
Gray wolf	Non-essential/experimental
Long-eared Myotis	BLM Sensitive
Spotted bat	BLM Sensitive
White-tailed prairie dog	BLM Sensitive
Swift fox	BLM Sensitive
Pygmy rabbit	BLM Sensitive
Mountain plover	BLM Sensitive and Proposed species
Northern goshawk	BLM Sensitive
Ferruginous hawk	BLM Sensitive
Peregrine falcon	BLM Sensitive
Greater sage-grouse	BLM Sensitive and Candidate species
Long-billed curlew	BLM Sensitive
Burrowing owl	BLM Sensitive
Sage thrasher	BLM Sensitive
Loggerhead shrike	BLM Sensitive
Brewer's sparrow	BLM Sensitive
Sage sparrow	BLM Sensitive

Northern leopard frog	BLM Sensitive
Great Basin spadefoot	BLM Sensitive
Boreal toad (Northern Rocky Mountain population)	BLM Sensitive
Spotted frog	BLM Sensitive
Meadow pussytoes	BLM Sensitive
Porter's sagebrush	BLM Sensitive
Limber Pine	BLM Sensitive
Cedar Rim thistle	BLM Sensitive
Fremont bladderpod	BLM Sensitive
Beaver Rim phlox	BLM Sensitive
Rocky Mountain twinpod	BLM Sensitive
Persistent sepal yellowcress	BLM Sensitive
Shoshonea	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 26). The following table shows current wild horse inventory information and Appropriate Management Levels (AML) for the allotment by HMA.

Table 3-15. GMCA Wild Horse Inventory and AML by Herd Management Areas

HMA	Current Number of Horses	AML
Green Mountain	490/109*	170-300
Crooks Mountain	43	65-100
Antelope Hills/Cyclone Rim	94	65-82

*Figure shows the total population for the HMA and the approximate number currently using the GMCA

Note: 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. The latest inventory was conducted on August 12, 2010. The inventory also indicated there were approximately 161 wild horses in-between these three HMAs. The areas are generally referred to as migration routes. During the winter months, wild horses in these areas move to their respective HMA to use their traditional winter range.

Wild horses in these HMA's 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 for wild horses 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 less common. 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 and can be used to forage on.

Distribution and Movement

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

The horses move between HMAs, and can therefore often be found in these migration routes. 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 healthy genetic viability within the herd management areas.

Viewing and Visitor Days

It is estimated that viewing of wild horses and the estimated visitor days for this specific activity has increased in recent years. In the BLM's 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 over a three year period (2005, 2006, and 2007) have averaged 32,800 visitor days. The three HMAs within the Green Mountain Common Allotment are not advertised or marketed as wild horse scenic routes. They are not located near an interstate highway; however, they are located on a major route to Yellowstone National Park (US Highway 287). 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 the White Mountain HMA does. 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 similar to the White Mountain HMA, if marketed and advertised by the BLM (Map 3-8).

Herd Genetics

The horses in the Green Mountain and Crooks Mountain HMAs display mixed-breed genetics and characters, with genetic markers 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 moderate. Although one cannot rule out Spanish heritage, it does not appear to be the main component of this herd.

MINERAL AND ENERGY RESOURCE USES

The region south of Crooks Gap has always been an area of interest for gas development. As recently as 2008, there was a significant interest in development of coalbed natural gas (CBNG) within the GMCA in the area known as Pappy Draw. However, these Units have since terminated and the leases have expired for a variety of reasons not relevant to this analysis. There is currently no CBNG development within the GMCA or any forecasted.

Oil and gas development has occurred on the GMCA starting with the Bison Basin field as early as the 1930s and more recently with the Found Soldier Unit. Recent development has primarily been confined to the Bison Basin field and the Crooks Gap area. Within the last 5 years, approximately 9 wells per year have been drilled in these areas. Prior to 2005, the oil and gas development activity was much lower only averaging approximately 1 well per year. It is anticipated that the recent trend of development will continue within these fields for the near future averaging approximately 9 wells per year in addition to the current production of the existing fields.

The disturbance associated with this development including access roads and associated production infrastructure averages approximately 2 acres/well resulting in approximately 18 acres of total disturbance within the GMCA per year. Development outside the area of Bison Basin and Crooks Gap is not anticipated in the immediate future. Should new interest in CBNG development arise within the GMCA, the proposal would be evaluated in accordance

with NEPA standards. In general, the most likely location for new disturbance will be existing units. The following table identifies those units in the GMCA:

Table 3-16. Oil and Gas Units in the GMCA

Unit Name	Company	Acres	Approx. Location	Case type
Found Soldier	IPEOC	20,387	T. 27 N. R. 91-92 W.	Exploration
Bison Basin	Richardson	1,249	T. 27 N. R. 95 W.	Exploration/Production
Happy Springs	Richardson	1,333	T. 28 N. R. 93 W.	Exploration/Production
Picket Lake	Hudson Group LLC	420	T. 26 N. R. 96 W.	Exploration/Production
	Total	**23,389**		

As of February 1, 2011, there are 4,462 mining claims within the GMCA. The total acreage under claim is approximately 112,243 acres. This includes both lode claims (20 acres per claim) and placer claims (range between 20 and 160 acres per claim). This represents approximately 21 percent of the GMCA surface area.

As of February 1, 2011, there are no active mines currently permitted in the GMCA. All exploration notices have expired, except for two. There are four pending plans of operation, two of which are under consideration by EIS, the remaining two plan-level projects are for exploration only and are EA-level projects. Total project surface includes 41,227 acres, which is approximately 8 percent of the GMCA surface. Current un-reclaimed surface disturbance for pending and active projects is 1,754 acres.

Table 3-17. Uranium Mines Authorized and Pending in the GMCA

Project	Operator	Type	Project area (acres)[1]	Surface Disturbed (acres)[2]	NEPA[3]	Status
Big Eagle Mine	Rio Tinto/Kennecott	Mine Plan	2,277	323	Inactive	Inactive
Sheep Mountain	Titan Uranium	Mine plan	3,658	450	EIS	Pending
Greater Bison Basin	Wildhorse Energy	Exploration plan	8,587	98	EA	Pending
Radon Springs	UR-Energy	Exploration notice	5,457	5	NA	Auth.
North Hadsell	UR-Energy	Exploration notice	2,424	5	NA	Auth.
JAB – Antelope	Uranium One	Exploration plan	14,574	550	EA	Auth.
Lost Creek ISL[4]	Lost Creek ISL LLC	Mine Plan	4,250	324	EIS	Pending
		Totals:	**41,227**	**1,754**		

1. Total project area. Surface disturbance footprint is always much less.
2. Proposed or current surface disturbance. Some surface disturbance included in the tally is pre-existing from inactive mining operations.
3. Notice level operations (5 acres or less of un-reclaimed disturbance) do not require NEPA.
4. Some of the acreage for this project is contained in the Rawlins Field Office.

Areas of the GMCA were mined extensively in the past. The Big Eagle Mine, for example, has remaining disturbance from previous operations. Some of the disturbed areas have not been reclaimed to current standards or have been reclaimed to health and safety standards but with reduced vegetation. The areas with reduced reclamation have not been surveyed or mapped. Modern mining posts reclamation bonds of sufficient value to ensure that reclamation will be completed even if the applicant abandons the mine.

In general, uranium mining is anticipated to occur in areas previously disturbed rather than new disturbance in pristine locations. For example, the proposed Sheep Mountain mine would operate within the area that was mined in the 1970s but utilizing new techniques to recovery minerals that were not economic when the price of uranium fell in the late 20th century. Although NEPA analysis is pending for the Sheep Mountain and Lost Creek uranium mines, the BLM's has limited authority under the Mining Law of 1872 as amended to deny the claimants' Plan of Operations. The BLM considers that it is highly likely that both projects will be authorized and the mines put into operation although there will be mitigation required for any adverse impacts to greater sage-grouse, particularly for the Lost Creek Mine which is located in Core Area.

As of February 1, 2011, all applications for wind test sites in the GMCA had been withdrawn. There have never been any wind production applications (Type III) for the GMCA. The existence of five congressionally designated trails in or near to the GMCA, the lack of transmission lines to the GMCA and the high percentage of greater sage-grouse Core Area, makes it extremely unlikely that any industrial wind energy development will occur in the GMCA during the permit term.

While some geothermal resources are known to exist in the GMCA (see Reasonably Foreseeable Development Report on the LFO RMP webpage), these are aquifers and thermal springs exceeding approximately 200 degrees Fahrenheit (90 degrees Celsius) which is lower temperature than generally utilized for electrical power generation. Although technology exists to generate electricity with thermal differentials of even 160 degrees Fahrenheit, these are economical only for onsite use and not for transmission. There is no local demand that would support this generation except a possibility of cogeneration with oil and gas operations. If such cogeneration were to occur, it would be contained within the acres of disturbance associated with the oil and gas operations. The BLM considers geothermal energy development in the GMCA to be extremely unlikely at least during the term of the permit.

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 little 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 atl-atl (spear thrower) and smaller darts as hunting implements.

The Late Prehistoric Period started around 1,800 years ago and lasted until about 300 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 300 years ago and ended about 200 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.

Specific Prehistoric Resources

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.

Only a small percentage of the allotment has been inventoried for cultural resources. Those inventories that have been conducted indicate that prehistoric sites are common near riparian areas, which are the same areas that this EA is focusing upon. From the inventories, we know that 27 prehistoric cultural resource sites have been damaged from past 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 have been impacted by grazing include prehistoric campsites near springs (sites 48FR270, 48FR6100, 48FR6199, 48SW14319, and six unnumbered sites), along semi-permanent creeks (48FR414, 48FR1938, 48SW4882, and seven unnumbered sites), along permanent creeks (48FR482), near lakes (48FR1908), and along perennial drainages (48FR3575 and four unnumbered sites).

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.

In the early 1850s, an alternate route to the main trail was blazed by Charles (Simino) Lajeunesse, a fur trapper and trader. This new route stayed south of the Sweetwater River, and became known as the Seminoe Cutoff. Although it had less water and feed for animals than the main trail, it was popular with freighters, military expeditions, Mormon emigrants, and others who wished to avoid heavy traffic and obstacles on the main trail such as Rocky Ridge and the last four crossings of the Sweetwater River. The primary emigrant trail period lasted until just before 1870, when the transcontinental railroad was completed. 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 Seminoe 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 29). 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 Seminoe Cutoff within the GMCA. Each segment is described as follows:

- Segment A starts at the beginning of the Seminoe 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 18).
- 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 18).
- 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 18).
- 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 18).
- 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 Seminoe 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 Seminoe 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 (Map 30). This trail 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 re-enters 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 30.

- 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.

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, 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

The 2008 GMCA Environmental Analysis for the recreation resource was broad and all encompassing. The purpose and need and scope of the alternatives contained in this document do not warrant this level of description of recreation. The following key recreation issues however, do remain:

- Changes to the recreation environment (setting) from: rangeland projects, herding, and supported maintenance of the infrastructure.
- Impacts to the unfenced character of the allotment.
- Impacts to recreation users from livestock management activities and use levels.

GMCA Recreation Setting

The general affected environment of the recreation resource on the GMCA is diverse; with numerous recreation activities, experiences, and benefit opportunities. This diversity of opportunities can be directly correlated to the recreation environment or setting of the GMCA. The recreation setting is an integral supply component because they "not only affect the experiences and benefits", but also help to "define what type of activities might occur in an area" (Pierskalla, 2004). Settings trending toward primitive will benefit non-motorized recreationist, and limit access to motorized users. Primitive settings typically contain a higher amount of naturalness with little human disturbances occurring in the landscape. Additionally primitive landscapes require an increased amount of physical exertion to access. In contrast settings trending toward urban/industrial will benefit motorized recreationist who enjoy recreating in a modified environment. Typically such recreation settings are not enjoyed by non-motorized recreationist seeking to experience a natural environment. Access to such motorized settings require little to no physical exertion from the user.

In general, the recreation setting in the allotment has seen modifications such as, increased road proliferation (from both recreational and commercial uses), decreased naturalness as a result of infrastructure development and other resource uses, and increased contacts with others. This trend can be compounded if management actions increase roads or decrease naturalness in areas where few roads exist and naturalness is not already compromised by major facilities or improved roads.

GMCA Unfenced Character

As demonstrated in Map 6 and Map 31, the GMCA encompasses a large unfenced area and is an integral portion of one of the largest unfenced areas of BLM lands in the lower 48 states; see Map 31 for fences in the cumulative impacts to greater sage-grouse for the context of fences in the area. This unfenced character provides unique recreation opportunities for both equestrian and foot travel, where the traveler can move for days without encountering a fence. In addition, this character is also of high demand to falconers who enjoy being in areas without fences; due in part to the risk fences pose to their falcon. Throughout the nation, the availability of recreation opportunities associated with large unfenced areas has decreased due to the converse need to control and distribute livestock.

GMCA Recreation Users

Visitor experience inhibiting encounters with livestock include: cows near camp, manure on the trail, and cows or impacts near water sources (Wallace, et al 1996). Camping on the GMCA occurs at a random basis and is typically associated with hunting activities or travel along the Continental Divide National Scenic Trail. Often the camping is conducted near water sources. Visitor experience inhibiting encounters with livestock along the Congressionally Designated trails also typically corresponds with those areas where the trails are in close proximity to water (both manmade and natural riparian systems). The rangeland health assessments done on the GMCA indicated that livestock grazing use was heavy to severe in and around water sources; therefore visitor experience inhibiting encounters with livestock occur throughout the allotment, with the exception of those water sources that have been fenced from livestock and still provide access for camping activities.

Sanderson et al (1986) found that as livestock management intensities (including level of fencing or other range improvements) increased, visitor demand or enticement for an area decreased. Sanderson, also found that customer or visitor preference for a landscape decreased as grazing intensity increased. Since the allotment has limited infrastructure to support livestock grazing it can be assumed that visitor demand or enticement for the area is high. Conversely, grazing intensities are higher in areas without fencing then areas with fencing; therefore the current

impacts to recreation from livestock grazing management and intensities are somewhat offset. The current impact of infrastructure on recreationists can therefore be viewed as a continuum with the least impact occurring in areas where the infrastructure excludes livestock (such as spring protection fences) and the most impact occurring in areas where the infrastructure increases livestock uses (such as water developments). Finally, the areas that are in highest demand to recreationists are those areas where livestock grazing intensities and infrastructure frequencies are both low. Currently, within the GMCA, this situation occurs primarily in upland range sites that are not in close proximity to water; this results in a less than ideal situation for recreationists since most activities on the allotment are facilitated by areas in close proximity to water

VISUAL RESOURCES

The allotment is encompassed by Visual Resource Management Classes 1-3. This analysis will focus on the impacts to those areas that stand to be impacted by the scope of actions proposed in at least one alternative in this document; therefore visual impacts will be considered within the view shed of Congressionally Designated Trails and Management Classes 1 and 2.

The Oregon/California/Mormon Pioneer/Pony Express historic trails and the Continental Divide National Scenic trail run through the GMCA (Map 29); these trails and their associated landscapes represent a sensitive visual resource. The trails run through VRM classes 2 and 3. Visual intrusion into the landscapes of the historic trails is currently low and do not contrast with the existing landscape. The CDNST through the allotment travels through more developed areas and therefore visual contrast along this trail is more apparent, however these contrast nearly become non-existent as the trail begins to move west of Happy Springs Oil Field.

The existing visual environment of the trails and allotment classes 1 and 2 can be characterized as a panoramic landscape with rolling hills and a very smooth texture. Little to no form or texture is introduced from the vegetation, however it does tend dominate the landscape color with gray hues. The lines within the landscape are very curvilinear initiating broad arching sweeps that are only interrupted when they pass across the skyline or move into the more blocky drainage basins.

SPECIAL DESIGNATIONS

'Wild Lands' as referenced in Secretarial Order 3310

The vast majority of the GMCA falls in a Lander Field Office wilderness inventory referred to as the "LFO Instant out Area." The "LFO Instant out Area" has been found to be clearly lacking in wilderness characteristics. As detailed in Draft Handbooks 6300-1 and 2:

> "Lands that clearly lack wilderness characteristics are those that do not meet the naturalness criterion because they have extensive surface disturbance and/or do not meet the size criterion of 5,000 acres or any of the size exceptions."

One area in the Sulphur Bar Spring Region has been found to not clearly lack wilderness characteristics, therefore needing further intensive inventory to determine if the area truly qualifies as a 'wild land'. The proposed Granite Creek Rocks fence intersects this area for approximately 2 miles on the western flanks of the intensive inventory area. As stated in Draft Handbook 6300-2:

> "When the BLM manager determines that wilderness characteristics are not clearly lacking in the area that would be affected by the proposed project, the manager shall determine whether or not the project could be implemented in a manner that preserves the BLM's discretion to protect wilderness characteristics as Wild Lands through subsequent land use planning. If the project can be so implemented, the project may be considered without conducting a wilderness inventory…."

If the area is found to contain wilderness character, appropriate mitigation measures (relocation, temporary electric fence etc) will be implemented as determined by appropriate supplemental NEPA analysis (CX, DNA, EA, etc.) necessary for these projects, and would develop, so as not to impact the wilderness characteristics. This mitigation measure will be of appropriate scope and magnitude so as to ensure BLM's future discretion to protect the areas wilderness characteristics.

WILDERNESS STUDY AREAS and WILD and SCENIC RIVERS

The GMCA encompasses portions of the Sweetwater Canyon WSA and Sweetwater Canyon Eligible Wild and Scenic River. All alternatives analyzed in this document: 1) reduce permitted use, and 2) propose no range projects within these areas, this in-turn results in an overall beneficial impact to the Sweetwater Canyon WSA and WSR. As a result, further detailed analysis of these 'special designation' issues is not necessary in this document.

ECONOMICS

Introduction

The GMCA is located primarily in Fremont County and portions of Sweetwater County. It is a common use allotment covering approximately 522,000 acres. The 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, on Green Mountain, timber production.

There are nineteen permittees sharing livestock grazing use within the allotment, but no formal livestock management system was in place until 1999, when the field manager issued a decision to establish a grazing schedule and implement other management actions. The allotment has some internal fencing but it is limited to small pastures of mostly private and state land.

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 Four. 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 38,057 in 2008 (Table 3-18). That represents an increase of about 34% from 1970-2008 (Table 3-20). Over this time period, the largest increase occurred between 1970 and 1980 where the population increased by nearly 38% (Table 3-20). 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 2008 as shown by Table 3-18 and 3-19.

Table 3-18. Personal Income, Population, and Per Capital Personal Income 1970-2008

FREMONT COUNTY[1]	1970	1980	1990	2000	2008
Personal income ($000)	$91,118	$380,787	$462,380	$850,201	$1,424,527
Population (persons)[2]	28,406	39,071	33,565	35,817	38,057
Per capita personal income (dollars)	$3,208	$9,746	$13,776	$23,737	$37,431

[1]Regional Economic Information System (REIS), Bureau of Economic Analysis (BEA), RCN-0955, May 1010

Table 3-19. Personal Income, Population, and Per Capital Personal Income in 2010 Dollars

FREMONT COUNTY[1]	1970	1980	1990	2000	2008
Personal income ($000) - 2010 dollars[2]	$511,605	$1,008,024	$771,774	$1,076,807	$1,443,317
Population (persons)	28,406	39,071	33,565	35,817	38,057
Per capita personal income (2010 dollars)	$18,010	$25,800	$22,993	$30,064	$37,925

[1]Regional Economic Information System (REIS), Bureau of Economic Analysis (BEA), RCN-0955, May 2010
[2]CPI, All Items, U.S. Department of Labor (Bureau of Labor Statistics)

Table 3-20. Change in Personal Income, Population and Per Capita Personal Income.

FREMONT COUNTY	% CHANGE '70-'80	% CHANGE '80-'90	% CHANGE '90-'00	% CHANGE '00-'08	% CHANGE '70-'08	% CHANGE '80-'08	% CHANGE '90-'08
Personal income ($000) - 2010 dollars	97.03%	-23.44%	39.52%	34.04%	182.12%	43.18%	87.01%
Population (persons)[2]	37.54%	-14.09%	6.71%	6.25%	33.98%	-2.60%	13.38%
Per capita personal income (2010 dollars)	43.25%	-10.88%	30.75%	26.15%	110.57%	47.00%	64.94%

Looking at the personal income for the period from 1970-2008 indicates the per capita income measured in 2010 dollars has increased by nearly 111%. While it increased over this period, there were variations in the rate of change by decade. For example, per capita income, measured in 2010 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 nearly 31% followed by a 26% increase from 2000 through 2008, which is only an eight year period.

The distribution of earnings from 1970 to 2000 is shown in Table 3-21. Table 3-21 is then converted to 2010 dollars using the Consumer Price Index (CPI) and the results are illustrated in Table 3-22. And then Table 3-23 uses the data from Table 3-22 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 0,84% of the total. And by 2000 Government and government enterprises share of total earnings was slightly nearly 29% and contributed the largest share of earnings compared to all other sectors in Fremont County.

Table 3-21. Distribution of Earnings from 1970 to 2000

FREMONT COUNTY ($000)[1]	1970	1980	1990	2000
Farm earnings	$4,393	$2,397	$9,478	$4,451
Agricultural services, forestry, and fishing	$531	$1,057	$1,543	$2,534
Mining	$17,644	$120,599	$23,671	$30,752
Construction	$10,334	$29,257	$23,056	$62,799
Manufacturing	$4,486	$11,213	$13,126	$26,730
Transportation and public utilities	$3,829	$16,149	$23,001	$33,204
Wholesale trade	$1,498	$7,994	$8,662	$12,186
Retail trade	$8,967	$31,409	$35,699	$62,665
Finance, insurance, and real estate	$1,947	$7,530	$6,472	$18,352
Services	$8,471	$43,500	$63,277	$124,316
Government and government enterprises	$15,620	$51,940	$102,323	$152,202
Total	**$77,720**	**$323,045**	**$310,308**	**$530,191**

[1]Regional Economic Information System (REIS), Bureau of Economic Analysis (BEA), RCN-0955, May 2010

Table 3-22. Earnings per Sector 1970-2000

FREMONT COUNTY ($000 - 2010$)[2]	1970	1980	1990	2000
Farm earnings	$24,666	$6,345	$15,820	$5,637
Agricultural services, forestry, and fishing	$2,981	$2,798	$2,575	$3,209
Mining	$99,067	$319,251	$39,510	$38,948
Construction	$58,023	$77,450	$38,484	$79,537
Manufacturing	$25,188	$29,683	$21,909	$33,854
Transportation and public utilities	$21,499	$42,750	$38,392	$42,054
Wholesale trade	$8,411	$21,162	$14,458	$15,434
Retail trade	$50,347	$83,146	$59,586	$79,367
Finance, insurance, and real estate	$10,932	$19,934	$10,803	$23,243
Services	$47,563	$115,154	$105,618	$157,450
Government and government enterprises	$87,702	$137,496	$170,791	$192,769
Total	**$436,378**	**$855,169**	**$517,946**	**$671,504**

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

Table 3-23. Proportion of Earnings per Sector (1970-2000)

LINE TITLE - FREMONT COUNTY (% OF TOTAL)	1970	1980	1990	2000
Farm earnings	5.65%	0.74%	3.05%	0.84%
Agricultural services, forestry, and fishing	0.68%	0.33%	0.50%	0.48%
Mining	22.70%	37.33%	7.63%	5.80%
Construction	13.30%	9.06%	7.43%	11.84%
Manufacturing	5.77%	3.47%	4.23%	5.04%
Transportation and public utilities	4.93%	5.00%	7.41%	6.26%
Wholesale trade	1.93%	2.47%	2.79%	2.30%
Retail trade	11.54%	9.72%	11.50%	11.82%
Finance, insurance, and real estate	2.51%	2.33%	2.09%	3.46%
Services	10.90%	13.47%	20.39%	23.45%
Government and government enterprises	20.10%	16.08%	32.97%	28.71%
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 2008 is split out and shown in Table 3-24

Table 3-24. Fremont County earnings Data for 2008

FREMONT COUNTY ($000)[1]	2008
Farm earnings	$3,235
Forestry, fishing, and related activities	$3,612
Mining	$84,259
Construction	$68,539
Manufacturing	$17,707
Retail Trade	$73,368
Information	$11,253
Finance and insurance	$18,015
Real estate and rental and leasing	$21,786
Professional and technical services	$36,190
Management of companies and enterprises	$2,158
Administrative and waste services	$11,680
Arts, entertainment, and recreation	$13,384
Accommodation and food services	$28,890
Other services, except public administration	$37,827
Other Private Earnings (Utilities, Wholesale Trade, Educational Services and Health care and social assistance)	$159,787
Government and government enterprises	$292,598
Total	**$884,288**

[1]Regional Economic Information System (REIS), Bureau of Economic Analysis (BEA), RCN-0955, May 2010

Table 3-25. Earnings Data.

FREMONT COUNTY ($000 - 2010$)[2]	2008
Farm earnings	$3,278
Forestry, fishing, related activities, and other	$3,660
Mining	$85,370
Construction	$69,443
Manufacturing	$17,941
Retail Trade	$74,336
Transportation and warehousing	$11,401
Information	$18,253
Finance and insurance	$22,073
Real estate and rental and leasing	$36,667
Professional and technical services	$2,186
Management of companies and enterprises	$11,834
Administrative and waste services	$13,561
Arts, entertainment, and recreation	$29,271
Accommodation and food services	$38,326
Other services, except public administration	$161,895
Other (Utilities, Wholesale Trade, Educational services, Health care and social assistance)	$296,458
Government and government enterprises	$895,952
Total	**$1,791,905**

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

Table 3-26. Percent Contributions by Each Sector

FREMONT COUNTY (% OF TOTAL)	2008
Farm earnings	0.18%
Forestry, fishing, related activities, and other	0.20%
Mining	4.76%
Construction	3.88%
Manufacturing	1.00%
Retail Trade	4.15%
Transportation and warehousing	0.64%
Information	1.02%
Finance and insurance	1.23%
Real estate and rental and leasing	2.05%
Professional and technical services	0.12%
Management of companies and enterprises	0.66%
Administrative and waste services	0.76%
Arts, entertainment, and recreation	1.63%
Accommodation and food services	2.14%
Other services, except public administration	9.03%
Other (Utilities, Wholesale Trade, Educational services, Health care and social assistance)	16.54%
Government and government enterprises	50.00%
Total	**100.00%**

Table 3-26 indicates farm earnings contributed 0.18% of total earnings in 2008. This is down from the 0.84% reported in 2000. But as mentioned above, in 2000 the SIC was used and in 2008 NAICS was used to define the sectors. So the 2000 data in Table 3-23 is not directly comparable to the data illustrated in Table 3-26. 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 3-25 and 3-26.

Table 3-27 examines the change occurring in farm and nonfarm earnings over the 1970-2008 period. Note: farm earnings include all earnings from all agriculture and are not limited to earnings associated with public lands grazing. During this timeframe, farm earnings declined by about 75% from 1970-1980 and then grew by nearly 151% from 1980-1990. It then declined by almost 39% from 1990-2000, declined again by nearly 65% from 2000-2008, and has declined by nearly 87% from 1970 through 2008. Contrasted to farm earnings, nonfarm earnings grew about 105% from 1970 to 1980, declined by almost 41% over the next decade, increased by slightly over 26% from 1990 -2000 and during the period from 2000-2008 grew by about 2.5%. Overall, nonfarm earnings grew by almost 58% from 1970 to 2008.

Table 3-27. Changes in Farm and Nonfarm Earnings 1970-2008

FREMONT COUNTY ($000)[1]	1970	1980	1990	2000	2008
Farm earnings	$4,333	$2,271	$9,034	$7,297	$3,235
Nonfarm earnings	$73,344	$319,666	$300,910	$500,145	$641,104
Total	**$77,677**	**$321,937**	**$309,944**	**$507,442**	**$644,339**
Line Title - Fremont County ($000 - 2010$)[2]	**1970**	**1980**	**1990**	**2000**	**2008**
Farm earnings	$24,329	$6,012	$15,079	$9,242	$3,278
Nonfarm earnings	$411,808	$846,224	$502,259	$633,450	$649,561
	$436,137	$852,236	$517,338	$642,692	$652,838
% Change '70-'08	**% Change '70-'80**	**% Change '80-'90**	**% Change '90-'00**	**% Change '00-'08**	**% Change '70-'08**
Farm earnings	-75.29%	150.82%	-38.71%	-64.53%	-86.53%
Nonfarm earnings	105.49%	-40.65%	26.12%	2.54%	57.73%
Total	**95.41%**	**-39.30%**	**24.23%**	**1.58%**	**49.69%**

[1]Regional Economic Information System (REIS), Bureau of Economic Analysis (BEA), RCN-0955, May 2010 [2] [2]CPI, All Items, U.S. Department of Labor (Bureau of Labor Statistics)

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 Regional Economic Information System (REIS) for Fremont County.

Table 3-28. Changes in Labor and Non-Labor Sources of Income 1980-2008

FREMONT COUNTY ($000 - 2010$)[1]	1980	1980 % OF TOTAL	1990	1990 % OF TOTAL	2000	2000 % OF TOTAL	2008	2008 % OF TOTAL
Personal income (thousands of dollars)	$1,008,024	100.00%	$771,774	100.00%	$1,076,807	100.00%	$1,443,317	100.00%
Labor Sources	$770,553	76.44%	$470,863	61.01%	$614,132	57.03%	$815,401	56.49%
Non-Labor Sources	$237,471	23.56%	$300,911	38.99%	$462,674	42.97%	$627,917	43.51%
Dividends, Interest and Rent	$160,045	15.88%	$178,692	23.15%	$252,178	23.42%	$346,691	24.02%
Personal current transfer receipts	$77,426	7.68%	$122,219	15.84%	$210,496	19.55%	$281,226	19.48%

[1]Regional Economic Information System (REIS), Bureau of Economic Analysis (BEA), RCN-0955, May 2010
[2]CPI, All Items, U.S. Department of Labor (Bureau of Labor Statistics)

Table 3-28 shows the relationship between total personal income and non-labor income for the period beginning in 1980 and extending through 2008. During this time, labor sources of income fell from about 76% of total personal income in 1980 to about 56.5% of total personal income in 2008. However, over this same timeframe, non-labor income went from about 24% of total personal income in 1980 to nearly 44% in 2008, 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 about 43% from 1980 to 2008. By contrast, non-earned income grew by over 164% during this same time period. So even though total personal income measured in 2010 dollars grew over this period, the growth in non-earned income outpaced it.

Figure 3-4 further illustrates the importance of non-earned labor income in Fremont County from 1980 to 2008 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 labor income fell from about 76% of total personal income in 1980 to about 56.5% of total personal income in 2008. But over this same period, non-labor income rose from slightly over 23.5% of total personal income in 1980 to over 43.5% of total personal income in 2008.

Figure 3-4. Importance of Non-Labor Income 1980-2008

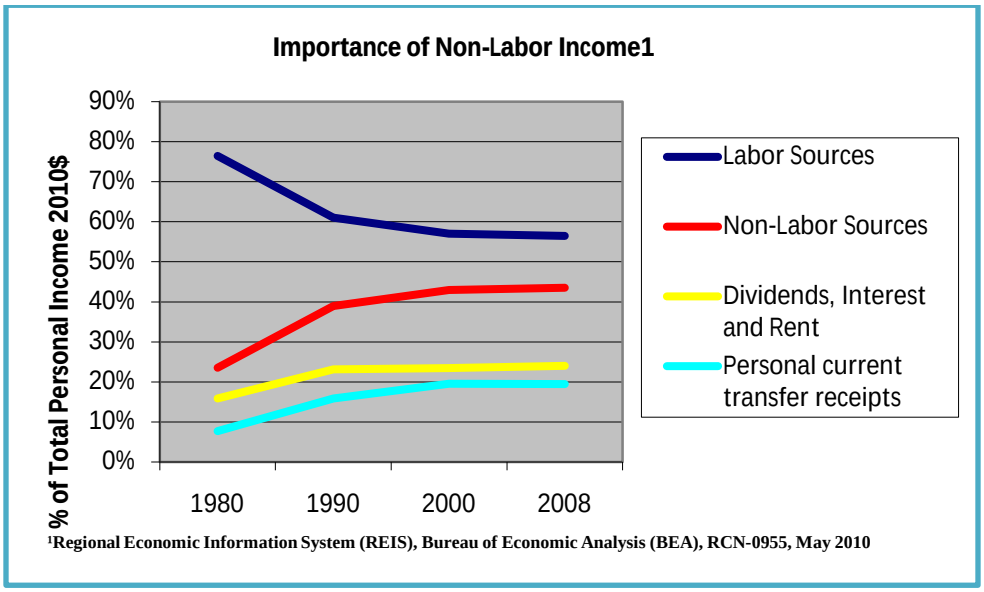
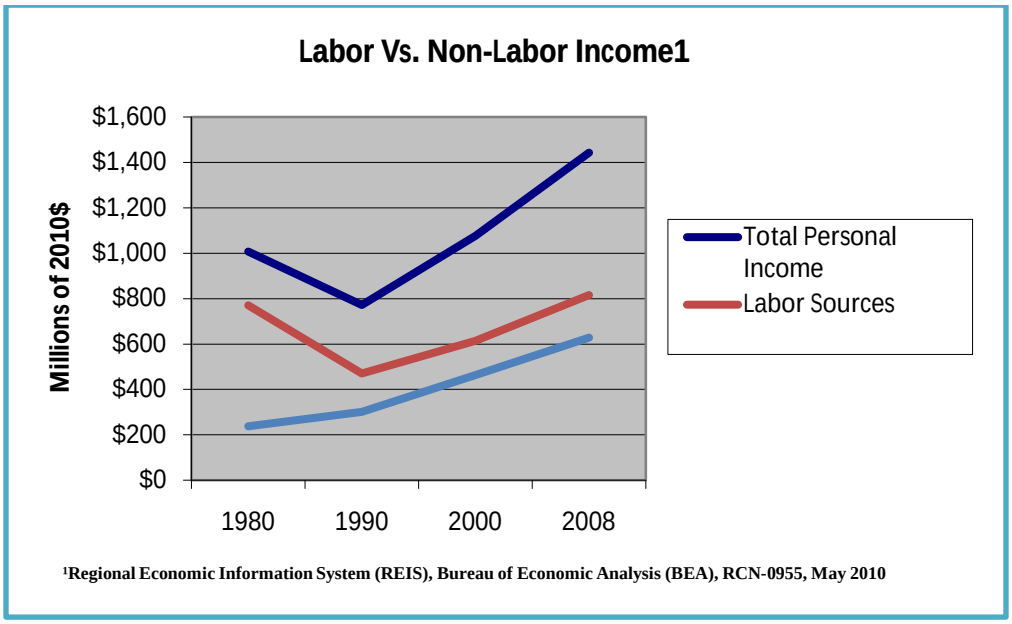


Figure 3-5 shows the trends in non labor income from 1980 to 2008. And during this time, non labor income has showed continued growth. In fact, dividends, interest & rent has grown by slightly 117% over this timeframe. Personal current transfer receipts have grown by slightly over 263% over this same period.

Figure 3-5. Labor and Non-Labor Income 1970 – 2008 in Relation to Total Personal Income



Recreation

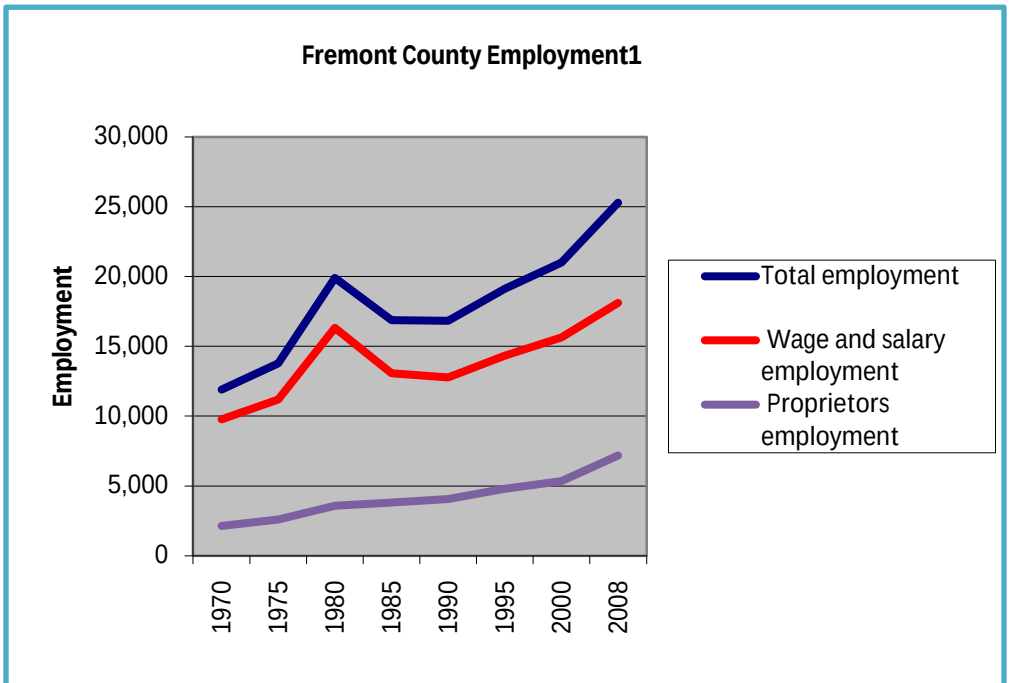
Recreation from the GMCA is also an important contributor to the study region. Based on the benefit cost analysis produced for this document, consumptive and non-consumptive use from the GMCA would annually account for about $315,000 and $83,000 respectively in direct expenditures in 2008 measured in 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.

Employment

Employment for both wage and salary jobs and the number of proprietors has grown in Fremont County from 1970 to 2008. But the growth has been uneven as shown in Figure 3 where wage and salary employment grew by a little nearly 15% from 1970 to 1975 and that growth rate increased to nearly 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 1990 by a little over 2%. But since 1990, wage and salary jobs have been increasing. And for the period from 1970 to 2008, they have increased by slightly over 85%.

Figure 3-6 also shows the number of proprietors from 1970 to 2008. 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 2008 was marked by an increased number of proprietors and overall saw an increase of about 235%. But it should be noted that in 1970 the number of proprietors constituted about 18% of the total number of jobs and by 2008 that number had increased to a little over 28%.

Figure 3-6 Fremont County Employment



[1]Source: Regional Economic Information System (REIS), Bureau of Economic Analysis (BEA), RCN-0955, May 2010

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 3-29. 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 historical use.

Table 3-29. Average Use 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 3-30 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 3-29

Table 3-30. Average Authorized Use, Permitted Use, and Percentage of Permitted Use

Item			'80-'98	'99-'06	'80-'06
Cattle					
Average Authorized Use			18,826	13,892	17,364
Average Permitted Use			35,768	35,910	35,810
Average % of Permitted Use			52.6%	38.7%	48.5%
Sheep					
Average Authorized Use			7,697	3,478	6,447
Average Permitted Use			12,100	11,451	11,908
Average % of Permitted Use			63.1%	30.4%	53.4%
Total					
Average Authorized Use			26,523	17,370	23,811
Average Permitted Use			47,868	47,361	47,718
Average % of Permitted Use			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 3-30 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 3-31 illustrates the locally assessed agricultural lands by type of use by county. Table 3-32 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 3-33. The percent of total range lands valuation depicted in Table 3-31 is computed based on both the total locally and state assessed valuation for 2010. The results of that computation is illustrated in Table 3-34, 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 3-34), it can be argued that the amount of infrastructure and services required to support these lands are also relatively low.

Table 3-31. Assessed Valuations by Wyoming Counties 2010

LOCALLY ASSESSED VALUATIONS FOR THE YEAR 2010[1]								
County	**Total Irrigated Lands**		**Total Dry Farm**		**Total Range Lands**		**Total Agricultural Lands**	
	Acres	**Valuation**	**Acres**	**Valuation**	**Acres**	**Valuation**	**Acres**	**Valuation**
Albany	71,344	$1,911,305	0	$0	1,606,698	$5,423,140	1,678,042	$7,334,445
Big Horn	$111,520	12,665,717	$0	0	$197,917	1,612,343	$309,437	14,278,060
Campbell	157	$15,806	78,973	$1,924,047	2,152,244	$6,988,281	2,231,374	$8,928,134
Carbon	138,367	$5,135,401	5,015	$86,819	1,772,461	$4,283,763	1,915,843	$9,505,983
Converse	42,469	$3,806,410	6,026	$153,888	1,874,431	$6,698,669	1,922,926	$10,658,967
Crook	4,073	$379,029	128,185	$3,025,343	1,227,142	$8,093,583	1,359,400	$11,497,955
Fremont	121,643	$9,427,226	**0**	$0	612,782	$2,839,012	734,425	$12,266,238
Goshen	111,741	$10,649,445	161,831	$3,951,617	996,280	$6,483,084	1,269,852	$21,084,146
Hot Springs	$24,101	2,166,945	$0	0	$362,837	1,314,006	$386,938	3,480,951
Johnson	57,815	$6,479,327	2,352	$51,998	1,522,518	$7,158,253	1,582,685	$13,689,578
Laramie	37,255	$3,652,130	261,012	$6,701,077	1,082,399	$6,350,846	1,380,666	$16,704,053
Lincoln	77,376	$5,161,269	18,628	$469,091	409,650	$1,679,932	505,654	$7,310,292
Natrona	23,828	$2,337,459	983	$25,225	1,270,052	$4,147,339	1,294,863	$6,510,023
Niobrara	11,657	$973,068	40,078	$946,341	1,300,696	$4,885,404	1,352,431	$6,804,813
Park	110,547	$12,164,736	0	$0	555,476	$2,710,725	666,023	$14,875,461
Platte	75,378	$6,601,976	87,745	$2,105,246	841,697	$3,160,355	1,004,820	$11,867,577
Sheridan	64,243	$6,460,801	25,849	$624,477	889,164	$4,893,728	979,256	$11,979,006
Sublette	132,889	$3,560,116	0	$0	409,476	$3,345,586	542,365	$6,905,702
Sweetwater	23,516	$1,284,920	0	$0	1,690,301	$3,601,109	1,713,817	$4,886,029
Teton	13,913	$1,019,313	4,606	$145,919	18,457	$495,153	36,976	$1,660,385
Unita	74,516	$3,625,820	0	$0	642,035	$2,161,407	716,551	$5,787,227
Washakie	43,865	$5,421,631	2,827	$59,880	302,724	$1,545,960	349,416	$7,027,471
Weston	2,949	$87,152	31,393	$711,239	1,008,212	$3,514,412	1,042,554	$4,312,803
Totals	**1,375,162**	**$104,987,002**	**855,503**	**$20,982,207**	**22,745,649**	**$93,386,090**	**24,976,314**	**$219,355,299**

[1]State of Wyoming Department of Revenue 2010 Annual Report, page 58

Table 3-32. Locally Assessed Valuations for the Year 2010

LOCALLY ASSESSED VALUATIONS FOR THE YEAR 2010[2]					
County	**Total Agricultural Land Valuation**	**Total Residential Land, Improvements & Personal Property**	**Total Commercial Land, Improvements & Personal Property**	**Total Industrial Property**	**Total Locally Assessed**
Albany	$7,334,445	$208,512,586	$70,157,973	$7,882,398	$293,887,402
Big Horn	$14,278,060	$50,583,153	$11,721,172	$11,630,909	$88,213,294
Campbell	$8,928,134	$226,636,849	$72,432,605	$454,143,355	$762,140,943
Carbon	$9,505,983	$81,634,517	$24,054,904	$105,102,603	$220,298,007
Converse	$10,658,967	$78,593,584	$18,187,681	$70,753,127	$178,193,359
Crook	$11,497,955	$43,981,734	$8,523,491	$9,451,454	$73,454,634
Fremont	$12,266,238	$223,454,689	$54,816,723	$91,452,714	$381,990,364
Goshen	$21,084,146	$58,747,478	$13,561,048	$2,765,125	$96,157,797
Hot Springs	$3,480,951	$26,985,840	$7,367,358	$6,717,023	$44,551,172
Johnson	$13,689,578	$79,248,384	$17,196,562	$114,100,096	$224,234,620
Laramie	$16,704,053	$525,006,700	$174,063,969	$77,409,822	$793,184,544
Lincoln	$7,310,292	$177,028,650	$24,307,661	$200,351,058	$408,997,661
Natrona	$6,510,023	$414,910,080	$178,185,386	$71,473,776	$671,079,265
Niobrara	$6,804,813	$10,147,670	$2,677,536	$2,804,883	$22,434,902
Park	$14,875,461	$245,298,056	$51,793,255	$18,047,823	$330,014,595
Platte	$11,867,577	$42,526,045	$9,515,748	$1,861,847	$65,771,217
Sheridan	$11,979,006	$262,602,908	$55,653,884	$39,770,510	$370,006,308
Sublette	$6,905,702	$110,675,470	$34,519,131	$235,878,992	$387,979,295
Sweetwater	$4,886,029	$206,730,058	$79,071,671	$327,145,022	$617,832,780
Teton	$1,660,385	$1,008,036,832	$166,676,287	$246,280	$1,176,619,784
Unita	$5,787,227	$104,008,884	$27,200,560	$54,066,025	$191,062,696
Washakie	$7,027,471	$48,272,426	$12,749,723	$10,486,981	$78,536,601
Weston	$4,312,803	$33,291,076	$4,792,586	$8,104,981	$50,501,446
Totals	**$219,355,299**	**$4,266,913,699**	**$1,119,226,914**	**$1,921,646,804**	**$7,527,142,686**

[2]State of Wyoming Department of Revenue 2010 Annual Report, page 64

Table 3-33. State Assessed Valuations for the Year 2010

STATE ASSESSED VALUATIONS FOR THE YEAR 2010[3]				
County	**Non-Minerals**	**Minerals**	**Total of All State Assessed**	**% of Total**
Albany	53,922,906	4,832,649	58,755,555	0.43%
Big Horn	14,369,680	123,254,283	137,623,963	1.00%
Campbell	174,809,862	4,079,716,109	4,254,525,971	30.85%
Carbon	84,309,578	459,587,374	543,896,952	3.94%
Converse	143,388,394	371,845,621	515,234,015	3.74%
Crook	7,195,546	86,300,948	93,496,494	0.68%
Fremont	20,572,110	362,009,498	382,581,608	2.77%
Goshen	32,256,253	16,892	32,273,145	0.23%
Hot Springs	8,003,396	141,718,660	149,722,056	1.09%
Johnson	5,496,473	903,368,230	908,864,703	6.59%
Laramie	87,297,676	28,245,574	115,543,250	0.84%
Lincoln	66,357,337	389,990,949	456,348,286	3.31%
Natrona	47,851,926	315,641,798	363,493,724	2.64%
Niobrara	21,564,150	29,648,226	51,212,376	0.37%
Park	15,859,708	395,393,843	411,253,551	2.98%
Platte	85,549,128	1,477,917	87,027,045	0.63%
Sheridan	14,548,815	155,312,161	169,860,976	1.23%
Sublette	6,730,423	3,124,982,129	3,131,712,552	22.71%
Sweetwater	192,823,024	1,311,114,886	1,503,937,910	10.91%
Teton	9,277,945	1,468,480	10,746,425	0.08%
Unita	89,638,021	202,744,387	292,382,408	2.12%
Washakie	8,768,769	43,555,833	52,324,602	0.38%
Weston	14,928,241	51,589,137	66,517,378	0.48%
Totals	**1,205,519,361**	**12,583,815,584**	**13,789,334,945**	**100.00%**

[3]State of Wyoming Department of Revenue 2010 Annual Report, page 66

Table 3-34. Percentage of total Rangeland Valuations 2010

COUNTY	% OF TOTAL RANGE LANDS VALUATION OF LOCALLY ASSESSED VALUATION-'10	% OF TOTAL RANGE LANDS VALUATION OF STATE ASSESSED VALUATION-'10	% OF TOTAL RANGE LANDS VALUATION OF TOTAL ASSESSED VALUATION-'10
Albany	1.85%	9.23%	1.54%
Big Horn	1.83%	1.17%	0.71%
Campbell	0.92%	0.16%	0.14%
Carbon	1.94%	0.79%	0.56%
Converse	3.76%	1.30%	0.97%
Crook	11.02%	8.66%	4.85%
Fremont	0.74%	0.74%	0.37%
Goshen	6.74%	20.09%	5.05%
Hot Springs	2.95%	0.88%	0.68%
Johnson	3.19%	0.79%	0.63%
Laramie	0.80%	5.50%	0.70%
Lincoln	0.41%	0.37%	0.19%
Natrona	0.62%	1.14%	0.40%
Niobrara	21.78%	9.54%	6.63%
Park	0.82%	0.66%	0.37%
Platte	4.81%	3.63%	2.07%
Sheridan	1.32%	2.88%	0.91%
Sublette	0.86%	0.11%	0.10%
Sweetwater	0.58%	0.24%	0.17%
Teton	0.04%	4.61%	0.04%
Unita	1.13%	0.74%	0.45%
Washakie	1.97%	2.95%	1.18%
Weston	6.96%	5.28%	3.00%
State Average	**1.24%**	**0.68%**	**0.44%**

Table 3-35. Change in Assessed Valuations 2010 as Compared to 2009

	STATE ASSESSED[4]			LOCALLY ASSESSED[4]			TOTAL ASSESSED[4]		
County	**Total 2010**	**Total 2009**	**10 vs. '09**	**Total 2010**	**Total 2009**	**10 vs. '09**	**Total 2010**	**Total 2009**	**10 vs. '09**
Albany	58,755,555	56,011,427	2,744,128	293,887,402	293,017,412	869,990	352,642,957	349,028,839	3,614,118
Big Horn	137,623,963	223,018,351	-85,394,388	88,213,294	84,734,471	3,478,823	225,837,257	307,752,822	-81,915,565
Campbell	4,254,525,971	4,949,234,676	-694,708,705	762,140,943	761,319,842	821,101	5,016,666,914	5,710,554,518	-693,887,604
Carbon	543,896,952	962,088,408	-418,191,456	220,298,007	261,141,911	-40,843,904	764,194,959	1,223,230,319	-459,035,360
Converse	515,234,015	525,462,825	-10,228,810	178,193,359	169,468,210	8,725,149	693,427,374	694,931,035	-1,503,661
Crook	93,496,494	142,009,867	-48,513,373	73,454,634	70,269,588	3,185,046	166,951,128	212,279,455	-45,328,327
Fremont	382,581,608	768,449,608	-385,868,000	381,990,364	367,178,842	14,811,522	764,571,972	1,135,628,450	-371,056,478
Goshen	32,273,145	30,953,900	1,319,245	96,157,797	95,582,833	574,964	128,430,942	126,536,733	1,894,209
Hot Springs	149,722,056	239,406,821	-89,684,765	44,551,172	43,121,713	1,429,459	194,273,228	282,528,534	-88,255,306
Johnson	908,864,703	1,619,636,749	-710,772,046	224,234,620	204,214,908	20,019,712	1,133,099,323	1,823,851,657	-690,752,334
Laramie	115,543,250	142,188,330	-26,645,080	793,184,544	774,077,579	19,106,965	908,727,794	916,265,909	-7,538,115
Lincoln	456,348,286	817,427,816	-361,079,530	408,997,661	410,462,460	-1,464,799	865,345,947	1,227,890,276	-362,544,329
Natrona	363,493,724	582,277,122	-218,783,398	671,079,265	705,655,304	-34,576,039	1,034,572,989	1,287,932,426	-253,359,437
Niobrara	51,212,376	69,732,364	-18,519,988	22,434,902	22,253,954	180,948	73,647,278	91,986,318	-18,339,040
Park	411,253,551	696,357,241	-285,103,690	330,014,595	336,920,437	-6,905,842	741,268,146	1,033,277,678	-292,009,532
Platte	87,027,045	69,745,897	17,281,148	65,771,217	64,973,120	798,097	152,798,262	134,719,017	18,079,245
Sheridan	169,860,976	416,197,717	-246,336,741	370,006,308	377,325,967	-7,319,659	539,867,284	793,523,684	-253,656,400
Sublette	3,131,712,552	5,987,968,582	-2,856,256,030	387,979,295	409,685,452	-21,706,157	3,519,691,847	6,397,654,034	-2,877,962,187
Sweetwater	1,503,937,910	2,390,119,647	-886,181,737	617,832,780	627,661,731	-9,828,951	2,121,770,690	3,017,781,378	-896,010,688
Teton	10,746,425	13,882,083	-3,135,658	1,176,619,784	1,313,278,913	-136,659,129	1,187,366,209	1,327,160,996	-139,794,787
Unita	292,382,408	615,079,760	-322,697,352	191,062,696	197,318,818	-6,256,122	483,445,104	812,398,578	-328,953,474
Washakie	52,324,602	81,512,447	-29,187,845	78,536,601	74,774,483	3,762,118	130,861,203	156,286,930	-25,425,727
Weston	66,517,378	105,982,694	-39,465,316	50,501,446	50,350,901	150,545	117,018,824	156,333,595	-39,314,771
Totals	**13,789,334,945**	**21,504,744,332**	**-7,715,409,387**	**7,527,142,686**	**7,714,788,849**	**-187,646,163**	**21,316,477,631**	**29,219,533,181**	**-7,903,055,550**

[4]State of Wyoming Department of Revenue 2010 Annual Report, page 67

Table 3-36 provides a comparison of the state and locally assessed valuations for both 2009 and 2010. Fremont County's assessed valuation was one of twenty counties that fell in 2010 and there were only three counties that showed increases in assessed value during that same period. The counties that increased were Albany, Goshen and Platte.

The total ad valorem tax assessed that was applied to the 2010 mineral production is depicted in 3-36. 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 31.07% and Sublette with 23.71%. By comparison, Fremont County's share of the state total is 3.33%.

Table 3-36. Mill Levies Applied to 2009 Mineral Production

COUNTY AND STATEWIDE AVERAGE 2010 MILL LEVIES APPLIED TO 2009 MINERAL PRODUCTION[5]			
County	**Average Mineral 2010 Mill Levies**	**Total Ad Valorem Production Tax Assessed**	**% of State Total**
Albany	63.949	$309,041	0.04%
Big Horn	$73	$8,949,918	1.14%
Campbell	59.776	$243,867,658	31.07%
Carbon	66.435	$30,532,535	3.89%
Converse	59.970	$22,299,654	2.84%
Crook	61.519	$5,309,173	0.68%
Fremont	72.266	$26,160,848	3.33%
Goshen	68.020	$1,149	0.00%
Hot Springs	$65	$9,163,011	1.17%
Johnson	62.734	$56,671,601	7.22%
Laramie	67.515	$1,906,993	0.24%
Lincoln	62.567	$24,400,390	3.11%
Natrona	70.717	$22,321,338	2.84%
Niobrara	68.500	$2,030,903	0.26%
Park	70.096	$27,715,656	3.53%
Platte	71.357	$105,459	0.01%
Sheridan	66.230	$10,286,386	1.31%
Sublette	59.558	$186,118,882	23.71%
Sweetwater	66.382	$87,034,364	11.09%
Teton	57.350	$84,217	0.01%
Uinta	63.964	$12,968,409	1.65%
Washakie	68.564	$2,986,348	0.38%
Weston	71.497	$3,688,479	0.47%
Statewide	**62.375**	**$784,912,412**	**100.00%**

[5]State of Wyoming Department of Revenue 2010 Annual Report, page 52

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, income and employment will be compared. Those comparisons are shown in Table 3-37.

Table 3-37. Change in Wage & Salary Employment and Proprietorship 1980-2008

	% CHANGE IN POPULATION -'80-'08	% CHANGE IN WAGE & SALARY EMPLOY-MENT - '80-'08	% OF PROPRIETORS -1980	% OF PROPRIETORS -2008	PERSONAL INCOME COMPOUND ANNUAL GROWTH RATE-'80-'08	NON-LABOR INCOME COMPOUND ANNUAL GROWTH RATE-'80-'08	LABOR INCOME COMPOUND ANNUAL GROWTH RATE-'80-'08	NON-LABOR SOURCES % OF TOTAL PERSONAL INCOME-'08
Fremont	-2.60%	11.03%	17.99%	28.36%	1.25%	3.41%	0.28%	43.51%
Wyoming	12.40%	33.88%	17.54%	23.93%	5.47%	7.22%	4.70%	61.79%

Source: Regional Economic Information System (REIS), Bureau of Economic Analysis (BEA), RCN-0955, May 2010

One of the trends that emerge in Table 3-37 is the population growth for Wyoming is significantly higher than Fremont County. Over the period from 1980 to 2008, the Fremont County population declined by 2.6 percent where Wyoming's population increased by 12.4%. Regarding the change in wage and salary employment, Wyoming's growth from 1980-2008 is again larger than Fremont County. However, the percent of proprietors in both 1980 and 2008 compared to the total employment is about the same for both Wyoming and Fremont County. But the personal income, non-labor income and labor income growth rate is substantially higher in Wyoming compared to Fremont County. And the percent of non-labor sources of income is also higher in Wyoming compared to Fremont County.

Interestingly enough, the unemployment data downloaded from the Local Area Unemployment Statistics (LAUS) indicates the unemployment rate has been consistently higher in Fremont County compared to Wyoming from 2000 to 2008 (Table 3-38). And even though the compound annual growth rate in personal income for the period 1980 to 2008 is positive for both Fremont County and Wyoming measured in 2010 dollars, the Wyoming's rate is nearly 4.5 times greater compared to Fremont County.

Table 3-38. Unemployment Rate in Fremont Compares to Wyoming Employment

YR	FRE-MONT LABOR FORCE	FREMONT EMPLOY-MENT	FREMONT UNEMPLOY-MENT	FREMONT UNEMPLOY-MENT RATE	WYO-MING LABOR FORCE	WYOMING EMPLOY-MENT	WYOMING UNEMPLOY-MENT	WYOMING UNEMPLOY-MENT RATE
2000	17,665	16,749	916	5.20	266,882	256,685	10,197	3.80
2001	18,149	17,214	935	5.20	269,985	259,508	10,477	3.90
2002	18,160	17,184	976	5.40	269,654	258,462	11,192	4.20
2003	17,763	16,733	1,030	5.80	271,607	259,489	12,118	4.50
2004	17,595	16,679	916	5.20	273,091	262,358	10,733	3.90
2005	17,820	16,957	863	4.80	278,183	267,927	10,256	3.70
2006	17,823	17,037	786	4.40	284,987	275,758	9,229	3.20
2007	18,142	17,444	698	3.80	290,490	282,102	8,388	2.90
2008	18,440	17,656	784	4.30	293,854	284,535	9,319	3.20
2009	18,849	17,374	1,475	7.80	293,927	275,217	18,710	6.40

Source: Local Area Unemployment Statistics (LAUS) http://doe.state.wy.us/lmi/LAUS/0004aa.htm

Looking at the distribution of earnings by sector indicates that, for example, farm earning in Fremont County has dropped from seventh (5.65% of total earnings) in 1970 to tenth (.84% of total earnings) in 2000 out of the eleven sectors examined in the analysis. By 2008 Farm Earnings ranked seventeenth (.18% of total earnings) out of the eighteen sectors identified.

The top four Fremont County sectors measured in terms of the percentage of total earnings in 2008 was government and government enterprises, 50.00%, other (utilities, wholesale trade, educational services, health care and social assistance) (16.54%), Other services, except public administration (9.03% and mining (4.76%). While the historical sectoral data previous to 2000 cannot be directly compared to the data from 2001 and later, for comparison purposes, the top four sectors in 1970 were Mining (22.7%), Government and government enterprises (20.1%), Construction (13.3%) and Retail Trade (11.54%).