



CHAPTER 3
AFFECTED ENVIRONMENT

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CHAPTER 3 AFFECTED ENVIRONMENT

Chapter 3 describes existing conditions for Bureau of Land Management (BLM) resource programs, resource uses, special designations, and the socioeconomic environment within the Casper Field Office planning area. Management of resources and resource uses on public lands administered by the BLM is directed by a variety of laws, regulations, policies, and other requirements. The Casper Field Office operates under applicable requirements and guidance set forth in Appendix B. The Casper Field Office also considers Best Management Practices (BMPs) in the management of resources and resource uses in the planning area. Appendix K identifies select sources of BMPs.

In addition to describing existing conditions, Chapter 3 identifies, where appropriate, management challenges for resource programs and resource uses on BLM-administered land. These management challenges were identified by the BLM's Management Situation Analysis (MSA), as well as by issues identified during the scoping process for revising the 1985 Platte River RMP (BLM 1985b). By describing existing conditions for resource programs in the planning area, this chapter serves as the baseline against which the impacts of the different alternatives are analyzed and compared in Chapter 4.

Overview of the Planning Area

The planning area comprises 1,361,577 acres of BLM-administered surface land and 4,657,172 acres of BLM-administered mineral estate in Converse, Goshen, Natrona, and Platte Counties in eastern-central Wyoming (see Maps 1 and 2). Except for Natrona County, most BLM-administered surface land in the planning area comprises scattered tracts intermingled with state and private lands.

The planning area encompasses the intersection of two physiographic regions—the Interior Plains to the east and the Rocky Mountain System to the west. The eastern planning area generally is characterized as rangeland with low annual rainfall (less than 20 inches) and marginal farmland. Most of the western planning area is included in the broad intermountain basins. This western part is classified as shrub-steppe dominated by sagebrush and interspersed with shortgrass prairie. As elevation increases, dominant vegetation transitions from sagebrush and grassland to mountain shrublands and, ultimately, to coniferous forests. Elevations in the planning area range from less than 4,000 feet in the North Platte River Basin to approximately 9,000 feet above mean sea level (msl) in the Laramie Mountains.

The planning area includes portions of the Wind River Basin to the west and the Powder River Basin to the northeast. The Casper Arch, a northwest-trending structural divide of low relief that connects the South Bighorns and the Laramie Range (NRCS 1983), separates these two basins.

Within the planning area, precipitation ranges from more than 30 inches annually in the mountains to under 10 inches in some grasslands. The climate of the planning area is classified as semiarid with a wide variation in daily and annual temperatures due to relatively high elevation and dry air. Summer temperatures average 67-degrees Fahrenheit (°F), while winter temperatures average 25 °F.

Soils and vegetation in the planning area generally provide rangeland suitable for year-round cattle and sheep grazing at lower elevations; however, supplemental feeding often is required, especially at higher elevations.

Limited small grains exist where water is available and suitable soils exist. Irrigated hay and pasture contribute to agricultural production in the planning area. Agriculture production is limited by low precipitation and scarcity of surface water. Small reservoirs, intermittent streams, and livestock-watering tanks supplement limited surface water.

Introduction

Natrona County

Natrona County was established in 1888, the same year Casper, Wyoming, was named as the county seat. Pioneers traveling west in the mid to late 1800s generally followed the Mormon and Oregon trails. Early settlers established homesteads in the area in the late 1800s and large ranches of sheep and cattle took advantage of the vast rangeland. The Salt Creek and other early oil fields established the energy industry in this part of the planning area. Today, energy and agriculture remain important commodities of the area's economy.

Highway 26 generally bisects the middle of Natrona County as it traverses east to west between Casper and Waltman. Interstate Highway 25 (I-25) is the primary north-south transportation corridor between Casper and Buffalo. Southern routes from Casper generally follow Highway 220 to Alcova and Highway 487. Approximately 5,000 acres of the Medicine Bow National Forest are in southeast Natrona County.

The North Platte River runs through Natrona County and includes Alcova Reservoir and a portion of Pathfinder Reservoir. The Alcova Reservoir in the Casper-Alcova Irrigation District (NRCS 1997) supplies water to most of the irrigated land in Natrona County. Energy development in Natrona County began in 1883 with the first oil well and continues today, primarily involving oil, gas, and uranium.

Natrona County comprises approximately 3,016,762 surface acres, of which the BLM administers approximately 1,124,485 acres. In addition, BLM administers approximately 2,362,582 acres of federal mineral estate in Natrona County. The Lander Field Office administers a portion of the northwest corner of Natrona County.

Converse County

Converse County was established in 1888, the same year Douglas, Wyoming, was named as the county seat. Early explorers traveled west along the North Platte River, followed later by pioneers traveling routes later identified as the Mormon and Oregon Trails. Homesteaders began settling in the late 1800s and by the early 1900s, the area was producing oil and gas. Agriculture and energy production continue today as the primary economic commodities in Converse County.

I-25 bisects the southern half of Converse County as it traverses east to west between Casper and Douglas. In Douglas, the southern terminus of Highway 59 begins at I-25 and travels north through the Thunder Basin National Grasslands and on into Campbell County and Gillette, Wyoming. The Medicine Bow National Forest extends into southern Converse County south of I-25.

The North Platte River runs west to east through Converse County and the North Platte watershed drains the southern half of this county. The Cheyenne watershed drains most of the northern half of Converse County. Energy development in Converse County began in the early 1900s and continues today, primarily involving oil, gas, uranium, and coal.

Converse County comprises approximately 2,727,850 surface acres, of which the BLM administers approximately 129,947 acres. In addition, the BLM administers approximately 1,619,626 acres of federal mineral estate in the county.

Platte County

Platte County was established in 1911, the same year Wheatland, Wyoming, was named as the county seat. Although pioneers traveled west along the Oregon Trail, the area known today as Platte County was occupied primarily by Native Americans and fur trappers until the late 1860s, when cattle ranches moved into the area. Agriculture remains an important economic commodity in Platte County. The Laramie River Station power plant northeast of Wheatland also plays an important role in the area's economy.

Platte County is bisected by I-25 as it traverses north-south between Glendo and Chugwater. Between Glendo and Wheatland, Highway 26 travels east to Guernsey and on to Torrington in Goshen County.

The North Platte River runs through northeast Platte County and includes the Glendo and Guernsey reservoirs. Mining plays a relatively minor role in Platte County's economy; however, the Laramie River Station power plant is a consumer-owned coal power plant that contributes to the area's economy.

Platte County comprises approximately 1,349,343 surface acres, of which the BLM administers approximately 81,965 acres. In addition, the BLM administers approximately 422,602 acres of federal mineral estate in Platte County.

Goshen County

Goshen County was established in 1911, the same year Torrington, Wyoming, was named as the county seat. Beginning in 1843, the area became a gateway for early explorers and pioneers traveling west via the North Platte River and the Oregon and Mormon Trails. Agriculture became a primary commodity early in Goshen County's history and remains so today.

Highway 26 parallels the North Platte River traversing west to east between Guernsey and Torrington. Highway 85 intersects Highway 26 and is the primary north-south trending transportation corridor in the county.

Goshen County comprises approximately 1,427,392 surface acres, of which the BLM administers approximately 25,180 acres. In addition, the BLM administers approximately 252,362 acres of federal mineral estate in Goshen County.

3.1 Physical Resources

Physical resources in the planning area include air quality, geologic resources, soil, and water. Each of the four resource sections includes a definition and description of the resource, the current condition of the resource, management challenges where appropriate, and management actions.

3.1.1 Air Quality

This section describes the climate and existing air quality in the region potentially affected by alternatives described in Chapter 2. Air pollutants addressed in this Environmental Impact Statement (EIS) include criteria pollutants, hazardous air pollutants (HAPs), and compounds that could cause visibility impairment or atmospheric deposition. Regional air quality is influenced by the interaction of several factors, including meteorology, climate, the magnitude and spatial distribution of local and regional air pollutant sources, and the chemical properties of emitted air pollutants.

Climate

The planning area is located in a semi arid midcontinental climate regime typified by dry windy conditions, limited rainfall, and long cold winters (Trewartha and Horn 1980). Table 3-1 summarizes components of climate that could affect air quality in the region.

Table 3-1. Summary of the Climate in the Casper Planning Area

Climate Component	Description
Temperature	Daily maximum summer temperature: 83.4 °F Daily minimum winter temperature: 13.9 °F Mean annual temperature: 45.1 °F
Precipitation	Mean annual precipitation: 12.5 inches Mean annual snowfall: 77.5 inches Mean winter snow depth: 1 inch
Winds	Mean annual wind speed: 12.8 mile per hour (mph) Prevailing wind direction: southwest

Source: Western Regional Climate Center 2006

Existing Air Quality

Components of air quality addressed in this environmental impact statement (EIS) include concentrations of air pollutants, visibility, and atmospheric deposition:

- Air pollutant concentration is an indicator of breathable, healthful air
- Visibility is an indicator of our ability to see the landscape around us
- Atmospheric deposition is an indicator of the health of terrestrial and aquatic ecosystems.

Air quality in the planning area generally is considered to be good based on the limited amount of air quality monitoring currently being conducted in the area. The planning area has no regions that are designated as nonattainment for National Ambient Air Quality Standards (NAAQS) or Wyoming Ambient Air Quality Standards (WAAQS).

Concentrations

Pollutant concentration refers to the mass of pollutant present in a volume amount of air, and can be reported in units of micrograms per cubic meter ($\mu\text{g}/\text{m}^3$), parts per million (ppm) or parts per billion (ppb).

Figure 3-1 shows the PM₁₀ (particulate matter less than 10 microns in diameter) data collected over the last 11 years at the State and Local Air Monitoring Station (SLAMS) located in Casper, Wyoming. The data are shown for both the 24-hours and annual averages as a percent of the respective NAAQS. The BLM supports ambient air quality monitoring programs within Wyoming for criteria pollutants, visibility, and air quality-related values in Class I pristine areas.

Visibility

Several national parks, wilderness areas, and national monuments exist in the region. Table 3-2 presents a list of these Class I and Class II areas within 100 miles of the planning area. The Bridger Wilderness Area is the closest Class I area to the west of the planning area; Wind Cave National Park is the closest Class I area to the east.

Table 3-2. National Parks, Wilderness Areas, and National Monuments in the Vicinity of the Casper Planning Area

Areas	Closest Distance to the Casper Planning Area (miles)	Direction from the Casper Planning Area	Clean Air Act Status of the Area
Bridger Wilderness Area	90	West	Class I
Fitzpatrick Wilderness Area	100	West	Class I
Washakie Wilderness Area	>100	Northwest	Class I
Teton Wilderness Area	>100	Northwest	Class I
North Abasaroka Wilderness Area	>100	Northwest	Class I
Cloud Peaks Wilderness Area	65	North	Class II
Grand Teton National Park	>100	Northwest	Class I
Yellowstone National Park	>100	Northwest	Class I
Wind Cave National Park	75	East	Class I
Badlands National Park	>100	East	Class I
Jewell Cave National Monument	50	East	Class II

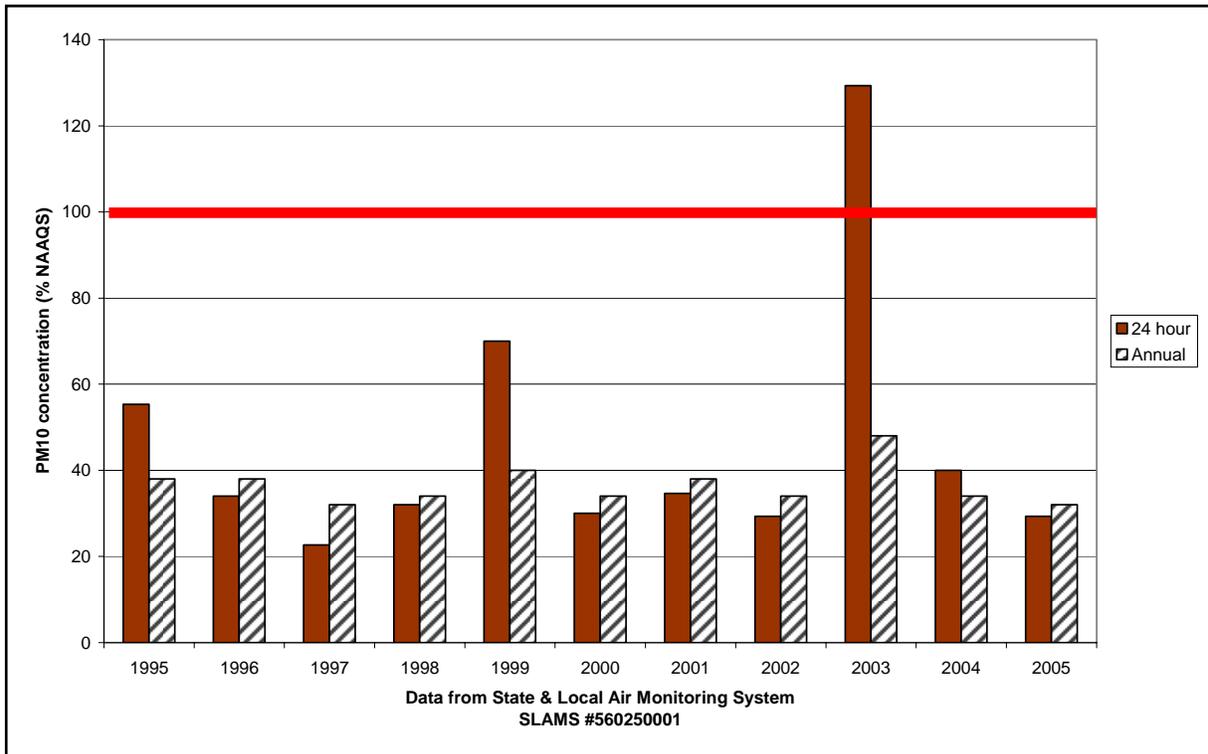
Source: NPS 2006

The BLM works cooperatively with several other federal agencies to measure visibility with the Inter-Agency Monitoring of Protected Visual Environments (IMPROVE) network. The IMPROVE station operating in the Class I area nearest to the planning area, approximately 90 miles to the west, is in the Bridger Wilderness Area. Figure 3-2 shows the visual range measured in the Bridger Wilderness Area over the last 15 years.

Atmospheric Deposition

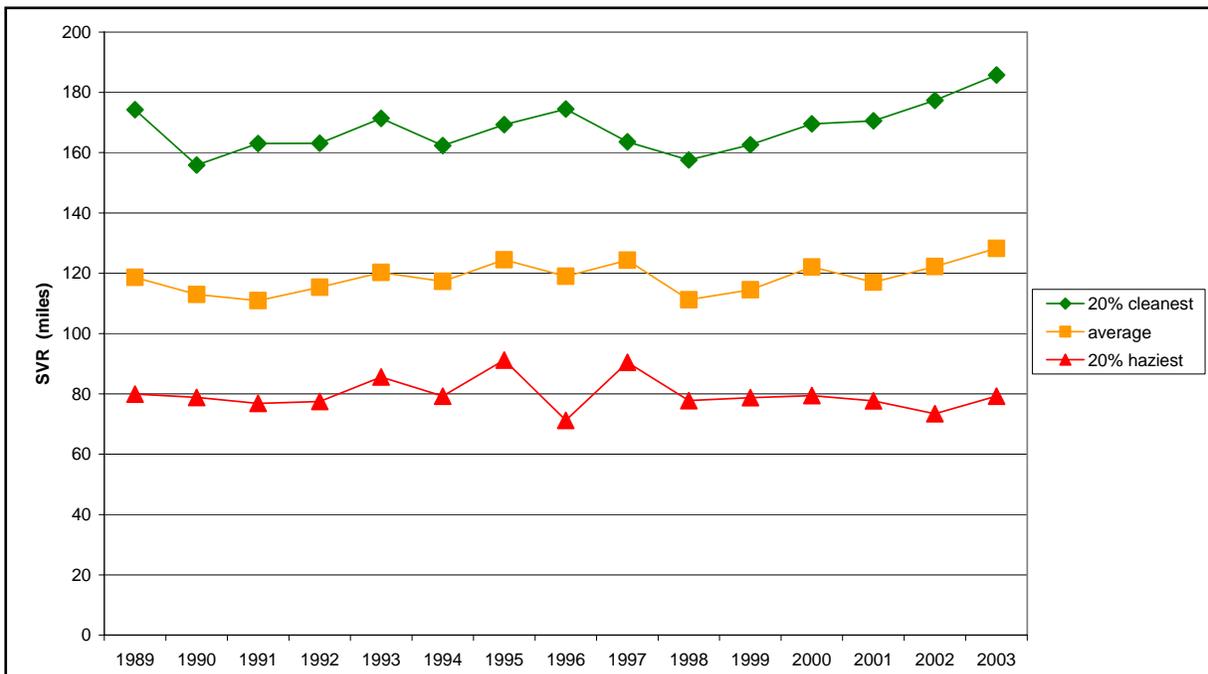
Atmospheric deposition refers to processes in which air pollutants are removed from the atmosphere and deposited into terrestrial and aquatic ecosystems. Much of the concern about deposition is due to secondary formation of sulfur and nitrogen compounds, which may contribute to acidification of lakes, streams, and soils and affect other ecosystem characteristics, including nutrient cycling and biological diversity.

Figure 3-1. Particulate Matter Concentrations in Casper, Wyoming



Source: Caplan 2006a

Figure 3-2. Annual Visibility (Standard Visual Range [SVR]) in the Bridger Wilderness Area



Source: (Caplan 2006b)

The secondary formation of pollutants occurs when primary pollutants (such as nitrogen oxides [NO_x] or sulfur dioxide [SO₂]) chemically react in the atmosphere to produce new compounds, such as nitrates or nitric acid that can have additional effects on fragile ecosystems.

Air pollutants can be deposited by either wet (precipitation) or dry (gravitational settling of particles and adherence of gaseous pollutants to soil, water, and vegetation) deposition. The BLM works cooperatively with the U.S. Environmental Protection Agency (EPA) to measure dry deposition. Three Clean Air Status & Trends Network (CASTNet) stations operate in Wyoming. The CASTNet stations nearest to the planning area are located in Centennial and Pinedale, Wyoming. The BLM works cooperatively with private, state and other federal organizations to measure precipitation chemistry and wet deposition. Eight National Atmospheric Deposition Program (NADP) stations operate in Wyoming. Figure 3-3 presents the wet deposition data collected near Pinedale (close to the Bridger Wilderness Area) for more than 20 years, and Figure 3-4 presents the dry deposition collected near Pinedale for 15 years.

Hazardous Air Pollutants

Hazardous Air Pollutants (HAPs) include air pollutants that can produce serious illnesses or increased mortality, even in low concentrations. HAPs are compounds that have no established federal ambient standards, but they may have thresholds established by some states and are typically evaluated for potential chronic inhalation and cancer risks. The impact of HAPs on sensitive members of the population is a special concern of the BLM. Sensitive groups include children, the elderly, and the acutely and chronically ill. Existing sources of HAPs within the planning area include (1) fossil fuel combustion that emits HAPs, such as formaldehyde, and (2) oil and gas operations that emit volatile organic compounds (VOCs) and may emit hydrogen sulfide (H₂S).

Existing Emissions in the Planning Area

Table 3-3 presents an estimate of annual emissions within the planning area from resource-related sources during 2001. These data show that the main contributors to emissions include oil and gas development and production, salable minerals, locatables, and coal mines. Year 2001 activities are used to define existing air quality conditions in the planning area for the purpose of comparing the impacts of future emissions from each alternative.

Table 3-3. Year 2001 Annual Emissions for BLM Activities within the Casper Planning Area

Project Scenario/Resource	Emissions (Tons per Year)						
	PM ₁₀	PM _{2.5}	NO _x	SO _x	CO	VOC	HAPs
Emission Sources							
Natural Gas Development/Production	85	34	431	6	394	2,599	267
Oil Development/Production	64	21	449	59	113	15	1
Locatable Minerals	151	21	19	2	49	7	1
Salable Minerals	295	38	19	0	9	2	0
Coal Mine	480	112	373	14	0	0	0
OHVs	7	7	3	0	427	230	23
Minor Emission Sources							
Resource Roads	1	0	0	0	0	0	0
ROW and Corridors	20	5	16	2	22	5	1
Livestock Grazing	11	2	1	0	1	0	0
Vegetation Management	1	0	0	0	0	0	0
Year 2001 Totals	1,116	241	1,311	84	1,016	2,858	293

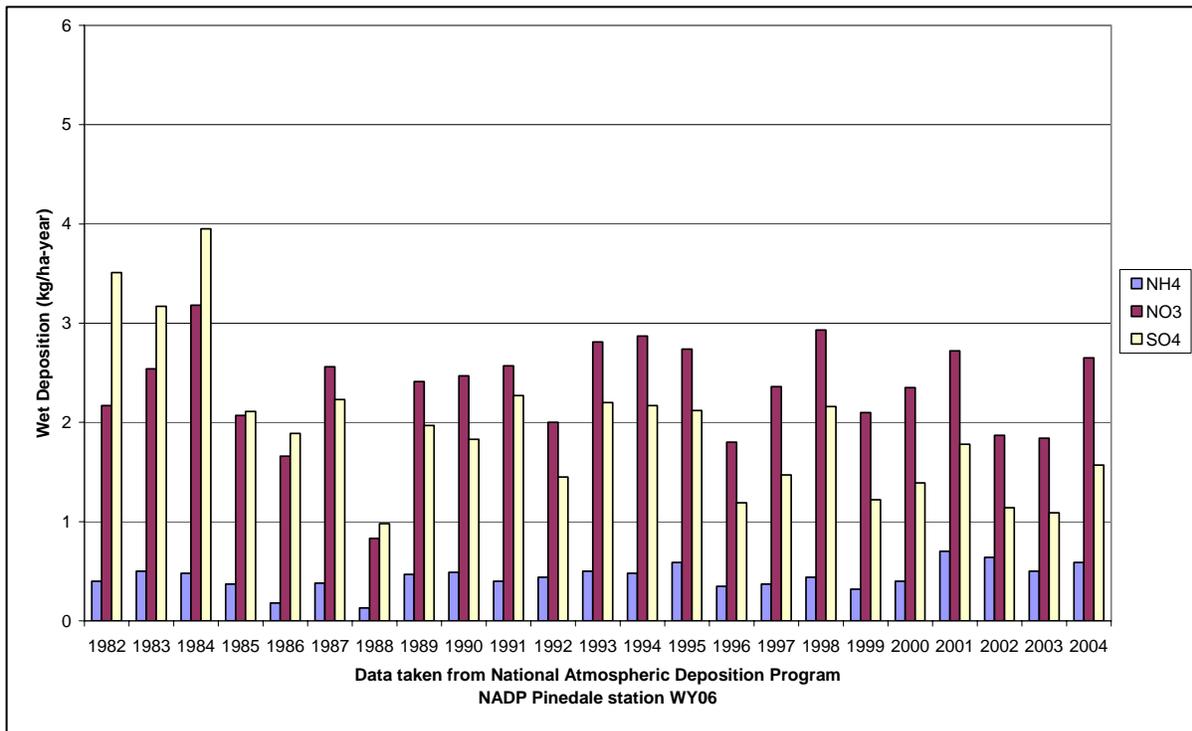
Source: BLM 2005c

Note: Due to rounding, column entries may not sum to total.

CO carbon monoxide
HAP Hazardous air pollutant
NO_x nitrogen oxides
OHV off-highway vehicle

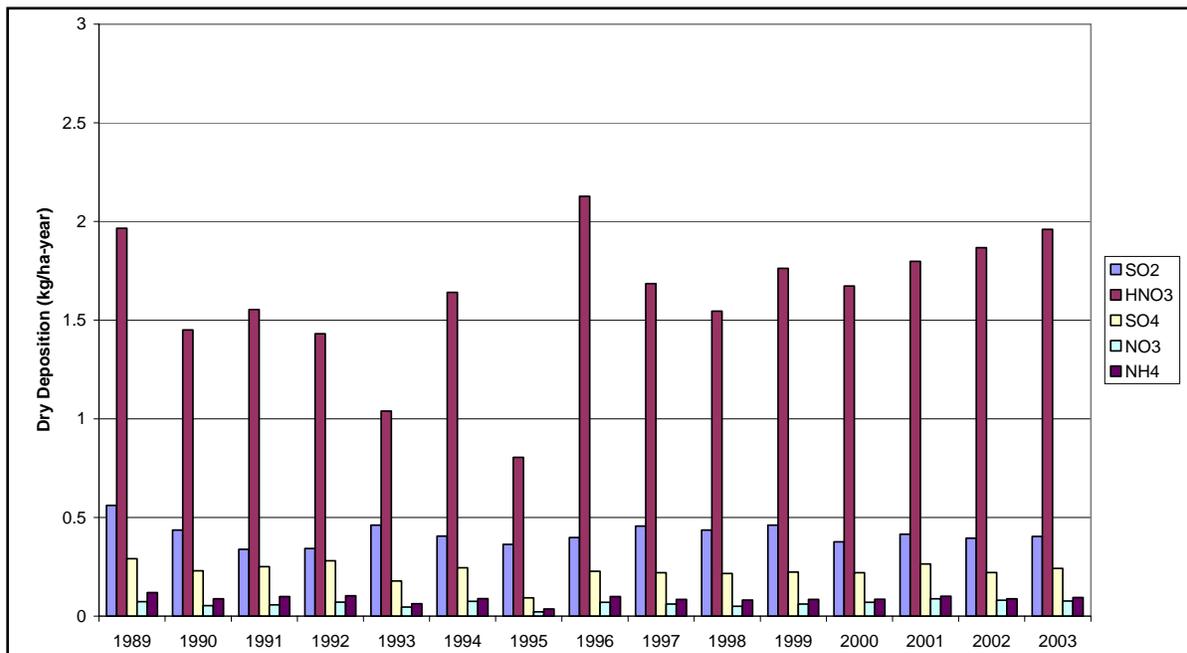
PM₁₀ particulate matter less than 10 microns in diameter
PM_{2.5} particulate matter less than 2.5 microns in diameter
ROW rights-of-way
SO_x sulfur oxides
VOC volatile organic compounds

Figure 3-3. Mean Annual Wet Deposition near Pinedale, Wyoming



Source: Caplan 2006b

Figure 3-4. Mean Annual Dry Deposition near Pinedale, Wyoming



Source: Caplan 2006b

Management Challenges

Three management challenges identified for air quality in the planning area are based, in part, on historic activities and current conditions and trends. First, the regulation of air quality standards, emission controls and other requirements are primarily the responsibility of other agencies, such as the Wyoming Department of Environmental Quality (DEQ) and the Environmental Protection Agency (EPA). The BLM works cooperatively with these regulatory agencies, as well as other land management agencies such as the U.S. Forest Service (USFS) and the National Park Service (NPS). Second, the development of mechanisms to better characterize the current status and future trends in air quality, such as establishing long-term air quality monitoring stations, is expensive and may be difficult to accomplish within current budgets. Third, prescribed burning is a tool that has potential benefits in managing the resource area, but also has air quality implications that need to be considered, including possible public health and visibility impacts.

Management actions anticipated to address the above challenges include characterizing the current status and future trends in ambient air quality in the region potentially affected by activity within the planning area, determining the range of air quality issues in the planning area, and implementing actions to maintain compliance or improve air quality. Management actions are incorporated in the alternatives and described in more detail in Chapter 2.

3.1.2 Geologic Resources

Wyoming, as a whole, and the planning area, in particular, lie within two physiographic regions—the Interior Plains and the Rocky Mountain System. Within the Interior Plains, the Northern Great Plains Province encompasses Goshen County, parts of Platte and Converse Counties, and the northeast portion of Natrona County. The Hartville Uplift further subdivides this region with the Natrona and Converse County portions defined as part of the unglaciated Missouri Plateau and the Goshen and Platte County portions defined as part of the High Plains. The Northern Rocky Mountains, Southern Rocky Mountains, Wyoming Basin, and Middle Rocky Mountains provinces comprise the Rocky Mountain System. The Laramie Mountains, which cover parts of Platte, Converse, and Natrona counties, are considered part of the Southern Rocky Mountain region. The Bighorn Mountains in northwestern Natrona County are part of the Middle Rocky Mountain region. Southwestern Natrona County, west of the Casper Arch, lies within the Wyoming Basin Province (USGS 2003a).

The physiography of the planning area reflects the underlying structural geology. Portions of two districts of the Interior Plains—the unglaciated Missouri Plateau and the High Plains—overlie portions of the Powder River and Denver-Julesberg basins, respectively. The Hartville Uplift separates these areas both physically and structurally. The uplifts responsible for the Bighorn Mountains, Casper Arch, and Laramie Mountains also form the western physical and structural boundaries for the Powder River and Denver-Julesberg basins, respectively. These same uplifts also separate these two basins from portions of the Wind River and Shirley Basins, which underlie the Wyoming Basin Province. The Sweetwater Uplift separates the Wind River and Shirley basins. These structural features—the uplifts, basins, and associated faulting—are part of the Rocky Mountain Foreland that developed during the Laramide Orogeny, a series of mountain-building episodes that lasted from the Late Cretaceous Period to the end of the Eocene Epoch (70 to 50 million years ago).

Geologic Formations

The rock sequence of the planning area represents a complex history that extends back perhaps 2.6-billion years to Precambrian time. There are many gaps, or unconformities, in the rock sequence in which millions of years of history are missing due to erosion or nondeposition. Further complications arise because rocks of the same age may have different names and lithologies, depending on where they are

Geologic Resources

located in the planning area. Boyd et al. (1989) discuss problems in stratigraphic nomenclature in further detail. The following discussion covers some of the more important formations in the stratigraphic sequence.

The oldest rocks in the planning area are Precambrian igneous and metasedimentary rocks exposed in the Laramie Mountains and the South Bighorns, where they have been faulted and uplifted. A major unconformity separates the Precambrian rocks from younger Cambrian-aged Flathead Sandstone, Gros Ventre Formation, Deadwood Formation, and Gallatin Limestone. Moving up in the rock sequence, the Bighorn Dolomite and the equivalent Whitewood Dolomite are the dominant units of the Ordovician. In parts of the Powder River and Wind River basins, the Lander Sandstone underlies the Bighorn Dolomite. No rocks of Silurian age appear to be within the planning area. In the Wind River Basin, the Beartooth Butte and Darby formations represent the Devonian. Above the Devonian, the Mississippian-aged Madison Limestone is a widespread sequence of massive limestone and dolomite that may also include a feldspar-rich basal sandstone. During the Pennsylvanian Period, the Amsden Formation and Tensleep Sandstone were deposited in the Wind River Basin and western part of the Powder River Basin. Equivalent-aged Minnelusa Formation sediments accumulated in the eastern Powder River Basin, while the Fountain and Casper formations built up to the south and east into what are now known as the Denver and Shirley basins. From the Permian Period into the Triassic Period, a series of reddish-colored shales, siltstones, sandstones, carbonates, and evaporites were deposited. Major stratigraphic units of this period include the Permian Goose Egg and Phosphoria formations in the western Powder River, the eastern Wind River, and the northeastern Shirley Basins; the Permian Minnekatha and Forelle Limestone in the Denver-Julesberg Basin; and the uppermost Triassic Chugwater Group, which includes the Alcova Limestone, in all basins.

Above an unconformity come the rocks of the Jurassic Period, which include the Gypsum Springs, Sundance, and fossil-rich Morrison formations. Separated from the Jurassic rocks by another unconformity are the rocks of the Early Cretaceous Period. The nomenclature across the planning area becomes more complicated at this point, but some of the important formations from an oil and gas standpoint include the Dakota and Muddy Sandstones and intervening Thermopolis or Skull Creek Shale.

During the Laramide Orogeny, from the Late Cretaceous Period to the end of the Eocene Epoch, deposition of a series of economically important formations occurred. The shales in this series served as source rocks for oil and gas, while the sandstones and limestones became reservoir rocks. The Mowry Shale is the oldest of this sequence. The Frontier Formation, an important petroleum reservoir, and its equivalents overlie the Mowry. Above this are the Carlile Shale and the Niobrara Formation. The Cody (Pierre) Shale overlies the Niobrara in most of the planning area, while in the western part, the Cody Shale and Mesaverde Formation interfinger. The Paleocene Fort Union Formation lies above the Cretaceous formations and contains the bulk of the coal and coalbed natural gas (CBNG) reserves in the planning area. The youngest rocks include the Eocene Wasatch and Wind River Formations, the Oligocene White River Formation, the Miocene Arikaree Formation, and the Pliocene Ogallala Formation. Capping all formations is a veneer of soil and Quaternary alluvium. In northern Converse County, Quaternary clinker deposits derived from natural burning of Paleocene and Eocene coalbeds lie at the surface.

Geologic Hazards

The primary geologic hazards in the planning area are earthquakes, landslides, and surface topography hazards (Map 3). Other potential hazards include flood-prone areas, radon, shrinking-swelling clay, selenium, windblown areas, and mine subsidence areas. The U.S. Geological Survey (USGS) and the Wyoming State Geological Survey (WSGS) monitor statewide earthquake events. The State of Wyoming has detected 28 earthquakes in the planning area since 1873. The latest earthquake occurred on February 1, 2003, and had an epicenter located 15 miles northeast of Casper in Natrona County, Wyoming. This

was the third recorded quake to occur on or near this site. Twelve earthquakes have occurred in Converse County, 4 in Goshen County, 11 in Natrona County, and 1 in Platte County. Most of the earthquake activity has occurred on active faults or along the north face of the Laramie Mountain Range, which may also be fault-related. No surface damage to the public surface or federal mineral estate is attributed to these known earthquakes.

Approximately 89,144 acres of high and 68,114 acres of moderate potential landslide area occur on public surface within the planning area. The USGS and the WSGS have mapped landslide areas. Shales within the Frontier Formation and Cody (Pierre) Shale provide an unstable foundation on which sliding can occur. The planning area has experienced a series of separate landslide events as observed in the field.

Activities in known geologic hazard areas are restricted on the public surface or federal mineral estate. The BLM addresses the management challenges associated with geologic hazards via the environmental analysis process for individual project proposals. When appropriate, the Casper Field Office develops mitigation measures to avoid and minimize impacts associated with geologic hazards. Hazards resulting from human activity are addressed in the Health and Safety section of this document.

Management actions for geologic resources address preserving unique geologic features within the planning area and reducing potential risks from known geologic hazards. Management actions are incorporated in the alternatives and described in more detail in Chapter 2.

3.1.3 Soil

Soils in the planning area are diverse and can vary substantially in terms of characteristics over relatively short distances. The distribution and occurrence of soils are dependent on many factors, including slope, geology, vegetation, climate, and time. General soils information for the planning area was obtained from the State Soil Geographic Database (STATSGO) (NRCS 1994), which was designed primarily for regional, multistate, river basin, state, and multicounty resource planning, management, and monitoring. STATSGO is intended to provide a general overview of soils distribution and occurrence in the planning area; it is not suitable for site-specific evaluations. For site-specific evaluations, detailed soils information should be obtained from published county soil surveys (NRCS 1971; NRCS 1983; NRCS 1997; NRCS 1994) or, the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS). More than 100 general soil map units are present in the area, which represent many unique soil series. However, only 11 map units comprise 40 percent of the soils in the planning area. Dominant soil textures are loams and sandy loams between 40 and 60 inches deep. These soils generally exhibit a low to moderate rate of runoff and wind erosion. In general, soils in the planning area are in good condition and capable of producing forage for wildlife and livestock, maintaining watershed integrity, and recovering from impacts associated with surface-disturbing activities.

Soil landscape position, steepness of slope, physical properties (including texture and structure), and chemical properties contribute to susceptibility to wind and water erosion. Soils in the planning area with a high wind or water erosion hazard have been identified where county soil survey data were available. On public surface within the planning area, approximately 185,815 acres of soils are highly susceptible to water erosion and 70,425 acres are highly susceptible to wind erosion. The areas highly susceptible to wind or water erosion potential soils for the planning area are displayed in Map 4 and summarized by ownership in Table 3-4.

The primary regional or national demand placed on soils in the planning area results from surface-disturbing activities. Extraction of minerals generally involves surface-disturbing activities including road building, well pad construction, pipeline installation, and vegetation treatments. Other actions that affect soils include a variety of surface uses that loosen topsoil and remove vegetation or other ground

cover, such as grazing and browsing by animals, off-highway vehicle (OHV) use, development of trails and campgrounds, ROW, fire-suppression activities, and the use of prescribed fire. Soil compaction resulting from surface-disturbing activities and associated development can reduce infiltration, increase runoff, and hamper reclamation.

Table 3-4. Soils with High Erosion Potential in the Casper Planning Area

Erosion Type	BLM Surface		Federal Minerals		All Land Ownership	
	Acres	Percent of Surface Estate	Acres	Percent of Mineral Estate	Acres	Percent of Lands within Planning Area
Wind	70,425	5	223,142	5	337,692	4
Water	185,815	14	352,636	8	459,681	5

Source: BLM 2005a

BLM Bureau of Land Management

There are designated sites in the planning area where soils require special management practices to limit erosion and loss of productivity. Currently, there are limits on surface development on Cedar Ridge due to erosive soils and fragile watershed conditions. Surface development is not permitted from December 30 to June 1 in specific areas, such as the South Fork Powder River drainage, Coal Mountain-Twin Buttes area, and Pine Mountain. Other management practices help protect soils in specially designated areas, including the Casper Sand Dunes and Salt Creek.

To address management challenges, management actions for soils generally address the following: identify and interpret existing soil resources and condition; utilize soil use limitation ratings for land use actions; prevent accelerated soil erosion from disturbed areas; utilize effective best management practices; establish successful reclamation on disturbed areas; manage activities to maintain or improve long-term soil productivity; and monitor, evaluate, and adapt management actions as needed. Management actions are incorporated in the alternatives and described in more detail in Chapter 2.

3.1.4 Water

This section characterizes surface water and groundwater resources and describes water use and current water management practices within the planning area.

Surface Water

The planning area lies within the Missouri River watershed. Map 5 shows the major streams and lakes in the planning area. The major tributary watersheds of the Missouri River include the following:

- The North Platte River flows into the planning area through Pathfinder Reservoir on the southern border of Natrona County and exits to the east at the Nebraska state line. The North Platte watershed encompasses the largest land area (66 percent) within the planning area and includes the following areas of interest for resource management: Bates Hole, Rattlesnake Hills, Laramie Range, Rawhide Buttes, and Goshen Hole.
- The Cheyenne River watershed comprises the headwaters of the Cheyenne River and tributaries located in northeast Natrona County and northern Converse County. About 16 percent of the planning area lies within this watershed.
- The Powder River watershed is located primarily in the northern half of Natrona County. It encompasses about 13 percent of the planning area.
- The Bighorn River watershed within the planning area primarily includes the area drained by Badwater and Poison Creeks (tributaries to the Wind River, which is tributary to the Bighorn

River). Located on the western edge of Natrona County, this drainage area comprises about 4 percent of the planning area.

- The Niobrara River watershed includes only a few square miles of drainage in northeastern Goshen County amounting to less than 1 percent of the total planning area.

Surface water quality and quantity is variable within the planning area. Relatively few perennial or intermittent stream segments exist on public lands compared to private and state lands. Most of the drainages on public lands are ephemeral. The Wyoming DEQ (2002b), in compliance with the federal Clean Water Act (CWA), requires that water quality be maintained or improved for outstanding (Class 1) and most of the high quality (Class 2) waters. The area managed by the Casper Field Office, located in the North Platte and Powder River watersheds, include Class 1 and Class 2 reaches. The Cheyenne, Wind, and Niobrara River watersheds each include some Class 2 stream segments. Water quality classes identified by the Wyoming DEQ do not correspond with Wyoming Game and Fish Department (WGFD) stream classes. See the Fish and Wildlife Resources – Fish section of this document for a description of WGFD stream classes. USGS (2005b) maintains streamflow statistics for streams within the planning area, as well as for streams nationwide.

The Wyoming DEQ permits all surface discharge of water, including produced water from CBNG development, through the (WYNPDES) permit process. WYNPDES permits require compliance with specific water quality standards which vary by stream class, and are periodically reviewed and revised for existing uses. The stream classes and water quality standards are defined (Wyoming DEQ 2002b), and a list of classified segments maintained by Wyoming DEQ is available (Wyoming DEQ 2001). Water discharged on the surface must be suitable for existing or planned uses, such as agricultural and livestock, and cannot result in a violation of water quality standards in the receiving stream. Discharges associated with CBNG production have been authorized in the North Platte River, Cheyenne River, and Powder River watersheds. In general, produced water from CBNG wells within the planning area can result in relatively high volumes of water compared with conventional natural gas wells, but not necessarily more than that associated with oil wells. The discharge water associated with current CBNG development, within the planning area, is of relatively high quality because it is derived from formations close to the recharge areas. This is not necessarily true of development deeper in the Powder River Basin to the north or from potential deeper development within the Wind River Basin. Produced water disposal options are highly dependent on water quality and economics (BLM 2002c). Produced water with high salinity levels are not be considered for surface discharge and are most likely disposed of through injection. Produced water from conventional oil and gas wells discharged in the vicinity of Midwest in Natrona County has much higher salinity because it is derived from aquifers that are typically more saline than those associated with the development of CBNG. BLM's policy on land application disposal does not allow disposal of produced water on public lands using surface disposal methods, such as irrigation (BLM 2005d).

Watershed conditions impact the effective life (and associated costs) of water development projects, such as reservoirs and spring developments. The development and use of resources that require surface disturbance, such as minerals development, livestock grazing, forestry, OHV use, and recreation, can impact surface water quality, primarily by increasing sediment loads. Streambank degradation and erosion, as well as upland sheet, rill, and gully erosion within the watersheds, are the predominant sources of sediment found in streams. Historic construction activities, unsurfaced roads, and some development activities have contributed to streambank degradation and erosion in the planning area. Proper management of grazing, road construction, forestry, oil and gas activity, mining, recreation, and proper application of mitigation measures identified in site-specific management or development plans can minimize sediment delivery within the planning area that might otherwise result from these activities. The use of pesticides, fertilizers, and other chemicals near streams and drainageways can affect surface

water quality if the chemicals drift in the wind or are transported by surface water runoff into water bodies. Proper implementation of mitigation measures can minimize or eliminate these sources of water pollution.

Groundwater Quality

Groundwater resources within the planning area occur in geologic formations (ranging from the Precambrian to the Holocene in age) that are exposed at points; most are known to yield some water to wells and springs. The major regional aquifers of the planning area are the High Plains aquifer and the Northern Great Plains aquifer. The High Plains aquifer is mostly alluvial, relatively shallow and thick, permeable, and generally productive for wells. The Northern Great Plains aquifer occurs primarily within the Powder River Basin in the planning area, and comprises a variety of formations, some of which are carbonate rocks that provide high-yielding aquifers and some confined formations that provide artesian wells. Discharges to small streams or springs at outcrops occur in some areas (USGS 1996).

Groundwater recharge occurs primarily from direct infiltration of precipitation into the shallower aquifers from infiltration into the rock outcrop areas of the deeper aquifers and leakage between aquifers.

Groundwater quality depends primarily on the source geologic formation or aquifer.

Groundwater is used to meet the demand of current uses on public land, such as livestock, wildlife, mineral development, and recreation. Groundwater sources are adequate to meet the demands of all current uses on public land. New development and increased water use by resources such as minerals, range, forestry, and recreation may affect groundwater quality.

Groundwater quality trends can be estimated by identifying the locations and characteristics of the areas most vulnerable to contamination. In the four counties of the planning area, areas that are highly vulnerable to groundwater contamination are located along the alluvial floodplains of the major rivers. The vulnerable areas contain high water tables, sandy soils, and high hydraulic conductivity rates that create suitable conditions for contaminant leaching from the surface into the groundwater. Approximately 1 percent of Converse County is considered to contain groundwater highly vulnerable to contamination. Approximately 2 percent of Natrona County, 8 percent of Platte County, and 13 percent of Goshen County contain areas with high groundwater vulnerability (Wyoming Geographic Information Science Center 1998).

Surface and Groundwater Quantity and Use

Both surface water and groundwater are used as water sources within the planning area. Surface water sources typically are adequate to meet existing uses on public lands, but natural climatic fluctuations, such as drought, can make marginally adequate sources unreliable.

As of February 2006, there were more than 21,000 active water wells permitted through the Wyoming State Engineer's Office within the four counties of the planning area (WSEO 2006). Table 3-5 shows a summary of the uses within each county. Table 3-6 summarizes water use as of the year 2000 for Converse, Goshen, Natrona, and Platte counties.

Table 3-5. Uses of Active Well Permits by County

County	Use	Number of Active Permits
Converse	Coalbed natural gas	166
	Domestic	1,175
	Domestic, stock	778
	Industrial	220
	Irrigation	46
	Miscellaneous	187
	Monitoring	1,643
	Municipal	15
	Stock	1,787
	Test well	9
Goshen	Domestic	751
	Domestic, stock	1,547
	Industrial	20
	Irrigation	683
	Miscellaneous	145
	Monitoring	209
	Municipal	32
	Stock	1,700
	Test well	41
Natrona	Coalbed natural gas	2
	Domestic	2,045
	Domestic, stock	933
	Industrial	46
	Irrigation	117
	Miscellaneous	370
	Monitoring	1,731
	Municipal	55
	Reservoir supply	7
	Stock	965
	Test well	25
Platte	Domestic	692
	Domestic, stock	949
	Irrigation	386
	Miscellaneous	134
	Monitoring	202
	Municipal	18
	Stock	1,242
	Test well	36

Source: WSEO 2006

Table 3-6. Water Use Summary for the Year 2000 for Counties Encompassing the Casper Planning Area

Water Use	Groundwater (Million gallons/day)	Surface Water (Million gallons/day)
Public Supply (municipal)	15.5	3.9
Domestic	1.4	0.0
Commercial (thermoelectric)	0.0	204.7
Industrial (includes mining)	56.8	5.1
Irrigation (withdrawal)	143.9	869.7

Source: USGS 2004

Within the planning area, the BLM has approximately 900 springs (of which less than 100 are developed) and approximately 125 wells. Water is used primarily for agricultural, commercial, municipal, and industrial purposes within the planning area. Water-based recreation and use by fish and wildlife also are prevalent. Agricultural uses consist primarily of livestock watering and irrigation for forage production for the livestock industry. Recent court decisions have established water allocations within the North Platte River watershed that define the allowable use of water within the North Platte River drainage in the planning area (WSEO 2001).

Control and allocation of water within the boundaries of the planning area are primarily the responsibilities of the Wyoming State Engineer's Office, which administers all waters of the state, and the U.S. Bureau of Reclamation (USBR), which manages dam and reservoir systems along the North Platte River. The BLM is responsible for the management of public surface and federal mineral estate in a manner that maintains or enhances water quality and quantity for other uses. Other administering agencies include the Wyoming Board of Control and the Wyoming DEQ.

The BLM has developed various types of water resource plans and stipulations to manage water resources. For example, watershed plans are commonly used to address degradation of specific streams and other riparian resources. The Casper Field Office's Watershed and Water Resources Program conducts data collection, resource monitoring, and analysis in support of other management activities, such as range management, forest management, and mineral extraction. In addition, water resource protection plans and stipulations can be used to protect surface water resources, such as streams, lakes, reservoirs; and groundwater resources, such as wells and springs. Other water management plans can address especially fragile areas in specific locations and water resources with special designations.

Management actions for water resources generally address water quality management, water conservation, impacts from other BLM resource program authorized activities, human-induced-nonpoint source pollution, maintenance or improvement of all streams to designated state classification levels, and improvement of watershed conditions. Management actions are incorporated in the alternatives and described in more detail in Chapter 2.

3.2 Mineral Resources

Mineral resources in the planning area include locatable, leasable (coal, geothermal, oil and gas, other solid leasables), and salable minerals. Each individual resource section below includes a definition and description of the resource, the current condition of the resource, management challenges, and management actions.

3.2.1 Locatable

The General Mining Law of 1872, as amended, allows the location and maintenance of mining claims on those federal mineral estate lands open for mining claim location and patent. Potentially locatable metallic (gold, silver, lead, platinum, copper, uranium, and chromite), and nonmetallic (talc, mica, white marble, building stone, fluorspar, chemical-grade limestone, gypsum, and bentonite) minerals exist in the planning area. Precious and semiprecious stones that exist or potentially exist include jade, diamond, iolite, ruby, sapphire, heliodor beryl, and kyanite. The BLM considers common varieties of sand, gravel, stone (e.g., decorative stone, limestone, and gypsum), clay (e.g., shale and bentonite), limestone aggregate, borrow material, clinker (scoria), and leonardite (weathered coals), to be salable and addresses them in the Salable Minerals section.

The 12 permitted mining operations on federal mineral estate include uranium (five mines in Natrona and Converse counties), chemical-grade limestone (Bass and Brush Creek quarries in Platte County), marble (White Marble and Silvergreen quarries in Platte County), bentonite (two mines in Natrona County), and jade (Lone Tree Mine in Natrona County). Converse County with 3,954 claims has most of the 5,766 active claims (as of February 2006). Natrona County has 1,972, Platte County has 45, and Goshen County has 16. In FY 2004, claimants filed 6 notices and 18 plans of operation to work on their claims.

The discovery of uranium in Wyoming was made first in 1949. Mining of uranium found in sedimentary rocks of the Powder River, Wind River, and Shirley basins began in the 1950s. In the 1980s *in-situ* leaching began to take the place of conventional mining as the preferred method for recovering uranium. The last conventional mine or mill operation closed in 1992. There are two active *in-situ* leaching operations (CAMECO's Highland/Morton Ranch and Smith Ranch Operations) in the planning area with a combined production of 1,323,530 pounds of uranium oxide (yellowcake) in 2004. Numerous mining claims for uranium have recently been staked due to the threefold increase in the price of yellowcake.

Bentonite, a sodium montmorillonite clay, is a major component of drilling mud. It has numerous other uses, and can be found in foundry molds, pet litter, and geotextile liners for landfills and water impoundments. Most bentonite production in the planning area is from east central Natrona County. Reported production in 2002 was 653,738 tons of bentonite, almost 20 percent of the total 3,454,582 tons produced in Wyoming that year (BLM 2004c).

Gold deposits have been identified in the Rattlesnake Hills portion of the planning area. Historically, copper deposits have been mined in the Hartville Uplift near Geurnsey, Casper Mountain, South Bighorn Mountains, and the Deer Creek Copper District and La Prele in Converse County. Chromite was mined in the northern Laramie Mountains and iron in the Hartville Uplift. All these operations are now abandoned. Additional information on these and other locatable minerals can be found in the Mineral Occurrence and Development Potential Report (BLM 2004c).

The BLM manages the Mining Law program on the federal mineral estate, including Stock Raising Homestead lands when the claimant does not receive written consent from the surface owner. Such management includes authorizing and permitting mineral exploration, mining, and reclamation actions. For operations other than casual use, the claimant is required to submit a notice or a plan of operations. Regulations require the claimant to prevent unnecessary or undue degradation of the land.

Management actions may recommend closures to mineral entry by withdrawing areas from further location of mining claims or sites and may apply restrictions needed to protect other resource values when conducting activities under the operation of the mining laws (Map 13). Management actions are incorporated in the alternatives and described in more detail in Chapter 2.

3.2.2 Leasable – Coal

The coal-bearing formations in the Southern Powder River Basin Field are the Wasatch, Fort Union, and Lance formations. The Wyodak-Anderson zone is the main producing coal zone and includes the Canyon, Anderson, Wyodak, and Big George splits. North of the planning area the coal zone is a single bed, but splits into two beds in the planning area—the upper Anderson and lower Canyon splits (BLM 2004c).

Wyoming produces approximately one-third of all coal produced in the United States. The Powder River Basin, which extends into the planning area in northern Converse County, contains some of the largest low-sulfur coal deposits in the world. The Powder River Basin Coal Review (BLM 2006b) discusses coal activities in the Powder River Basin. Two other coal fields, the Goshen Hole Coal Field of the Denver Basin and the Wind River Coal Field of the Wind River Basin, also extend into the planning area; however, neither of these is currently producing in the planning area (BLM 2004c).

Coal production began in the planning area in 1883 near the towns of Glenrock and Douglas in south central Converse County. Prior to closure in 2000, the Dave Johnston mine produced an annual average of 2.4-million tons of coal over 43 years with a peak production of 4.1-million tons in 1997. This mine is now undergoing reclamation. Further north, on the Converse-Campbell county line, the Antelope Mine began production in 1986. Production from this mine has increased steadily; however, the New Source Review Air Quality permit limits production to 32.58-million tons per year (Wyoming DEQ 2003). In 2004, the mine produced 29.7-million tons of coal (BLM 2004c).

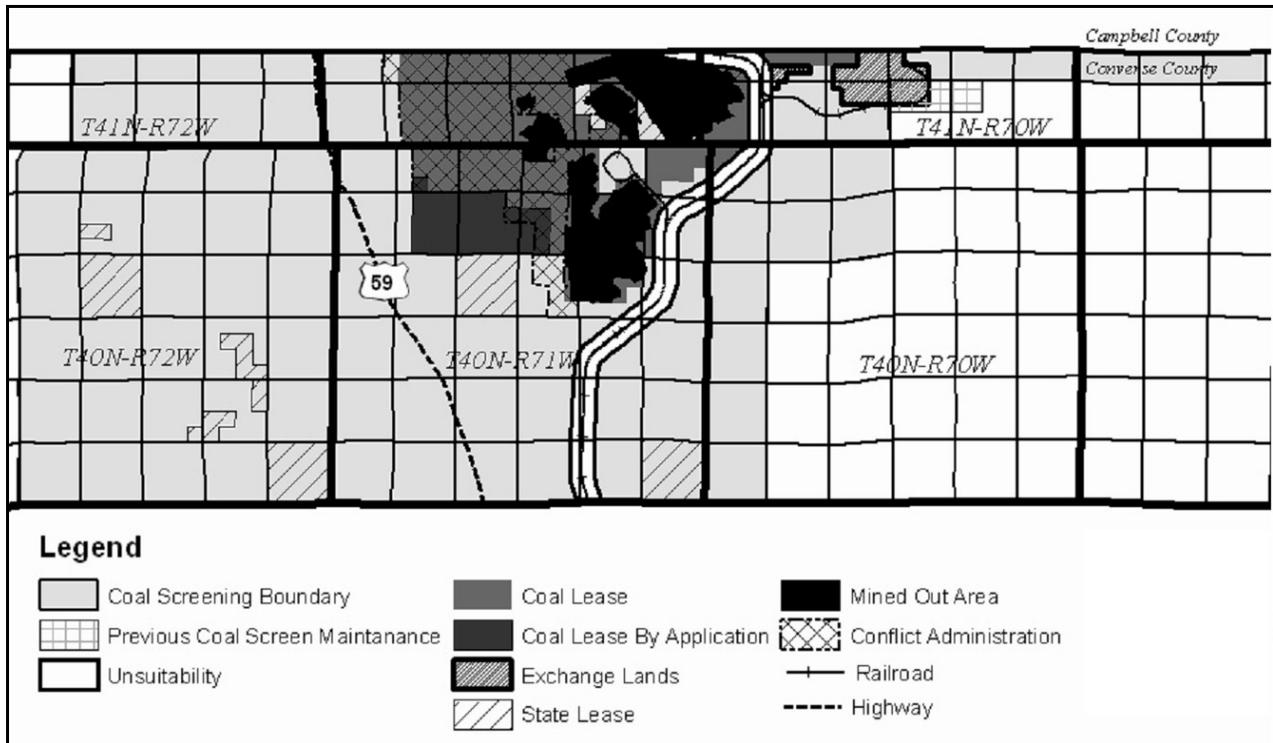
Coal exploration is allowed on all federal mineral estate lands in the planning area. Exploration on federal mineral estate lands is subject to the requirements and conditions of the coal exploration license process, the result being a set of project-specific stipulations and conditions designed to limit impacts from exploration on other resources. Before the area can be considered for leasing, the amount of overburden, volume and quality of coal, and other information needed to plan a mine must be gathered. The Casper Solid Minerals Group (CSMG) has the primary responsibility for all coal operations within the Wyoming Powder River Basin (including inspection and enforcement) on federal lands.

The entire coal development production area falls within the Thunder Basin National Grassland and is jointly managed by the BLM and the USFS. Two recently issued leases include acreage in the planning area. One is a 3,542-acre extension of the Antelope Mine. The lease for the West Antelope Lease by Application (LBA) extension was issued with an effective date of February 1, 2005. The second lease is an extension of the North Antelope/Rochelle Mine (NARO) complex covering 4,503 acres, a portion of which extends into Converse County (BLM 2004c). The applicant successfully acquired the NARO South LBA and a lease was issued effective September 1, 2004. A new LBA was received in April 2005 proposing to add acreage to the Antelope Mine. An additional area adjacent to the NARO South LBA is under consideration as a potential exchange tract and may add additional mining reserves within Converse County (refer to Figure 3-5). Approximately 59,694 acres have been found acceptable for further consideration for coal leasing as a result of previously applied land use planning screens in 43 Code of Federal Regulations (CFR) 3420.1-4. Table 3-7 identifies mined and unmined leasable coal areas. Table 3-8 displays coal development potential for northern Converse County.

Management challenges for the coal program include conflict resolution between resource programs (e.g., oil and gas leases vs. coal leases) and complying with restrictions imposed by other resource programs (e.g., wildlife stipulations). In addition, health and safety issues, including landslides and soil and groundwater contamination, present management challenges.

Management actions for coal generally define areas acceptable for further consideration for leasing. Restrictions on coal result from management actions identified in other resource programs. These management actions are incorporated in the alternatives and described in more detail in Chapter 2.

Figure 3-5. Coal Development Potential Area in Northern Converse County



Source: BLM 2001a

Table 3-7. Mined and Unmined Leasable Coal Areas (acres)

	Leased	Unmined	Mined/No Coal
Federal Coal	8,655	3,502	5,153
Lease by Application	1,353	1,353	-
Exchange Area	822	822	-
State Coal	807	59	748
Total	11,637	5,736	5,901

Source: Wright 2005

Table 3-8. Coal Development Potential for Northern Converse County (acres)

2001 Screening¹	Acres
Federal coal with development potential	61,960
Areas deleted by unsuitability criteria	2,266
Areas deleted due to multiple use conflicts	0
Areas deleted by surface owner consultation	0
Areas of Federal coal acceptable for further consideration for leasing ²	59,694
Conflict Administration Zone	
Coal and coalbed natural gas conflict area	5,056

¹Scoping for the RMP revision did not identify the need for additional screening.

²Subsequent to 2001, 5,901 acres were leased and mined, leaving 53,793 acres or 6 Billion tons of coal acceptable for further consideration for leasing

Source: BLM 2006c

3.2.3 Leasable – Geothermal

Geothermal resources found on federal mineral estate are considered leasable minerals. As such, the same laws and regulations governing other leasable minerals cover exploration and development of these resources. Use of low temperature geothermal resources is most common in warm-water heating systems in homes and businesses. Although not yet widespread, low temperature geothermal use is increasing as prices for other types of energy increase.

There are three areas of natural thermal springs in the planning area—the Alcova Hot Springs in southern Natrona County (now under Alcova Reservoir), the Douglas Warm Spring south of the town of Douglas in southeastern Converse County, and Immigrants Washtub in east central Platte County. A bathing facility constructed in 1961 near the Douglas Warm Spring is the only commercial use of thermal waters (BLM 2004c). In addition, the BLM has authorized a thermal water well and associated pond under the Recreation and Public Purposes (R&PP) Act in the Salt Creek area for year-round scuba diving use.

In 1970, Congress passed the Geothermal Steam Act (Public Law 91-581, as amended [30 U.S.C. § 1001 et seq.]). Since that time, several studies have been conducted to assess geothermal resources in Wyoming. The draft Reasonable Foreseeable Development (RFD) (BLM 2005e) document for geothermal development contains more information on these studies. None of the studies identified geothermal resources within the planning area with sufficiently high temperatures to produce steam to generate electricity. Some studies identified several areas of anomalously high geothermal gradients with the potential for producing hot water for direct use.

Due to the increasing costs of energy, geothermal resources in the planning area could be increasingly leased for home heating or electrical power generation. Restrictions on energy development generally result from management actions identified in other resource programs. Management actions are incorporated in the alternatives and described in more detail in Chapter 2.

3.2.4 Leasable – Oil and Gas

Oil and gas exploration and development are important industries in the planning area. Activity began in the 1880s in the Salt Creek area of the Powder River Basin and has continued to grow across the planning area as the country’s demand for oil and gas increases.

In simplest terms, oil and gas are most often found in the pore spaces of sedimentary rocks, such as sandstone and limestone, having migrated there from source rocks, like marine shales, rich in organic

material. When rocks containing this organic material are subjected to heat and pressure, the organic compounds break down over time, resulting in oil and natural gas. As the oil and gas are generated, they migrate through the pore spaces of the rock or along fractures until they encounter a structural or stratigraphic trap with an impermeable seal. In the planning area, these conditions are associated with four sedimentary basins and the Casper Arch. The sedimentary basins include the Powder River, Wind River, Denver-Julesburg, and Shirley basins, of which portions of each underlie the planning area. Of the four basins, the Powder River and Wind River basins are the most prolific in the planning area while production from the planning area portions of the Shirley and Denver-Julesburg basins are negligible. Another mode of occurrence for natural gas is CBNG, where the gas is trapped in the coal where it was generated. A well-known hazard in coal mines, CBNG has become economically important with some of the largest reserves found in the Powder River Basin. The Mineral Occurrence and Development Potential Report (BLM 2004c) contains a more detailed explanation of these processes. Table 3-9 lists important oil and gas producing formations in the Denver-Cheyenne, Powder River, and Wind River basins (BLM 2005f).

Geophysical exploration is a tool of the oil and gas industry that bounces shock waves off subsurface rock layers to determine their thickness and geometry. Shock waves are produced by an energy source and instruments record the waves when they return to the surface. The energy typically comes from the detonation of explosives in a shallow drill hole or from a heavy weight either dropped or vibrated on the ground surface. Sensors pick up the resulting shock waves through a line of sensors, or geophones, connected to a recording truck. Seismic operations use existing roads when feasible, but also require off-road travel. For additional information about how geophysical exploration is conducted, refer to Appendix D.

There are generally two kinds of seismic surveys, two-dimensional (2-D) and three-dimensional (3-D). The 2-D surveys are single or multiple linear lines with their receivers and source points in the same line extending up to several miles in length, whereas 3-D surveys are conducted over a grid pattern and their source lines and receiver lines are separate. According to the RFD scenario for oil and gas (BLM 2005f), the Casper Field Office approved 15 2-D and 17 3-D projects between 1995 and 2003, with 3-D projects comprising most of the activity since 1999. This trend and level of activity is expected to continue throughout the planning period.

The BLM is responsible for authorizing and administering geophysical exploration operations on all public surface lands within the planning area, while the Wyoming Oil and Gas Conservation Commission (WOGCC) is responsible for authorizing all operations on state and private surface land. The BLM authorizes geophysical exploration under a federal oil and gas lease via Sundry Notice approval. At the leasing stage, the CFO applies appropriate stipulations on federal oil and gas leases, including standard oil and gas stipulations (see Appendix N), as well as special stipulations identified in the Resource Management Plan (RMP).

Leasing procedures for oil and gas, including CBNG, are the same. Based on the federal Onshore Oil and Gas Leasing Reform Act of 1987, all parcels must be exposed to competitive interests. Lands that do not receive competitive interest are available for noncompetitive leasing for a period not to exceed 2 years. The BLM holds competitive sales six times a year by oral auction and issues competitive and noncompetitive leases for a term of 10 years. If the lessee establishes hydrocarbon production, the competitive and noncompetitive leases can be held for as long as oil or gas is produced. The federal government receives yearly rental fees on nonproducing leases. The State of Wyoming also receives half of all money generated from the sale and rental of oil and gas leases. Royalty on production is received on producing leases, one-half of which is returned to the State of Wyoming. According to the RFD scenario for oil and gas (BLM 2005f), approximately 1.74-million acres of federal land in the planning area is covered by oil and gas leases.

Table 3-9. Oil and Gas Producing Formations in the Casper Planning Area

Age	Denver-Cheyenne Basin	Powder River Basin	Wind River Basin	Comments
Paleocene	–	Fort Union Formation	Fort Union Formation	Primary source of CBNG
Upper Cretaceous	–	–	Lance Formation	Major gas production in the Wind River Basin
	–	Lewis Shale	–	Minor production from Teckla Sandstone Member
	–	Mesaverde Formation	Mesaverde Formation	Minor production from Teapot Sandstone and Parkman Sandstone Members
	Codell Sandstone	–	–	–
	–	Frontier Formation	–	Major production from Wall Creek and “2 nd Wall Creek Sand”
	–	Mowry Shale	–	Minor production
Lower Cretaceous	Muddy (J) Sandstone	Muddy/Newcastle Sandstone	Muddy Formation	Major production in the Powder River and Wind River basins
	–	Fall River (Dakota) Formation	Part of Inyan Kara Group	Major production in Powder River Basin
	–	Lakota Formation	–	
Jurassic	–	Sundance Formation	–	Minor production
Permian	–	Goose Egg Formation	–	Minor production from Minnekahta Limestone Member
Pennsylvanian	–	Minnelusa Formation (Tensleep and Amsden formations in western portion of basin)	Tensleep Formation	Major production in Powder River Basin

Source: BLM 2005f
 - none identified
 CBNG coalbed natural gas

After acquiring an oil and gas lease, and prior to development, an application for permit to drill (APD) must be filed with the WOGCC and the BLM Casper Field Office if the well is located on a federal oil and gas lease in the planning area. Within the planning area, Natrona County has the largest number of APDs filed with a total of 8,508 as of mid-February 2005, followed by Converse County with 4,357 applications filed, Goshen County with 249 filings, and Platte County with 97 applications filed since the WOGCC began keeping records (WOGCC 2005). Table 3-10 provides well statistics for the planning area. After the BLM approves the permit, the company may proceed with drilling in accordance with the conditions of the permit’s approval.

**Table 3-10. Well Statistics for Casper Planning Area
as of February 24, 2005**

County	Federal	State or Fee	Total
Natrona County			
Total APDs filed	7,331	1,177	8,508
APDs waiting on approval	4	0	4
Total APDs issued	7,327	1,177	8,504
Number of permits expired	186	29	215
Total number of active permits	7,141	1,148	8,289
Number of permits to drill	48	7	55
Number of wells drilling (spuds)	197	42	239
Current activity level	245	49	294
Number of completed (producing) wells	2,450	217	2,667
Number of monitoring wells	4	0	4
Number of dormant (shut-in) wells	105	29	134
Number of intents to abandon	72	13	85
Number of plugged and abandoned wells	4,265	840	5,105
Total wells drilled	6,896	1,099	7,995
Converse County			
Total APDs filed	1,853	2,504	4,357
APDs waiting on approval	7	1	8
Total APDs issued	1,846	2,503	4,349
Number of permits expired	127	141	268
Total number of active permits	1,719	2,362	4,081
Number of permits to drill	86	10	96
Number of wells drilling (spuds)	24	19	43
Current activity level	110	29	139
Number of completed (producing) wells	589	606	1,195
Number of monitoring wells	0	1	1
Number of dormant (shut-in) wells	26	50	76
Number of intents to abandon	17	24	41
Number of plugged and abandoned wells	977	1652	2629
Total wells drilled	1,609	2,333	3,942
Goshen County			
Total APDs filed	40	209	249
APDs waiting on approval	0	0	0
Total APDs issued	40	209	249
Number of permits expired	0	0	0
Total number of active permits	40	209	249

Table 3-10. Well Statistics for Casper Planning Area as of February 24, 2005 (Continued)

County	Federal	State or Fee	Total
Number of permits to drill	0	0	0
Number of wells drilling (spuds)	0	1	1
Current activity level	0	1	1
Number of completed (producing) wells	1	0	1
Number of monitoring wells	0	0	0
Number of dormant (shut-in) wells	0	0	0
Number of intents to abandon	0	0	0
Number of plugged and abandoned wells	39	208	247
Total wells drilled	40	208	248
Platte County			
Total APDs filed	12	85	97
APDs waiting on approval	0	0	0
Total APDs issued	12	85	97
Number of permits expired	0	1	1
Total number of active permits	12	84	96
Number of permits to drill	0	0	0
Number of wells drilling (spuds)	0	1	1
Current activity level	0	1	1
Number of completed (producing) wells	0	0	0
Number of monitoring wells	0	0	0
Number of dormant (shut-in) wells	0	1	1
Number of intents to abandon	0	2	2
Number of plugged and abandoned wells	12	80	92
Total wells drilled	12	83	95

Source: WOGCC 2005
 APD Application for Permit to Drill

One-hundred seventy oil and gas fields have been found and named within the planning area. At the end of 2004, 119 of these fields were still producing. Table 3-11 lists currently producing oil and gas fields, wholly or partially, within the planning area by basin and their production for 2004 (WOGCC 2005). No production occurred in the planning area portion of Shirley Basin in 2004.

**Table 3-11. Field Statistics for Oil and Gas
Production in the Casper Planning Area during 2004**

Field	Oil (bbls)	Gas (mcf)	Water (bbls)
Wyoming Oil And Gas Conservation Commission—Powder River Basin			
Report Date 02/24/05			
Production for Year 2004			
Based On Oil Production			
African Swallow	34,917	1,028,849	3,831
Allemand	2,557	23,081	0
Avery Draw	3,614	84,676	245
Bear Creek	2,578	29,987	0
Big Muddy	20,387	39	208,725
Big Muddy East	5	0	0
Blizzard	3,526	4,005	1,110
Blue Hill	4,571	2,056	204
Bobcat Creek	5,005	2,645	149
Bower	26,425	58,021	83,355
Box Creek	1,191	0	0
Brooks Draw	16,331	16,682	0
Brooks Ranch	9,168	0	5,179
Brush Creek	14,716	18,714	349
Buck Draw	3,124	27,819	93
Buck Draw East	129	4,957	0
Burke Ranch	626	0	223
Burke Ranch East	13,662	210	116,774
Carter	1,379	0	0
Casper Creek North	6,340	0	832,582
Cole Creek	36,304	8,162	201,525
Cole Creek South	25,050	0	1,384,927
Cole Northeast	6,586	19,302	637
Corney	3,074	2,872	4,351
Crawford Draw	27,550	417,272	257
Deer Creek	724	0	0
Dennell Draw	515	0	0
Derrick Draw	70,549	2,757,891	2,444
Dilts	3,294	3,857	1,674
Don Draw	2,433	486	505
Douglas South	2,126	0	0
Dry Fork	9,637	22	12,924
Dull	273	0	0
Fetter	2,772	43,049	234
Finley Draw	9,338	126,802	1,340
Flat Top	15,129	264,622	7,050
Flat Top East	188	0	0
Frog Creek	10,149	73,056	0
Geary Dome	2,721	0	9,602
Geary North	387	75	103
Gibson Draw	10,760	46,920	317
Glenrock	7,611	0	24,268
Glenrock South	63,400	0	3,480,409
Haps Draw	510	0	0
Hornbuckle	91,424	15,116	1,033
Horse Ranch	8,596	0	1,940,866
Kaye	105,026	14,402	60,536
Lebar	563	0	84
Manning	16,652	20,898	36,843
Martin Springs	7,109	0	16,200
Mary Draw	3,055	75,409	195
Midway	1,457	0	744
Mikes Draw	112,393	60,864	84,443

**Table 3-11. Field Statistics for Oil and Gas
Production in the Casper Planning Area during 2004 (Continued)**

Field	Oil (bbls)	Gas (mcf)	Water (bbls)
Moore	2,183	47,231	620
Morton	4,218	3,855	10
Ninemile	1,435	3,782	0
Nutcracker	4,413	32,743	1,186
Ogalalla Hills	2,448	13,080	0
Ormsby Road	506	0	0
Orpha	6,194	1,369	432
Phillips Creek	15,214	84,448	70
Pine Tree	100,383	383,243	6,590
Piney Creek	7,372	0	0
Poison Draw	32,321	5,521	210
Popskull	9,504	4,092	0
Powell	132,130	3,377,571	38,817
Rawles	0	0	0
Ross (009)	2,786	5,316	99
Sage Spring Creek	65,786	21,070	817,374
Salt Creek	1,588,285	731,650	197,134,657
Salt Creek East	69,935	72,604	1,915,757
Salt Creek West	3,140	564	482
Sand Creek North	4,195	603	0
Sand Dunes	79,388	5,931,728	4,490
School Creek	27,154	466,354	1,183
Scott	293,475	722,323	145,194
Shawnee	5,300	4,779	1,639
Smoky Gap	4,064	12	0
Snake Charmer Draw	160,130	230,313	4,640
Soda Lake	731	0	498
Spearhead Ranch	87,676	280,712	2,782
Steinle Ranch	4,426	183,947	1,248
Taylor	8,314	79,163	648
Teapot East	13,015	0	31,342
Teapot Naval Reserve	171,336	864,573	14,831,940
Tick	1,129	0	0
Tisdale East	10,071	0	425,771
Twenty-Mile Hill	5,372	0	0
V-Two Draw	5,785	0	39
Well Draw	189,976	748,015	199,901
Total Production	3,649,703	18,827,301	223,948,745
Wyoming Oil And Gas Conservation Commission—Wind River Basin			
Report Date 02/24/05			
Production for Year 2004			
Based On Oil Production			
Austin Creek	46,569	742,654	620
Bates Creek	309	0	94
Boone Dome	3,385	249,747	303
Burnt Wagon	112	10	0
Canal	6,011	12,022	0
Casper Creek South	113,962	0	12,632,125
Clark Ranch	17,721	3,613	740,595
Cooper Reservoir	25,730	4,741,313	229,237
Emerald	14,704	0	747,843
Frenchie Draw	311,465	8,419,443	2,840,876
Government Bridge	16,886	2,265	5,761
Grieve	6,882	2,295	496,261
Grieve North	930	373,037	0
Iron Creek	5,524	33	137,930
Lost Dome	107,579	0	2,406,723
Madden	91,344	138,934,332	4,067,726

**Table 3-11. Field Statistics for Oil and Gas
Production in the Casper Planning Area during 2004 (Continued)**

Field	Oil (bbls)	Gas (mcf)	Water (bbls)
Notches Dome	176,487	0	28,652,404
Oil Mountain	11,326	0	104,538
Okie Draw	32	0	0
Pine Mountain	4,701	0	0
Poison Spider	35,902	0	577,362
Poison Spider West	26,809	136,769	36,915
Poison Spring Creek	1,647	1,471	202
Raderville	9,008	2,698	1,917
Saddle Rock	4,954	628,178	1,549
Schrader Flats	46	0	4,500
Squaw Butte	3,804	14,066	1,761
Sun Ranch	1,152	129,106	196
Tepee Flats	0	9,253	28
Tipps	2,225	160	1,332
Wallace Creek	51,876	3,747,113	21,762
Waltman (Cave Gulch)	112,930	21,581,115	487,152
Total Production	1,034,373	179,601,587	25,545,112
Wyoming Oil And Gas Conservation Commission—Denver-Cheyenne Basin			
Report Date 02/24/05			
Production for Year 2004			
Based On Oil Production			
Torrington	6	0	0
Total Production	6	0	0

Source: WOGCC 2005

bbl barrel

mcf thousand cubic feet

Oil and gas reserves, both proven and potential, can be evaluated using different methods and assumptions. With the continuing increase in demand, a number of studies identify where and how much oil and gas remains to develop. The most comprehensive of these studies, completed by USGS in 1996, looked at potential onshore oil and gas reserves in the United States. Other studies, completed since the USGS study, focus on a particular geographic region or basin. The RFD scenario for oil and gas (BLM 2005f) describes studies pertaining to the planning area, including their assumptions and results. Table 3-12 is a distillation of the RFD discussion, showing the range of estimates made for oil and gas reserves in the planning area.

CBNG is one of the largest contributors to total natural gas production in Wyoming, and coals of the Powder River Basin are the largest source of CBNG. Of the 336 billion cube feet (Bcf) of natural gas produced in the Powder River Basin in 2004, 298 Bcf (almost 89 percent), was CBNG. Development of CBNG resources in the planning area is limited, with 6 wells completed on federal land and 33 completed on state or fee (private) land (WOGCC 2005).

The oil and gas industry impacts the economy of the planning area. Employment and income follow the drilling and production cycle, which follows the prices for oil and gas. These relationships are discussed in more detail in the Socioeconomic Resources section. The baseline unconstrained RFD scenario for oil and gas projects approximately 2,800 conventional, deep, and CBNG wells (1,988 federal and 812 state and fee) to be developed in the planning area between 2001 and 2020. Similarly, the unconstrained RFD projects 700 wells (497 federal and 203 state and fee) drilled for CBNG in the planning area by 2020 as this resource is developed (BLM 2005f).

Table 3-12. Summary of Oil and Gas Reserve Estimates for the Casper Planning Area

	Gas – Bcf	Oil – MMB	NGL – MMB
Estimated Gas Reserves in Place			
Powder River Basin CBNG	5,850	-	-
Wind River Basin CBNG	1,380	-	-
D-C Basin CBNG	130	-	-
Wind River Basin Conventional	228,850	-	-
Wind River Basin Conventional <15,000 feet	268,870	-	-
Wind River Basin Conventional >15,000 feet	1,380	-	-
Proved Oil and Gas Reserves			
Powder River Basin Conventional	430	34.7	-
Wind River Basin Conventional	575	20.0	-
D-C Basin Conventional	0	0.62	-
Estimated Potential Reserves			
Powder River Basin All	2,681	345.2	23.3
Powder River Basin Conventional <15,000 feet	770	-	-
Powder River Basin Conventional >15,000 feet	180	-	-
Wind River Basin All	268	39.6	2.5
Wind River Basin Economically recoverable	7,390	-	-
Wind River Basin Technically recoverable	28,060	-	-
Wind River Basin Conventional <15,000 feet	1,550	-	-
Wind River Basin Conventional >15,000 feet	1,150	-	-
Wind River Basin CBNG	564	-	-
D-C Basin All	4.23	3.96	1.34
D-C Basin Conventional <15,000 feet	109	-	-

Source: BLM 2005f

- > greater than
- < less than
- Bcf billion cubic feet
- CBNG coalbed natural gas
- D-C Basin Denver-Cheyenne Basin
- MMB million barrels
- NGL natural gas liquids

Management challenges for the oil and gas program include conflict resolution between resource programs (e.g., oil and gas leases vs. coal leases), split-estate issues, and restrictions imposed by other resource programs (e.g., wildlife stipulations).

Management actions for oil and gas generally address those areas open and/or closed to leasing. Restrictions on oil and gas development result from management actions identified in other resource programs. These management actions are incorporated in the alternatives and described in more detail in Chapter 2.

3.2.5 Leasable – Other Solid Leasables

Other leasable minerals include sodium (trona), phosphates, and oil shale. Uranium, bentonite, gypsum, limestone, and other “hardrock minerals” occurring on acquired public lands that are not closed to mineral leasing, can be developed only under a leasing system. Access to the federal leasable mineral estate is at the BLM’s discretion.

The United States Bureau of Mines (USBM 1993) recognized the occurrence of sodium- and phosphate-bearing rocks in small parts of the planning area. Some production of sodium has occurred in the past, but is not being produced at this time.

The United States Bureau of Mines (USBM 1993) recognized the occurrence of relatively large areas of uranium-, bentonite-, gypsum-, and limestone-bearing rocks within the planning area. They also identified smaller areas of other “hardrock minerals.” In the past, the BLM has issued leases for uranium and bentonite on acquired lands in the planning area. At present, there are no active leases. Recent uranium price increases now cause producers to pay severance tax. Increasing prices could lead to additional future uranium leasing. *In-situ* mining is the mostly likely method of recovering uranium. If water quality is affected by any mining that generates tailings piles, the BLM requires remediation. Although bentonite-, gypsum-, and limestone-bearing rocks cover relatively large areas, their intersection with acquired lands (which cover relatively small isolated areas within the planning area) is limited and, thus, potential future leasing will occur only infrequently. The BLM also expects that future leasing of other “hardrock mineral” on acquired lands will be infrequent.

Management actions for other solid leasables generally address those areas open and (or) closed to leasing. Restrictions on development of other solid leasables result from management actions identified in other resource programs. These management actions are incorporated in the alternatives and described in more detail in Chapter 2.

3.2.6 Salable

Salable minerals, also known as mineral materials, include common variety materials such as sand, gravel, stone (e.g., decorative stone, limestone, and gypsum), clay (e.g., shale and bentonite), limestone aggregate, borrow material, clinker (scoria), and leonardite (weathered coal). Lapidary quality agates and jaspers are found in Platte and Natrona counties. Recreational collecting of this material is allowed, but large volume removal requires mineral sale. Access to the federal salable mineral estate is at BLM’s discretion and by either Free Use Permit or sales contract. Much of what the BLM sells in the planning area is from established community pits. From time to time, a proposal is received requesting an exclusive sale or exclusive Free Use Permit. Map 18 identifies the areas accessible to salable minerals.

In terms of volume produced and value, borrow material was the most important mineral material in the planning area in fiscal year (FY) 2003, followed by sand and gravel, leonardite, and specialty stone. Table 3-13 shows the number of active permits, volumes produced, and values of materials in FY 2003 (BLM 2004c). Other salable minerals produced include riprap and shale (clay).

Table 3-13. Salable Mineral Production in the Casper Planning Area for FY 2003

Resource	Number of Active Permits	Cubic Yards Produced	Production Value
Borrow material	3	298,165	\$71,124
Sand, gravel, limestone aggregate, and riprap	41	45,392	\$31,898
Leonardite	1	25,000	\$22,500
Specialty stone	10	122	\$2,105

Source: BLM 2004c
 FY Fiscal Year

In the planning area, borrow material is used primarily for remediation cleanup. Sand, gravel, limestone aggregate, and riprap are used as construction materials. Leonardite is used as an additive to drilling mud. Specialty stone can include flagstone, moss rock, and landscape boulders. Riprap is used in soil stabilization projects.

Most salable minerals are common construction materials; demand for these materials is linked to the area’s economy. Planning area demand generally coincides with activity in the oil and gas industry, highway construction, and urban use near Casper, Douglas, and smaller towns. Additional demand for construction materials is tied to activity associated with any future proposals for new mines (e.g., coal and uranium). Leonardite demand depends on oil and gas drilling activity. The BLM maintains three “community” mineral material pits to provide sand, moss rock, flagstone, and boulders to the public.

Mineral materials are basic natural resources used in construction; however, they are generally bulky and have low unit prices. The sheer weight of mineral materials results in high transportation costs. Therefore, adequate local supplies of these basic resources are important to the area’s economy. The BLM’s policy is to make these materials available unless it is detrimental to the public interest to do so. When made available, exploration for and removal of these minerals must protect public surface resources and the environment and minimize damage to public health and safety. Additional planning area information on salable minerals is in the Mineral Occurrence and Development Potential Report (BLM 2004c).

Management actions for salable minerals determine areas open or closed to mineral material development and identify restrictions needed to protect other resource values. Management actions are incorporated in the alternatives and described in more detail in Chapter 2.

3.3 Fire Management and Ecology

The Casper Field Office fire management program focuses on two categories of fires: unplanned and planned. Unplanned or wildland fire occurs as the result of an act of nature (e.g., lightning), human accident, or by intent to cause damage. Planned or prescribed fire is used in a controlled manner for specific purposes, such as improving habitat and plant community health and reducing hazardous fuels. Vegetative types and their respective fire regimes vary throughout the planning area. Table 3-14 displays the number of acres of planned and unplanned fires occurring in different vegetative types. The number of acres burned is calculated as the annual average since 1985 for planned fires and since 1990 for unplanned fires. The Casper Field Office coordinates its fire management program with the USFS, Wyoming State Forestry Division (WSFD), county fire departments, and local fire protection districts.

Table 3-14. Annual Average Acreage of Planned and Unplanned Fires in Different Vegetative Types in the Casper Planning Area

Vegetative Types	Average Number of Acres Burned/Year
Planned Fire 1985-2003	
Aspen and conifers	2
Mountain big sagebrush	378
Mountain mahogany	25
Rocky Mountain juniper forest	3
Subtotal	408
Unplanned Fire 1990-2003	
Greasewood-salt desert shrub	42
Forest or woodlands	250
Mountain shrubs	24
Sagebrush grasslands	1,620
Subtotal	1,936
Grand Total	2,344

Source: BLM 2005c

Under the existing plan, the Casper Field Office identifies site-specific fire management practices for multiple sites within the planning area. These practices vary by site, but generally identify the acreage designated for full fire suppression, limited fire suppression, and sites designated for prescribed burns (Map 19). Full suppression is a strategy requiring immediate and aggressive attack of the fire and typically relies heavily on mechanized equipment on or off roads. In contrast, limited suppression is a less aggressive strategy, generally used to keep a fire within a specified area. For example, in the Southern Bighorns, there are approximately 300,000 BLM acres of limited suppression; 80,770 acres of full suppression; and 7,500 acres of prescribed burns at 59 sites on BLM-administered lands. Current fire management planning emphasizes appropriate management response using limited and full suppression.

3.3.1 Unplanned/Wildland Fire

Public Safety and Resource Protection

An essential component of the Casper Field Office’s fire management program is protection of the public and property from the adverse impacts of wildland fires; however, unplanned fire can sometimes serve as a management tool to benefit natural resources. Fire suppression on public lands is guided by objectives in the existing plan and clarified by the annually updated Fire Management Plan (FMP) for the Wyoming

Eastern Zone (BLM 2004d). The FMP was recently refined as a result of the 2003 Risk Assessment and Mitigation Strategy (RAMS) exercise. The Healthy Forests Initiative, Healthy Forest Restoration Act (USC 2003), and the National Fire Plan 2000 also influence the BLM's approach to forest health and fire management in the planning area.

Full suppression provides the most effective and flexible tactics to suppress unplanned fire; however, use of heavy equipment can cause damage to wildlife habitat, soil erosion, water quality degradation, impacts to cultural resources, and facilitate the spread of invasive nonnative plant species (INPS). Full suppression also encompasses the use of fire retardant or foam; however, current practice limits the use of retardant or foam within 300 feet of waterways. In areas where full suppression may impact sensitive natural resources, limited suppression tactics may be utilized.

Lightning accounts for most unplanned fires in the planning area. Since 1990, the majority (1,620 acres) of unplanned fires occurred in the sagebrush and grassland vegetative types on BLM-administered lands in the planning area (see Table 3-14). The largest unplanned fires in the planning area occurred in the sagebrush and grassland vegetative types, relying on the fine fuels of grasses. Surface disturbance and seedbed exposure in these vegetative types resulted in establishment of INPS such as annual bromes, which exacerbate the frequency and spread of unplanned fires in the planning area. See the INPS section of this document for additional discussion.

The forest and woodlands vegetative types host the majority of the wildland-urban interface (WUI) in the planning area (See Glossary for definition of WUI). The size of individual fires and the total annual forest and woodlands acreage burned have been relatively small; however, the presence of WUI in these vegetative types increases the potential risk of unplanned fire.

Fuel Loading

An important objective of the BLM's fire management program in the planning area is to reduce fuel loads (i.e., where fire suppression has allowed fuels to increase above historical levels, usually expressed in tons per acre) with an emphasis on the WUI. The WUI is not addressed in the existing plan; however, the Casper Field Office currently is planning and evaluating options for implementing fuel reduction projects in WUI areas. Mechanical, chemical, and biological fuel treatments for reducing hazardous fuels are tools for fire and fuels management in the WUI and other parts of the planning area. In areas of mixed ownership, modification of vegetative fuels on public land alone does not result in a significant reduction of the threat of wildland fire to private lands and homes; cooperation among all landowners is required.

Using wildland fire for the benefit of resources, managing natural fire regimes, and managing fire return intervals are not addressed in the existing plan. The revised RMP will recognize the use of wildland fire as a tool for resource management when such fires do not threaten life or property and the Casper Field Office will collaborate with county fire departments, local fire protection districts, stakeholders, and the public to identify opportunities to reintroduce fire into the ecosystem.

3.3.2 Planned/Prescribed Fire

Prescribed, or planned, fire (as well as some wildland fire) is a management tool used to maintain or increase age-class diversity within vegetative types (e.g., big sagebrush/grassland); rejuvenate fire-dependent vegetative types (e.g., true mountain mahogany/ponderosa pine); maintain or increase vegetation productivity, nutrient content, and palatability; and maintain or improve wildlife habitats, rangeland, and watershed conditions. Fire also is considered a management tool for disposal of timber slash, seedbed preparation, reduction of hazardous fuel, control of disease or insects, grazing management, thinning, or plant species manipulation. Under current management, use of prescribed fire

to manipulate vegetation is in accordance with treatments identified by the range, wildlife, and forestry programs. Prescribed fire currently is allowed on highly erosive soils, but is prohibited within bald eagle roosts from November 1 through March 31.

3.3.3 Rehabilitation

The existing plan contains no specific decisions regarding rehabilitation; thus, rehabilitation is conducted on a case-by-case basis. Rehabilitation may be necessary following fire suppression, wildland fire, and prescribed burns to address the following:

- Emergency stabilization and rehabilitation. The BLM will identify actions, such as seeding, fencing, and temporary closures, that could be taken to stabilize or rehabilitate burned areas.
- Restrictions. Use of heavy equipment near known National Historic Trail (NHT) ruts, crucial big game winter range, and special status species' habitats is restricted; however, practical application of these restrictions is vague and does not include guidance to protect areas with sensitive soils and fragile watershed conditions or important cultural/historic resources.
- INPS. Burned areas and areas subject to fire suppression usually offer an excellent opportunity for the establishment or expansion of INPS. Pre- and post-fire management is crucial and, as within WUI areas, dependent on a cooperative approach by all landowners.

Management challenges related to fire include the ability of the BLM to control fire; the potential unintended impacts of fire on visibility and public health; the use of fire as a resource management tool; fire management in the WUI; linking fire management activities and resource management goals and objectives; consideration of natural fire regimes, fire return intervals, and desired future vegetative types; the impacts of fire on INPS and habitat for wildlife and special status species; and post-fire livestock grazing management. For example, when the BLM develops management strategies, the agency must recognize the role of wildland fire as an essential ecologic process. At the same time, these strategies also must include firefighter and public safety, suppression costs, the values to be protected, as well as be consistent with resource program objectives. While protection of human life is the single overriding priority in the BLM's fire management decisions, the BLM also considers community infrastructure; private property; natural and cultural resources; and social, economic, and political factors. For example, BLM policy requires a minimum of 2 years deferment of livestock grazing from burned areas. This policy, land-ownership patterns, and the economic impact of deferring grazing for 2 years, limit the number of prescribed fire projects that have occurred on grazing allotments in the planning area. Management actions addressing these challenges are incorporated in the alternatives and described in more detail in Chapter 2.

3.4 Biological Resources

This section describes the affected environment (i.e., existing conditions) for habitat fragmentation, biological diversity, and individual biological resources (i.e., vegetation, fish, wildlife, and special status species). Habitat fragmentation and biological diversity are not considered resources or resource uses; rather, they reflect conditions within the planning area that can be impacted (beneficially or adversely) by BLM management actions and allowable uses, as expressed in the alternatives (see Chapter 2). Therefore, the existing condition of habitat fragmentation and biological diversity are described in this section. Following the descriptions of habitat fragmentation and biological diversity, the existing conditions of individual biological resources are described, beginning with vegetation and followed by fish and wildlife and special status species.

Due to the complexity of biological resources and the vast size of the planning area, this section does not attempt to provide an encyclopedic description of all vegetation, fish, wildlife, and special status species; rather, based on issues identified during the scoping process and BLM's MSA, this section focuses on existing biological resource conditions in the planning area, which may be further impacted (beneficially or adversely) by alternatives. Chapter 4, Environmental Consequences, describes the potential environmental consequences (i.e., impacts) of each alternative related to individual biological resources.

Habitat Fragmentation

As large contiguous blocks of habitat are dissected into smaller blocks, they become isolated from one another by dissimilar habitats and land uses. For example, a contiguous 100,000-acre block of sagebrush habitat is considered fragmented when a road or other development is constructed within the habitat, thereby dissecting the block. If, in this example, the road dissects the 100,000-acre block in half, the result of this fragmentation is two 50,000-acre blocks of sagebrush habitat dissected by a road. As blocks of habitat are repeatedly dissected into smaller blocks, adverse impacts, including isolation, can occur to individual plant and animal species and communities occupying the habitat. The impacts of habitat fragmentation to biological resources can occur on multiple scales.

Actions that result in habitat loss are exacerbated when fragmentation reduces the size and (or) isolates remaining habitat patches below size thresholds necessary to support particular species. For example, some large birds (e.g., northern harrier) in the planning area have large territorial requirements, while smaller birds (e.g., Savannah and grasshopper sparrows) in the planning area favor habitat areas that are larger than their territory (Johnson 2001). These species are area-sensitive and habitat loss and fragmentation that reduces or isolates their area thresholds likely affects their distribution and abundance in the planning area.

At the landscape scale, vegetative types within the planning area are naturally distributed based on physical factors of geology, hydrology, elevation, soils, and climate. For example, Wyoming big sagebrush and grassland, the most common community in south-central Wyoming, is located primarily in the western half of the planning area on shallow to deep soils at elevations below 7,000 feet. Wyoming big sagebrush/grassland and other communities in the planning area were initially fragmented by land ownership and associated land management practices during Anglo settlement beginning in the late 1800s (Map 1). The Homestead acts and early Anglo settlement of Wyoming introduced people, trails, livestock, agriculture, irrigation, and energy development to the planning area, all of which contributed to changes in land management and habitat fragmentation. Subsequent development of the region in the early to mid 1900s included establishment of the railroad and a road network to connect population centers. In the late 1900s, ever-increasing rural development of homes and recreational properties (the WUI) further fragmented planning area habitats. Animal-vehicle collisions resulting from increased

traffic in these areas and the risk to private property from wildland fire are both consequences and reminders of existing habitat fragmentation conditions within the planning area.

Currently, the planning area is primarily fragmented by linear features including roads, railroads, trails, irrigation systems, and ROW. I-25 and a network of state highways, county roads, local roads on private and public lands, the Burlington Northern Railroad, and the Colorado and Northwestern Railroad dissect much of the planning area. The development of irrigation reservoirs and districts with their associated water-distribution systems has also contributed to habitat fragmentation in the planning area. Similar to a network of roads, the Pathfinder, Alcova, Goldeneye, Guernsey, Grayrocks, and Glendo reservoirs, the North Platte and Laramie rivers, as well as associated irrigation water-distribution systems, dissect planning area habitats. Irrigation water also has supported the conversion of native plant communities to hayfields, pasture, and cropland, thereby, further fragmenting habitats. Fences can block migration routes for some wildlife species, such as pronghorn, consequently fragmenting their habitats. While this has been an issue in other parts of Wyoming, it has not been identified as an issue in the planning area. The conversion of large acreages of sagebrush to predominately grassland communities can fragment habitat for sagebrush-dependent species such as the sage-grouse. Existing corridors (Map 43) parallel I-25, in part, between Casper and Midwest to the north and parallel Highway 26 between Casper and Waltman to the west. However, other existing corridors do not parallel roads, thus increasing fragmentation.

Habitat fragmentation in the planning area is most obvious along the linear features identified in the previous discussion; however, fragmentation also occurs at population centers, reservoirs, and other developments where humans live, recreate, and work. For example, the development of large private parcels bordering BLM-administered lands has, in some instances, contributed to habitat fragmentation by the conversion to subdivisions or smaller ranchettes. This type of land conversion and habitat fragmentation primarily occurs near population centers and the WUI. Buildings, roads, fences, and utility corridors associated with residential and commercial developments all have contributed to fragmentation of planning area habitats.

In addition to the described linear features and other types of development, conditions on BLM-administered land continue to be influenced by the management of resources and resource uses, including mineral resources; fire management and ecology; forests, woodlands, and forest products; and land resources. The reader of this document should refer to the individual sections in this chapter for additional details regarding existing conditions of these resources and resource uses.

In general, development and the associated construction and maintenance of roads, railroads, well pads, pipelines, and power lines has fragmented habitat in the planning area. In addition, prescribed and wildland fire have sometimes contributed to temporary habitat fragmentation in the planning area. Intense and large area burns temporarily can isolate individual species and communities of plants and less mobile species of animals. A frequent fire return interval often associated with INPS can effectively fragment habitat over the long term. Similar to fire, mechanical vegetative treatments have generally been temporary in nature and, on public lands, have consisted of small acreages. OHV use may also contribute to habitat fragmentation through the transportation of INPS seeds. Management actions to address these challenges are incorporated in alternatives for biological resources in Chapter 2.

Biological Diversity

The Keystone Center (1991) defines four elements of biological diversity relating to scale:

1. Genetic diversity
2. Species diversity
3. Community or ecosystem diversity
4. Landscape or regional diversity.

Biological diversity is a complex subject that makes the measurement of existing conditions difficult. Species diversity is probably the most recognizable and easily understood element of biological diversity and, for this RMP revision, is defined as the variety of species found in the planning area. In other words, species diversity includes the numbers and distribution of all species in the planning area. This includes species (e.g., cottontail rabbits, coyotes, elk, pronghorn, etc.) that are common and plentiful, as well as other species (e.g., Laramie columbine, mountain plover, bald eagle, etc.) that are less common or rare. Classifying rare species as sensitive, threatened, or endangered is one way of conserving biological diversity because these classifications heighten awareness for conservation of rare species.

Spatial and temporal scales are also important considerations for conserving biological diversity. For example, nonmigratory populations of mammals are sometimes temporarily diminished following a harsh winter and limited food supply. In addition, migratory birds may return to breeding grounds with diminished populations due to the stress factors associated with migration. In these instances, the lower number of individuals of wildlife populations does not necessarily equate to a reduction in biological diversity in the planning area because the number of individuals ultimately (all else being equal) return to pre-winter levels. Permanent reductions in the four elements of diversity listed above are considered adverse impacts to biological diversity for this RMP revision.

Counting the number and relative frequency of species occupying an area over time is one means of identifying reductions in species diversity; however, this approach can be overly simplistic and does not necessarily address the other three elements of diversity. Currently, there is no single, commonly accepted scientific protocol for measuring biological diversity. Nevertheless, it is generally accepted that "...reducing the number of biological entities in a system or making some of them less abundant reduces diversity" (Langner and Flather 1994). Biological diversity in the planning area is currently addressed by strategies such as the BLM's National Sage-Grouse Habitat Conservation Strategy.

Climatic factors (e.g., drought), disease, fire regime, predation, competition, and population cycles all have contributed to the current natural variability in number and relative frequency of individuals, species, and communities of plants and animals in the planning area. Other factors include surface-disturbing activities (e.g., road and well pad construction), the physical and chemical environment (e.g., soil nutrients and water), adjacent area vegetation (e.g., croplands), historic vegetation, INPS, herbivory (e.g., native ungulates and livestock), and the planning area's existing vegetation.

The current condition for biological diversity in the planning area is a function of physical factors (e.g., soils, geology, air, water, geography, and elevation), natural factors (e.g., fire, drought, disease, evolution), and human actions. In the context of these physical and natural factors, biological diversity evolved over time to produce the diversity present in the planning area prior to Anglo settlement. Human actions during the subsequent 140 years changed the pattern, composition, structure, and function of plant and animal communities within the planning area, thus affecting the pre-Anglo biologically diverse settlement. Management challenges for biological diversity include competing resources and resource uses. Management actions to address these challenges are incorporated in alternatives for physical and biological resources and for fire management and ecology in Chapter 2.

Vegetation

The convergence of two physiographic regions (Interior Plains and Rocky Mountain System) and a wide range of topography result in a diversity of vegetative types in the planning area (Maps 20 and 21). Table 3-15 summarizes the extent of nine vegetative types within the planning area. Grasslands and sagebrush types, followed by desert shrubs and saltbush-greasewood flats and woodlands, dominate vegetation in the planning area. Lodgepole pine and ponderosa pine forests are limited to approximately 5 percent of the planning area at higher elevations. Existing conditions for four categories of vegetation (forests,

woodlands, and forest products; grassland and shrubland communities; riparian and wetland communities; and INPS and pest control) are described in the following sections.

Table 3-15. Vegetative Types and Acreage in the Casper Planning Area

Vegetative Type	Total Acreage	BLM Acreage	Percent BLM Surface Acreage
Altered by Human (agriculture, mining, urban)	1,126,287	12,371	0.9
Grasslands	3,091,713	299,954	22.0
Sagebrush	2,408,101	630,183	46.2
Ponderosa/Lodgepole pine forests	549,340	66,182	4.9
Desert Shrubs and Saltbush-Greasewood flats	460,426	181,064	13.3
Aspen/Juniper/Limber pine woodlands	314,862	101,882	7.5
Mountain shrubs	204,218	46,779	3.4
Riparian and Wetland	243,184	12,960	1.0
Other (Rock outcrops, water)	123,216	10,202	0.9
Total	8,521,347	1,361,577	100

Source: BLM 2005a

BLM Bureau of Land Management

Note: Percentage may not sum to 100 due to rounding; totals for acreage columns do not equal total planning area and total BLM-administered land within planning area due to differences in source files for boundary and for vegetation.

3.4.1 Vegetation – Forests, Woodlands, and Forest Products

This section describes existing conditions for forests, woodlands and forest products. Current management of these vegetation categories is also described.

Forest Communities

The Casper Field Office administers approximately 165,004 acres of forests and woodlands (delineated in Table 3-16). Forests and woodland acres are distinguished by the type (species composition), size, and density of the trees.

Table 3-16. Distribution of Forests and Woodlands on BLM-Administered Land in the Casper Planning Area

Classification	Distribution (Acreage)	Percent of BLM Surface Acreage
Forests	66,005	4.8
Woodlands	98,999	7.3
Total	165,004	12.1

Source: BLM 2003d

BLM Bureau of Land Management

The 66,005 acres of forests on BLM-administered land in the planning area include lodgepole pine, ponderosa pine, and scattered areas of Douglas fir. Included in this acreage are 17 Forest Management Areas (FMAs) on BLM-administered land (Map 21). The 17 FMAs are scattered throughout mountainous regions of the planning area as isolated stands of forests. The importance of these forest stands is a function of their distribution, relatively long rotation age (number of years to maturity), and the

diversity of plants and animals they support. Age-class distribution in the planning area currently is unbalanced, tending toward mature, heavily stocked stands. Portions of these stands remain healthy but many are declining in tree vigor and productivity (BLM 2003d). The advanced age and density of these stands, combined with the lack of silviculture treatments and a natural fire regime, have contributed to the decline in overall health of forest stands in the planning area. For this section, *silviculture treatments* are synonymous with *vegetation treatments* and include methods anticipated to manage natural processes, insects, and disease, structure, density, species composition, age-class distribution; and site-quality of forest stands. Treatments include the use of mechanical, chemical, and prescribed fire to harvest, thin, release, regenerate, prune, salvage, and otherwise affect forest stands.

For the most part, lodgepole pine stands are struggling, with the components of density and a lack of age-class distribution, for growth and survival. This species is suffering from mountain pine beetle and dwarf mistletoe infestations in scattered patches throughout the planning area. This is a result of the need for fire and forest management to manipulate these components to provide essential ingredients for a vigorous and overall healthy forest.

Ponderosa pine forest stands contain better age-class diversity and better spacing than lodgepole pine stands and are, therefore, healthier and more vigorous. Ponderosa pine is more fire tolerant and grows well on poorer sites; however, some stands of ponderosa pine are exhibiting damage from the mountain pine beetle and over maturity.

Woodland Communities

Woodlands range from small monotypic to larger mixed stands of quaking aspen, limber pine, and Rocky Mountain juniper. Inventory data are not available for woodland communities in the planning area; however, in general, distribution of quaking aspen has decreased while limber pine and juniper stands have increased. Woodland species occasionally are used for firewood, decorative, and hobby applications, but are not important commercially at this time. On the other hand, woodland communities are important ecologically, especially as wildlife habitat.

Aspen are scattered throughout the planning area, although most stands are maturing and distribution is declining. Aspen stands also appear to be declining throughout the interior west, due to age and conifer invasion (Bartos and Campbell 1998; Kulakowski et al. 2004; Knight 2001; WSFD 2001). Many of these stands have declined due to the lack of fire to control competition and stimulate regeneration, ungulate use, and advanced age. Aspen stands typically exhibit a diversity of understory vegetation, are used by wildlife and livestock, can serve as a natural fire break, and often occur as part of an important riparian and wetland component in the forest system. According to a report on forest health published by the WSFD, the average age of aspen forests is 68 years (WSFD 2001). Older aspen stands on Muddy Mountain, Casper Mountain, and the foothills of the South Bighorns are showing signs of increased cankers, conks, and decay in the boles.

Juniper woodlands typically comprise Rocky Mountain juniper stands sometimes mixed with Utah juniper and limber pine located on steep slopes and ridge tops. After long periods of time without fire, juniper species encroach into and dominate sagebrush communities. The existing plan does not specifically identify actions for treating woodland encroachment. The most notable juniper woodlands are in Natrona County adjacent to the Alcova Reservoir, Cedar Ridge, and the west slope of Casper Mountain (BLM 2003d).

Limber pine is another vegetative type comprising woodland communities. Although not considered a commercial species, limber pine is an important food and cover source for birds and other wildlife. Limber pine has been plagued by a blister rust in many locales of the planning area.

Forest Products

With the exception of the Muddy Mountain area, no active forest management occurred on forestlands in planning area FMAs from 1990 to 2001. Consequently, current forest inventory data for the planning area are limited. Historically, forest products from public lands in the planning area have played a small role in the wood product industry. However, since the development of the Muddy Mountain Forest Health Recovery Plan (BLM 2001c), the public has responded to the sale of posts and poles, firewood, and wood for landscaping and furniture.

Management of Forests, Woodlands, and Forest Products

Fragmentation of forests and woodland communities within the planning area has occurred through localized development of roads, forest management, or from natural processes such as climate, disease, insects, or wildland fire. These historic disturbances have affected the size and distribution of forests and woodlands throughout the planning area. For example, dwarf mistletoe in conifer stands, blister rust on limber pines, and mountain pine beetle and Ips beetle in conifer stands are the insect- and disease-damaging agents of primary concern in the planning area. Stand densities, age-class distribution, and overall health are affected by the invasion and spread of these agents.

The Casper Field Office has developed management treatments to maintain and enhance the multiple use of forests and woodlands. The responsibility of the Casper Field Office is to analyze the circumstances surrounding each forest and woodland area and to implement the management treatments to achieve desired goals. In the existing plan, these goals encompass the establishment, composition, structure, and growth of forests and woodland areas. The BLM's existing plan is designed to restore and maintain forest health whereby forest management activities are directed in accordance with sound silvicultural and multiple use practices.

Since 2000, a gradual increase has occurred in the number of government programs emphasizing forest conditions and health on public lands (GAO 2003). For example, the Healthy Forests Restoration Act (HFRA) was signed in 2003 to address catastrophic wildland fire. Ecosystem management recognizes that fire, as well as insects, disease, drought, and external factors, affect resource conditions. For example, lack of a natural fire regime affects forest composition, species diversity, age-class distribution, and structural stage composition. The lack of a natural fire regime in forests and woodlands in the planning area has resulted in increasing stand densities and abundant ground fuels. Because natural regeneration of lodgepole pine and aspen relies on fire, fire suppression also has contributed to changes in the composition and structure of forest and woodland communities. In the absence of natural fire regimes, active management is necessary to ensure the health and vigor of forest and woodland communities.

Management challenges for forests, woodlands, and forest products in the planning area generally include lack of a natural fire regime and fuel management; management of fragmented and isolated stands; encroachment of woodland species into other vegetation types; lack of a current forest inventory; declining or over mature stands; and management of disease, insects, pathogens, and INPS. Management actions designed to address these challenges are included in the alternatives and described in more detail in Chapter 2.

3.4.2 Vegetation – Grassland and Shrubland Communities

Grassland communities comprise approximately 22 percent of the public land surface administered by the BLM in the planning area and are represented primarily by mixed grass prairie; however, short- to mid-size grasses also occur. Shrubland communities comprise approximately 63 percent of BLM-

administered land in the planning area and are represented by the desert-shrub and saltbush-greasewood flats, mountain shrub, and sagebrush vegetative types (see Table 3-15).

Most grassland and shrubland communities in the planning area have been influenced by surface-disturbing activities, livestock grazing, fire or fire suppression, and INPS. See also the Livestock Grazing, Fire Management and Ecology, and Vegetation – Invasive Nonnative Plant Species sections of this document.

Grasslands

Mixed-grass prairie grasslands occur primarily at lower elevations and on rolling plains and foothills in the eastern two-thirds of the planning area. As shown in Map 20, this area occupies most of Converse, Platte, and Goshen counties, north and east of the Laramie Range, and a small part of eastern Natrona County. This vegetative type primarily includes grasses and forbs, but does contain some shrub species. Grass and grass-like plants that are common to this type include western wheatgrass, needle-and-thread, prairie Junegrass, Indian ricegrass, blue grama, Sandberg bluegrass, sand dropseed, threeawn, little bluestem, and threadleaf sedge. The most common shrubs are Wyoming big sagebrush, silver sagebrush, sand sagebrush, snowberry, and Douglas rabbitbrush. Common forbs include fringed sagewort, scurfpea, prairie clover, milkvetch, American vetch, yarrow, buckwheat, and prickly pear cactus. The mixed-grass prairie vegetation type predominantly is used for livestock and wildlife grazing.

Other grassland communities, present within the planning area, inhabit shallow soil sites that are too dry to support many shrubs or trees. These grasslands comprise short- to mid-size grass species and numerous mat-forming forbs. These communities are found primarily in Natrona County in the southern foothills of the South Bighorns.

Shrublands

Shrubland communities occur throughout the planning area and dominate the majority of the public land surface administered by the BLM. These communities are diverse and primarily include three vegetative types: desert shrub and saltbush-greasewood flats, mountain shrub, and sagebrush.

Greasewood

Greasewood-dominated shrublands occur primarily on lowland positions adjacent to streams, playas, lakes, and ponds. They usually occur in areas that receive lower amounts of precipitation and on soils that contain at least moderate amounts of salinity or alkalinity. Greasewood is a halophyte that does well in very saline soils; however, it needs more soil moisture to survive than does saltbush. A good example of this vegetation community is located along the floodplain of lower Bates Creek in south central Natrona County.

Where greasewood is the dominant shrub, subdominant shrubs include Gardner saltbush, shadscale, rubber rabbitbrush, Wyoming big sagebrush, and basin big sagebrush. The understory is limited to salt-tolerant herbaceous vegetation, such as inland saltgrass, western wheatgrass, alkali sacaton, bottlebrush squirreltail, Sandberg bluegrass, biscuit root, Hood's phlox, pepperweed, and sea blight. In places, cheatgrass is a substantial component of the understory vegetation.

Although greasewood is not considered very palatable to livestock or big game wildlife, pronghorn and sheep will eat the spiny stems and leaves in the spring and early summer. Cattle use greasewood in the summer and fall as a source of salt. Greasewood contains soluble oxalates that can be poisonous to both sheep and cattle. Greasewood communities are important for providing cover to wildlife and livestock and important spring habitat for mule deer.

Saltbush

Salt desert shrubland is perhaps the most arid vegetation type in the Intermountain West (Knight 1994). Gardner saltbush dominates this community type in the planning area and, in some instances, makes up 90 percent of the vegetative cover. These areas are characterized by accumulations of salt in soils developed primarily from sodic shale. Soils of these areas usually have a potential of hydrogen (pH) of 7.8 to 9, which restricts the uptake of soil minerals and nutrients. The soils in these areas restrict the uptake of water and soil nutrients by all but the most tolerant of plants, usually halophytes.

Gardner saltbush normally grows no higher than 12 inches, and may grow along the ground forming a mat. Subdominant shrubs in areas dominated by Gardner saltbush include birdfoot sage, bud sage, spiny hopsage, broom snakeweed, shadscale, and Douglas rabbitbrush. Some greasewood also may be found in this community. Grasses associated with these sites include Indian ricegrass, bottlebrush squirreltail, Sandberg bluegrass, and western wheatgrass. Forbs found in these areas include wild onion, biscuitroot, woody aster, winterfat, Hood's phlox, globemallow, and prickly pear cactus.

Saltbush communities within the planning area occur on relatively flat to steep, highly eroded hills at lower elevations, usually in areas of low precipitation. Examples of this vegetative type can be found in the Bates Hole and Anderson Draw areas west and southwest of Casper. Gardner saltbush is a valuable forage species on winter and spring ranges for wildlife and livestock. In the spring, when Gardner saltbush is green, its protein content can be higher than late-season alfalfa, and is a preferred livestock forage for lambing sheep and calving cattle.

Mountain Shrublands

Mesic Upland Shrub Steppe

Chokecherry is the primary shrub in this community, often growing in conjunction with snowberry, currant, Wood's rose, serviceberry, and Rocky Mountain maple. Mesic Upland Shrub Steppe is usually found at low to mid elevations in areas that receive greater moisture due to snow accumulation, runoff, or subsurface flow. These areas include drainage bottoms, north slopes, and the leeward side of hills. This community usually exists as dense but scattered stands of shrubs and is often adjacent to aspen and willow communities. Chokecherry, serviceberry and maple in these areas may grow to be 15-foot high. Herbaceous understory vegetation includes basin wildrye, green needlegrass, Columbia needle grass, bluebell, columbine, aster, yarrow, and violet. Although the Mesic Upland Shrub Steppe is found across the planning area, individual stands are seldom more than ½ acre in size.

This community provides hiding and thermal cover for deer, elk, and other wildlife species. The dominant shrubs provide excellent forage for browsing animals when their softer leaves and shoots are within reach. These shrubs reestablish following fire, often in less dense patches, making them more accessible to wildlife and livestock. The new growth is highly palatable and is sought out by browsing animals.

Xeric Upland Shrub Steppe

True and curl-leaf mountain mahogany dominate this plant community. True mountain mahogany is found in the southern portions of the planning area along the foothills of the Laramie Range. Curl-leaf mountain mahogany is found in the northwestern part of the planning area on the southern slopes of the South Bighorns. Both species grow on dry sites, usually rocky slopes and ridges with shallow soils. Mountain mahogany usually occurs as the dominant shrub but sometimes grows in conjunction with juniper, antelope bitterbrush, currant, snowberry, Douglas rabbitbrush, and Wyoming and mountain big sagebrush. Grass species found in the understory include bluebunch wheatgrass, Indian ricegrass, Sandberg bluegrass, mutton bluegrass, and western wheatgrass. Forb species found in the understory

include phlox, buckwheat, locoweed, Hooker sandwort, goldenweed, and milkvetch. Cheatgrass is a dominant component of the understory vegetation within some true mountain mahogany communities.

Mountain mahogany may grow to a height of 5 to 7 feet, depending on the extent of browsing and depth of soil. Many of these communities consist of mature and often decadent plants with little recruitment of young plants. Fire generally lessens the density of the shrub stands, allowing grasses and other herbaceous plants to increase, while still providing wildlife browse. Mountain mahogany is an important fall and winter forage species for deer and elk and is also utilized by livestock. Mountain mahogany communities within the planning area usually provide crucial winter range for mule deer.

Sagebrush

Sagebrush-dominated communities are the most common vegetative type in the planning area. These communities are found on approximately 630,183 acres (46 percent) of public land surface within the planning area and include Wyoming big sagebrush and grassland; mountain big sagebrush and grassland; silver sagebrush and grassland; basin big sagebrush shrubland; and the low sages—birdfoot and Wyoming threetip sagebrush and grassland. Fire is an important component of all sagebrush-dominated plant communities. It can create a mosaic of seral stages across the landscape that benefits numerous species of wildlife. Depending on the nature of the site, the fire return interval can be between 25 and 100 years (Knight 1994). Following a stand replacement fire, it can take more than 20 years for sagebrush to return to pre-burn densities. The return interval for sagebrush is based on several factors, including fire intensity, species of sagebrush, soil, precipitation, percent slope, aspect, and availability of seed source.

Sagebrush communities are important sources of food and cover for numerous wildlife species found in Wyoming. Sagebrush obligate species include the sage sparrow, Brewer's sparrow, sage thrasher, greater sage-grouse, sagebrush vole, sagebrush lizard, and pronghorn. See also Fish and Wildlife Resources – Wildlife and Special Status Species – Wildlife sections of this document.

Wyoming Big Sagebrush and Grassland

Wyoming big sagebrush and grassland is the most common community in south-central Wyoming. It occurs primarily in the western half of the planning area, on shallow to deep soils at elevations below 7,000 feet. Between 6,000 and 7,000 feet, Wyoming big sagebrush grows in conjunction with mountain big sagebrush. In these areas, Wyoming big sagebrush usually is found on drier sites, while mountain big sagebrush is found on deeper soils and in areas receiving greater moisture, such as drainage bottoms. Shrub height varies from as little as 8-inches tall on shallow soils to around 30-inches tall on deeper soils. The canopy cover for Wyoming big sagebrush communities usually does not exceed 30 percent.

Wyoming big sagebrush often appears as the dominant plant in mosaic communities intermixed with other shrubs and open grasslands. On shallow or rocky to gravelly soils, Wyoming big sagebrush may be co-dominant with black sagebrush and Douglas rabbitbrush. On lighter textured soils, such as sandy loams, Wyoming big sagebrush may be co-dominant with silver sagebrush, Douglas rabbitbrush, and winterfat. Grass and forb species vary depending on soil texture, aspect, and slope. Common grass and grass-like species include bluebunch wheatgrass, western wheatgrass, Sandberg bluegrass, mutton bluegrass, Indian ricegrass, needle-and-thread, green needlegrass, prairie June grass, threadleaf sedge, and bottlebrush squirreltail. Common forbs include phlox, sandwort, buckwheat, penstemon, Indian paintbrush, globemallow, astragalus, and prickly pear cactus.

Wyoming big sagebrush is the most frequently consumed sagebrush by wildlife and is a staple for pronghorn, mule deer, and the greater sage-grouse. In the planning area, Wyoming big sagebrush is generally the dominant species found on pronghorn and mule deer crucial winter ranges. Many of the Wyoming big sagebrush communities in the planning area have even-aged stands of mature and often

decadent plants, which presents a problem on crucial mule deer and pronghorn winter ranges due to the poor forage quality of older plants and lack of new young plants.

Mountain Big Sagebrush and Grassland

Mountain big sagebrush is located on shallow to deep soils at elevations above 7,000 feet. In areas where mountain big sagebrush grows in conjunction with Wyoming big sagebrush, mountain big sagebrush generally grows on the deeper soils and in areas receiving more moisture, either through runoff or snow accumulation. At higher elevations, mountain big sagebrush occurs as smaller plant communities in mountain areas and is often intermixed with aspen and conifer woodlands. Shrub height varies from 10 to 30 inches, with canopy cover reaching 50 to 60 percent.

Other shrubs found in mountain big sagebrush communities are antelope bitterbrush, serviceberry, threetip sagebrush, and snowberry. Associated grasses include Idaho fescue, king spike fescue, green needlegrass, Colombia needle grass, mutton bluegrass, big bluegrass, western wheatgrass, basin wildrye, and elk sedge. Common forbs found in these areas include Indian paintbrush, lupine, larkspur, penstemon, violet, and Oregon grape.

Mountain big sagebrush is palatable to wildlife, although browsing is sometimes limited when the higher elevation habitats become unavailable due to snow accumulation. Mountain big sagebrush provides hiding and nesting cover for various wildlife species. Following fire, mountain big sagebrush reestablishes as the dominant species more quickly than other sagebrush types, often resuming dense canopy cover after 20 to 30 years. The natural fire-return interval in this sagebrush type is 20 to 75 years.

Silver Sagebrush and Grassland

Silver sagebrush and grasslands have two subtypes occupying distinctly different habitats in the planning area. The more common subtype is found on deep sandy-textured soils where silver sagebrush is the dominant shrub, but other shrubs (including Wyoming big sagebrush, Douglas rabbitbrush, and rubber rabbitbrush) are usually present. In sand dune areas, silver sagebrush may be the only shrub present. Associated herbaceous species include needle-and-thread, Indian ricegrass, threadleaf sedge, blue grama, prairie sandreed, sand dropseed, scurfpea, buckwheat, and prickly pear cactus.

The second subtype of silver sagebrush and grassland is not abundant and is located in drainage bottoms and riparian areas above the wet sedge and rush zone found along the streambank. Other vegetation found in this subtype include basin wildrye, Kentucky bluegrass, redtop, streambank wheatgrass, Baltic rush, clover, dandelion, aster, and, occasionally, cottonwood and willow.

Silver sagebrush is desirable forage for both livestock and big game species because it provides important habitats for various wildlife species. Silver sagebrush responds well to fire as it has the capability to send up new stems from root crowns after burning.

Basin Big Sagebrush Shrubland

Basin big sagebrush shrubland is found in moderately deep to deep soils of all soil textures in zones of 10 to 16 inches of annual precipitation (Beetle 1960). It occurs as pockets within Wyoming big sagebrush, Gardner saltbush, and greasewood communities as the dominant shrub type along valley bottoms, canyons, and isolated ephemeral washes. This subspecies of big sagebrush may reach 12 feet in height, with canopy cover reaching 70 percent. Basin big sagebrush shrubland is not abundant within the planning area on BLM-administered land.

In addition, basin big sagebrush shrubland is not very palatable forage, usually serving as little to no use, even in extreme winters when use levels of other plants are severe. It is important, however, as cover for

mule deer and elk, and as habitats for other wildlife species. Basin big sagebrush shrubland may also be important to greater sage-grouse in severe winters. Basin big sagebrush shrubland can increase in density and cover with poor livestock management and interruptions in the fire cycle.

Low Sages – Birdfoot and Wyoming Threetip Sagebrush and Grassland

Birdfoot sagebrush is found at elevations below 7,000 feet on clay to dense-clay alkaline soils where pH ranges from 8.5 to 11. At lower pH levels, Gardner saltbush is often found growing in birdfoot sagebrush communities along with a variety of grasses and forbs. Grasses that are present include western wheatgrass, Indian ricegrass, Sandberg bluegrass, and bottlebrush squirreltail. Forbs that are present include woody aster, Hood's phlox, biscuitroot, and wild onion. At higher pH levels, birdfoot sagebrush occurs as a monoculture. Most of the birdfoot sagebrush communities are found in the western part of the planning area in Natrona County.

Wyoming threetip sagebrush occurs at elevations above 7,000 feet in the foothills of the various mountain ranges on shallow to moderately deep, well-drained soils. It normally grows to between 4- and 15-inches tall and is found intermixed with mountain big sagebrush and black sagebrush. Grasses and forbs found in this community include Idaho fescue, king spike fescue, Colombia needle grass, mutton bluegrass, elk sedge, Indian paintbrush, mountain pea, larkspur, balsamroot, phlox, Hooker sandwort, and buckwheat. Wyoming threetip sagebrush does not appear very palatable to either livestock or wildlife in the summer or winter. Its location on windswept ridges and knolls may cause it to be used as emergency winter forage, especially for big game (Beetle and Johnson 1982). This community-type responds well to low-intensity fires, but may be set back by high-intensity fires. Large fires rarely occur in this type due to the lack of fuel needed to carry the fire through it. The ability of Wyoming threetip sagebrush to stump sprout and layer makes its control difficult.

Management challenges for grassland and shrubland communities include the invasion and spread of INPS; lack of a natural fire regime; over-mature stands with insufficient recruitment; integrating treatments of multiple resource programs to achieve landscape-level objectives; competition for forage between native ungulates and livestock; habitat fragmentation; restoration of areas damaged by surface-disturbing activities to mitigate potential impacts regarding erosion and water quality; and maintaining a distribution and diversity of these communities sufficient to support wildlife, special status species, livestock, and other competing multiple-use demands on BLM-administered lands. As appropriate, management actions designed to address these challenges were identified during the alternative formulation planning phase and are incorporated in the alternatives described in Chapter 2 of this document.

3.4.3 Vegetation – Riparian and Wetland Communities

Riparian and wetland communities are areas that exhibit persistent water or obligate vegetation (e.g., sedges, rushes, willows) reflecting the availability of surface or groundwater. Vegetation found in these communities typically is adapted to flooding disturbances or saturated (water-logged) soils. Due to their importance in the landscape, wetlands are legally protected and are defined and delineated by use of a manual to determine the simultaneous presence of specific criteria for soil, water, and vegetation (Environmental Laboratory 1987). For the purpose of this discussion, references to wetlands are not restricted to the legal definition.

Riparian areas support more wildlife diversity than any other habitats (WGFD 1999) and are the single most productive wildlife habitat type in Wyoming. Many wildlife species depend on these habitats for all or part of their life-cycle (WGFD 1999). Healthy riparian areas provide vertical structural complexity, canopy, and subcanopy layers as well as a ground layer that supports species diversity. In addition to being an integral part of watershed health, riparian areas are desired for their recreation, fish and wildlife,

water supply, cultural, and historical values as well as for their economic values stemming from their use for livestock production and mineral extraction (BLM 1998a).

About half of the bird species found in riparian habitats are obligate species (Howe et al. 2004). In general, the greater the diversity of habitat along a river or stream, the greater the species diversity of aquatic and riparian biota (Wohl 2004). Riparian habitats support extended forb production and diversity in vegetation and structural complexity that provides for biological communities rich in insect composition (Connelly et al. 2004). Most birds are insectivores during the breeding season (Howe et al. 2004). Emerging aquatic insects are a large part of the diet of birds using riparian areas (Moline 2004). These factors make riparian areas the most important habitats to avian biodiversity across the West (Howe et al. 2004). Greater sage-grouse depend on riparian areas in the summer for late brood-rearing habitat. After upland forbs have expired, greater sage-grouse move into mesic riparian habitats as forbs generally are still available in these areas for several more months (Connelly et al. 2004).

Compared to uplands, healthy riparian areas generally are lusher and stay greener for a longer portion of the year (WGFD 1999). Typical plant species found in riparian and wetland communities in the planning area include cottonwoods, willows, rushes, sedges, redtop, bluegrass, saltgrass, horsetail, dock species, iris, wild licorice, arrowgrass, bulrushes, and cattails. In addition to these native plant species, several INPS are prevalent in riparian areas found in the planning area, including Russian knapweed, Canada thistle, musk thistle, houndstongue, salt cedar, and leafy spurge. Leafy spurge is not as widespread as Russian knapweed or other INPS in the planning area. INPS have been shown to decrease biological diversity, affect stream functions, degrade the quality of wildlife habitat, and decrease forage production for livestock and wildlife. See also the Vegetation – Invasive Nonnative Plant Species section of this document.

Nationally, about 70 percent of riparian areas have been lost (Howe et al. 2004). Although riparian areas generally account for less than 1 percent of the total land area in the western United States (Slater and Anderson 2004), the benefits of these vital oases in semiarid environments far exceed the relatively small area they occupy. Despite the relatively small area they occupy in the planning area (2,960 acres or 1 percent of the total public land surface acreage), riparian and wetland communities provide important functions, such as improving water quality, sustaining base flows, lessening the impact of floods, providing wildlife habitats, and providing forage, shade, and water for livestock (BLM 1991). Moreover, vegetation found in riparian and wetland areas influences stream communities by shading the stream (lowering water temperature), controlling dissolved nutrient inputs, stabilizing streambanks, and contributing organic matter (Moline 2004). Streamside vegetation provides cover for fish by creating quiet, shaded resting areas beneath overhanging vegetation and contributes material to organic debris jams (Wohl 2004). The roots of riparian vegetation are crucial to the development and maintenance of undercut banks that also provide cover for trout (Wohl 2004). The roots help to stabilize the streambanks, thus reducing siltation in pools and on spawning bars (Wohl 2004). Root stabilization of streambanks also allows soils to absorb extra water during spring runoff that is later released during drier months; thereby, improving late summer stream flows (WGFD 1999).

The ability of riparian and wetland areas to provide the functions described in this section depends, in part, on the interactions of water, soil, and vegetation. Due to the importance of riparian and wetland areas, the BLM performs assessments of the functional condition of these areas using a method referred to as the *Assessment of Proper Functioning Condition* (PFC) (BLM 1998a). The PFC method categorizes a site into the following functional categories: PFC, functional at-risk (FAR), or nonfunctional (NF). A site is considered to be in PFC when adequate vegetation, landform, and large woody debris are present to dissipate stream energy, filter sediment, improve water retention and groundwater recharge, develop root masses to stabilize streambanks, develop diverse habitat characteristics for fish and wildlife, and support greater biodiversity (BLM 1998a). FAR sites are susceptible to degradation and NF sites do not provide

adequate vegetation, landform, or large woody debris to dissipate stream energy; therefore, they do not provide functions, such as improving water quality and groundwater recharge (BLM 1998a).

Table 3-17 displays the functional categories of riparian and wetland communities assessed on public land surface in the planning area. Approximately 350 miles of lotic (flowing water) riparian and wetland communities and 10,000 acres of lentic (standing water) riparian and wetland communities occur within the planning area. The inventory and monitoring of these areas is an ongoing process; therefore, the classification in Table 3-17 may not fully represent current conditions.

Table 3-17. Classification and Condition of Riparian and Wetland Habitats on Public Land Surface in the Casper Planning Area

Riparian and Wetland Areas	Total	Areas Evaluated	Proper Functioning Condition	Functional At-Risk	Nonfunctional
Lotic Habitat (miles)	350	213	105	75	33
Lentic Habitat (acres)	10,000	930	877	26	27

Source: BLM 2005c

The PFC of riparian areas and wetlands is important to other resource programs and uses within the planning area, including mineral extraction; fire management; fish, wildlife, and special status species habitats; heritage resources; livestock grazing; recreation; special designations; and socioeconomic resources. For example, specific management guidelines pertaining to other resource programs include habitat improvement projects, restrictions on or prohibitions of certain activities near riparian and wetland areas, monitoring range conditions, stream improvement and use of areas by wildlife, control of INPS, and recreation guidelines. Standard #2 of the *Standards for Healthy Rangelands* (BLM 1998b) is related to riparian and wetland areas and provides a goal for all riparian and wetland areas grazed by livestock: “Riparian and wetland vegetation has structural, age, and species diversity characteristics of the stage of channel succession and is resilient and capable of recovering from natural and human disturbance in order to provide forage and cover, capture sediment, dissipate energy, and provide for groundwater recharge.”

BLM’s goal for riparian and wetland areas is to maintain, rehabilitate, and improve riparian ecosystems to achieve maximum long-term benefits. Management challenges for riparian and wetland communities include balancing the sometimes conflicting demands of livestock grazing and wildlife habitats; managing for PFC; water quality; avoiding improper livestock grazing, especially during dry summer months without sufficient alternative water supplies and fencing or other livestock exclusion options along riparian areas and wetlands; placing livestock supplements proximate to riparian areas and wetlands and associated potential physical and chemical impacts to terrestrial, wetland, and aquatic habitats; managing to PFC when riparian area and wetland systems typically comprise different landowners with different resource objectives; and controlling the invasion and spread of INPS. For example, some riparian or wetland areas are located on public lands in most of the larger grazing allotments in the planning area; however, these areas usually make up only a small percentage of the total riparian acreage and are almost always intermingled with private and (or) state lands. Riparian and wetland areas are often the primary, and sometimes the only, watering place for livestock. Consequently, livestock tend to congregate in these areas, especially during the hot summer season. As a result, the condition of riparian areas is one reason some grazing allotments have not met rangeland health standards (Standard #2). This and other management challenges for improving or maintaining riparian and wetland communities are addressed through management actions incorporated in the alternatives for biological resources and other resource programs and are discussed in more detail in Chapter 2.

3.4.4 Vegetation – Invasive, Nonnative Plant Species and Pest Control

The BLM works cooperatively with the State of Wyoming and the Converse, Goshen, Natrona, and Platte county weed control districts through the cooperative weed and pest management program to conserve and enhance all resources within the planning area. The Animal and Plant Health Inspection Service (APHIS) is currently the BLM's agent for pest control.

INPS are plants that are invasive and not indigenous to the planning area. Typically, INPS are detrimental to native ecosystems and human welfare. Noxious weeds are undesirable native or nonnative plants that have either been “designated” by the State of Wyoming or “declared” by the county weed control districts. For the purpose of this discussion, nonnative noxious weeds are a subset of INPS.

With the exception of vascular plants classified as INPS, a pest can be any biological life form, that poses a threat to human or ecological health and welfare. To date, and only occasionally, the Casper Field Office has dealt with grasshoppers, Mormon crickets, prairie dogs, and predator control.

There are 24 designated and prohibited noxious weeds on the State of Wyoming Weed and Pest Control Act Designated List (Wyoming Weed and Pest Council 2005a). Table 3-18 displays these 24 weeds. Table 3-19 lists the 41 INPS that are the focus of control efforts within the planning area. The INPS species in Table 3-19 represent the Declared List of Weeds and Pests in accordance with the Wyoming Weed and Pest Control Act of 1973 for Platte, Goshen, Natrona, and Converse counties.

The Wyoming State Weed Team (2003) estimated that noxious weeds and INPS inhabit 1.3-million acres in Wyoming and threaten croplands, rangelands, and natural areas. Approximately 410,400 acres of public land are infested with INPS and an estimated 952,100 acres have small or isolated populations of INPS in the planning area (BLM 2005c). Most species on the BLM's national list of INPS (www.co.blm.gov/botany/invasiweed.htm) have not invaded the planning area (BLM 2005c).

INPS often out-compete native plant species and, therefore, are considered a detriment to native vegetation. Invasion and spread of INPS in the planning area have contributed to economic loss and the loss of rangeland productivity, reduced structural and species diversity, and degraded and fragmented wildlife habitat. Based on observations and reports by the county weed control districts, INPS control measures are limiting population sizes in some cases, but not in others. Inventory and monitoring for INPS have been initiated, but currently the data are insufficient to project the rate or spread of INPS in the planning area.

Table 3-18. Wyoming Weed and Pest Control Act Designated List

Common Name
Field bindweed
Canada thistle
Leafy spurge
Perennial sowthistle
Quackgrass
Hoary cress (whitetop)
Perennial pepperweed (giant whitetop)
Ox-eye daisy
Skeletonleaf bursage
Russian knapweed
Yellow toadflax
Dalmatian toadflax
Scotch thistle
Musk thistle
Common burdock
Plumeless thistle
Dyer's woad
Houndstongue
Spotted knapweed
Diffuse knapweed
Purple loosestrife
Saltcedar
Common St. Johnswort
Common tansy

Source: Wyoming Weed and Pest Council 2005a

Note: Designated Noxious Weeds W.S. 11-5-102 (a)(xi) and Prohibited Noxious Weeds W.S. 11-12-104

Historical INPS infestations in the planning area likely began as small patches in disturbed areas because of development, fire, roadway and utility corridors, livestock concentration areas, recreation, or OHV trails. The USGS (2003b) identifies fire and grazing as important disturbance factors promoting INPS invasions. Although data are not available, the spread of initial infestations in the planning area are thought to have occurred through the transport of seeds or other propagates by wildlife, livestock, vehicles, people, water, or wind to disturbed areas. Disturbed areas are more frequent and the vegetative communities have become fragmented along the southeastern and central portion of Wyoming where historical land uses have included grazing, agriculture, and energy and mineral development (Mac et al. 1998).

Changes in vegetative frequency; construction of roads, utility corridors, and well pads; and the concentration of livestock and wildlife in some areas have exposed bare soil and provided a seedbed for the establishment of INPS in the planning area. These, as well as other historical vegetative disturbances and activities (e.g., fire, fire suppression, recreation, and OHV use) have encouraged the spread of invasive grasses and noxious weeds in the planning area (see Map 22). The combined effects of agriculture, grazing, fire, fire suppression, energy and mineral development, and, in some cases, drought, have altered the structure, composition, and site of some vegetative types within the planning area.

**Table 3-19. Declared List of Weeds and Pests
by Counties in the Casper Planning Area for 2005**

County	Common Name
Converse County	Black henbane
	Bull thistle
	Chicory
	Common crupina
	Common mullein
	Dames rocket
	Goatsrue
	Gorse
	Iberian starthistle
	Italian thistle
	Jointed goatgrass
	Meadow knapweed
	Medusahead
	Orange hawkweed
	Phragmites
	Purple starthistle
	Rush skeleton weed
	Sandbur
	Scentless chamomile
	Scotch broom
	Sericea lespedeza
	Squarrose knapweed
	St. Johnswort
	Sulphur cinquefoil
	Syrian beancaper
	Tansy
Tansy ragwort	
Teasel	
Wild licorice	
Yellow hawkweed	
Goshen County	Puncturevine
Natrona County	Black henbane
	Curlycup gumweed
	Halogeton
	Puncturevine
	Showy milkweed
	Small burnett
Platte County	Wild licorice
	Chicory
	Cheatgrass
	Puncturevine

Source: Wyoming Weed and Pest Council 2005b

INPS in the planning area include tamarisk (salt cedar), an exotic tree or shrub that is rapidly invading riparian and wetland areas and out-competes native vegetation by utilizing its much deeper root system (up to 100-feet deep) to inhabit a larger area further from streams and open water bodies than native riparian vegetation (Tamarisk Coalition 2003). Once established, salt cedar changes soil chemistry, depletes soil nutrients and water, and increases salinity, thereby reducing the potential for and recovery of native plant species. The actual rate of spread for salt cedar and its distribution in the planning area is unknown; however, observations over time indicate that the spread of salt cedar has been rapid.

Nonnative annual grasses (particularly downy and Japanese bromes) are invading grassland, sagebrush grassland, mixed grass prairie, desert-shrub and mountain-shrub communities (Mac et al. 1998). These annual grasses are spreading rapidly into grassland and shrubland communities (BLM 2003d); however, the exact rate of spread and distribution of these nonnative grasses in the planning area is unknown (BLM 2003d). While not currently listed by the State of Wyoming as noxious weeds, nonnative annual grasses may spread into areas that have not been impacted by grazing, OHV use, or surface-disturbing activities. Areas with high densities of these annual grasses may reduce the fire return interval sufficiently to eliminate shrubs and change species composition of sagebrush communities.

Although the application of pest-control measures has been limited up to this time, it is reasonable to conjecture that issues, such as West Nile Virus, bird flu, native noxious weeds, nonnative animals, tree rusts, and so on, may be important challenges in the near future.

Cooperative Management in INPS and Pest Control

The BLM controls INPS on public lands through cooperative agreements with Converse County, Goshen County, Natrona County, and Platte county weed control districts. The BLM's resource users prepare pesticide-use proposals incorporating district INPS control guidelines (BLM 2003d). The primary species targeted for control in the planning area include Russian knapweed, spotted knapweed, diffuse knapweed, leafy spurge, Dalmatian toadflax, Canada thistle, scotch thistle, musk thistle, houndstongue, field bindweed, and puncturevine. These species are typically found in sagebrush and grassland, desert shrub, and riparian and wetland community types.

Methods used to control INPS population size and reduce density across the planning area include chemical or a combination of chemical and biological treatments. With the exception of insects that target musk thistle, spotted knapweed and diffuse knapweed, bio-control agents exhibited limited success, especially when used exclusively (BLM 2003d). Some non-native organisms introduced as biological control agents are known to diminish native biological diversity and may negatively affect populations of special status species such as Federally listed threatened or endangered species, species proposed or candidates for listing under the ESA, or Wyoming BLM's Sensitive Species List. Biological control agents that diminish native biological diversity and (or) may negatively affect populations, will not be used within the planning area. Approximately 850 acres of INPS, including the Salt Creek ACEC, are being chemically treated within the planning area annually.

The Casper Field Office also addresses weed control relating to lands and realty, wildlife, range, recreation, oil and gas, and other mineral-related actions. To date, the county weed control districts generally have been able to meet the control needs of BLM-administered lands with biological control agents and herbicides; however, the future rate of invasion and spread of INPS may exceed the districts' current capacity. Users of BLM-administered land will continue to be required to meet INPS control needs. Best preventative management practices and mitigation options for INPS are presented in Appendix X.

BLM is participating fully with five Coordinated Resource Management (CRM) working groups formed to address INPS. Four of these are located in Natrona County (South Bighorns Weed CRM, Bates Hole

Weed CRM, Badwater Weed CRM, and Rattlesnake Hills Weed CRM) and one is located in Goshen County (Goshen County Weed CRM). The CRM groups are initiating educational efforts, contemplating preventative measures, applying for outside funding, and increasing organized control efforts.

Management challenges for INPS include managing BLM-authorized activities in the planning area that disturb the soil or otherwise create an opportunity for the establishment of INPS; educating resource users regarding the spread, early detection, diminishing funding, and control of INPS; and determining effectiveness of INPS control without a completed INPS inventory and a comprehensive INPS management program. These challenges require coordination across all of the BLM's resource programs to develop, integrate, and implement aggressive management techniques and the strategies for controlling the adverse impacts and the spread of INPS in the planning area.

In the overall scheme of INPS and pest control, pest control has been a minor component. However, the integrated approach, the need for coordination, and the potential impacts to ecological and human health and welfare are equally important. Though not as active or visible as the INPS program, pest control will continue to be an integral part of INPS and pest management in the future. Management actions anticipated to address the challenges presented by INPS and pest control are incorporated in the alternatives for INPS and pest control in Chapter 2.

Fish and Wildlife Resources

The BLM is responsible for managing fisheries and wildlife habitats. Management of fish and wildlife species is overseen by state and federal wildlife management agencies. Fisheries habitat includes perennial and intermittent streams, lakes, and reservoirs that support fish through at least a portion of the year. Drainages providing fisheries habitat within the planning area are described under surface water quality in the Water section of this document and include the North Platte, Cheyenne, Powder, Wind, and Niobrara watersheds (Map 5). Within these drainages and their tributaries, aquatic habitat varies by vegetation type, water quality and quantity, land use, and landscape setting. The WGFD manages resident wildlife populations and migratory game birds within four regions (Casper, Laramie, Lander, and Sheridan) encompassing the planning area (Map 23 and Map 24). The U.S. Fish and Wildlife Service (USFWS) provides regulatory oversight for all species that are listed, proposed for listing, or are candidates for listing under the Endangered Species Act (ESA) (See Special Status Species.) The USFWS also administers the Migratory Bird Treaty Act, which protects migratory bird species whether they are hunted (e.g., waterfowl) or not (e.g., songbirds).

3.4.5 Fish and Wildlife Resources – Fish

Riparian vegetation occurs along drainages and serves to moderate water temperatures, control erosion by adding structure and stability to streambanks, provide instream habitat for fish, and provide organic material and nutrients to aquatic macroinvertebrates. Vegetation within the floodplain of drainages also serves to dissipate stream energy, store water for later release, provide areas for groundwater infiltration, and provide rearing areas for juvenile fish. In addition to physical habitat features such as vegetation, water quality also influences aquatic habitats. Specifically, water temperature, turbidity, dissolved oxygen, and total dissolved solids or salinity, determine the quantity and quality of aquatic habitats. Other factors influencing aquatic habitats in the planning area include adjacent land uses and the locations of such habitats relative to natural landscape features. Riparian and wetland habitat conditions within the planning area are further described in *Vegetation – Riparian and Wetland Communities*. Information on surface water bodies, water quality and water quantity, is provided in the Water section of this document.

The BLM has developed several activity plans to focus management of site-specific fisheries and aquatic habitats in the planning area, including the Bolton Creek Action Plan, Bates Creek Aquatic Habitat

Management Plan (HMP), and the Goldeneye Wildlife and Recreation Area HMP. These activity plans are in various stages of implementation. Their management focus is identified in Table 3-20 in Fish and Wildlife Resources – Wildlife. Additionally, the WGFD has developed Basin Management Plans (see Appendix E) that identify fish species present, describe the miles of stream by class and acres of standing water, and identify habitat challenges for management basins located in the planning area.

Approximately 57 fish species occur within the planning area; a few fish-bearing streams occur on BLM administered public surface due to the fragmented land ownership pattern. Most fish-bearing streams occur on lands under state or private ownership. Where fish-bearing streams do occur on public lands they generally occur on small isolated land parcels.

Special status fish species, including federally listed fish species, are discussed in Special Status Species – Fish. Species identified by WGFD as priority for management include 22 sport fish and 10 fish species classified as Native Species Status (NSS) (see Special Status Species – Fish and Appendix E). Twenty-six other fish species, not categorized as either sport or NSS, occur in the planning area. The black bullhead is classified as both NSS and sport fish.

The arid climate of the planning area, drought, and the erosive nature of flash flooding are natural events that influence the planning area's fisheries habitat conditions. Historically, agriculture, vegetation management, fire management, development, OHV use, and recreation also have influenced fisheries habitat in the planning area. Another factor affecting fisheries habitat and condition is water quality, which is regulated by the Wyoming DEQ. Historic and current water withdrawals for irrigation and other beneficial uses seasonally restrict the amount and distribution of aquatic habitats available for fisheries; however, water use in the planning area is regulated by the Wyoming State Engineer's Office and the USBR (North Platte River dam and reservoir systems only). Although irrigation and other types of reservoirs can contribute to water depletion, they also serve to trap sediment, which can degrade aquatic habitats, thereby reducing the sediment load downstream.

In addition to water depletion from historic activities (e.g., irrigation diversions), activities that result in soil compaction or erosion; increased sedimentation of streams; removal and degradation of riparian vegetation; changes in water temperature, velocity, volume, or timing of flows; and invasion of INPS in riparian corridors have altered aquatic habitats in the planning area. For example, in some riparian areas, historic livestock grazing contributed to aquatic habitat degradation through accelerated loss of streamside vegetation, compaction of soil, increased streambank erosion, and increased silt deposition. To address these historic issues and to address the health, productivity, and sustainability of BLM-administered land in Wyoming, the BLM currently employs standards and guidelines for managing public rangelands toward the following fundamentals (BLM 1998b):

- Watersheds are functioning properly
- Water, nutrients, and energy are cycling properly
- Water quality meets state standards
- Habitat for special status species is protected.

Historic vegetation removal affecting aquatic habitats, primarily occurred through agricultural conversion, fire, land development, and associated erosion and sedimentation. In some locations within the planning area, water produced during the development of oil and gas wells is discharged at the surface, undergoes chemical changes, reacts with local soils, and changes water quality; however, where this activity occurs, produced water also increases (at least temporarily) the quantity of local surface water. The drilling and completion procedures, outfalls, and quality of produced water from wells are regulated and restricted in distribution in the planning area. Wyoming BLM's policy is to not allow produced water to be used as

irrigation of public lands (BLM 2005d). Produced water is either reinjected or discharged to the surface on BLM-administered land in the planning area. The development of private lands within the planning area also contributed to effluent discharge, stream channelization, stream diversions and dams for reservoirs and power plants, and changes in water temperature and water quality.

In addition to the historic activities described above, sport fish stocking is occurring in designated multiple-use reservoirs in the planning area that are suitable for fisheries. These multiple-use reservoirs have improved public access to recreational fisheries in the planning area; however, public access continues to be limited due to the fragmented land-ownership pattern. Land-tenure adjustments currently are being pursued opportunistically to address public access.

Management challenges identified for fish in the planning area are based, in part, on historic activities and habitat conditions and trends and include habitat challenges described in Appendix E, Table E-2. Management challenges include flow management and sediment entrainment; activities contributing to reductions in streamside vegetation; management of produced water discharges; stream road crossings; maintaining PFC for lotic and lentic riparian habitats; improving floodplain connectivity; developing water sources and acquisition of water rights to benefit fisheries; public access to fisheries; herbivory and physical trampling of riparian vegetation and soil compaction by herbivores; vegetation management, including invasive species; fragmented land ownership; and water quality. Future activity plans may be identified to address these habitat challenges.

Management actions for fish generally address water sources and rights; habitat restoration, improvement, and conservation; impacts from other BLM resource program authorized activities; floodplain connectivity; land-tenure adjustments; and recreational and Special Management Areas (SMAs).

3.4.6 Fish and Wildlife Resources – Wildlife

Wildlife species throughout this document have been grouped in accordance to Wyoming Statutory Wildlife Categories to facilitate the discussion regarding these species. The remainder of this section includes a description of the existing conditions and management challenges of habitat types and statutory wildlife groups found in the planning area. Management actions are incorporated in the alternatives and described in more detail in Chapter 2. For the purpose of this discussion, the terms *habitat* and *vegetative types* are used interchangeably.

Wildlife and Habitats in the Planning Area

The planning area straddles the transitional zone between three major ecoregions: the Great Plains and Palouse Dry Steppe, the Southern Rocky Mountains, and the Intermountain Semidesert and Desert provinces (Bailey 1995). The convergence of these zones results in a diversity of vegetative types, as listed in Table 3-15 and described in more detail in the Vegetation section. Following is a brief description of wildlife associated with the vegetative types as identified in Table 3-15.

Grasslands, sagebrush, and desert shrub vegetative types dominate the planning area, with grasslands more abundant to the east and sagebrush and other shrublands more abundant to the west. Grasslands cover 3,091,173 acres, or 36 percent of the planning area (22 percent of BLM-administered land). Although dominated by grasses and forbs, the grassland vegetative type does contain some shrub species. The open grassland, sagebrush, and shrubland vegetative types are home to many raptor species, such as the Swainson's hawk, northern harrier, and prairie falcon. Raptors are attracted to the abundant prey, including upland game birds, small game, and numerous rodent species.

The sagebrush vegetative type covers 2,408,101 acres, or 28 percent of the planning area (46 percent of BLM-administered land). More than 350 species of flora and fauna depend on the sagebrush vegetative

type for all or part of their existence (Connelly et al. 2004). Sagebrush provides crucial winter range for big game and is essential for greater sage-grouse and other sagebrush obligates, such as the Brewer's sparrow, sage sparrow, and sage thrasher (Cerovski et al. 2001). Many other species utilize the sagebrush vegetative type, including a number of reptiles and invertebrates.

Due to the importance of the sagebrush vegetative type to wildlife, the WGFD, in cooperation with the BLM, is conducting habitat inventories and evaluation studies of two sagebrush habitat areas in the planning area: Bates Hole and Rattlesnake Hills (WGFD 2004a) (see Appendix E). For the Bates Hole area, WGFD calculated a utilization (i.e., browsing by livestock and wildlife) threshold of approximately 35 percent for the current year's big sagebrush production. In other words, when 35 percent or more of the current year's growth of a big sagebrush plant is utilized, detrimental impacts on individual big sagebrush plants and the big sagebrush community as a whole may occur. For 7 of 10 years (1993 to 2002), monitored by WGFD, big sagebrush plants and communities exhibited excessive utilization and detrimental impacts. The WGFD study also determined that spring (April-June) precipitation patterns play an integral role in big sagebrush production.

The WGFD monitoring of big sagebrush plants and communities in the Rattlesnake Hills area identified a 35-percent utilization threshold for the current year's growth of big sagebrush. Moreover, contrary to the Bates Hole study, results of the Rattlesnake Hills 9-year (1994 to 2002) study revealed that only 2 of the 9 years exhibited excessive utilization of the current year's production or detrimental impacts to big sagebrush plants and communities. However, during 1 of these 2 years (2000), the WGFD documented a dramatic increase in utilization of the current year's growth of big sagebrush, primarily from wintering domestic sheep.

Compared to grasslands and sagebrush, forest and woodlands are less abundant in the planning area; however, they add structural and biological diversity to the landscape. The Casper Field Office administers approximately 165,004 acres of forests and woodlands (see Table 3-16). Vegetative types included in the forest category include ponderosa/lodgepole pine with Douglas fir and subalpine fir at higher elevations and moister sites. Woodlands include limber pine, Rocky Mountain juniper, and quaking aspen. Forest and woodlands provide summer cover for big game and are prime habitats for American marten, blue grouse, and northern goshawks. Calliope hummingbird, Williamson's sapsucker, Townsend's warbler, and brown creeper also are species of interest (Cerovski et al. 2001). Aspen is another vegetative type included in the woodlands category and represents an important component of biodiversity in the planning area. Aspen stands typically have a diverse understory component and, thus, provide abundant forage and cover for big game, particularly females with young. Aspen also supports an abundance and diversity of animal species, including birds such as the blue grouse, red-naped sapsucker, and warbling vireo. Some locations within the planning area have experienced a decline in aspen. Fire management, land development, climate, and ungulate grazing continue to affect the quantity and distribution of aspen in the planning area.

Mountain shrubs cover 204,218 acres, or only 2 percent of the planning area (approximately 3 percent of BLM-administered land). Most of this vegetative type is dominated by xeric species, such as true and curl-leaf mountain mahogany and antelope bitterbrush. Other common species are chokecherry, snowberry, currant, Wood's rose, and serviceberry. Mountain shrub communities provide important forage, hiding, or thermal cover for a variety of wildlife, including deer and elk, nongame birds, and small mammals. A second shrub vegetative type occurring within the planning area is the arid desert shrubs and saltbush-greasewood flats. Although not regarded as highly palatable to most species, pronghorn do forage on greasewood and mule deer use this vegetative type as spring habitat.

Riparian and wetland vegetative types occur on less than 1 percent of the public lands within the planning area; however, it is estimated that 70 to 85 percent of Wyoming's wildlife use riparian habitats for at least

a portion of their life-cycles. Many amphibian species, as well as muskrat, beaver, mink, and various waterbirds and waterfowl, occur in riparian or wetland areas only. Songbirds are attracted to the structural and vegetative diversity for both nesting and migrating habitat (Knopf et al. 1988). The Wyoming Partners in Flight have categorized riparian habitats as a top priority for conservation of neotropical migrant birds (birds that breed in the United States and Canada and winter in Latin America) (Cerovski et al. 2001). The various lakes, reservoirs, streams, and associated riparian vegetation provide food, cover, and travel corridors for a variety of wildlife species. The proximity of aquatic habitats to wetland and upland habitats, provide breeding, migratory, winter, or year-round habitats for numerous waterfowl. Diving ducks, such as mergansers and goldeneye, require open and deep water that supports fish and aquatic insects. Dabbling ducks, such as mallards and teal, require migration and winter habitats with a mix of open water for loafing and emergent vegetation for food and cover. Quality breeding habitats for mallards and teal exhibit nesting cover sufficiently close to water bodies to support emergent vegetation for secure cover. In addition, young ducklings require an abundant supply of aquatic insects for food.

The BLM developed HMPs for site-specific areas within the planning area containing one or more of the vegetative types described above that have the potential for improvement. For these areas, the Casper Field Office uses HMPs to focus management on habitat conservation and improvement for fish and wildlife species. Table 3-20 summarizes the name, approximate size, and management focus of existing HMPs for the planning area.

Table 3-20. Habitat Management Plans for the Casper Planning Area

Habitat Management Plan	Acres	Management Focus
33-Mile Reservoir HMP (BLM 1974a)	149	Waterfowl and shorebird habitats
Bald Eagle HMP for the Platte River Resource Area and Jackson Canyon ACEC (BLM 1992a)	3,938	Bald eagle habitats
Bates Creek Aquatic HMP (BLM 1973)	1,350	Fisheries habitats
Bates Creek Reservoir HMP (BLM 1972a)	1,823	Waterfowl habitats
Bishop Waterfowl HMP (BLM 1972b)	119	Waterfowl habitats
Bolton Creek Action Plan (BLM 1988b)	437	Riparian habitats
Ferris-Seminole HMP (BLM 1983)	Approximately 50,000	Wildlife and fisheries habitats
Goldeneye Wildlife and Recreation Area (BLM 1978)	894	Fisheries, wildlife, and recreation
Laramie Peak Big Horn Sheep HMP (BLM 1995a)	Approximately 10,000	Bighorn sheep habitats
Teal Marsh Reservoir HMP (BLM 1974b)	117	Waterfowl habitats

Acres includes lands administered by the BLM only.

ACEC Area of Critical Environmental Concern

BLM Bureau of Land Management

HMP Habitat Management Plan

Historic activities from agriculture, development, fire management, OHV use, recreation, and transportation, have, in some areas, contributed to the degradation of wildlife habitats in the planning area. In other instances, historic activities have improved habitats or the ability to manage wildlife habitats. Examples of historic activities that have contributed to the degradation of wildlife habitats include livestock concentration areas (e.g., water sources), which have trampled and removed vegetation and compacted soil; utility and pipeline corridor installation, which has disturbed soil and provided opportunities for the spread of INPS; fire suppression, which has depleted or completely removed the natural fire regime with which habitats evolved; oil and gas well and associated infrastructure development, which has disturbed soil for well pad and road development, thereby contributing to soil erosion and habitat fragmentation; improper OHV use, which has spread INPS and disturbed wildlife; recreation activities, which have disturbed wildlife; and road placements, which have contributed to

habitat fragmentation in the planning area. The historic activities mentioned above have occurred to various degrees and primarily in isolated areas within the planning area. Consequently, current wildlife habitats in the planning area exhibit a range of existing conditions from habitats in PFC to habitats in something less than PFC and from large, contiguous blocks of habitats to small, fragmented patches of habitats. Examples of historic activities that have improved wildlife habitats or improved the management of habitats in the planning area include prescribed fire to maintain or restore desirable vegetative types and restore a natural fire regime; livestock water developments as sediment traps and as water sources for native ungulates and other wildlife; use of OHVs to manage and monitor wildlife habitat in remote locations within the planning area; and granting of public access for hunting as a tool for big game management.

BLM and WGFD guidance documents are available regarding Best Management Practice (BMPs) and management of wildlife habitats (WGFD 2004b; BLM 2005g). Although not as specific in management focus as the HMPs and action plans identified above, the existing plan does guide the BLM's overall management of wildlife habitats within the planning area. Due to the relationship between wildlife habitats managed by BLM and wildlife species managed by the WGFD, a statewide agreement was established to facilitate cooperation between these agencies relative to wildlife (WGFD and BLM 1990). In accordance with the cooperative relationship between these agencies, the following description of priority wildlife species in the planning area is organized by Wyoming statutory categories: big game, trophy game, furbearers, predatory animals, small game, game birds, migratory game birds, and nongame (raptors, neotropical migrants, mammals, and reptiles and amphibians).

Big Game

The planning area contains 1,124,830 acres of designated crucial winter range for big game, 25 percent (281,158 acres) of which occurs on lands managed by the BLM (Map 23 and Map 24). As shown in these maps, crucial winter ranges for some big game species overlap. Winter is a crucial and stressful time for wild ungulates; therefore, crucial winter range for the most abundant big game species (pronghorn, mule deer, and elk) is often the focus of management and a criteria for analyzing the impacts of resource management on big game. The WGFD herd units for big game are shown in Figures 3-6, 3-7, and 3-8. Pronghorn, deer, and elk are migratory, generally moving to a winter range during November and remaining there until April or May. Current management prohibits surface development from November 15 through April 30 in all big game crucial winter ranges in the planning area. Although specific characteristics of winter ranges may vary, essential factors are the quantity and quality of available forage (Short 1981). Winter ranges typically occur on relatively low-elevation shrubsteppe habitats (Carpenter and Wallmo 1981), which support nutritious browse plants that are accessible above snow cover. Pronghorn, mule deer, and elk avoid deep snow, which can cover preferred winter forage and inhibit escape from predators (Wilson and Ruff 1999). Important winter browse in the region includes big sagebrush, mountain mahogany, rabbitbrush, bitterbrush, and serviceberry (Kufeld et al. 1973).

Basic requirements of summer ranges are thermal and visual cover and adequate forage, particularly for females with young. Summer ranges for mule deer occur in shrublands and in aspen and juniper woodlands. Woody riparian areas are important year-round for mule deer. Elk tend to move to higher-elevation aspen and conifer woodlands during summer. Adjacent upland meadows, sagebrush and mixed grass, and mountain shrub habitats are used for foraging. Woody riparian corridors often are important for hiding cover and forage during migration periods.

The planning area encompasses all or part of 41 big game populations or herd units (12 pronghorn, 15 mule deer, 3 white-tailed deer, 10 elk, and 1 bighorn sheep). Established population size "objectives" guide management strategies for each big game herd unit. These objectives are established by the WGFD through a public and interagency review and input process and are set at a biologically sustainable and

socially acceptable level. Appendix E contains a table that summarizes the current population objective, current population estimate, population trend, percent of BLM-administered land, and the management challenges for each herd unit (WGFD 2005a). Much of the affected environment description for big game and trophy game was provided by WGFD (2005b).

Management challenges for big game species include poor habitat conditions, fire management, drought, increased development and urbanization, habitat fragmentation, OHV misuse, disease, and the impacts of livestock grazing on the frequency, quality, and composition of key forage species (Appendix E). The BLM and the WGFD continually coordinate and evaluate actions affecting herd units and habitat conditions to determine appropriate management direction. Currently, Chronic Wasting Disease (CWD) is present in deer and elk populations throughout the planning area. Another emerging management issue for big game is the placement and use of livestock forage supplements that may contain chemicals toxic to wildlife. The impacts of these issues at the population level are not well understood.

Figure 3-6. WGFD Pronghorn Herd Units within the Casper Planning Area

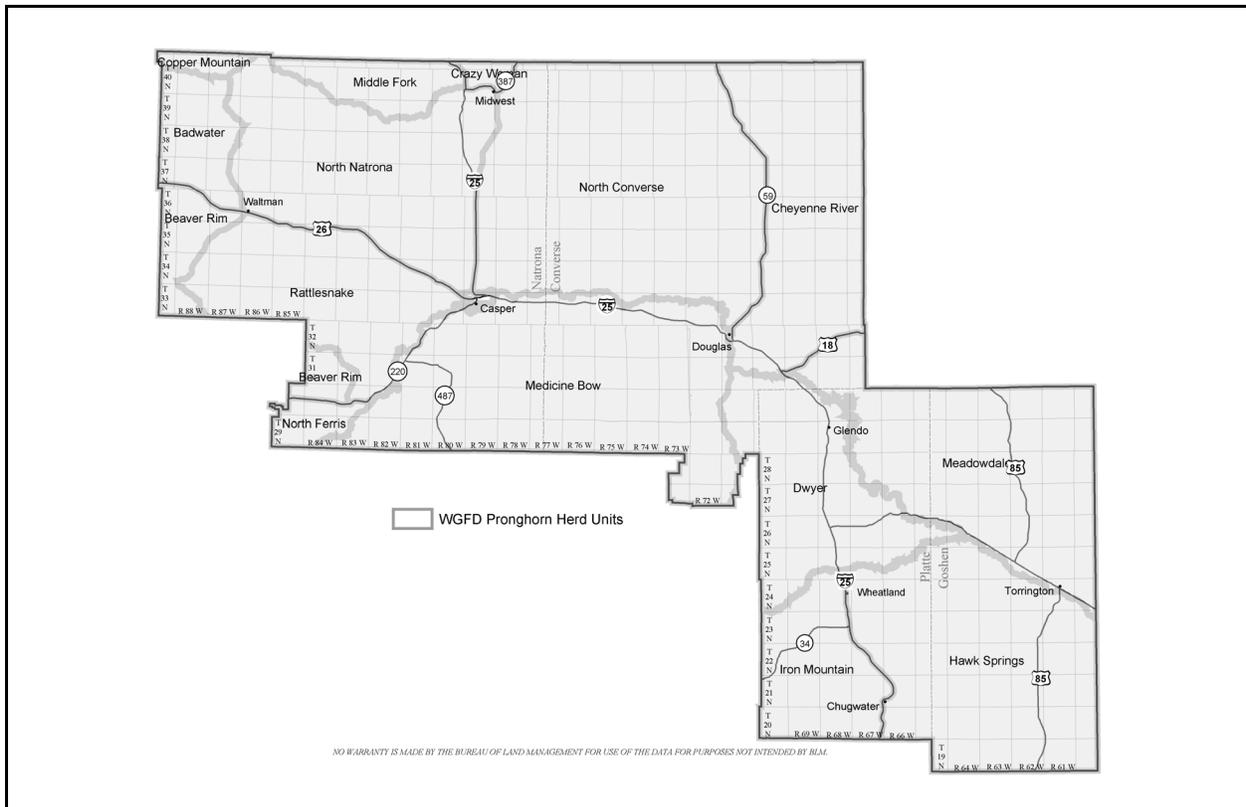


Figure 3-7. WGFD Mule Deer Herd Units within the Casper Planning Area

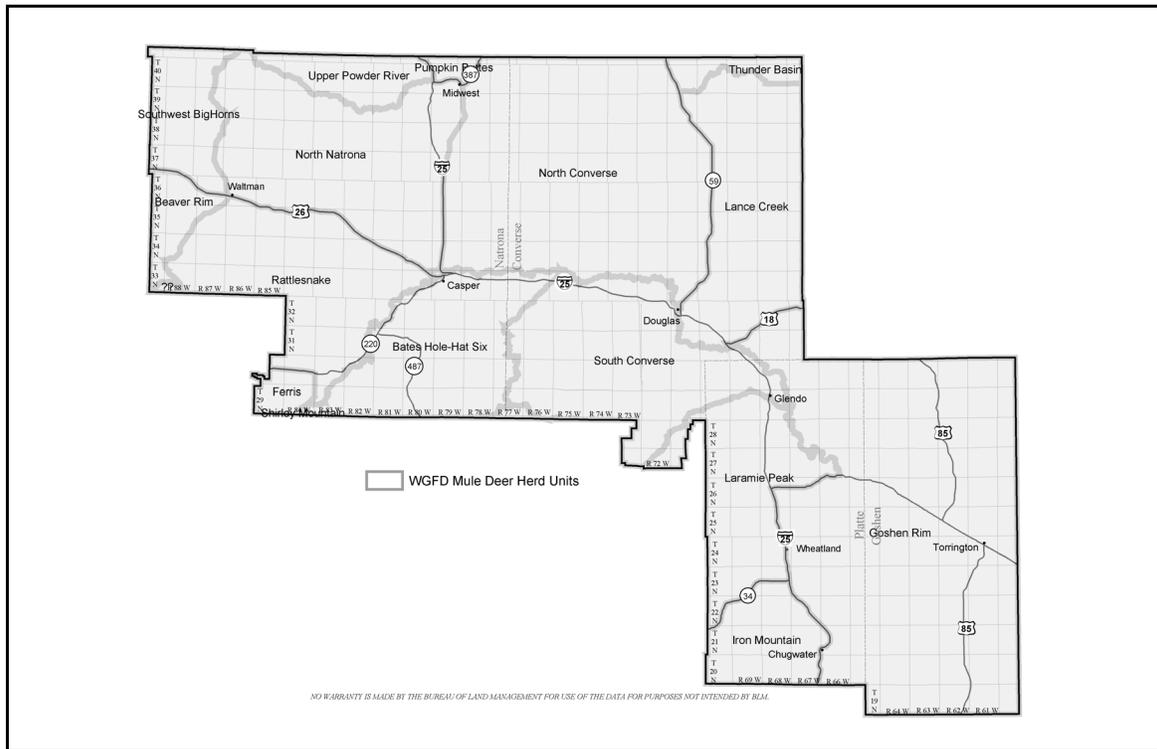
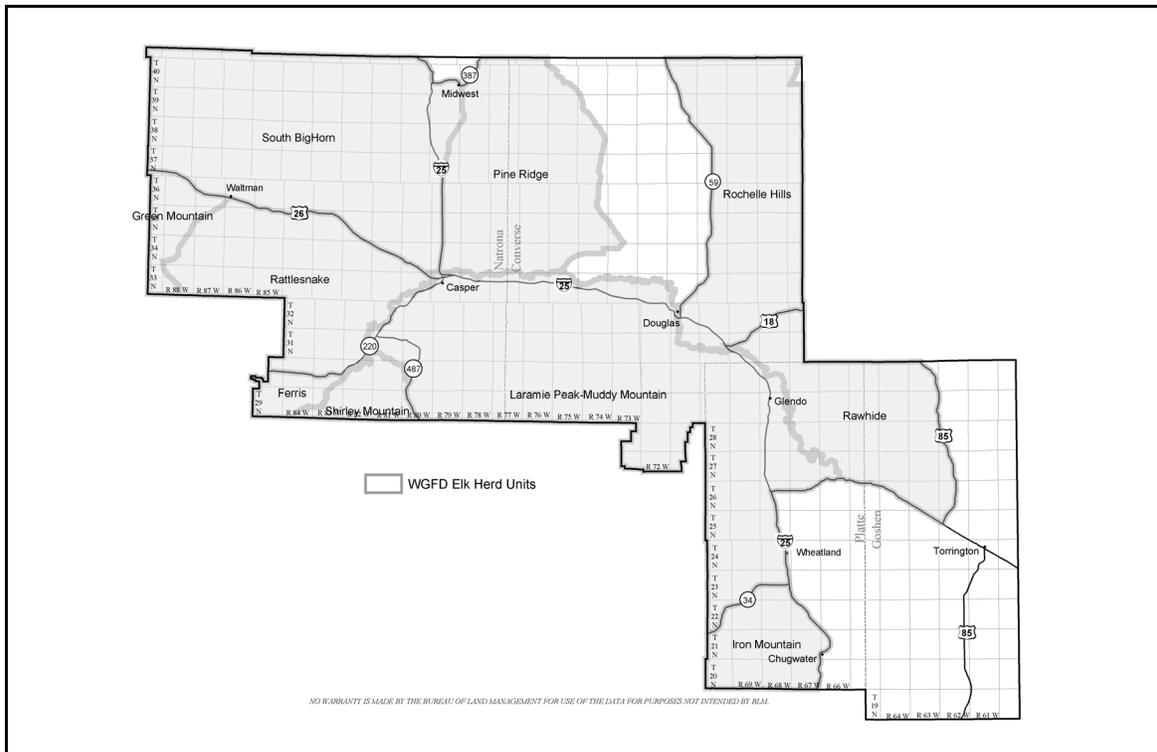


Figure 3-8. WGFD Elk Herd Units within the Casper Planning Area



Pronghorn and Mule Deer

Population sustainability of pronghorn and mule deer at their objective level depends, in part, on habitat quality, quantity, and availability on public lands. Currently, 9 of 12 (75 percent) pronghorn and 13 of 15 (87 percent) mule deer populations within the planning area are below objective (see Big Game Herd Unit Summaries, Appendix E). Overall, winter habitat conditions for pronghorn and mule deer are in poor condition due to a variety of reasons (see Sagebrush monitoring, Appendix E) resulting in poorer fawn production, survival, and recruitment, and, thus, lower population levels. Over the past 10 years, it has become apparent, in many herd units, that habitat conditions cannot sustain pronghorn or mule deer numbers at the current levels. The BLM and the WGFD have cooperatively developed and implemented a number of habitat enhancement projects to reduce this trend. In addition, the WGFD is reviewing population objectives and management options to address habitat and population concerns.

Of the 496,929 acres of pronghorn crucial winter range in the planning area, 114,920 acres (approximately 23 percent) occur on BLM-administered land surface. Similarly, of the 635,155 acres of mule deer crucial winter range in the planning areas, 170,716 acres (approximately 27 percent) occur on BLM-administered land surface. Many of the pronghorn and mule deer populations in the planning area experienced large-scale die-offs during the winter of 1983-1984. Populations recovered, but during the winter of 1992-1993, pronghorn and mule deer experienced another year of winter mortalities. In 2000, the onset of a severe drought and its impact on the rangelands has hampered the populations' abilities to recover. As a result, populations remain below levels observed in the early 1990s.

Elk

Unlike pronghorn and mule deer, elk populations have thrived. Of the 10 elk herd units within the planning area, 7 are above objective and 1 is at objective. Of the 130,209 acres of elk crucial winter ranges in the planning area, approximately 33,630 acres (26 percent) occur on land surface administered by the BLM. In general, elk populations have increased throughout the planning area over the last 15 years. CWD has been documented in some of the elk herd units within the planning area. The impacts of this disease at the population level are not thought to be a significant factor for elk; however, these impacts are not completely understood.

White-Tailed Deer

White-tailed deer populations in the planning area are healthy and occupy cottonwood galleries and riparian habitats mostly on private lands near riverine corridors. Of the three white-tailed deer herd units within the planning area, one herd has a population objective. In the remaining two herd units, population dynamics is not managed actively due to preponderance of private lands. In general, white-tailed deer have increased throughout central and eastern Wyoming over the last 15 years. White-tailed deer populations continually fluctuate due to Epizootic Hemorrhagic Disease outbreaks.

Bighorn Sheep

As a result of introductions from Whiskey Mountain in the early 1970s and late 1980s, Rocky Mountain bighorn sheep (*Ovis canadensis canadensis*) are found in the Laramie Range. This population did quite well for several years after the introductions, but has experienced an overall decline during the past 15 years. This is not surprising and has been observed in other similar introduction efforts. Also, there has been a dramatic shift in distribution of sheep from "traditional" habitats to areas further south that were more or less unoccupied. It is likely the bighorn sheep that originally occupied suitable habitats in the planning area were the now extinct subspecies *Ovis canadensis auduboni*. This subspecies was well adapted to the smaller, xeric mountain ranges in central and southeastern Wyoming. The WGFD indicates that future introductions of bighorn sheep in this area should focus on the California bighorn sheep (*Ovis canadensis californiana*). This subspecies is nonmigratory, utilizes a greater proportion of

browse in its diet, and occupies environments similar to suitable habitats (i.e., Box Elder Canyon, Glendo Canyon, and Fremont Canyon) in the planning area. The Laramie Peak Bighorn Sheep Herd is the only bighorn sheep herd unit within the planning area. This herd is believed to be below objective, although no accurate population estimate exists. Of the 13,598 acres of bighorn sheep crucial winter range in the planning area, 789 acres occur on BLM-administered land. In 1995, the BLM entered into a Memorandum of Understanding (MOU) for the preparation of the Laramie Peak Bighorn Sheep HMP to conduct a series of vegetative treatments and management actions aimed at increasing sheep population. The BLM will continue to support future bighorn sheep introduction efforts by the WGFD.

Trophy Game

Trophy game, found on BLM-administered land in the planning area, include black bear and mountain lion. Black bears occur within the planning area and primarily inhabit forested habitat types (i.e., Laramie Range, Muddy Mountain, and the South Bighorns) at higher elevations. These areas are encompassed in the WGFD's Laramie Peak bear management unit (BMU) and the Bighorn BMU. Due to a bear's secretive nature, population estimates are difficult to obtain and population objectives are not established. The BLM and WGFD utilize management guidelines established by the WGFD's Black Bear Management Plan (WGFD 1994) to help direct management activities on BLM-administered land.

Mountain lions reside throughout the planning area; however, they are more common in areas associated with the canyons and foothills of mountain ranges (i.e., Laramie Range, Rattlesnake Hills, the South Bighorns, and the Pine Ridge) where mule deer concentrate. Lions within the planning area are encompassed in the WGFD's southeast lion management unit (LMU), the Bighorn LMU, the north-central LMU, and the southwest LMU. Similar to black bears, population estimates for mountain lions are difficult to obtain. Mountain lion harvest levels are monitored; management direction for this species may be adjusted based on the age and gender structure of harvested animals.

Management challenges for trophy game are similar to those discussed for big game. In addition, bear baiting around developed recreation areas poses an ongoing management challenge.

Furbearing Animals

Furbearing animals in the planning area include badger, beaver, bobcat, marten, mink, muskrat, and weasel. Badger, bobcat, and weasel are habitat generalists, occupying all vegetative types in the planning area with appropriate prey base. Marten primarily utilize mixed-conifer forest and aspen communities within the ponderosa and lodgepole pine forests and the aspen, juniper, and limber pine woodlands vegetative types. Beaver, muskrat, and mink typically are found in the aspen and riparian and wetland vegetative types.

Management challenges for beaver on BLM-administered lands are of two types: (1) restoring or maintaining beaver in riparian and aquatic communities, and (2) controlling beaver damage to other resources. Beaver can be beneficial in restoring degraded riparian and aquatic systems by raising the water level and helping to maintain high water tables, thereby encouraging recovery of hydrologic functions and reestablishment of riparian vegetation. Conversely, beaver can remove trees in well-established riparian systems and cause damage to facilities (e.g., damming road culverts, irrigation ditches, etc.).

Due to the wide distribution of other furbearing animals throughout Wyoming, no management challenges have been identified in the planning area. The primary management effort by the BLM is directed at maintaining the continuity of ecosystems in the planning area.

Predatory Animals

According to Wyoming statute, predatory animals include coyote, jackrabbit, porcupine, stray cat, gray wolf, red fox, raccoon, and skunk (striped and spotted). All but the gray wolf can be found in the planning area. From the standpoint of BLM management, most of the efforts and attention are focused on coyote, red fox, and skunk animal damage-control activities. BLM does not conduct any habitat management activities for predatory animals.

Predatory animal damage-control activities on public lands are conducted by the U.S. Department of Agriculture APHIS-Wildlife Services in accordance with the national MOU and local action plans (BLM 1994a; BLM 1997a; BLM 1995b; BLM 2000c). These activities are conducted in response to requests from individuals, organizations, and agencies experiencing damage caused by wildlife. Animal damage-control activities primarily include mechanical (trapping, shooting, and denning), chemical (poison), and nonlethal methods (noise devices, aversive conditioning, etc.). Through the Animal Damage Management Board, the State of Wyoming also conducts animal damage-control activities, particularly those actions involving rabies and other diseases.

The management challenges of animal damage-control activities are to conduct a program that responds to predation problems and remains socially acceptable and safe in accordance with applicable laws and regulations.

Small Game

Small game in the planning area include the cottontail rabbit, snowshoe hare, red squirrel, fox squirrel, and gray squirrel. Cottontail rabbits are habitat generalists, occupying all vegetative types in the planning area. Snowshoe hare and red squirrel primarily utilize mixed-conifer forest and aspen communities within the ponderosa and lodgepole pine forests and the aspen, juniper, and limber pine woodlands vegetative types. Fox and gray squirrel typically occur in deciduous gallery forests. Populations of all small game species tend to be cyclic in nature.

Due to the wide distribution of small game species throughout Wyoming, no management challenges have been identified in the planning area. The primary management effort by the BLM is directed at maintaining the continuity of ecosystems in the planning area.

Game Birds

Game bird management direction for the BLM is identified in the BLM and Fish and Wildlife 2000 Upland Game Bird Habitat Management Plan (BLM 1992e). All game bird species in Wyoming are managed for recreational use (e.g., hunting, bird watching, etc.).

Game birds include the greater sage-grouse, ring-necked pheasant, blue grouse, wild turkey, sharp-tailed grouse, Hungarian partridge, and chukar partridge. Greater sage-grouse are discussed in the Special Status Species – Wildlife section. The ring-necked pheasant is a game farm bird in Wyoming and generally occupy river-bottom agricultural lands and adjacent habitats on which BLM has minimal management authority. The majority of the ring-necked pheasant population in the planning area occurs in Goshen County. Blue grouse typically utilize mountain and foothill forested habitats and are primarily found in the Laramie Range and Southern Bighorn Mountains of the planning area. Wild turkey generally are associated with river-bottom habitats and in the pine savannahs and foothills throughout the planning area. Sharp-tailed grouse, Hungarian partridge, and chukar partridge occupy grassland habitats within the planning area. Sharp-tailed grouse tend to be associated with sites dominated by native grasslands and woody draws, while Hungarian partridge are often associated with agricultural strip farming and mountain shrub communities. Habitats for the Chukar partridge typically are broken topography and steep terrain. Current management restricts or prohibits surface occupancy within ¼ mile

of a sharp-tailed grouse strutting/dancing ground and does not allow surface use within 1-¼ mile of the ¼-mile protection zone between March 1 and June 15. The BLM's authorized officer may grant exceptions to both restrictions.

Management challenges focus on maintaining or enhancing the presence of game birds and the habitats upon which they depend. Management actions for game birds generally are directed at activities around delineated breeding and nesting habitats (e.g., sharp-tailed grouse leks). Some opportunities for wild turkey introductions in cooperation with the WGFD may exist in the planning area.

Migratory Game Birds

Migratory game birds in the planning area include waterfowl, mourning dove, and sandhill crane. Sandhill cranes typically occupy similar habitats as waterfowl. In Wyoming, mourning doves are typically associated with river-bottom lands and agricultural areas that provide necessary food, water, roosting, and breeding areas. BLM-administered public lands typically provide limited habitats for migratory game birds. These habitats generally are associated with water bodies and riparian and wetland areas that provide suitable nesting or roosting sites. Several HMPs have been developed on public lands in the past to increase the quantity and quality of these habitats; however, the majority of these habitats occur on state and private lands.

In general, small wetlands represent the most available habitats to waterfowl during spring and early summer. More permanent wetland habitats (e.g., large marshes, lakes, and reservoirs) and agricultural fields are used by migrating game birds during fall migration. Open river channels, warm water canals, tailraces below reservoirs, and agricultural habitats are used during the winter.

Water availability and water quality are two habitat parameters that influence waterfowl use of a site. The current drought in Wyoming has reduced wetland habitat quantity and quality within the planning area. Moreover, poor vegetation growth associated with the drought has reduced residual cover for upland nesting ducks. Like other states, Wyoming struggles with the degradation of wetland and adjacent upland habitats due to increased urbanization, agricultural conversion, and improper livestock grazing practices.

During most years between 1952 and 1999, the WGFD flew a May duck breeding ground survey. Based on these counts, Wyoming was ranked sixth in duck production among the states. However, the May duck counts did not correlate with the low number of duck broods in the state during July. Recent research by the cooperative unit at the University of Wyoming indicates that ducks that do nest in Wyoming are productive; disproving a hypothesis, that Wyoming was a duck sink. An alternative hypothesis for the high number of ducks during April and May is that Wyoming provides good spring migration habitats for ducks during good water years. Of the 58 May survey sampling units flown in Wyoming, 6 were within the planning area.

The planning area includes parts of two joint venture areas (Intermountain West and Northern Great Plains). Ducks Unlimited has developed a national conservation plan (Ducks Unlimited 2004) that addresses waterfowl management needs, including those in Wyoming. In addition, several HMPs have been developed for the planning area to address site-specific areas of waterfowl habitats (see Table 3-20). The BLM will continue to look for opportunities to develop and enhance migratory bird habitats within the planning area.

Historic activities in watersheds that have contributed to loss or degradation of habitat in the planning area include recreation, agriculture, forest management, fire management, urbanization, and land development. Management of wetlands and riparian areas in this arid climate continues to be a challenge. Other challenges include access to public lands during breeding season, contaminants, INPS, and water quantity and quality.

Nongame

Existing conditions for four categories of nongame wildlife (raptors, neotropical migrants, mammals, and reptiles and amphibians) are briefly described below. Raptors and neotropical migrants are afforded protection under the Migratory Bird Treaty Act. Additional detail about nongame wildlife occurring with the planning area can be found in the WGFD’s *Atlas of Birds, Mammals, Amphibians and Reptiles in Wyoming* (WGFD 2004c). Additionally, the Wyoming Partners in Flight’s Wyoming Bird Conservation Plan identifies priority bird species and habitats, as well as population and habitat objectives for birds (Nicholoff 2003).

Raptors

Raptors include eagles, hawks, owls, falcons, and vultures. Ten species of diurnal raptors and five species of owls are known or suspected to occur within the planning area. Nine of the 10 raptor species breed in Wyoming; the remaining species—the rough-legged hawk—is a winter resident. Four of the owl species are year-round residents in the state, while the snowy owl is only a winter resident. Raptors can be found collectively in all vegetative types in the planning area. Table 3-21 summarizes the potential number of raptors and nongame bird species in the planning area.

Table 3-21. Summary of Potential Number of Raptor and Nongame Bird Species in the Casper Planning Area

Season/Time of Year	Number of Diurnal Raptor Species	Number of Owl Species	Number of Nongame Bird Species	Total Nongame Avian Species
Breeding/Year-round	9	4	127	140
Winter/Migration	1	1	41	43
Total	10	5	168	183

Source: WGFD 2005c

Management direction for the BLM is identified in the BLM and Fish and Wildlife 2000 Raptor Habitat Management Plan (BLM 1992b). Management procedures and activities for raptors have been identified by the USFWS management guidelines (USFWS 2002a) and Avian Protection Plan guidelines (APLIC and USFWS 2005). The Wyoming Partners in Flight Wyoming Bird Conservation Plan Version 2.0 identifies habitat requirements and threats for raptor species (Nicholoff 2003). Currently, approximately 2,000 raptor nests have been documented in the planning area. Not all of these nests are occupied, however, the BLM and the WGFD regularly survey and monitor raptor nest activity.

Management challenges for raptors generally are directed at activities around nesting habitat, concentration sites (e.g., winter roosts), and foraging areas. Management of powerlines and contaminants for raptor conservation are ongoing issues in the planning area. Emerging issues for raptors in the planning area are wind-energy development and the impacts of the West Nile Virus on raptor populations.

Neotropical Migrants

For the purposes of this RMP, neotropical migrants include birds that breed in the United States and Canada and winter in Latin America (Nicholoff 2003). The terms “neotropical migrants” and “nongame birds” are used interchangeably for this discussion. Neotropical migrant management direction for the BLM is identified in the BLM Fish and Wildlife Nongame Migratory Bird Conservation Plan (BLM 1992c) Wyoming Partners in Flight Wyoming Bird Conservation Plan Version 2.0 provides habitat requirements for neotropical migrant species and identifies their threats (Nicholoff 2003).

Approximately 168 nongame bird species are known or suspected to occur within the planning area. This includes waterbirds, shorebirds, marshbirds, and a range of songbirds, both residents and neotropical

migrants. More than 120 of these species breed in Wyoming and more than 40 rely on habitats within the state during migration. A few species, such as the snow bunting and American tree sparrow, migrate to Wyoming in the autumn and remain during the winter. Preferred habitats for these species range from sagebrush and grasslands to marshes and wetlands to coniferous and deciduous forests. These species collectively utilize all of the vegetative types in the planning area.

Management challenges focus around maintaining or enhancing the presence of these species and the habitats upon which they depend. Management actions for neotropical migrants generally are directed at activities around nesting habitat and migration corridors. Ongoing conservation issues for neotropical migrants include managing hazards such as powerlines, communication towers, contaminants, and wind turbines.

Mammals

Twenty-nine species of nongame mammals are known or suspected to occur within the planning area (WGFD 2005d) (see Table E-4 in Appendix E). For a complete habitat description and distribution of nongame mammals, refer the *Atlas of Birds, Mammals, Amphibians, and Reptiles in Wyoming* (WGFD 2004c). Most nongame mammals are widely distributed in the state, and although the population trends are unknown, they are believed to be stable. Population trend data and specific habitat requirement information are lacking for many of these species.

Four bat species (eastern red bat, hoary bat, silver-haired bat, and the eastern pipistrelle) potentially occurring within the planning area are considered a management priority. Although these species utilize a wide variety of habitats, caves and abandoned mines represent important habitat components upon which these species depend for roosts, nurseries, and hibernacula. No specific habitat components have been delineated on public lands in the planning area.

Management challenges currently focus on increasing the understanding of habitat requirements for these species and maintaining the presence of these species in occupied habitats. Ongoing conservation efforts for nongame mammals include INPS and managing hazards, such as contaminants and developments.

Reptiles/Amphibians

WGFD (2004c) documents the locations of past observations of reptiles and amphibians in the planning area. In general, reptiles occurring in the planning area occupy a variety of habitats including aquatic (turtles); rock outcrops (lizards); and a variety of terrestrial vegetative types (snakes and lizards).

Amphibians occurring in the planning area occupy aquatic habitats, including springs, wetlands, riparian corridors, or open water for the first phase of their life-cycle. Amphibians potentially occurring in the planning area include tiger salamanders, toads, and frogs.

Population data for reptiles and amphibians in the planning area are unknown. Management challenges for reptiles and amphibians primarily include maintaining a variety of habitat types and components (e.g., rock outcrops) in proximity to provide for the requirements of these species.

Special Status Species

Lists of special status species are maintained under federal and state authority, including a March 1990 MOU between the WGFD and Wyoming BLM (WGFD and BLM 1990). The purpose of the MOU is to strengthen the cooperative approach to the management of wildlife and wildlife habitat on public land between the two agencies and to encourage them to work together to develop, enhance, maintain, and manage wildlife resources, including planning and sharing data concerning biological resources.

The BLM Wyoming Sensitive Species Policy and species list is provided in an annually updated memorandum (BLM 2002d; USFWS 2004c). The goals of BLM Wyoming policy regarding special status species follow:

- Maintain vulnerable species and habitat components in functional BLM ecosystems.
- Ensure special status species are considered in land-management decisions.
- Prevent a need for species listing under the ESA.
- Prioritize needed conservation work with an emphasis on habitat.

The USFWS provides regulatory oversight for all species that are listed, proposed for listing, or are candidates for listing under the ESA. The USFWS also administers designation of critical habitat for listed species and the Migratory Bird Treaty Act, which protects migratory bird species whether they are hunted (e.g., waterfowl) or not (e.g., songbirds).

Special status wildlife species are governed under BLM Manual 6840 (BLM 2001d). The goals and objectives of this policy are to (1) conserve listed species and the ecosystems on which they depend and (2) ensure that actions requiring authorization or approval by the BLM are consistent with the conservation needs of special status species and do not contribute to the need to list special status species either under the provisions of the ESA or BLM Manual 6840. In addition, management actions for federally listed species are often derived through the consultation process (i.e., Section 7 of the ESA). Currently, the Casper Field Office determines presence of special status plant species on a case-by-case basis. Restrictions in areas with known populations of special status plants are also determined on a case-by-case basis. The Wyoming Natural Diversity Database (WYNDD) maintains a list of Wyoming plant species of special concern and provides information on global and state abundance, legal status, and state distribution. Species in Wyoming are considered to be of special concern if (1) the species is vulnerable to extinction at the global or state level due to inherent rarity, (2) the species has experienced a significant loss of habitat, or (3) the species is sensitive to human-caused mortality or habitat disturbances.

The Casper Field Office is responsible for managing habitat, while management of special status wildlife and fish species is overseen by state and federal wildlife management agencies. The WGFD manages resident special status wildlife populations and migratory game birds within four regions (Casper, Laramie, Lander, and Sheridan) encompassing the planning area. These four regions are displayed on Maps 23 and 24.

3.4.7 Special Status Species – Plants

The Casper Field Office also is responsible for managing habitat for special status plant species. Special status species considered in this analysis are those listed as threatened or endangered, those proposed for listing or are candidates for listing under the provisions of the ESA, or those designated by the BLM State Director as sensitive.

Nine special status plant species are known to or may occur within the planning area. One species is endangered, two are threatened, and the other six are designated as BLM sensitive species. Blowout penstemon is endangered, and Colorado butterfly plant and the Ute ladies'-tresses are threatened. A tenth species, the western prairie fringed orchid, a threatened species, could be affected by management actions in the planning area; however, it is only known to occur in riparian areas in watersheds downstream of the planning area and beyond the Wyoming border. Critical habitat for the Colorado butterfly plant was designated in 2005 on 107 acres of private land (Unit 1: Tepee Ring Creek) in Platte County within the planning area (USFWS 2005a).

Special status plants are found within a variety of habitats in the planning area. The landscape in the area exhibits diverse climates, topography, soils, and rock cliffs and outcrops. Within this complex, habitats for special status plant species range from valley-bottom riparian areas along the North Platte River to montane outcrops and forests. Table 3-22 presents habitat associations for special status plants that are known to or may be found on land managed by the Casper Field Office. Due in large part to their rarity, precise information regarding the location and number of populations of special status plant species in the planning area, the percent of populations occurring on public lands, the number of individual plants in each population, and the condition of each population (habitat quality) on public land in the planning area, is not available. The Casper Field Office continues to collect or have data collected to address these limitations as funding allows. A brief description (see below) of trends, occurrence, and threats to these special status plant species precedes the table. Unless otherwise stated, sources of information on the status, distribution, and threats for special status plant species in this section are Keinath et al 2003 and NatureServe 2006.

Laramie columbine (BLM Sensitive)

Laramie columbine is ranked as an imperiled species at the state and global levels based on rarity and vulnerability to extinction. Although no intensive surveys have been conducted for this species, eight occurrences of this perennial herb are documented. The Laramie columbine is restricted to the Laramie Range in southeastern Wyoming and more than 50 percent of this local endemic plant species' continental range is encompassed in Wyoming. Habitat for this species includes shady crevices and ledges in granite boulders or cliffs. A moderate number (21 to 75) of occurrences are documented for the Laramie columbine, including Converse County. The species is rare (less than 5,000 individuals or less than 400 occupied acres) in abundance. Although trend data are not available, populations are thought to be stable. Due to the remoteness and rugged nature of the Laramie Range, populations of this species are not presently considered threatened; however, populations near trails and campgrounds could be adversely impacted by collecting, grazing, and trampling by hikers and OHV use.

Porter's sagebrush (BLM Sensitive)

Porter's sagebrush is ranked as an imperiled species at the state and global levels based on rarity and vulnerability to extinction. Porter's sagebrush is endemic to the Wind River Basin with known occurrences only in Fremont, Johnson, and Natrona Counties. Habitat for this perennial subshrub is sparsely vegetated badlands from 5,300 to 6,500 feet above MSL. A low number (6 to 20) of occurrences are documented for Porter's sagebrush. This species is uncommon (5,000 to 50,000 individuals or 500 to 5,000 occupied acres) in abundance. Although trend data are not available, trends since 1950 are thought to be stable. Threats to this species include oil and gas exploration and development as all known occurrences are within a known geologic structure identified as high priority for gas exploration and development.

Nelson's milkvetch (BLM Sensitive)

Nelson's milkvetch is ranked as a rare species at the state and global levels based on approximately 18 known occurrences from five counties in Colorado, Utah, and Wyoming (Natrona County). Habitat for this long-lived perennial includes sedimentary formations that concentrate selenium. Threats identified for Nelson's milkvetch include trampling by OHV use and habitat disturbance associated with oil and gas development.

Many-stemmed spider-flower (BLM Sensitive)

Many-stemmed spider-flower is ranked as an imperiled species at the global level based on apparent decline, rarity, occurrence in few protected areas, habitat specificity, annual life cycle, and vulnerability to extinction. This rare wetland annual species occurs as a disjunct population in Wyoming and is documented for Natrona County. Habitat for the many-stemmed spider-flower is limited to alkaline playa

wetlands. A very low number (1 to 5) of occurrences are documented for this species and it is uncommon (5,000 to 50,000 individuals or 500 to 5,000 occupied acres) in abundance. The many-stemmed spider-flower is thought to be in decline. Threats to this species include water development projects; however, the annual life cycle and specific habitat requirements may increase the potential for chance extinction from extended drought or other stochastic events.

William's wafer-parsnip (BLM Sensitive)

William's wafer-parsnip is ranked as a rare species at the global and state levels based on the number of sites, abundance, and known threats. This perennial umbel is endemic to limestone habitats in the Bighorn Mountains. A moderate number (21 to 75) occurrences are documented for William's wafer-parsnip. This species is uncommon (5,000 to 50,000 individuals or 500 to 5,000 occupied acres) in abundance and distribution is limited to four counties in Wyoming, including Natrona. Populations are thought to be stable in part because habitat is often inaccessible and cattle and sheep apparently do not graze this species. However, limestone quarrying and other ground disturbance may pose a threat to this species.

Colorado butterfly plant (Federal Threatened)

Colorado butterfly plant is ranked rare at the global level, imperiled at the state level, and threatened at the federal level based on the small number of sites globally, limited number of protected sites, and inherent population fluctuations. Colorado butterfly plant was listed as threatened in accordance with the ESA on October 18, 2000. Critical habitat for this species is designated in Platte County (USFWS 2005a). Habitat for the Colorado butterfly plant includes subirrigated, alluvial soils in floodplains and drainage bottoms at elevations of 5000-6400 feet. Colorado butterfly plant is an early successional species adapted to periodically disturbed stream channels. In the absence of periodic disturbance from flooding (historically, fire and grazing disturbance may also have been important), establishment of dense vegetation may prevent new seedlings from establishing. A low number (6 to 20) of occurrences are documented for this species and it is uncommon (5,000 to 50,000 individuals or 500 to 5,000 occupied acres) in abundance. Trend data for six populations showed increases for the period 1984 to 1986 whereas seven other populations showed decreases for the same period. Colorado butterfly plant within the protected F.E. Warren Air Force Base near Cheyenne, Wyoming shows a 16-year increasing trend; however, one subpopulation on the Air Force Base, located in a densely vegetated stream section, has declined (Fertig 1998, Heidel 2005). Identified threats to Colorado butterfly plant include herbicide spraying, livestock grazing, haying and mowing, water development, conversion of rangeland to cultivation, competition from exotic plants, and loss of habitat to urban expansion. (Marriott 1987; Fertig 1994). Changes in habitat suitability due to natural succession and the lack of periodic habitat disturbance may threaten this species, even in protected areas (Fertig 2000c; USFWS 2000a).

Blowout penstemon (Federal Endangered)

Blowout penstemon is ranked as critically imperiled at the global and state levels and endangered at the federal level based on its restricted distribution to open, early-successional habitat and regional endemic range in the Nebraska Sandhills Prairie and the Great Divide Basin in Wyoming. Approximately 10 small populations are known within the entire distribution of this species. Critical habitat for blowout penstemon is not designated within the planning area and the species is not known to occur in the planning area. Blowout penstemon is a perennial herb adapted to blowout dunes habitat that are caused and maintained by wind erosion. A very low number (1 to 5) of occurrences are documented for this species and it is rare (less than 5,000 individuals or less than 400 occupied acres) in abundance. Remaining populations of blowout penstemon are thought not to be stable; however, annual census data for this species in Wyoming is only available since 2000. Fire suppression and dune stabilization are thought to have reduced suitable habitat for this species and isolated remaining populations. Threats to blowout penstemon include habitat loss, stabilization of sand-dune habitat, natural plant succession, and

collection by humans (Fertig 2001a; USFWS 1987). Two management requirements are identified for blowout penstemon: 1) Reducing competition from other vegetation where the species is established; and 2) Creating favorable conditions for colonization of new sites. Fire and livestock grazing may benefit blowout penstemon or create favorable habitat conditions by controlling competing vegetation.

Western prairie fringed orchid (Federal Threatened)

Western prairie fringed orchid is ranked imperiled at the global level and threatened at the federal level based on limited distribution and ongoing threats. Historically wide spread in distribution, the western prairie fringed orchid is known from only 172 occurrences, most of which are consider small populations. The western prairie fringed orchid is not documented in the planning area or in Wyoming; however, it does occur within the Platte River watershed in Nebraska (USFWS 1996). Groundwater-maintained habitats within the Platte River watershed may be affected by activities within the planning area that deplete groundwater contributing to the North Platte River (USBR and USFWS 2003). This perennial orchid is long-lived and found in western portions of tallgrass prairie in North America. Habitat for the western prairie fringed orchid is commonly moist, calcareous subsaline prairie and sedge meadows that may be periodically flooded. Threats to this species include habitat loss or fragmentation, conversion of tallgrass prairie habitat to agricultural uses, and hydrologic alteration which draws down the water table near the plant roots (USBR and USFWS 2003; USFWS 1996). Overgrazing, intensive hay mowing, and fire suppression are also identified as threats and collection by humans and use of herbicides are identified as potential threats.

Laramie false sagebrush (BLM Sensitive)

Laramie false sagebrush is ranked imperiled at the global and state levels based on limited distribution. This southeastern Wyoming endemic species is known to occur in southwestern Converse and southeastern Natrona Counties (Fertig 2000d). More than 50 percent of its continental range occurs in Wyoming. Six of the 11 sites in four counties where this species is documented, were discovered as recently as 1997. Laramie false sagebrush is a perennial herb occurring on rocky limestone soils at elevations of 7,545 to 8,530 feet above MSL. A low number (6 to 20) of occurrences are documented for this species and it is uncommon (5,000 to 50,000 individuals or 500 to 5,000 occupied acres) in abundance. Threats to this species include road development, vehicle traffic, and competition from INPS (Fertig 2000d). In addition, one of the limestone outcrops where this species occurs is being quarried.

Ute ladies'-tresses (Federal Threatened)

The Ute ladies'-tresses is ranked as rare at the global level, critically imperiled at the state level, and threatened at the federal level. This BLM Sensitive species is a local endemic known to occur in Converse and Goshen Counties (Fertig 2001b). More than 50 percent of the continental range of this species occurs in Wyoming. Habitat for this perennial orchid includes riparian and wet meadow habitats. A very low number (1 to 5) of occurrences are documented for this species and it is rare (less than 5,000 individuals or less than 400 occupied acres) in abundance. Based on limited census data and loss or conversion of riparian habitat throughout its range, populations of Ute ladies'-tresses are thought to be declining. Threats to this species include water developments, intense domestic livestock grazing, hay mowing, competition from INPS, habitat fragmentation urbanization, and collection by humans (Fertig 2001b; USFWS 1992). In 2004, USFWS initiated a 5-year status review to determine if delisting this species is warranted (USFWS 2004b).

Management of special status plant species within the planning area presents a number of challenges including declining population trends for select species, drought and other natural events, spread and control of INPS, maintaining PFC for riparian and wetland habitats, impaired floodplain connectivity, water depletions in areas contributory to the Platte River Basin, vegetation treatment with prescribed fire or herbicides, lack of periodic disturbance events (e.g., fire, flood, grazing), physical trampling (e.g.,

OHV use), loss of habitat resulting from altered hydrology, and challenges presented by special status plant populations occurring over multiple land ownerships. While threats to some species may remain low due to the remoteness of habitat, threats to other species may increase despite distance or restricted access. For example, special status plant species dependent on groundwater levels may be affected by upstream depletions of groundwater far removed from impact populations. Moreover, early successional special status plant species protected from habitat alteration, may still be adversely affected by natural succession and the lack of fire, flooding, or other disturbance factors necessary to retain early successional habitat.

The BLM manages the challenges for special status plant species in the planning area according to BLM Manual 6840 – Special Status Species Management (BLM 2001d), including the use of all methods and procedures necessary to improve the status of federally listed species and their habitats to a point where provisions of the ESA are no longer necessary. BLM Manual 6840 includes the objectives (1) conserve listed species and the ecosystems on which they depend and (2) ensure that actions requiring authorization or approval by the BLM are consistent with the conservation needs of special status species and do not contribute to the need to list special status species, either under the provisions of the ESA or BLM Manual 6840. Management actions to address the challenges for federally listed plant species often are derived from the consultation process (i.e., Section 7 of the ESA). Management actions for BLM sensitive species focus on the following goals of the BLM Wyoming Sensitive Species Policy and List (BLM 2002d):

- Maintain vulnerable species and habitat components in functional BLM ecosystems.
- Ensure special status species are considered in land management decisions.
- Prevent a need for species listing under the ESA.
- Prioritize needed conservation work with an emphasis on habitat.

Current management uses appropriate regulatory and policy mechanisms to minimize or avoid impacts to special status plant species. In addition, current management of special status plant species considers opportunities for species recovery. For example, current management within the planning area focuses on managing riparian and wetland habitats toward proper functioning condition, managing livestock grazing to healthy rangeland standards, and surveying for special status plant species in suitable habitat prior to authorizing surface disturbing activities. Management actions incorporated in alternatives (see Chapter 2) address the challenges identified for special status plant species by continuing or improving the focus of current management. In addition, alternatives consider a range of management actions that may affect special status plant species in the planning area including management of specific plant communities (e.g., sagebrush, aspen, mountain shrubland) towards desired plant community; restrictions on placement of livestock supplements relative to special status plant species populations and riparian areas; restrictions on surface disturbance and occupancy on steep slopes and highly erosive soils; restrictions on discharge of water produced from coalbed natural gas wells; restrictions on OHV use; restrictions on energy and mineral development; and special designations.

Table 3-22. Special Status Plant Species Known to or Potentially Occurring in the Casper Planning Area

Common Name	Special Status ¹	Rank ²	Habitat Association ³
Laramie columbine	S	G2/S2	Associated with shady granite outcrop microsites (crevices, ledges, cliff bases). Elevation range is from 6,250 to 10,100 feet (Keinath et al. 2003; Fertig 2004).
Porter's sagebrush	S	G2/S2	Associated with ashy or tubaceous mudstones and clay slopes among badlands and sparse vegetation. Elevation range is from 5,300 to 6,500 feet (Fertig 2000a; Keinath et al. 2003).
Nelson's milkvetch	S	G2/S2	Associated with alkaline, seleniferous, clay flats, shale bluffs and gullies, pebbly slopes, and volcanic cinders with sparse vegetation. Elevation range is from 5,200 to 7,600 feet (Heidel 2003).
Many-stemmed spider-flower	S	G2G3/S1	Associated with whitish alkali-rich soils amid hydrogen-sulfide gas. Adjacent shallow, spring-fed playa lakes or dried lakebeds. Highest species occurrence is among damp flats with approximately 90 percent vegetative cover. May also occur (in lower abundance) on clayey dunes with approximately 50 percent vegetative cover. Patchy occurrence is known to take place on dry alkaline depressions with approximately 20 percent vegetative cover. Occurs at elevations greater than 5,860 feet (Fertig 2000a; Keinath et al. 2003).
Williams' wafer-parsnip	S	G2G3/S2S3	Associated with thin, sandy soils on south or east facing slopes among small cracks or pockets in limestone bedrock. Elevation range is from 6,000 to 8,300 feet (Fertig 2000b; Keinath et al. 2003).
Colorado butterfly plant	T	G3T2/S2	Associated with level to slightly sloped landscapes with sub-irrigated soils within a floodplain or drainage bottom. Elevation range is from 5,000 to 6,400 feet (Fertig 2000c; Keinath et al. 2003).
Blowout penstemon	E	G1/S1	Associated with the leeward slope of early successional sands dunes with spare vegetation. Also connected to sandy apron deposits on the lower half of steep granite or sedimentary mountains or ridges. Elevation range is from 6,680 to 7,440 feet (Fertig 2001a; Keinath et al. 2003).
Western prairie fringed orchid	T	G2/ not in WY	Associated with mesic swales or draws in moist, tallgrass, calcareous or subsaline prairies and sedge meadows (USFWS 1996). Occurs on watersheds adjoining the planning area.
Laramie false sagebrush	S	G2/S2	Associated with rocky limestone ridges and gentle slopes among cushion plant communities. Elevation range is from 7,500 to 8,600 feet (Fertig 2000d; Keinath et al. 2003).
Ute ladies'-tresses	T	G2/S1	Associated with low, level, floodplain terraces or abandoned oxbows less than 15 meters from a stream channel. Vegetation coverage is usually between 75 and 90 percent. Soils are basic (pH 7.7 to 7.8), moist, and range from alluvial sand and coarse silt to whitish loamy clays. Elevation range is from 4,650 to 5,420 feet (Fertig 2001b; Keinath et al. 2003).

Source: Heidel 2003

¹Status: E = Federal Endangered, T= Federal Threatened, S = BLM Sensitive

²Rank: G - Global rank: Refers to the rangewide status of a species. Plant species in this section ranked G1, G2, G2G3, or G3T2 are not considered "stable". These species are described in NatureServe as rare and are critically imperiled or imperiled. Only species ranked G4 or G5 are considered stable.

T - Trinomial rank: Refers to the rangewide status of a subspecies or variety.

S - State rank: Refers to the status of the taxon (species or subspecies) in Wyoming. State ranks differ from state to state.

1 - Critically imperiled because of extreme rarity (often known from 5 or fewer extant occurrences or very few remaining individuals) or because some factor of a species' life history makes it vulnerable to extinction.

2 - Imperiled because of rarity (often known from 6-20 occurrences) or because of factors demonstrably making a species vulnerable to extinction.

3 - Rare or local throughout its range or found locally in a restricted range (usually known from 21-100 occurrences).

³Species does not occur in the planning area; occurs in habitat subject to hydrologic influence from activities in the planning area. Habitat associations are described for Wyoming and (or) the planning area.

The BLM addresses these management challenges in accordance with BLM Manual 6840 - Special Status Species Management (BLM 2001d) with these objectives (1) conserve listed species and the ecosystems on which they depend and (2) ensure that actions requiring authorization or approval by the BLM are consistent with the conservation needs of special status species and do not contribute to the need to list special status species, either under the provisions of the ESA or BLM Manual 6840.

Management actions to address the challenges for federally listed plant species often are derived from the consultation process (i.e., Section 7 of the ESA). Management actions for BLM sensitive species focus on the following goals of the BLM Wyoming Sensitive Species Policy and List (BLM 2002d):

- Maintain vulnerable species and habitat components in functional BLM ecosystems.
- Ensure special status species are considered in land management decisions.
- Prevent a need for species listing under the ESA.
- Prioritize needed conservation work with an emphasis on habitat.

3.4.8 Special Status Species – Fish

Special Status Species fisheries habitats include perennial and intermittent streams that support fish through at least a portion of the year. Fisheries habitats within the planning area encompass five watersheds: North Platte, Wind, Cheyenne, Niobrara, and Powder River (Map 5). Of these, only the North Platte watershed contributes flows to the Platte River. The North Platte watershed itself includes lands outside of the planning area and is the largest of six major sub-basins of the Platte River recovery implementation area, which also includes the South Platte, Central Platte, Lower Platte, Elkhorn, and Loup River sub-basins (USBR and USFWS 2003).

Fisheries habitats within the planning area are limited due to the arid nature of the landscape, the limited number of perennial and intermittent streams, and a fragmented land ownership pattern. Watersheds vary by vegetation types, water quality and quantity, land use, and location. Refer to the Fish and Wildlife Resources – Fish section for a more detailed description of fisheries habitat in the planning area. Drainages providing fisheries habitats within the planning area also are described under surface water quality in the Water section of this document.

No BLM sensitive fish species are present within the planning area; however, there are 10 NSS recognized by the WGFD as Status 1-3 (NSS1-3) including lake chub, flathead chub, hornyhead chub, black bullhead, common shiner, finescale dace, pearl dace, plains topminnow, plains minnow, and suckermouth minnow (refer to Appendix E). Wyoming NSS1-3 are species that may be rare to common, with declining or vulnerable habitats.

No federally listed fish species occur in the planning area; however, the endangered pallid sturgeon could be affected by upstream activities, including those within the North Platte watershed portion of the planning area. Native habitats for this species include large rivers exhibiting free-flowing, warm, and turbid waters. Historically, the pallid sturgeon's range included the Missouri and Mississippi rivers, as well as lower reaches of the Platte, Kansas, and Yellowstone rivers (USFWS 1993). Disjunct populations now occur in the upper Missouri near the Yellowstone River in Montana, near Gavins Point Dam in South Dakota, and in the Platte River in Nebraska (National Research Council 2005). The USFWS attributes the decline of this species to habitat loss, commercial harvest, hybridization, and pollution (USFWS 1993). For a discussion of water quality and water quantity in the planning area, please refer to the Water section of this document.

Water depletions upstream can change the velocity, volume, and timing of downstream river water flows. Historically, water-development projects (e.g., dams, reservoirs, water and sediment control basins, irrigation diversions, sand and gravel mining, and wetland creation) have altered historic surface water hydrographs (e.g., water-flow timing, volume, and velocity) in the Platte River Basin through consumption, evaporation, or by altering the timing of water flows. The USFWS indicates that habitat degradation and destruction within the Platte River Basin are primarily a result of water resource developments in the Platte River Basin (USFWS 2002b). As a result, the USFWS determined that water depletions to the Platte River Basin might jeopardize the continued existence of this species. Consequently, the BLM conducts formal consultations with the USFWS regarding any actions resulting in water depletion to the Platte River Basin.

While fisheries habitat condition in the planning area is a function of historic activities, it is also actively managed by the BLM to (1) conserve listed species and the ecosystems on which they depend and (2) ensure that the actions requiring authorization or approval by the BLM are consistent with the conservation needs of special status species and do not contribute to the need to list special status species, either under the provisions of the ESA, BLM Manual 6840 (BLM 2001d), or the BLM Wyoming Sensitive Species Policy and List (BLM 2002d). Activities and management challenges affecting Special Status Species – Fish are similar to those discussed in the Fish and Wildlife Resources – Fish Section.

3.4.9 Special Status Species – Wildlife

Special status species are those listed as threatened or endangered, are proposed for listing, or are candidates for listing under the provisions of the ESA; those listed by a state implying potential endangerment or extinction (i.e., NSS); or those designated by the BLM State Director as sensitive. Wyoming NSS1-3 species are discussed in this section and include species that may be rare to common, with declining or vulnerable habitats.

Within the planning area three wildlife species (bald eagle, black-footed ferret, and Preble's meadow jumping mouse) are listed as threatened or endangered under the ESA (see Table 3-23). In addition, four endangered bird species (whooping crane, interior least tern, piping plover, and Eskimo curlew) occur outside of the planning area but depend on the Platte River system for survival. These four are potentially affected by upstream actions, including those occurring within the planning area (see Table 3-23). Critical habitat for the Preble's meadow jumping mouse is designated within the planning area for portions of Cottonwood, Chugwater, and Lodgepole creeks and some tributaries (USFWS 2003c). Known distribution of special status wildlife species within the planning area appears in Maps 26 through 30.

Special status wildlife species in the planning area inhabit a variety of habitat types, including sagebrush shrublands (e.g., sage sparrow, sage thrasher, greater sage-grouse, loggerhead shrike, ferruginous hawk), grasslands (e.g., long-billed curlew, burrowing owl, swift fox), and riparian and wetland habitats (e.g., northern leopard frog, long-eared myotis, yellow-billed cuckoo, white-faced ibis). For most special status species, comprehensive data on population numbers and distribution within the planning area are not available. Occurrence data from WYNDD identify presence and location for some special status wildlife species in the planning area; however, these data reflect historic observations from opportunistic or project specific surveys rather than a complete inventory of the planning area.

Table 3-23 and the subsequent discussion of special status wildlife species in this section are organized by the applicable Wyoming statutory categories identified in the Fish and Wildlife Resources – Wildlife section. Table 3-23 identifies all special status wildlife species that (1) occur in, (2) have potential habitat in, or (3) could be influenced by activities in the planning area. Table 3-23 also summarizes the status and general habitat description for each special status wildlife species.

The BLM uses HMPs to focus habitat management for special status (as well as other) species within the planning area. For example, the Bald Eagle HMP for the Platte River Resource Area and Jackson Canyon ACEC focuses management of bald eagle habitats throughout the planning area. This and other HMPs used by the Casper Field Office are identified in Table 3-20 in the Fish and Wildlife Resources – Wildlife section of this document.

Game Birds (Greater Sage-Grouse)

Populations of greater sage-grouse have declined throughout their native range in western North America. Several petitions to list greater sage-grouse as threatened were submitted to USFWS in 2002. In January 2005, the USFWS determined that listing under the ESA was not warranted. Greater sage-grouse habitat components and terminology referenced in the following discussion are defined in BLM 2005i. Braun (2002) and Connelly et al. 2000 provide additional information regarding greater sage-grouse habitat needs and habitat and population trends.

According to the recently completed range-wide *Conservation Assessment of Greater Sage-Grouse and Sagebrush Habitats* (Connelly et al. 2004), the numbers of greater sage-grouse have declined across their range during the past 50 years, as has the quality and distribution of the birds' requisite sagebrush-steppe habitats. Population declines of greater sage-grouse are largely attributed to the loss and degradation of sagebrush habitats (Martin 1970; Braun et al. 1977; Swenson et al. 1987; Braun 1998). Changes in land use and land development are the primary causes of habitat loss, while habitat degradation is a complicated interaction among many factors, including drought, livestock grazing, changes in natural fire regimes, and the invasion of INPS (Fischer et al. 1996; Pyle and Crawford 1996; Beck and Mitchell 2000; Nelle et al. 2000). Emerging issues include impacts of pesticides, disease, wind turbines, noise, and raptor perch sites on powerlines among sage-grouse populations.

Presently, there are approximately 200 greater sage-grouse leks documented throughout the planning area, primarily in Natrona and Converse counties, with the highest densities of leks occurring in larger tracts of sagebrush shrublands (Map 20). The largest greater sage-grouse lek complexes are found in Bates Hole, the Shirley Basin, the Rattlesnake Hills, the South Bighorns, and the Laramie Range foothills. Occupied habitat is fairly contiguous throughout much of Bates Hole and the Shirley Basin. Habitats within the Rattlesnake Hills and the South Bighorns are more fragmented by changes in habitat type and land use practices. Greater sage-grouse habitats in the Laramie Range are primarily limited to the portion of the west slope of the Laramie Range. Large contiguous blocks of sagebrush and grassland communities east of the Laramie Range have, for the most part, been eliminated. Specific wintering concentration areas of sage-grouse within the planning area are not widely documented to date. Sage-grouse may benefit from HMPs identified in Table 3-20 through the provision of seasonal habitats.

The following discussion of the greater sage-grouse population trend within the planning area is summarized from WGFD 2005e and reproduced in entirety in Appendix E. The WGFD and the BLM have annually surveyed and monitored greater sage-grouse leks since the 1950's. Male attendance on leks is utilized by the WGFD to provide an index of relative change in population abundance in response to environmental conditions over time. The number of males observed per lek has decreased by more than 31 percent since 1958. More recently, the number of males counted per lek increased through the 1980s, peaked in 1992, dramatically declined through the early 1990s, came to an all-time low between 1994 and 1997, and has since recovered to a level similar to the early 1980s. Since data collection was standardized in 1996, the number of males counted on leks has exhibited some recovery.

Table 3-23. Special Status Wildlife Species in the Casper Planning Area

Common Name	Status ¹	Habitat
Game Birds		
Greater sage-grouse	Sensitive, NSS2, Level I Priority	Sagebrush
Migratory Game Birds (Waterfowl)		
Northern pintail	NSS3	Marshes and lakes in association with most habitats below 8,000 feet (WGFD 2004c)
Lesser scaup	NSS3	Marshes, lakes, rivers (WGFD 2004c)
Barrow's goldeneye	NSS3	Aspen; cottonwood-riparian; marshes; lakes and rivers associated with lodgepole pine, Douglas fir, and other or mixed coniferous forests (WGFD 2004c)
Redhead	NSS3	Marshes, lakes, rivers (WGFD 2004c)
Canvasback	NSS3	Marshes, lakes, rivers (WGFD 2004c)
Nongame (Raptors)		
Bald eagle	Threatened, NSS2, Level I Priority	Cottonwood riparian, mixed coniferous forests near large lakes and rivers
Burrowing owl	Sensitive, NSS4, Level I Priority	Grasslands, basin-prairie shrublands
Ferruginous hawk	Sensitive, NSS3, Level I Priority	Basin-prairie shrublands, grasslands
Northern goshawk	Sensitive, NSS4, Level I Priority	Coniferous forests, aspen
Peregrine falcon	Sensitive, NSS3, Level I Priority	Tall cliffs
Merlin	NSS3, Level II Priority	Ponderosa pine savannah, juniper woodlands, basin-prairie shrublands
Nongame (Neotropical Migrants)		
Brewer's sparrow	Sensitive, NSS4, Level I Priority	Basin-prairie shrublands
Loggerhead shrike	Sensitive, Level II Priority	Basin-prairie shrublands, mountain-foothills shrublands
Sage sparrow	Sensitive, NSS4, Level I Priority	Basin-prairie shrublands, mountain-foothills shrublands
Sage thrasher	Sensitive, NSS4, Level II Priority	Basin-prairie shrublands, mountain-foothills shrublands
Baird's sparrow	Sensitive, Level I Priority	Grasslands
Long-billed curlew	Sensitive, NSS3, Level I Priority	Grasslands, plains, foothills, wet meadows
Mountain plover	Sensitive	Shortgrass prairies and shrubsteppe; prefers areas with little vegetative cover, such as prairie dog towns (USFWS 2003a)
White-faced ibis	Sensitive, NSS3	Marshes, wet meadows
Yellow-billed cuckoo	Sensitive, NSS2, Level II Priority	Cottonwood-riparian
Trumpeter swan	Sensitive	Wetlands, lake and pond edges
American white pelican	NSS3, Level II Priority	Rivers, lakes, ponds

Table 3-23. Special Status Wildlife Species in the Casper Planning Area (Continued)

Common Name	Status ¹	Habitat
Black-crowned night heron	NSS3	Marshes, lakes
Snowy egret	NSS3	Marshes, lakes, rivers
Caspian tern	NSS3	Marshes, aquatic areas
Forster's tern	NSS3, Level I Priority	Marshes, aquatic areas
Black tern	NSS3, Level I Priority	Marshes, aquatic areas
Franklin's gull	NSS3, Level I Priority	Marshes, lakes
Lewis's woodpecker	NSS3, Level II Priority	Ponderosa pine savannah, juniper woodlands, cottonwood-riparian, aspen
Willow flycatcher	NSS3, Level II Priority	Riparian shrub
Eskimo curlew ²	Endangered	Tundra and grasslands; migratory stopover habitat included grasslands adjacent to the Platte River (Gill et al. 1998)
Interior least tern ²	Endangered	Nests on unvegetated alluvial sand and gravel bars along major rivers, including the Platte River (USFWS 1985).
Piping plover ²	Endangered	Nests on protected sand and gravel bars along rivers and on unvegetated shores of alkali wetlands (USFWS 2001)
Whooping crane ²	Endangered	Nests in large undisturbed marshlands; for migration, require sand and gravel bars for night roosting and feed in grain fields during the day (USFWS 1978)
Nongame (Mammals)		
White-tailed prairie dog	Sensitive, NSS4	Basin-prairie shrublands
Black-tailed prairie dog	Sensitive, NSS3	Grasslands
Black-footed ferret	Endangered, NSS1	Prairie dog colonies
Preble's meadow jumping mouse	Threatened	Dense riparian areas in foothills and prairies (USFWS 2003c)
Swift fox	Sensitive, NSS4	Grasslands
Townsend's big-eared bat	Sensitive, NSS2	Caves and abandoned mines, deciduous forests
Spotted bat	Sensitive	Deserts and open woodlands; often forage over water
Long-eared myotis	Sensitive, NSS2	Caves and abandoned mines, coniferous forests
Fringed myotis	Sensitive, NSS2	Caves and abandoned mines, coniferous forests
Western small-footed myotis	NSS3	Caves and abandoned mines, basin-prairie shrublands
Little brown myotis	NSS3	Caves and abandoned mines, most habitats
Long-legged myotis	NSS2	Caves and abandoned mines, coniferous forests
Big brown bat	NSS3	Most habitats
Pallid bat	NSS2	Sagebrush-grasslands, cliffs, rock outcrops
Olive-backed pocket mouse	NSS3	Basin-prairie shrublands
Silky pocket mouse	NSS3	Basin-prairie shrublands
Hispid pocket mouse	NSS3	Sagebrush-grasslands
Plains harvest mouse	NSS3	Grasslands
Prairie vole	NSS3	Basin-prairie shrublands

Table 3-23. Special Status Wildlife Species in the Casper Planning Area (Continued)

Common Name	Status ¹	Habitat
Eastern red bat	NSS4	Coniferous and deciduous forest, riparian woodlands
Hoary bat	NSS4	Coniferous and deciduous forest, riparian woodlands
Silver-haired bat	NSS4	Coniferous and deciduous forest, riparian woodlands
Sagebrush vole	NSS4	Basin-prairie shrublands
Plains pocket gopher	NSS4	Sagebrush-grasslands
Nongame (Amphibians)		
Northern leopard frog	Sensitive	Wetlands, streams, and ponds, usually with aquatic vegetation

Sources: BLM 2002d; USFWS 2003b; WGFD 2004c

¹ Status: Sensitive = BLM Sensitive Species; Threatened, Endangered, Proposed, Candidate = in accordance with the ESA; State-listed definitions:

- NSS1 - Native Species Status 1 Populations are greatly restricted or declining, extirpation appears possible OR on-going significant loss of habitat.
- NSS2 - Native Species Status 2 Populations are declining, extirpation appears possible; habitat is restricted or vulnerable, but no recent or ongoing significant loss; species may be sensitive to human disturbance. ~OR~ Populations are declining or restricted in numbers and (or) distribution, extirpation is not imminent; ongoing significant loss of habitat.
- NSS3 - Native Species Status 3 Populations are greatly restricted or declining, extirpation appears possible; habitat is not restricted, vulnerable, but no loss; species is not sensitive to human disturbance. ~OR~ Populations are declining or restricted in numbers and (or) distribution, extirpation is not imminent; habitat is restricted or vulnerable, but no recent or ongoing significant loss; species may be sensitive to human disturbance. ~OR~ Species is widely distributed; population status or trends are unknown, but are suspected to be stable; ongoing significant loss of habitat.
- NSS4 - Native Species Status 4 Populations are greatly restricted or declining, extirpation appears possible; habitat is stable and not restricted. ~OR~ Populations are declining or restricted in numbers and (or) distribution, extirpation is not imminent; habitat is not restricted, vulnerable, but no loss; species is not sensitive to human disturbance. ~OR~ Species is widely distributed, population status or trends are unknown but are suspected to be stable; habitat is restricted or vulnerable, but no recent or ongoing significant loss; species may be sensitive to human disturbance. ~OR~ Populations are stable or increasing and not restricted in numbers and (or) distribution; ongoing significant loss of habitat.

² Species does not occur in the planning area. Species occupies habitat along the Platte River in Nebraska, which is subject to the hydrologic influence of activities affecting North Platte River downstream flows.

In 2000, the Wyoming Sage-Grouse Working Group was formed to develop a statewide, multi-agency strategy for the conservation of sage-grouse. This group prepared the Wyoming Greater Sage-Grouse Conservation Plan (2003) to provide for coordinated management and direction across the state. In 2004, local sage-grouse working groups were formed to develop and implement local conservation plans. The majority of the planning area is split between the Bates Hole/Shirley Basin and Powder River Basin local working groups, in which the BLM participates. Current management of greater sage-grouse focuses primarily on the enhancement and protection of sage-grouse seasonal habitats. A description of seasonal and spatial stipulations for greater sage-grouse are identified as management actions for existing management and alternatives in Chapter 2.

Current management restricts surface disturbance and occupancy within ¼ mile of occupied greater sage-grouse leks. In addition, human activity between 8 p.m. and 8 a.m. March 1 to May 15 also is avoided within the same ¼ mile buffer. Current management also restricts surface-disturbing and disruptive activities in suitable greater sage-grouse nesting and early brood-rearing habitats within 2 miles of an occupied lek or in identified greater sage-grouse nesting and early brood-rearing habitats outside the 2-mile buffer from March 15 to July 15.

Migratory Game Birds (Waterfowl)

Special status species migratory game birds (waterfowl) include canvasback, northern pintail, lesser scaup, redhead, and Barrow's goldeneye (see Table 3-23). Population trends for these species generally are declining range-wide. In the planning area, the primary habitat for these species is open water located along the North Platte River. Habitat, management challenges, and actions for special status waterfowl species are similar to those described for waterfowl (see Wildlife section). See also Ducks Unlimited's Conservation Plan (Ducks Unlimited 2004) for additional information.

Nongame (Raptors)

Six special status raptor species are known to occur within the planning area (see Table 3-23). All except the merlin are BLM sensitive species. One, the bald eagle, is a federally threatened species. The remaining five are classified as WGFD NSS3 or 4 (see the Glossary for definition of NSS categories). All six raptor species are Wyoming Partners in Flight Priority Species (either Level I or II). Two species, the ferruginous hawk and burrowing owl, depend on grassland and sagebrush-grassland habitats, while the northern goshawk requires coniferous forests and aspen stands. The USFWS Utah Field Office Guidelines for Raptor Protection From Human and Land Use Disturbances (USFWS 2002a) summarizes the typical nesting periods for these and other raptor species. There are 46 artificial nesting structures constructed in the planning area. Of these, 14 structures constructed as mitigation outlined in the Cave Gulch-Bullfrog-Waltman Natural Gas Development Project (BLM 1997b) protected by a ¼ mile no surface occupancy (NSO) stipulation and an additional ¼ mile seasonal restriction (timing limitation stipulation) for activities occurring February 1-July 31. Current management does establish a buffer zone (controlled surface use) around raptor nest sites that considers topography and special status prey habitats surrounding the nest site. Except for bald eagles, raptor buffer zones around nests are ¼ to ½ mile in size for the period February 1 through July 31.

Management challenges for special status raptor species include habitat degradation, fragmentation, loss; lack of cottonwood and aspen regeneration; collision and electrocution from powerlines; collision with wind turbines; and incompatible land use practices (e.g., land conversion, clear-cutting, snag removal, industrial activities, intensive recreational activities, removal of burrowing mammals). Other challenges include impacts from contaminants and human disturbance during sensitive periods.

Management actions focus on maintaining the presence of special status raptor species and the habitats upon which they depend in the planning area. Seasonal and spatial protective stipulations are currently applied around identified nest sites and communal roost areas to afford raptors a level of protection from human disturbance and industrial activities.

Bald Eagle

The bald eagle is a large, primarily fish-eating raptor, although they also consume waterfowl and carrion. Bald eagles nest near large bodies of water, such as lakes, reservoirs, and large rivers. Nest sites are typically in large trees adjacent to water. Five bald eagle nests have been identified within the planning area. There are 11 known bald eagle roost sites within the planning area; however, not all of these roosts occur on public lands. Of the 45,772 acres of bald eagle roost areas in the planning area, approximately 14,055 acres (31 percent) occur on BLM-administered land surface. Approximately 37,290 additional acres of bald eagle roost areas occur on BLM mineral estate. An important winter roost for bald eagles is found in the Jackson Canyon ACEC, as well as smaller sites scattered throughout Natrona and Converse counties. Bald eagle habitats are described in detail in the Bald Eagle HMP for the Platte River Resource Area and the Jackson Canyon ACEC (BLM 1992a). Current management of bald eagle habitat includes the following:

Roosts

- All BLM-administered public lands within or adjacent to bald eagle roost are designated full fire suppression zones. However, to the extent possible, trees are not to be cut within 200 yards of the roost during fire suppression. A wildlife biologist shall be present when wildfires threaten an eagle roost.
- Prescribed burning is implemented to meet resource management objectives, but is not permitted from November 1 through March 31.
- NSO or development is allowed.
- Public surface and federal mineral estate is to be withdrawn from location and appropriation under mining laws.
- Mineral materials are not available for disposal.

Nests

- Surface development is prohibited on an area from ¼ to 1 mile of known or discovered nests.

Feeding Areas

- Except for recreation or habitat improvement projects, surface development is prohibited within ¼ mile of the North Platte River on a year-round basis.
- Surface-disturbing activities within ½ mile of the river are not allowed from November 1 through March 31.

Flyways

- Proposed development is analyzed on a case-by-case basis in consultation with the USFWS.
- New power distribution and transmission lines in the Emigrant Gap flyway are designed to reduce hazards to raptors from collisions.

Ferruginous Hawk

This species occurs in grasslands and shrublands during the spring, summer, and fall seasons throughout the planning area. Ferruginous hawks often nest on the ground, topographic high points, or cliffs. There are numerous ferruginous hawk nest sites in the planning area. This species is sensitive to disturbance during the nesting period.

Merlin

Merlins (also referred to as pigeon hawks) are a mid-sized falcon occurring in grasslands, shrublands, and woodland habitats as a seasonal migrant. Merlins use abandoned black-billed magpie nests in juniper, shrubland, and open ponderosa pine habitats within the planning area. Merlins nesting in the planning area have been recorded.

Peregrine Falcon

The peregrine falcon is a mid- to large-sized falcon associated with a variety of habitats during the spring, summer, and fall seasons. Nesting habitats for this species include cliffs, canyons, or other secure topographic features typically near larger water bodies. Nesting sites often are found near an abundant prey base; one peregrine falcon eyrie is known to occur within the planning area. This species was recently delisted from the federal endangered species list.

Northern Goshawk

The northern goshawk is a large accipiter associated with coniferous forests and aspen stands. This species is a seasonal migrant in the planning area. Nesting habitats are generally in coniferous forests. Northern goshawks often forage throughout the forest, including in aspen stands, meadows, and forest openings. Several northern goshawk nest sites have been documented in the planning area.

Burrowing Owl

The burrowing owl is a mid-sized owl closely associated with prairie dog colonies within the planning area. This species nests in prairie dog burrows and is a seasonal migrant in the planning area. Several burrowing owl nests have been documented in the planning area. This species is relatively tolerant of human activity, often to its detriment.

Nongame (Neotropical Migrants)

For the purposes of this RMP, neotropical migrants include birds that breed in the United States and Canada and winter in Latin America (Nicholoff 2003). The terms neotropical migrants and nongame birds are synonymous for this discussion. Twenty-three special status nongame birds are known or suspected to occur within the planning area (Table 3-23). Those species that are widely distributed in Wyoming are believed to have relatively stable population trends within the planning area; however, for species exhibiting a more restricted distribution, population trend data are lacking. Results and analysis of 1966 to 2004 data for the North American Breeding Bird Survey provide more information on trends (Sauer et al. 2005). Collectively, these species occupy all vegetative types within the planning area and are all seasonal migrants.

Management challenges for neotropical migrants include habitat fragmentation and degradation, land conversion, incompatible land uses (e.g., industrial activities, human disturbance, contaminants, agricultural practices), water quantity and quality, lack of cottonwood regeneration, snag removal in preferred habitats, collision with wind turbines and powerlines, and interspecific competition for nest sites.

Management actions maintain the presence of neotropical migrants and their preferred nesting and foraging habitats. Management actions focus on maintaining or increasing the viability and biological integrity of special status species habitats within the planning area.

Mountain Plover

The mountain plover inhabits shortgrass prairies and shrubsteppe habitats, both for breeding and wintering. This species prefers areas with little vegetative cover for nesting, particularly prairie dog towns. In 2003, the USFWS withdrew its proposal to list the mountain plover as threatened. Updated information indicated that threats to this species were not significant and that the population was stable (USFWS 2003a). The species is now included on the BLM sensitive species list. Mountain plovers are considered an uncommon nester in the planning area.

Platte River Bird Species

Four additional endangered bird species occurring outside of the planning area depend on the Platte River system for survival and are potentially affected by federal actions occurring within the planning area. Piping plover, Eskimo curlew, interior least tern, and whooping crane are referred to as Platte River bird species because they occur along the Platte River in central Nebraska, downstream from the planning area. Since 1978, the USFWS has taken the position that all actions resulting in water depletions to the Platte River system may jeopardize the continued existence of one or more federally listed species and adversely modify designated critical habitats (USFWS 2002b). The primary management challenge to

Platte River bird species is water depletion to the Platte River, which could occur from BLM actions in the North Platte watershed portion of the planning area. See Table 3-23 and associated references for more information on the habitat associations of the four Platte River bird species. The Platte River Recovery Implementation Program Draft EIS prepared by the USBR and the USFWS (USBR and USFWS 2003) provides details about the challenges affecting these species.

Yellow-billed Cuckoo

Populations of this species on the west side of the Continental Divide are currently considered for ESA listing. East-side populations appear relatively stable. Preferred habitats for this species include mature cottonwood-riparian gallery forests with a shrubby understory, which is limited in distribution in Wyoming. Known occupied habitats for this species occurs along Sybille Creek and the east slope of the Laramie Range.

Long-billed Curlew

The long-billed curlew is an upland shorebird occupying grasslands and wet meadows in the planning area. Typical nest sites are on the ground near water with a supply of insects and aquatic macroinvertebrates. This species can be found throughout the planning area.

Colonial Waterbirds

Eight waterbird species (American white pelican, white-faced ibis, black-crowned night heron, snowy egret, Caspian tern, Forster's tern, black tern, and Franklin's gull) nest and (or) forage together in wetlands and marsh habitats during the breeding season.

Lewis's Woodpecker

This uncommon summer resident occurs in open ponderosa pine, cottonwood-riparian, aspen, and juniper habitats. This species nests in cavities in either dead or live trees and occasionally poles and feeds primarily on insects, nuts, and berries. Lewis's woodpecker breeding populations have been confirmed in the planning area.

Willow Flycatcher

The willow flycatcher is an insectivore and riparian obligate species and needs a viable riparian shrub habitat to forage and nest successfully. The willow flycatcher is a summer resident and breeder in the planning area.

Sagebrush Obligates

The greater sage-grouse, sage thrasher, Brewer's sparrow, and sage sparrow are sagebrush obligate birds that require intact sagebrush habitats for nearly all their nesting and foraging needs. These species are all known to nest in the planning area.

Loggerhead Shrike

Shrublands are the preferred habitats for the loggerhead shrike and are found throughout the planning area. This species typically nests in deciduous trees or tall shrubs and feeds on insects, small vertebrates, and carrion.

Baird's Sparrow

This uncommon summer resident occupies grasslands and nests in depressions; however, no documented nests have been recorded within the planning area. The Baird's sparrow forages on insects and seeds.

Trumpeter Swan

This species is an occasional migrant that nests on muskrat houses or small islands in open water; however, no breeding populations occur in the planning area. The trumpeter swan feeds mainly on aquatic vegetation and macroinvertebrates.

Nongame (Mammals)

Twenty-four special status nongame mammals are known or suspected to occur within the planning area (see Table 3-23). One is endangered (black-footed ferret), 1 is threatened (Preble's meadow jumping mouse), 7 are designated by BLM as Sensitive, and the remaining 15 have a WGFD NSS1-3 designation. Many of the remaining species are dependent on a grassland component in the habitat. Following is a brief description of existing conditions for nongame mammals identified in Table 3-23.

Black-footed Ferret

The black-footed ferret is a federally endangered species. Historically, the distribution of black-footed ferrets closely matched that of prairie dogs, their primary prey. However, black-footed ferrets were practically extinct by the 1970s due to habitat loss, prairie dog eradication, disease, and shooting. In 1986 and 1987, several ferrets were captured from a site in Meeteetse, Wyoming, to begin a captive breeding program with the goal to reintroduce ferrets into their historic range. There have been five historic black-footed ferret sightings in the planning area: three from Natrona County in the mid-1970s, one from Converse County in 1917, and one from Platte County in 1964 (Meaney and Company 2004).

Black-footed ferrets are located in the Shirley Basin-Medicine Bow Black-Footed Ferret Management Area. BLM currently manages 145,641 acres of public lands in Natrona County within the black-footed ferret ESA Section 10J Rule area in accordance with the black-footed ferret experimental release efforts in Shirley Basin. Although black-footed ferrets from the experimental release area currently are not documented in the planning area, it is possible that ferrets have dispersed into the area; the possibility exists that this species could occasionally occur in or expand into the planning area. Other black-tailed prairie dog complexes, potentially suitable for black-footed ferret reintroduction, occur at other locations within the planning area (WGFD 2005f).

Preble's Meadow Jumping Mouse

Preble's meadow jumping mouse is a federally threatened species; however, the USFWS recently proposed to delist this species. This species is a small rodent that is limited in its distribution in southeast Wyoming. Critical habitat for the Preble's meadow jumping mouse is designated in four places along riparian areas in Converse and Platte counties within the planning area. This habitat includes varying widths (360 to 394 feet) from stream edge for portions of Cottonwood, Chugwater, Lodgepole creeks and some tributaries (USFWS 2003c). The Preble's meadow jumping mouse is associated with brushy riparian systems along foothills and prairies. This species appears to prefer streamside habitats with structural diversity, including a dense herbaceous understory, shrubs, and trees (USFWS 2003c). The primary threats to the species are habitat loss and degradation. Potential habitats for Preble's meadow jumping mouse occurs in Converse, Goshen, and Platte counties.

White-Tailed Prairie Dog

The species occurs in southern and western Natrona County, including 3,365 acres of BLM-administered land. Some colonies within the southern portion of Natrona County are within the Shirley Basin-Medicine Bow black-footed ferret experimental release area. White-tailed prairie dogs have not drawn as much management attention in the past for animal damage-control efforts as have black-tailed prairie dogs. The habitats and behaviors of the two species differ.

Black-Tailed Prairie Dog

Many special status wildlife species are found in prairie dog towns, including the black-footed ferret, burrowing owl, mountain plover, and swift fox. Black-tailed prairie dogs historically inhabited shortgrass and mixed-grass prairies throughout the United States. However, the USFWS estimated that occupied prairie dog habitats have declined by about 99 percent (USFWS 2000b). Habitat loss and fragmentation, disease, and eradication programs remain serious threats to the species. In the planning area, black-tailed prairie dog habitats generally occur in Natrona, Converse, Platte, and Goshen counties; however, most suitable habitat, especially arable lands and drainage bottoms, are located on private and state land. Eight black-tailed prairie dog complexes (44,692 acres within the planning area) either completely or partially exist within the boundaries of the planning area. For land within the planning area administered by the BLM, three of these complexes are greater than 5,000 acres in size and the others are between 800 and 5,000 acres. These complexes may represent important habitats for future black-footed ferret populations.

Current management allows prairie dog control when the following criteria are met:

- Written request is received from the owner of adjacent property or the grazing lessee
- No historical black-footed ferret occurrences or confirmed signs have been recorded in the preceding 5 years
- The prairie dog town is not determined by the USFWS to be essential habitat for the survival of the black-footed ferret
- Prairie dog towns are ½ mile or closer to public lands
- Control of private and public lands must be done concurrently.

Swift Fox

This species occurs in short- and mid-grass prairies, agricultural areas, and irrigated and native meadows within the planning area. Although not an obligate, the swift fox often is found in association with prairie dog towns. The swift fox uses underground dens year-round. The species feeds on small birds, rabbits, and mice in the winter and, typically, ground squirrels in the spring. In addition to small mammals, the swift fox supplements its diet with insects during summer and fall. This species was petitioned for listing under ESA, but its protection under that statute was found not warranted. The swift fox population in Wyoming currently appears to be relatively stable.

Bats

Twelve special status bat species occur within the planning area (see Table 3-23). Although these species utilize a wide variety of habitats, caves and abandoned mines are important habitat components upon which these species depend for roosts, nurseries, and hibernacula.

Management challenges for special status mammals include habitat fragmentation and degradation, land conversion, incompatible land uses (e.g., industrial activities, human disturbance, use of contaminants, AML and cave closures, animal damage-control practices, etc.), lack of cottonwood and willow regeneration, collision with wind turbines (bats), and snag removal in preferred habitats. Management actions are intended to maintain and enhance the presence of nongame mammals and their habitats, upon which they depend.

Nongame (Amphibians)

Special status amphibians in the planning area are limited to the northern leopard frog, a BLM sensitive species. This species occupies riparian and wetland habitats and is typically found in cattail marshes and beaver ponds in the plains, foothills, and montane zones up to 9,000 feet above mean sea level in the

planning area. Adults feed on tadpoles, insects, and other invertebrates. No special status reptile species are known to occur in the planning area.

Management challenges for the northern leopard frog include habitat degradation, land conversion, incompatible land uses (e.g., contaminants, conversion or degradation of aquatic habitats) and degradation of water quantity and quality. Management actions are intended to maintain and enhance the presence of the northern leopard frog and the wetland and riparian habitats upon which it depends.

3.5 Heritage and Visual Resources

The Heritage Resources topic includes the individual resources of cultural, paleontological, and visual resources. Each individual resource section includes a definition and description of the resource, the current condition of the resource, management challenges, and management actions.

3.5.1 Cultural Resources

Cultural resources are any prehistoric or historic district, site, building, structure, or object considered important to a culture, subculture, or community for scientific, traditional, religious, or other purposes. Cultural resources include archeological resources, historic architectural and engineering resources, and traditional resources. Archeological resources are areas where prehistoric or historic activity measurably altered the earth or where deposits of physical remains (e.g., arrowheads, pottery) are discovered. Architectural and engineering resources include standing buildings, districts, bridges, dams, and other structures of historic or aesthetic significance. Traditional resources can include archeological resources, structures, topographic features, habitats, plants, wildlife, and minerals that Native Americans or other groups consider essential for the preservation of traditional culture.

Identified Cultural Resources

Little archeological work was carried out prior to passage of the National Historic Preservation Act (NHPA) in 1966. Cultural resources investigations in the planning area began in earnest in 1967. Most investigations are conducted pursuant to compliance with Section 106 of the NHPA and provisions of the National Environmental Policy Act (NEPA), both of which require federal agencies to consider potential impacts of federally assisted or permitted projects on significant cultural resources. BLM also conducts cultural resources investigations in the planning area pursuant to the establishment of the BLM's stewardship responsibilities under Section 110 of the NHPA, which requires federal land-managing agencies to identify and manage significant cultural resources on lands administered by those agencies.

From 1967 to 2003, approximately 4,029 cultural resource investigations or other projects were conducted within the planning area (BLM 2004g). Surveys to date have occurred on approximately 192,000 acres, about 5 percent of the planning area. In addition to 3,841 Class I, Class II, and Class III (see the Glossary for distinction of these classes) inventories, 85 monitoring projects, 59 testing and evaluation projects, and 17 major excavations or other mitigation projects have occurred. Most recently, the BLM completed a Class I regional overview of the planning area that reviewed and summarized past cultural resources investigations, the numbers and kinds of recorded resources, and cultural resources management directions (BLM 2004g).

The planning area is divided into 16 subregions based on convenient geographic locales: Bates Hole, Cedar Ridge-Badwater Creek, Chugwater, Chugwater Flats, Crescent Basin, East Wind-West Powder River, Goshen Hole, Hartville Uplift/Spanish Diggings, Laramie Range, Pine Ridge, Powder River Basin, Rattlesnake Hills, Saltbush Badlands, South Bighorns, Sweetwater Rocks, and Wheatland Heights. Cultural resource inventory coverage throughout the subregions is not evenly distributed and concentrates more on project locations, particularly, but not limited to, projects related to energy development. A purely scientific archeological approach entails formal sampling techniques, or focuses on areas of particular interest. Although a complete picture of site density and distribution is problematic given the inconsistent nature of inventory coverage, current inventory shows a higher percentage of historic materials on the east side of the planning area and a higher percentage of Native American materials on the west, suggesting the influence of environmental factors or differing homestead success rates.

Investigations to date have recorded 7,844 cultural resource sites within the planning area (BLM 2004g), including archeological resources, historic architectural and engineering resources, and traditional cultural

resources. Approximately 4 percent of the total number of cultural resources possesses both a prehistoric and historic component of some type. A multicomponent cultural resource can be counted as two or more separate cultural resources, even though they occupy the same location.

Native American site types found within the planning area generally are prehistoric and include open and sheltered camps, hearths, lithic scatters, toolstone quarry, lithic workshops, ritual localities, bison kill and butchering, processing areas, stone circles, and rock cairns. Archeological resources relate to the full scope of human presence in the planning area, from the PaleoIndian Period to the Historic Periods. Most archeological resources to date have been identified as being from the Late Archaic and Late Prehistoric periods (roughly the last 5,000 years) (BLM 2004g). One Native American traditional cultural property (TCP) is located in the planning area. TCPs are traditional resources that are eligible for the National Register of Historic Places (NRHP).

Historic era resources include trails, wagon roads, stage roads, transmission lines, irrigation canals, urban buildings, homesteads and ranches, stock-herding camps, cairns, oilfields, bridges, mines, Civilian Conservation Corps camps, and World War II bombing ranges (BLM 2004g). The Special Designations section of this document discusses National Historic Trails and Other Historic Trails.

Sites of Specific Concern to Native Americans

Native American traditional resources include TCPs, and sites of cultural concern that may not be eligible for the NRHP, but are identified as significant by Native American groups and may be protected under the American Indian Religious Freedom Act (AIRFA). In general, Native American traditional resources can include archeological sites; stone alignments; petroglyphs and pictographs; plant, wildlife, and lithic resource collection areas; spiritual sites; and locations that may have spiritual or cultural meanings to Native Americans. The BLM consults with Native American tribes to identify sites of cultural concern found on BLM-administered land, as well as communicates with Native American tribes associated with the planning area. To protect traditional resources, the locations of such are confidential and not released to the public.

One Native American TCP has been documented in the planning area (BLM 2004g). The Cedar Ridge complex is culturally important to the Eastern Shoshone Tribe and possibly to other tribes. It was established as a TCP in 1997 after extensive consultation with the Eastern Shoshone and the Wyoming State Historic Preservation Office (SHPO). This locality was used for more than 5,500 years as a ceremonial site for prayers and rituals and continues to be a sacred place for the Eastern Shoshone to conduct religious observances. The site is considered integral to the proper functioning of contemporary Shoshone ways of life. Executive Order 13007, AIRFA, and elements of the NHPA enjoin the federal agencies to work to prevent disturbance and provide access to such sites. No other TCPs have been identified in the planning area to date (BLM 2004g), although others are likely to be discovered in the future as the tribal consultation process continues.

Current Resource Management

The BLM is responsible for identifying, protecting, managing, and enhancing cultural resources located on its lands or on non-federal lands that may be affected by BLM undertakings. Certain specific cultural resources are managed under Land Use Decisions C-1 and C-5 (BLM 1985a). Land use decisions relating to NHTS (C-2, C-3, and M-1) are discussed in the Special Designations section under National Historic Trails and Other Historic Trails.

BLM Manual 8110, *Identifying Cultural Resources* (BLM 1998c), identifies six use categories for cultural resources: scientific use, conservation for future use, traditional use, public use, experimental use, and discharged from management. A cultural property may be allocated to more than one use

category and allocations are revised when circumstances change or new data become available (BLM 1998c).

The primary management tool used to mitigate potentially adverse impacts to cultural resource values is Section 106, of the NHPA. In addition, Wyoming state protocol, NRHP guidance, and agency manuals aid in complying with Section 106, while providing opportunities for the development of resources. Given these tools, and aside from specific RMP stipulations, the general approach to mitigate impacts includes (1) avoidance by project redesign, (2) minimizing impacts by redesigning projects into noncontributing portions of sites, and (3) full impact mitigation, generally in the form of data recovery excavation.

Management challenges for cultural resources in the planning area include accounting for the impacts of BLM management actions and other activities on heritage resources; identifying and protecting TCPs such as Cedar Ridge; and being able to conduct cultural resource inventories above and beyond those required under Section 106.

Management actions for cultural resources generally address cultural resource inventory, protection of known and unrecorded sites, and public outreach programs. Management actions are incorporated in the alternatives and described in more detail in Chapter 2.

3.5.2 Paleontological Resources

Paleontological resources, usually thought of as fossils, include the bones, teeth, body remains, traces, or imprints of plants and animals preserved in the earth through geologic time. Paleontological resources also include related geological information, such as rock types and ages. All fossils offer scientific information, but not all fossils offer noteworthy scientific information. Fossils generally are considered to be scientifically noteworthy if they are unique, unusual, rare, diagnostically or stratigraphically important, or add to the existing body of knowledge in a specific area of science. Most fossils occur in sedimentary rock formations. Although experienced paleontologists generally can predict which formations may contain fossils and what types of fossils may be found based on the age of the formation and its depositional environment, predicting the exact location where fossils may be found is not possible.

The BLM is legally mandated to manage and protect scientifically noteworthy fossils for the benefit of the public, primarily under the auspices of the Federal Land Policy and Management Act of 1976 (FLPMA). Noteworthy fossils include all vertebrate fossil remains (body and trace fossils) and those plant and invertebrate fossils determined, on a case-by-case basis, to be scientifically unique.

Management of fossils found on BLM-administered lands is restricted to public surface. Collecting fossils is allowed with some restrictions, depending on the significance of the fossils. Hobby collecting of common invertebrate or plant fossils by the public is allowed in reasonable quantities when only hand tools are used. Commercial collecting of fossils is not permitted. Collection of all vertebrate and any administratively designated plant or invertebrate fossils may be done only under permits issued by the BLM to qualified researchers. The basic permit is the survey and limited surface collection permit, issued for reconnaissance work and collection of surface finds, with a 1 square meter limit to surface disturbance. If the disturbance will exceed 1 square meter, or will require mechanized equipment, the researcher must apply for an excavation permit. Prior to authorization of an excavation permit, and in some cases for survey permits in SMAs, the BLM must prepare an EA for the proposed location. All fossils collected under a permit remain public property and must be curated in an approved repository.

Presently, 17 active paleontology permits (16 survey permits, 1 excavation permit), representing 15 different researchers, have been granted for the planning area. Ten of these active permits were issued for

statewide research and may not reflect work presently occurring in the planning area. Five paleontological permittees principally work in the planning area.

No formal monitoring of paleontological resource use or assessing of mitigation efforts is being conducted. The relatively low level of fossil collection for both hobby and scientific use and ongoing mitigation efforts will most likely result in minimal adverse impacts to paleontological resources.

Probable Fossil Yield Classification

Geologic units in the planning area have been classified using the Probable Fossil Yield Classification, according to the probability of yielding paleontological resources of concern, primarily vertebrate fossils, to land managers. The classification uses a ranking of 1 through 5, with Class 5 assigned to geologic formations or members with a high potential for noteworthy fossils. Within the planning area, Class 4 and 5 geologic formations account for approximately 50 percent of the total acreage, encompassing all ownerships. Class 4 and 5 formations underlie about 35 percent of public surface in the planning area. The classifications are defined in the Glossary under Probable Fossil Yield Classification.

Identified Paleontological Resources

Within the planning area, rocks as old as 3 billion years are exposed, but presently known vertebrate or other noteworthy fossil deposits date back to about 200 million years. Potentially, older vertebrate fossils could be found, as older rock formations present in the planning area have produced such finds elsewhere in the state. Nearly all the major fossil-bearing formations identified within Wyoming have been found in the planning area, but they are not as extensively distributed as in other areas. The major formations known to produce dinosaur or marine reptile remains in the planning area include the Chugwater (including the Alcova Limestone), Sundance, Morrison, Cloverly, and Lance formations. The Wind River and White River formations are the main units that produce mammal fossils and other small nonmammalian vertebrates. The Fort Union and Wasatch formations also are known to produce important fossil mammals and other vertebrates, but are not as fossiliferous in this area as the other listed formations.

Chugwater Formation. In general, the Chugwater Formation is made up of reddish mudstones, shales, and thin beds of limestones. The Alcova Limestone Member of the Chugwater Formation consists of a thin, hard, fine-bedded, pinkish-to-light-gray limestone. It rarely exceeds 1.5 to 3 meters in thickness, and is generally about 1-meter thick. Studies of fossils from the Alcova limestone (e.g., *Corosaurus*), suggest deposition during the Late Triassic Period.

Sundance Formation. The Sundance Formation consists of marine sandstones and shales deposited in an inland sea or adjacent near-shore and beach deposits from the latter part of the Jurassic Period. The formation varies in thickness from 75 to 130 meters. The Redwater Shale Member (Jurassic Period) consists of greenish-gray glauconitic mudstones and shales with some interbedded sandstones and limestones containing many invertebrate fossils, including clams, crinoids (sea lilies), and belemnites (squid-like animals). Pterosaur tracks occur in the Upper Jurassic-aged Sundance Formation at Alcova Reservoir. Dinosaur tracks are preserved in the Bighorn Basin at the BLM's Red Gulch Dinosaur Tracksite; dinosaur bones rarely are found. Ichthyosaur, mosasaur, and plesiosaur specimens occur in this formation.

Morrison Formation. The Late Jurassic Morrison Formation deposited in floodplain and lacustrine conditions can be up to 65 meters thick. It consists of green and greenish-gray shale and claystone with lenticular silty sandstones and occasional conglomerates, thin carbonaceous beds, freshwater marls, and limestone lenses characteristic of floodplain and lake deposits. The Morrison Formation is well known for producing scientifically noteworthy and highly diverse fauna and flora. In Wyoming, these include

Paleontological Resources

allosaurs, diplodocids, stegosaurus, and ankylosaurs, as well as reptiles, early mammals, mollusks, fish, and trace fossils. This formation is found throughout the Rocky Mountain area and is noted for fossil deposits at Dinosaur National Monument, Como Bluff, and other world-class sites.

Cloverly Formation. Overlying the Morrison Formation is the Lower Cretaceous Cloverly Formation with an average thickness of approximately 90 meters. The formation primarily has variegated claystones with channel-filling sandstones and conglomeratic sandstones. Above the zone of conglomerates and conglomeratic sandstones at the base of the Lower Cretaceous, the shales and sandstones are buff and gray with purple, maroon, and red shales in the middle. The Cloverly Formation has produced a diverse dinosaur fauna, as well as other Mesozoic reptiles and early mammals. In Wyoming, these include iguanodonts, sauropods, theropods, and ankylosaurs.

Lance Formation. The Late Cretaceous Lance Formation is dominated by nonmarine coastal floodplain sandstones, mudstones, and marls, with marginal marine sandstones and shales in its lower parts. It reaches more than 750 meters in thickness and is found in many places throughout Wyoming. The formation produces a diverse fauna in Natrona County. Lance Formation fossils include tyrannosaurs, ankylosaurs, hadrosaurs, ceratopsians, and pachycephalosaurs as well as mammals, reptiles, birds, and fish.

Wind River Formation. The Wind River Formation is composed of sandstone, conglomerate, mudstone, carbonaceous shale, and minor coal seams. Early Eocene mammal, reptile, and fish fossils have been identified in the Wind River Formation. The Lysitean and Lostcabinian subages of the Wasatchian North American Land Mammal Age are based on fossils recovered partly within the planning area near the communities of Lysite and Lost Cabin. These age designations are used throughout North America to categorize mammal fossils from these time periods.

White River Formation. The White River Formation is composed of bentonitic mudstone, sandstone, and altered and unaltered volcanic debris. About 230 meters of sediments of the early Oligocene White River Formation are exposed in Natrona and Converse counties (Emry 1973). Thousands of fossil vertebrates have been collected from these outcrops, including mammals, reptiles, fish, and birds. This formation is found throughout the Northern Great Plains and forms the landscape preserved at Badlands National Park in South Dakota.

Special Management for Paleontological Resources

The existing plan rescinded the original Pterodactyl Track ACEC designation; however, a mineral withdrawal from the 1872 Mining Law was mandated for this area, but never completed. The existing plan also stipulated no surface development in the Pterodactyl Track area unless it is related to paleontological site interpretation. This area is discussed in greater detail under the Special Designations, Alcova Fossil ACEC section of this document.

Preservation concerns are addressed by mitigation efforts aimed at reducing or preventing loss of paleontological resources and related information. These losses to the public can be caused by surface-disturbing activities, accelerated erosion resulting from natural or manmade actions, transfer from public ownership to private entities during land-tenure adjustments, illegal collecting, or vandalism. Identification of paleontological resources, implementation of proper mitigation measures, and overall sensitivity to the fragility and rarity of the resource is needed to maximize preservation efforts.

Recreation opportunities, which include hobby collecting of fossils and onsite interpretation and development, possibly can be developed within the planning area. Identifying specific hobby collecting areas presently is not possible due to a lack of information, but further study may determine that such areas exist and that collecting activities can occur in those areas without long-term adverse impacts to the

resource. Onsite interpretation and development of localities that prove interesting to the public also is possible, but not without some risk. Concentrating people at a developed site often increases the adverse impacts to that site and the resource due to increased vehicle and foot traffic and vandalism.

The biggest management challenge facing paleontological resources is the protection of important fossils and fossil localities from loss, damage, or destruction resulting from authorized or permissible activities, illegal collecting, vandalism, or disposal through land-tenure adjustments. Another management challenge is providing recreational opportunities to the public by identifying appropriate hobby-collecting areas or interpretive efforts without reducing the significance or interest of the resource.

Management actions for paleontology generally address protection of paleontological resources while providing for hobby and scientific collection, development of interpretive facilities, and identification of areas with high paleontological values. Keeping abreast of research, performing survey and monitoring mitigation of construction activities, avoiding important finds, and developing cooperative agreements with outside institutions can accomplish this. Some of these management actions are incorporated in the alternatives and described in more detail in Chapter 2.

3.5.3 Visual Resources

The purpose of visual resource management (VRM) is to manage the quality of the visual environment and to reduce the visual impact of development activities while maintaining the viability of all resource programs. VRM involves applying methods for evaluating landscapes and determining appropriate techniques and strategies for maintaining visual quality and reducing adverse impacts. A summary of the BLM VRM program follows:

- Lands have different visual values that warrant different management
- The VRM inventory system identifies and evaluates visual values
- The results are inventory classes incorporated into the RMP process
- Visual values are considered along with all other multiple resource values during the RMP process to determine VRM objectives; management decisions reflect a multidisciplinary analysis
- VRM objectives established by the RMP provide guidelines for the design and construction of all surface-disturbing activities
- Proposed projects are analyzed using the contrast rating process to determine if management objectives are met and to identify mitigation measures to minimize visual impacts.

Visual Resource Management Classes

The four VRM class objectives are as follows:

Class I – The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.

Class II – The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Class III – The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention, but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominate natural features of the characteristic landscape.

Class IV – The objective of this class is to provide for management activities that require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

Visual Resource Management within the Planning Area

Implementation of the the BLM’s VRM methodology begins with the inventory process. Landscapes are evaluated based on scenic quality, visual sensitivity, and distance zones (the distance from the existing network of travel routes). VRM class recommendations are based on the inventory process, and final class determinations are established by the RMP. Current VRM classes for portions of the planning area were established in the Platte River Resource Area Oil and Gas EA (BLM 2003b) (see Table 3-24 and Map 32).

Table 3-24. Visual Resource Management Classes

VRM Class	Acres (BLM-Administered Surface)
Class I	0
Class II	109,827
Class III	210,258
Class IV	953,543
Class V	2,074
Excluded	85,875

Source: BLM 2005a

Five areas in Natrona County were excluded from consideration during the Platte River Resource Area Oil and Gas EA and, as a result, no VRM class determinations have been made for these areas. The excluded areas include the Naval Petroleum Reserve #3, South Bighorns, Salt Creek Hazardous ACEC, and two smaller federal parcels.

Although the planning area continues to be managed in accordance with the classes established in 1981, BLM guidance has subsequently changed. In 1986, the BLM changed the number of VRM classes from five to four (BLM 1986a). The new guidance, along with increased visual intrusions and changing public opinion, necessitated the completion of a new inventory. The inventory was completed in 2004 as part of the current planning effort.

Results from the 2004 VRM inventory illustrate that the majority of the planning area should be classified as VRM Class III and Class IV. This allows for moderate- to large-scale visual intrusions, while striving to preserve the characteristic landscapes. Areas warranting more protections were delineated as Class II and include the South Bighorns, the South Bighorns/Red Wall and the Seminoe/Alcova National Back Country Byways, Fremont Canyon, the Laramie Range, portions of the Rattlesnake Hills, and along the North Platte River. These locations are higher in scenic quality and are much higher in visual sensitivity.

Special recommendations were made concerning NHTs and other historic trail corridors. Visual intrusions within these landscapes impact visitor experiences and the integrity of trail segments where the setting is integral in their historical significance.

Visual Resource Conditions

The condition of visual resources in the planning area varies greatly depending on location, the amount of activity, and the overall character of the landscape. Heavily impacted areas are normally populated with highly visible large-scale facilities or exhibit obvious surface disturbance. High-profile visual intrusions involve concentrated development, such as buildings, industrial facilities, infrastructures associated with oil and gas fields, quarries, and ROW involving surface disturbance. Surface-disturbing activities associated with these areas are readily noticed due to the amount of contrast with the representative landscapes. Portions of the NHTs lie within designated ROW corridors.

Low-profile visual intrusions, which include range improvements, fences, and two-track roads, are found throughout the planning area. Individually, these intrusions provide minimal disturbance to visual resources.

Visual resources in areas of concentrated recreation use near roads and trails may exhibit damage to vegetation, compacted soils, and linear features that contrast with the surrounding landscape. Areas currently exhibiting damage from OHV use within the planning area include public land in the South Bighorns, along the North Platte River, the Casper Canal, Alcova Lake, Kerfoot Creek, Badwater, Sioux Pass, Poison Spider Creek, and the K. Trail.

In addition to describing the VRM classes within the planning area, another aspect of VRM includes identifying rehabilitation areas. These areas, in which the existing visual intrusions exceed acceptable levels and class objectives, should include visual resource mitigation measures. Rehabilitation areas recommended within the planning area include the Salt Creek Oil Field, Casper Canal Shooting Area, Hackalo Quarry, Iron Creek Oil Field, and UMETCO pit/rock quarry on the west end of the Rattlesnake Hills.

Public concerns, including the quality of recreation experiences on public lands, protecting landscapes along NHTs, scenic values and scenic quality, and the costs to develop mitigation present management challenges for the BLM. Other management challenges for VRM include the environmental consequences of concentrated recreational use, degradation caused by the use of OHVs on public lands, overlap of NHTs and utility corridors, effective mitigation along travel routes including National Back Country Byways, data supporting the validity of current VRM classes within the planning area, and monitoring the long-term impacts of management standards and practices. Management actions are incorporated in the alternatives and described in more detail in Chapter 2.

3.6 Land Resources

The land resources topic includes the individual resources of lands and realty, renewable energy, rights-of-way and corridors, transportation, OHV, livestock grazing, and recreation. Each individual resource section includes a definition and description of the resource, the current condition of the resource, management challenges, and management actions.

3.6.1 Lands and Realty

The Casper Field Office lands and realty program is aimed at managing the underlying land base that hosts and supports all resources and management programs. The key activities of the lands and realty program include (1) land use authorizations (e.g., leases and permits, airport leases); (2) land tenure adjustments (e.g., sales, exchanges, donations, purchases); and (3) withdrawals, classifications and other segregations. The BLM works cooperatively to execute the Casper Field office lands and realty program with federal agencies, the State of Wyoming, counties and cities, and other public and private landholders.

Land Use Authorizations

Land use authorizations include various authorizations to use public surface for leases, permits, and easements under Section 302(b) of the FLPMA; R&PP leases under the R&PP Act of June 14, 1926 (43 U.S.C. 869 et seq.); and airport leases under the Act of May 24, 1928, as amended (49 U.S.C. Appendix, Sections 211-213). Past and current conditions associated with these components of land use authorizations are described below.

Leases, Permits, and Easements

Section 302(b) of the FLPMA authorizes the BLM to issue leases, permits, and easements for the use, occupancy, and development of the public lands. The Casper Field Office currently administers one special land use permit on 200 acres issued to the Wyoming Army National Guard for military training purposes near Camp Guernsey. Several permits were issued for short-term use of off-lease public surface associated with oil and gas development. Other permits have been issued for commercial filming projects on a one-time basis. No easements have been authorized.

Recreation and Public Purposes Act Leases and Conveyances

The R&PP Act authorizes the BLM to lease or convey public surface to state and local governments and qualified nonprofit organizations for recreation or public purpose uses. Lands are leased or conveyed for less than fair market value or at no cost for qualified uses. Examples of typical uses under the R&PPA include historic monument sites, campgrounds, schools, parks, public works facilities, and hospitals. Lands usually are leased first until development of the area is completed, and then, if appropriate, a title may be conveyed. The Casper Field Office administers 12 R&PP conveyances covering approximately 2,849 acres, and 14 R&PP leases covering approximately 626 acres.

Airport Leases

No existing airport leases currently are authorized.

Land Tenure Adjustments

The land-ownership pattern in the planning area is diverse. The eastern portion, mostly Platte, Goshen, and eastern Converse counties, have scattered public land parcels that are isolated by large private landholdings. This scattered ownership pattern makes these lands difficult to manage as part of the public land system. The small size of many scattered parcels and their isolation from other parcels of public

land make them of marginal utility to the public. Lack of legal public access diminishes their public utility. Some areas of exception occur, such as along the eastern flank of the Laramie Range west of Wheatland (e.g., Mule Shoe Flats and Cooney Hills), where large parcels are present. In western Converse County and largely throughout Natrona County large blocks of federal land are present, though scattered isolated parcels remain.

Land ownership (or land tenure) adjustment refers to those actions that result in the retention of public land, disposal of public land, or the acquisition by the BLM of nonfederal lands or interests in land. The FLPMA requires that public land be retained in public ownership, unless, as a result of land use planning, disposal of certain parcels is warranted. Tracts of land that are designated in BLM land use plans as potentially available for disposal are more likely to be conveyed out of federal ownership through an exchange rather than a sale. This preference toward exchange over sale is established in BLM policy. Acquisition of lands and interests in lands is an important component of the BLM's land tenure adjustment strategy. Acquisition of lands and interests in land is accomplished through several means, including exchange, purchase, donation, and condemnation, as described below. Lands and interests in lands are acquired for the following actions:

- Improve management of natural resources through consolidation of federal, state, and private lands
- Secure key property necessary to protect endangered species, promote biological diversity, increase recreational opportunities, and preserve archeological and historical resources
- Implement specific acquisitions authorized or directed by acts of Congress.

Exchanges

Exchange is the process of trading lands or interests in lands. Public lands may be exchanged for lands or interests in lands owned by corporations, individuals, or government entities. Exchanges are the primary means by which land acquisition and disposal are carried out. Except for those exchanges that are congressionally mandated or judicially required, exchanges are voluntary and discretionary transactions with willing landowners. Exchanges serve as a viable tool for the BLM to accomplish its goals and mission. The lands to be exchanged must be of approximately equal monetary value and located within the same state. Exchanges must also be in the public interest and in conformance with applicable BLM land use plans.

Land exchanges are used to (1) bring lands and interests in land with high public resource values into public ownership, (2) consolidate land and mineral ownership patterns to achieve more efficient management of resources and BLM programs, and (3) dispose of public land parcels identified for disposal through the planning process.

Only modest exchange activity has taken place in recent years within the planning area, although interest in exchanges continues to increase. Recent exchanges resulted in the acquisition of approximately 5,914 acres of private land in the South Bighorns area and approximately 656 acres of private land in the Pine Mountain area.

Purchases

The BLM has the authority, under Section 205 of the FLPMA, to purchase lands or interests in lands. Similar to other acquisitions, purchase is used to acquire key natural resources or to acquire legal ownership to lands that enhance the management of existing public lands and resources. Acquiring lands and interests in lands through purchase helps consolidate management areas to strengthen resource

protection. Purchases are used primarily to enhance recreation opportunities and acquire crucial wildlife habitats.

Acquisition of land by purchase is used sparingly given the limited funds available through appropriations. Only one land purchase using appropriated funds was completed in the planning area. One other purchase was completed using monies from the Land and Water Conservation Fund.

Donations and Condemnations

The BLM occasionally receives gifts or donations of lands or interests in land when an entity elects not to receive the market value for the interests being conveyed. Two access easements were donated to the BLM by the State of Wyoming for the Muddy Mountain access road. The city of Casper donated two easements for roads and utilities, as well as approximately 10 acres of land to the BLM for the National Historic Interpretive Trail Center in Casper. Acquisition by condemnation is rare and has not been used by the BLM for any acquisition in the planning area.

Land Sales

Section 203 of the FLPMA authorizes the sale of public lands. The objective of BLM land sales is to provide a means for disposal of public lands that are found, through the land use planning process, to be suitable for disposal. Public lands must be sold at not less than fair market value and meet the sale criteria of the FLPMA. Properties identified for disposal, restricted disposal, or retention are identified in Appendix G.

Section 209 of the FLPMA authorizes the conveyance of federal minerals through sale and specifies the conditions under which the mineral rights will be conveyed. The mineral rights may be sold with the land surface, sold as a separate transaction, or retained by the United States. Conveyance of mineral rights has occurred only in conjunction with sale of land surface.

The following sale activity shows the limited nature of land sales within the Casper planning area:

- In 1986, 14 parcels in the Goshen Hole area of Platte and Goshen counties totaling approximately 1,042 acres were sold.
- In 1987, 280 acres were sold to Umetco Minerals Corporation to accommodate a uranium mill tailings disposal site.
- In 1992, approximately 70 acres were sold to the town of Midwest to meet their needs for a sanitary landfill.
- In 1992, 2.5 acres were sold to a family in fulfillment of their 20-year commitment toward developing a cabin site under a small tract lease.

Withdrawals and Classifications

A withdrawal is a formal action that sets aside, withholds, or reserves federal lands for public purposes. Withdrawals accomplish one or more of the following:

- Transfer total or partial jurisdiction of federal land between federal agencies
- Dedicate federal land to a specific purpose
- Segregate (close) federal land from operation of some or all of the public land laws and (or) mineral laws. All the existing withdrawals segregate from operation of the public land laws, unless the surface estate is in nonfederal ownership. As used in terms of withdrawals, the public

land laws refer to the body of laws governing land disposal, such as sales and exchanges. No existing or proposed withdrawal segregates from mineral material disposal, meaning that no withdrawal closes the land to permits or contracts for disposal of sand and gravel or common varieties of building materials. Only four withdrawals (Naval Petroleum Reserve No. 3, Fort Laramie National Historic Site, Spook Site, and Camp Guernsey) segregate from operation of the mineral leasing laws. This precludes applications to lease the land under the Mineral Leasing Act for minerals such as oil and gas, coal, sodium, phosphates, and others. Most of the withdrawals segregate from operation of the mining laws. The exceptions include national forest and national grasslands, stock driveways (SDW), public water reserves, and some, but not all reclamation withdrawals. This means the land is closed to filing mining claims and prospecting for locatable minerals such as gold, silver, uranium, bentonite, and others.

Table 3-25 lists existing withdrawals. Included in the table are existing withdrawals established by the BLM to close specific sites and to protect the existing resource values, as well as withdrawals transferring public land to other federal agencies to accomplish their mission goals. This land use plan will make decisions recommending the continuation, revocation, or enlargement of existing BLM withdrawals and about establishing new BLM withdrawals. This land use plan also will consider transferring additional public land to other federal agencies through withdrawal, where additional public land is needed to accomplish their mission goals.

This plan will not make decisions on revocation of other federal agency existing withdrawals. However, this plan does recognize that should a withdrawal be revoked by action of another federal agency, those lands that are suitable for return to public land status for management by the BLM will be managed in the same fashion as adjoining public lands.

Land classification is a process required under specific laws to determine the suitability of public lands for certain types of disposal or lease, or suitability for retention and multiple use management. Most land classifications also segregate public lands from operation of some or all of the public land laws and (or) mineral laws. Table 3-25 shows existing site-specific classifications.

Lands proposed to be leased or conveyed under the R&PP Act must first be classified as suitable for such use. R&PP classifications segregate the land from operation of the public land laws except for the R&PP Act, which precludes disposal by sale, exchange or other means, but specifically allows for R&PP lease or conveyance. R&PP classifications also segregate from operation of the mining laws, closing the area to mining of locatable minerals. R&PP classifications do not segregate from mineral leasing. R&PP leases and conveyances reserve all minerals in the land to the United States. In accordance with 43 CFR 3809.2(a), this land use plan will make decisions about continuation or termination of the segregation on the reserved locatable mineral estate in land that was classified and conveyed under the R&PP Act. Lands that are classified and leased under the R&PP Act remain segregated.

Table 3-25. Existing Withdrawals, Classifications, and Other Segregations in the Casper Planning Area

Name	Acres
Special Management Areas	
North Platte River	3,226
Resource Protection	
Fremont Canyon (Classification and Multiple Use)	0
Muddy Mountain (Classification and Multiple Use)	1,027
Public Water Reserves	1,389
Stock Driveways	101,636
Table Mountain, Bump-Sullivan, and Springer (Classification and Multiple Use)	2,018
Classifications	
Coal Classifications	417,000
R&PP Classifications	3,468
Other Segregations	
Exchange Land	10,566
Sale Land	1,219
Other Federal Agency Withdrawals	
Air Navigation Site (Federal Aviation Administration)	198
Camp Guernsey	5,620
Fort Laramie National Historic Site (National Park Service)	792
Grey Reef Power Site (Federal Emergency Regulatory Commission)	29
Mill Tailings Spook Site (U.S. Department of Energy)	90
National Forests (U.S. Forest Service)	81,768
Thunder Basin National Grasslands (U.S. Forest Service)	163,238
National Wildlife Refuge (U.S. Fish and Wildlife Service)	7,458
Naval Petroleum Reserve Number 3 (U.S. Department of Energy)	9,324
Reclamation (U.S. Bureau of Reclamation)	18,078

Source: BLM 2005a

Note: Due to overlapping resources, numbers are not additive.

R&PP Recreation and Public Purposes

Several existing classifications were established under the 1964 Classification and Multiple Use Act. The lands were classified for retention and multiple use management, and against sale, agricultural entry, and mining location, but remain open to mineral leasing. Table Mountain, Springer, Bump Sullivan, Muddy Mountain, and Fremont Canyon area are included within this group of classifications. This land use plan will review these existing classifications and determine if the segregations they provide are still necessary and need to remain in place. If the segregation imposed by the classification is still appropriate, the BLM will pursue a formal withdrawal of the land and this plan will establish the parameters of any formal withdrawal action.

Coal withdrawals segregate lands from entry under the public lands laws and from the nonmetalliferous mining laws, pending classification of the coal potential within those lands. They remain open to mineral leasing and entry. Subsequent legislation including the 1909 and 1910 coal acts allowing nonmineral entry on coal lands, and the 1920 Mineral Leasing Act, as amended by the Federal Coal Leasing Amendments Act, have effectively replaced the need for coal withdrawals and subsequent classification of the coal potential. This land use plan will make decisions concerning the need for continuing these coal withdrawals and classifications and the accompanying segregation.

Other segregations result from a variety of actions, such as exchanges and land sales where the federal mineral rights are reserved to the United States in the land patent. Table 3-25 lists other segregations of this type.

Locatable federal minerals reserved to the United States in a land exchange or land sale completed under authority of the FLPMA are segregated from operation of the mining laws. This segregation is the result of language in the FLPMA, to the effect that such reserved federal mineral rights are not available for entry until regulations are promulgated providing for such entry. This is the same segregation affecting reserved federal minerals in R&PP conveyances discussed above. The implementing regulations were enacted on November 21, 2000 (65 FR 70112), at 43 CFR 3809.2(a). In accordance with these regulations, this land use plan will make decisions about continuation or termination of the segregation on the reserved locatable minerals in land that was conveyed by exchange or sale.

Management challenges identified for lands and realty in the planning area are based, in part, on historic activities and trends, as well as on current and future needs of public resources and internal and external customers. Management challenges include managing BLM lands to adequately meet the needs of multiple uses per the FLPMA; improving the management of natural resources; obtaining important lands needed for the protection of endangered species, enhancing biological diversity, increasing recreational opportunities, and preserving archeological and historical resources; bringing into public ownership lands and interests in land with high public resource values; consolidating land and mineral ownership patterns for more streamlined management of resources and BLM programs; and disposing of lands identified for disposal.

Management actions for lands and realty generally address meeting the needs of internal and external customers through lease and permits, land-tenure adjustments, and withdrawals. Management actions are incorporated in the alternatives and described in more detail in Chapter 2.

3.6.2 Renewable Energy

Renewable energy generally is defined as energy derived from sources such as wind, solar, and biomass. Wind energy refers to the kinetic energy generated from wind produced by power-generating turbines. Solar energy includes electricity from photovoltaic panels. Bioenergy from biomass refers to energy from organic waste products that are either burned directly or converted to fuels that can be burned to produce energy.

Wyoming has one of the best wind resources in the country; the demand for solar and biomass energy in the state are not as strong. Currently, the operating renewable energy capacity in Wyoming is 284.6 megawatts (MW) of wind energy, 0.05 MW of solar energy, and 0 MW of biomass energy (GAO 2004; Energy Atlas 2004). A recent study, "Assessing the Potential for Renewable Energy on Public Lands," presented a nationwide overview of renewable resources on BLM lands. In this study, Wyoming was assessed as having a high potential for wind-energy development and lower potentials for solar and biomass energy (BLM 2003e). Currently, no wind farms are located in the planning area. Due to the lack of demand in the near future for development of solar and biomass energy, only wind energy will be discussed in the remainder of this section.

Lands within the planning area have varying wind-energy potentials: approximately 146,129 acres have been classified for outstanding and superb potential; 999,468 acres with excellent, good, or fair potential; and 215,980 acres with poor or marginal potential. Approximately 429,294 acres of BLM-administered surface are open to wind-energy development without use limitations, and approximately 723,619 acres are open but subject to avoidance limitations. Map 42 presents the wind-energy potential for the planning area and Table 3-26 provides information on the wind-power classes referred to in Map 42. The

information displayed in Map 42 and Table 3-26 is derived from U.S. Department of Energy (DOE) National Renewable Energy Laboratory (NREL) wind-energy potential data (NREL 2002). The identified wind-potential areas embrace large geographic areas within which there are numerous areas of land that do not meet the overall classification. A large margin of error is likely in the mapped location and boundaries and, thus, in any acreage calculations.

Table 3-26. Wind-Energy Potential by Wind-Power Class

Wind-Power Class	Resource Potential	Wind Speed (mph)
1	Poor	0-12.5
2	Marginal	12.5-14.3
3	Fair	14.3-15.7
4	Good	15.7-16.8
5	Excellent	16.8-17.9
6	Outstanding	17.9-19.7
7	Superb	> 19.7

Source: NREL 2002

Note: The estimates have been validated by NREL; however, the numbers are just measurements and should be confirmed by direct measurement.

> greater than
mph miles per hour
NREL National Renewable Energy Laboratory

The National Energy Policy encourages the development of renewable energy resources as part of an overall strategy to develop a diverse portfolio of Domestic Energy supplies for the future (National Energy Policy Development Group 2001). The United States wind-power-generating capacity quadrupled between 1990 and 2003 (GAO 2004). It is BLM's general policy to encourage the development of wind-energy in acceptable areas.

Development of renewable energy projects depends on market trends and market value. The demand for renewable energy is illustrated by development projects throughout the west on public and private lands. The importance of renewable energy sources increases in the planning area as nonrenewable energy prices increase and as the need grows for more and cleaner energy sources. Interest in wind-energy development involving BLM-administered lands is increasing in the western United States. At this time, renewable energy development within the planning area is limited to isolated wind-energy development on private lands; however, potential for increased wind-energy development within the planning area exists. Current management does not limit wind-energy development to specific areas or power classes.

Cooperative Management

Due to the wind-energy potential in the west and the associated interest and applications for wind-energy on BLM lands, the BLM prepared a *Final Programmatic Environmental Impact Statement on Wind-Energy Development on BLM-Administered Lands* (BLM 2005h). This EIS will be used by the BLM when considering development of wind-energy resources on BLM-administered lands in the planning area. Management actions for renewable energy generally address development on suitable lands for energy development. These actions are included in the alternatives and are described in more detail in Chapter 2.

3.6.3 Rights-of-Way and Corridors

A rights-of-way (ROW) grant is an authorization to use specific pieces of public land for certain projects, such as developing roads, pipelines, transmission lines, and communication sites. The grant authorizes rights and privileges for a specific use of the land for a specific period of time. In the existing land use plan, ROW corridors were formally designated as the preferred location for existing and future ROW in the planning area.

An important component of the ROW program is the intrastate and interstate transportation of commodities that are ultimately delivered as utility services (e.g., natural gas, electricity) to residential and commercial customers. Equally important on the local level is the growing demand for legal access to private homes and ranches using ROW grants.

The BLM and other agencies (Office of Electricity Delivery and Energy Reliability, Department of Energy, and the USFS) are preparing the West-wide Energy Corridor Programmatic EIS (PEIS). The PEIS will evaluate potential impacts associated with the proposed action to designate corridors on Federal land in the 11 Western States (including Wyoming) for oil, gas and hydrogen pipelines and electricity transmission and distribution facilities. BLM and other agencies issuing the PEIS will amend their respective land use plans by designating a series of energy corridors effective upon signing of the Record(s) of Decision. As of January 2003, more than 1,000 ROW existed in the planning area that were issued under a variety of laws over time and administered according to the conditions specified in the ROW grants. In the 20-year period from 1982 through 2002, 632 ROWs were issued on approximately 9,955 acres of public land in the planning area. On average, 32 ROWs authorizing use of approximately 15 acres per ROW, or 495 acres total per year, are authorized by ROWs in the planning area.

There are eight designated ROW corridors and one designated communication site window with three sites (ROW use areas) in the planning area. ROW corridors encompass 92,113 acres of federal surface lands. Designated Casper Field Office ROW corridors are identified by the Western Utility Group Western Regional Corridor Study (1992).

Most of the proposed ROWs in the planning area are approved, although approvals may be subject to mitigation that may include minor relocation or project modification. Where land use conflicts exist, such as cultural resource values and oil and gas lease development, the project depends on resolving that conflict.

The majority of road ROW and the majority pipeline ROW are directly related to oil and gas lease development (195 APD-related roads compared to 57 other roads and 176 oil and gas pipeline ROW out of 632 total ROWs in the past 20 years). During the 20-year period from 1982 through 2002, four major ROW applications (1983, 1989, 1996, and 2001) were processed and approved by the Casper Field Office. Most of these ROW used designated corridors. This level of major ROW project activity is expected to continue.

In the past 20 years, only two ROW applications have been rejected due to management plan restrictions. In areas currently managed as ROW "exclusion areas," one proposed ROW application was denied because it was located in the Jackson Canyon ACEC. One in the South Bighorns also was denied, but the need was met by other means (e.g., generator power). Approximately 32 new or amendment ROW applications are processed annually within the Casper Field Office. The ROW corridors are identified in Map 43.

Future needs for existing corridors are not well defined, but the need for power transmission, telecommunication, infrastructure improvements, and pipeline capacity is anticipated. The demand for ROW and corridors is influenced by specific actions within the planning area (such as oil and gas leasing) and by economic forces and other external pressures and conditions that are independent of resource management decisions in the planning area. For example, the demand for expanded infrastructure capabilities throughout the planning area can be dictated largely by state or national needs and requirements. Technological advancements also have brought new demands for public land, largely related to wind energy and telecommunications (e.g., cellular and fiber optic advancements).

Management actions for ROW and corridors include meeting the anticipated needs for power transmission, telecommunication, infrastructure, and pipeline capacity; making public lands available to meet the needs for major ROW customers (e.g., an intrastate pipeline); and making public lands available to meet the needs for smaller ROWs (e.g., roads or pipelines for oil fields, access roads for private homes and ranches). Management actions are incorporated in the alternatives and described in more detail in Chapter 2.

3.6.4 Transportation

The emphasis of the following discussions is on BLM's transportation program, which includes providing means for legal access to public land and maintenance and development of various transportation facilities. Acquisition of lands and interests in lands, and the tools used to acquire access, are discussed in detail in the Lands and Realty section of this document. ROW to meet transportation needs are addressed in the Rights-of-Way (ROW) and Corridors section of this document. OHV and related issues are discussed in this OHV section.

Access is acquired using several different tools, including purchase, exchange, reciprocal ROW, donation and condemnation. ROW reservations are used to establish and record access roads across private land. Cooperative agreements with land owners are used on occasion, but do not provide long-term legal public access. Both the transportation and ROW programs are active and receive a great deal of public interest because access is important for resource users and managers. Some access that is wanted or needed in the planning area is limited.

As seen in Table 3-27, the BLM currently manages 19 existing easements acquired for public access. Current planning identifies the need for acquisition of access easements on 16 proposed roads or trails.

Management challenges identified for the transportation program in the planning area are based, in part, on historic activities and existing conditions and trends. Management challenges include increased road use based on anticipated increases in oil and natural gas activity and recreational use demand; a road network insufficient to support anticipated expansion of oil and natural gas operations in compliance with the multiple-use concepts within the FLPMA; roads that are no longer needed; and road design and construction considering other resource programs aims to minimize impacts.

The Casper Field Office transportation program aims at managing access to and across public lands. Transportation management areas may be designated and a travel management plan may be developed during RMP implementation to address management challenges. Management actions designed to address the challenges identified in this section are incorporated in the alternatives and described in more detail in Chapter 2.

Table 3-27. Existing and Proposed Access Easements in the Casper Planning Area

Easement	Length (Miles)	Width (Feet)	Area (Acres)
Existing			
Muddy Mountain	0.80	100	9.7
Muddy Mountain	0.12	100	1.45
Muddy Mountain	3.25	100	39.39
Goldeneye Trail (pedestrian trail)	---	---	1.44
Goldeneye Trail (pedestrian trail)	---	---	75.17
Meadow Creek Site (interpretive site)	---	---	1.34
Bucknum	1.36	100	16.48
Bucknum	0.42	100	5.09
Cactus Flat	0.52	100	6.3
Cactus Flat	0.07	100	0.85
Cactus Flat	1.55	100	18.79
Cactus Flat	0.35	100	4.24
Horse Ranch	0.42	70	3.56
Horse Ranch	2.16	70	18.33
Casper Mountain	0.13	30	0.47
Casper Mountain	0.1	30	0.36
Three T	0.36	70	3.05
Pathfinder	0.02	60	0.15
Pathfinder	0.16	90	1.75
Proposed			
Corral Creek	3.50	100	42.42
Bates Creek Reservoir	3.00	100	36.36
Kerfoot Creek	0.50	100	6.06
Alkali Trail	0.75	100	9.09
Horse Ranch	2.50	100	30.3
Hitt	6.50	100	78.79
Big Sulphur	5.75	100	69.7
Canyon Creek	2.25	100	27.27
North Platte River #2	1.25	100	15.15
North Platte River #3	0.25	100	3.03
North Platte River #4	1.50	100	18.18
North Platte River #5	3.25	100	39.39
North Platte River #6	0.50	100	6.06
North Platte River #8	1.50	100	18.18
North Platte River #9	2.00	100	24.24
Upper Laramie River	1.25	100	15.15

Source: BLM 2005a

3.6.5 Off-Highway Vehicles

For legislative purposes, 42 CFR 840 defines an OHV as “any motorized vehicle capable of or designated for, travel on or immediately over land, water, or other terrain.” The majority of OHV use on public lands occurs on unpaved roads and two-track trails (Map 49). In the planning area, the most common vehicles used are four-wheel drive trucks and sport utility vehicles. The national objectives for OHV management are to provide for OHV use while protecting natural resources, promoting safety of all users, and minimizing conflicts among the various users of public lands.

OHV Use Within the Planning Area

Road networks within the planning area comprise a series of county roads, BLM-maintained roads, two-track trails, and snowmobile trails. The use of these travelways is an integral part of public land management, as these roads are used for both recreational and nonrecreational purposes.

OHV use is a popular method to explore public lands. OHV use also provides access for nonmotorized recreational purposes, such as fishing, hiking, mountain biking, horseback riding, and primitive camping opportunities.

Nonrecreational OHV use of the planning area includes agricultural management, energy development, and land-management activities. Employees of government agencies, ranchers, energy companies, and utility providers are permitted users who utilize OHVs to access and maintain the infrastructure required for the continued operation and maintenance of their facilities.

BLM has established OHV area designations in accordance with the BLM Land Use Planning Handbook requirements and 43 CFR 8342.1. These designations establish guidelines and limitations for OHV use. Public lands may be designated open, limited, or closed (see OHV Management Designations in the Glossary and Appendix R). The vast majority of OHV use throughout the planning area is limited to existing roads and trails. Exceptions are listed below:

- Muddy Mountain (natural area) and sites along both the Oregon Trail and Bozeman Trail are closed to all types of motorized vehicle use.
- Motorized vehicle use on public lands along the North Platte River from Casper to Alcova or within the Goldeneye Wildlife & Recreation Management Area, Sand Hills, Jackson Canyon ACEC, Muddy Mountain Environmental Education Area (EEA), and Red Wall is limited to designated roads and trails.
- Motorized vehicle use within the Casper Sand Dunes is limited to designated roads and vehicle routes, but this designation reverts to existing roads and trails during the hunting season.
- The Poison Spider OHV Park is open to all types of motorized use.

OHV Use and Environmental Concerns

The OHV designations for the majority of public lands within the planning area are currently either “limited to existing roads and trails” (1,311,715 acres) or “limited to designated roads and trails” (47,014 acres). While these designations provide for a wide variety of OHV use, the majority of recreational OHV use occurs in areas with legal and physical access to large blocks of public lands. The majority of OHV use currently is located in the South Bighorns, in and around the Muddy Mountain EEA, along the North Platte River, and in areas of Bates Hole. The Poison Spider OHV Park (187 acres) has become a popular venue for local OHV enthusiasts and is open to all forms of OHVs (see Recreation section for more information). Approximately 2,661 acres are currently closed to OHV use in the planning area.

The popularity and use of OHVs has grown substantially. Areas that were once infrequently visited are now popular places for recreational touring and other OHV-related activities. However, off-road or other inappropriate use of these vehicles can cause undue environmental degradation and increased conflicts among user groups.

Certain environments are more susceptible to OHV damage, including crucial wildlife habitats, riparian areas, and areas with steep slopes or sensitive soils. Within the planning area, OHV use in the South Bighorns includes the Red Wall area, Bates Hole as defined by the SMAs, North Platte River from Casper to Alcova, and the Muddy Mountains including the area between the EEA and Jackson Canyon are of special concern because of the sensitive nature of these areas. In addition, the Sand Hills are particularly vulnerable to OHV-related impacts; however, this area currently has limited public access.

OHV use will continue into the future. The lack of appropriate signage, a shortage of law enforcement personnel, the increase in OHV use throughout the planning area, and a general lack of understanding of land use ethics have increased inappropriate uses of OHVs on federal lands and represent management challenges for the BLM. OHV damage includes driving off established roads and trails, pioneering unauthorized roads and trails, and associated damage to vegetation and soils. Management actions to address these challenges are included as part of the alternatives described in Chapter 2 of this document.

3.6.6 Livestock Grazing

The BLM is responsible for administering livestock grazing on public land surface across the planning area. Livestock grazing includes the grazing of domestic animals (e.g., cattle, sheep, horses, goats, and bison) within the planning area. BLM-administered public lands are important to local ranch operations particularly in the western half of the planning area (Natrona and western Converse counties). In these areas, the majority of ranch operations lease some public lands. The public lands are almost always intermingled with private and state lands, which are grazed as one unit. Across the planning area there are only a few pastures and just three allotments that contain 100 percent public land. Public lands maintain the integrity of many ranch operations and support the culture, lifestyle, and livelihood of the grazing lessees. In many cases, if ranchers lost their BLM grazing lease(s), the viability of their ranch operation would be seriously affected, thereby making it extremely difficult for them to stay in the livestock business. If forced to sell, many of these ranches would be subject to subdivision, which would result in the loss of important open spaces, view sheds, scenic vistas, and revenues to local economies. In the eastern portion of the planning area, public lands generally are less important to the viability of most of the grazing operations. In this area, BLM-administered public lands usually consist of isolated 40- 80- or 160-acre tracts of land, and the viability of most grazing operations likely would be able to be maintained if the BLM grazing leases were lost.

Animal Unit Month (AUM) Allocations

Lands within the planning area have been used by ranchers for grazing livestock since the latter part of the 19th century. In the early part of the 20th century, there were more sheep than cattle in Wyoming, and Natrona County was one of the largest sheep-producing areas within Wyoming. Sheep numbers reached their peak in the 1920s, but have steadily declined since then.

The Casper Field Office manages lands for livestock grazing in Converse, Goshen, Natrona, and Platte counties; the majority of the lands are in Natrona County. Approximately 1.4-million surface acres of public land are available for grazing within 514 grazing allotments. Grazing allotments typically contain a combination of federal, state, and private lands and range in size from approximately 12 acres to 116,538 acres, with the average allotment size being approximately 8,768 acres. The Casper Field Office administers 462 grazing leases, allowing approximately 182,479 Animal Unit Months (AUMs) of livestock forage. Actual AUM use in the planning area is considered to correspond with authorized AUM

use. Currently, approximately 6,016 acres of BLM-administered public lands are closed to grazing (see Appendix H). Current management evaluates 10 percent of grazing allotments annually to determine whether they meet standards for healthy rangelands.

Grazing systems used on public lands within the planning area fall into the following six categories: yearlong, season long, early season, late season, split season, rotation (i.e., deferred rotation, rest rotation, and time-controlled grazing systems). Of the 462 grazing leases in the planning area, approximately 72 percent (335) authorize yearlong use, which is a reflection of the intermingled land pattern that exists across the planning area, as well as the small percentage of public land found in the majority of allotments. The majority of these ranch operations use pastures containing public land throughout the year; however, this does not mean individual pastures containing public lands are used 12 months of the year.

Table 3-28 shows the number of grazing leases by livestock use category. Of the 462 grazing leases 76 percent authorize cattle only; 9 percent authorize both cattle and sheep; 3 percent authorize cattle, sheep and horses; 1 percent authorizes sheep only; 1 percent authorizes horse only; and less than 1 percent authorizes bison and goats. The use of horses for ranch operations is common and is authorized on 9 percent of the leases. Appendix S describes the guidelines for yearling conversion.

Table 3-28. Livestock Grazing Leases on Lands Administered by the Casper Field Office

Number of Leases	Livestock Use Category
353	Cattle
41	Cattle and Sheep
14	Cattle, Sheep, and Horses
6	Sheep
5	Horses
2	Bison and Goats
41	Horse and Ranch Operations
462	Total

Source: BLM 2005c

The number of AUMs authorized by the Casper Field Office has declined slightly since 1985. This decline is due to changes in ownership from patenting of mining claims, closing areas to grazing, allotment boundary adjustments that have been made with adjoining BLM offices, suspension of AUMs due to rangeland suitability, and land-tenure adjustments. No increases in permitted AUMs in any grazing allotments have occurred since 1985. Population growth is expected to continue around existing cities, which could result in a local decrease in AUMs, especially around Casper.

From 1995 to 2002, livestock production within the planning area accounted for 23 to 25 percent of the total number of breeding sheep and 21 to 27 percent of all cattle and calves in Wyoming. The amount of land leased for grazing ranges from 12 acres to 50,000 acres of public land. Public lands contribute anywhere from 1 to 60 percent of the available forage in some grazing allotments.

SDW withdrawals are authorized under the Stock Raising Homestead Act of 1916 and created by secretarial order for the specific purpose of creating lanes and reserving water sources for trailing livestock. The SDW withdrawals prohibited disposal of these lands, protected water sources, and placed limits on mining activity, but did not withdraw them from locatable mineral entry. For the most part, the SDW are fenced lanes; however, in some areas, they are unfenced through adjacent allotments.

Historically, more than 200 miles of SDWs existed in the planning area (see Map 54). Use of these SDWs is an important part of livestock operations, especially for ranchers trailing livestock between summer and winter ranges. Today, there are two major SDW systems—the 33-Mile SDW and Bates Hole SDW, both of which occur in Natrona County and comprise approximately 46,378 acres and 5,797 AUMs. Annually, the BLM issues trailing permits and supervises the use of these areas. Some segments of the SDWs are seldom used for trailing and, in many cases, have been incorporated into adjacent grazing allotments. Current management uses SDWs to the extent possible; however SDW withdrawals are canceled for trails that are not active. For example, the Orpha SDW in Converse county is now part of a grazing operation and is used for moving livestock between pastures. In 1985, approximately 7,200 cattle and 44,000 sheep were using the SDWs annually. Annual use of the SDWs has dropped as fewer operators use them for trailing, and since 2000, a shift in the number of sheep and cattle using them has occurred (to approximately 17,500 cattle and 27,700 sheep).

Rangeland Health/Productivity

In 1985, the BLM established three categories for allotments to identify areas where management was potentially needed, as well as to prioritize workloads and the use of range-improvement dollars. Allotments were categorized as Improve Existing Resource Conditions (I), Maintain Existing Resource Conditions (M), or Custodial Management (C). When allotments in the planning area were originally categorized, resource conditions in some of the allotments placed in the I category were not necessarily in need of improvement. Criteria that were used to place allotments in the I category included the amount of public land present in the allotment; willingness of lessees to invest in management; opportunities for constructing range improvements; existence of grazing-related resource conflicts; allotment had moderate to high forage production potential and was producing at low to moderate levels; the rancher or the BLM identified opportunities for improvement in range condition; range trend was static or downward; livestock management could be improved through water distribution; seasons of use or other factors; and opportunities existed for a positive economic return on public investments.

Since 1985, the BLM has worked to resolve the issues identified in higher priority allotments. Currently, 46 allotments are categorized as I, 65 are classified as M, and 403 are classified as C (Map 54). The I and M category allotments contain approximately 1,016,314 acres of public land, or 70 percent of the total acreage in the planning area. The majority of the allotments with an I designation in the planning area occur west of Casper in Natrona County; the majority of the allotments with an M designation occur west of Douglas in Natrona and western Converse counties. The primary reason for this distribution of allotments is that the majority of public land occurs in these counties. In the past, allotments in the I category generally received top priority; however, with the current emphasis on evaluating rangeland health on a watershed basis, some management actions may be implemented on M or C category allotments to resolve problems within a watershed. Comparison of range condition data from surveys completed in the 1950s and 1960s and surveys completed in the 1980s and 1990s indicate that the condition of public lands in the planning area has improved due to improved livestock management both by the BLM and grazing lessees.

Changes in federal grazing regulations required the BLM to evaluate rangeland health and manage domestic livestock in accordance with the *Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for Public Lands Administered by the BLM in the State of Wyoming* approved August 12, 1997 (BLM 1998b). The six standards set forth relate primarily to physical and biological features of the landscape and are intended to be within control of the land manager and achievable by the user. These standards relate to all BLM resource programs, and rangeland health can be positively or adversely impacted by any resource program or resource use.

The standards are used to enhance sustainable livestock grazing and wildlife habitat while protecting watersheds and riparian ecosystems. For allotments that do not meet rangeland health standards,

guidelines designed to improve rangeland health are specified in allotment management plans or management agreements. A total of 15 allotments (233,019 acres) currently are operated under allotment management plans, CRM plans, or management agreements. Current management strives to maintain or improve rangeland health on all grazing leases; however, the emphasis is on I and M category allotments and not all allotments in the planning area.

Approximately 10 percent of the public lands in the planning area are assessed annually for rangeland health. By the end of FY 2004, 50 allotments totaling 477,824 acres were evaluated. Twenty-six allotments (280,238 acres) were found to meet rangeland health standards. The remaining 24 allotments (197,586 acres) were found to not be meeting one or more standards. In 2 of the 24 allotments not meeting standards, livestock were determined not to be the primary factor causing degradation of rangeland health. In the remaining 22 allotments not meeting rangeland health standards, past or present livestock uses were determined to be contributing factors. It is important to note that only specific areas (e.g., 15 percent or less of the allotment) of public land within the 22 allotments were failing rangeland health standards.

Other factors contributing to rangeland health degradation include county roads channeling runoff into stream channels adding sediment and changing hydrology; culverts in roads causing headcuts; production water from oil and gas wells that increases bank sloughing and sediment loading; and heavy browse use by wildlife on winter ranges. The rangeland health standards most often not met were Standard #2, which addresses riparian and wetland areas, and Standard #3, which addresses upland plant communities. In upland communities, INPS, poor plant vigor, and composition of plant communities are contributing factors for not meeting Standard #3.

Where livestock grazing has been identified as contributing to an allotment failing rangeland health standards, guidelines or BMPs have or will be implemented. The Garrett Allotment is an example where successful guidelines were used to improve grazing and ecological conditions. The 41,562 acres of the Garrett Allotment (Allotment Number 10032) include 20,684 acres of public land, 18,167 acres of private land, and 2,600 acres of state land. In 1998, the BLM determined that while the majority of the public lands in the allotment met rangeland health standards, some of the public lands in three pastures did not. Working cooperatively with the grazing lessee and the WGFD, the BLM implements range improvements to address rangeland health concerns. Prescribed burning, water developments, creation of a riparian pasture, channel stabilization structures, cross fencing to create smaller pastures, and a change in season of use to provide longer periods of rest have improved conditions in the allotment. A segment of Lawn Creek, which was determined to be nonfunctional, is now in PFC. Prescribed burns in the allotment improved forage quantity and quality for both livestock and wildlife and helped improve the distribution of livestock. Additional prescribed burns and other vegetative treatments are being proposed within the allotment.

Standards for Healthy Rangelands in Wyoming

- **Standard #1.** Within the potential of the ecological site (soil type, landform, climate, and geology), soils are stable and allow for water infiltration to provide for optimal plant growth and minimal surface runoff.
- **Standard #2.** Riparian and wetland vegetation has structural, age, and species diversity characteristic of the stage of channel succession and is resilient and capable of recovering from natural and human disturbance in order to provide forage and cover, capture sediment, dissipate energy, and provide for groundwater recharge.
- **Standard #3.** Upland vegetation on each ecological site consists of plant communities appropriate to the site that are resilient, diverse, and able to recover from natural and human disturbance.
- **Standard #4.** Rangelands are capable of sustaining viable populations and a diversity of native plant and animal species appropriate to the habitat. Habitats that support or could support threatened, endangered, species of special concern, or sensitive species would be maintained or enhanced.
- **Standard #5.** Water quality meets state standards.
- **Standard #6.** Air quality meets state standards.

Monitoring is conducted to determine whether objectives are being met and if adjustments in management need to be made.

Over the last 40 to 50 years, an improvement in range condition has occurred, due largely to improved grazing management practices, development of range improvement projects (e.g., fences and water developments) and, in some cases, reduction in livestock numbers or change in kind of livestock. To various degrees, improvements in range condition generally are anticipated to continue under all alternatives based on vegetation treatment and range-improvement projects and development of guidelines for those areas determined not to meet rangeland health standards. INPS is one factor that may adversely impact the improving trend.

The Missouri River Basin studies, conducted by the BLM between 1952 and 1965, provided baseline data on vegetative types, livestock carrying capacities, and, in some cases, range conditions. The North Platte River Basin Study, 1962, was based on an indepth literature search on historical range condition. The study area includes a large portion of the planning area. A number of journals and observations of frontiersmen from the 1840s to the 1870s were quoted, and old photographs taken in the 1870s were reviewed. The same landscapes were rephotographed in 1958 for comparison. The results of this assessment indicate that range conditions, including sagebrush densities, were much the same in 1958 as they were in 1870.

Two range site and range condition surveys were completed by the BLM on approximately 587,000 acres of rangeland in Natrona County in 1982 and 1994. These surveys indicate that the condition of about 80 percent of the survey area was in good or excellent condition, while about 10 percent of the survey area was in fair or poor condition. The remaining 10 percent included lands that were unclassified and included rock outcrops, slick spots, or areas of disturbance. A comparison of range conditions between the Missouri River Basin surveys and the 1982 and 1994 surveys indicate range conditions improved during the 30-to 40-year period between the two surveys.

Vegetation and rangeland improvement projects have been, and will continue to be, implemented on BLM-administered public lands. Between 1985 and 2004, approximately 430 acres per year were treated with prescribed burns. These projects typically included adjacent landowners and, therefore, encompassed a greater extent of land than reported; however, it is unknown how much more land would be affected by these types of projects within the planning area. An estimated 1,950 acres per year were burned due to wildland fire between 1985 and 2004. Frequently, both planned (i.e., prescribed) and unplanned (i.e., wildland) fires are beneficial to rangeland health, livestock production, wildlife, and watershed health. However, the BLM's policy requiring deferment of livestock grazing for two growing seasons following planned and unplanned fires has and will continue to affect livestock producers.

Rangeland improvement projects can serve as management tools or BMPs to control or improve livestock distribution and use within an allotment. These projects consist primarily of improving fences, reservoirs, springs, water wells, and vegetative treatments. When properly implemented, rangeland improvement projects assist in maintaining or improving rangeland health and increase forage production. On average, the BLM completes 11 to 12 new range improvement projects per year to meet specific management goals and objectives. Table 3-29 shows the range improvement projects completed since 1985.

Table 3-29. The Type and Number of Range Improvement Projects in the Casper Planning Area

Project Type	Projects Completed Since 1985	Total Recorded Number
Reservoirs (Number/Acres)	45/30-50	421
Springs (Number)	25	38
Wells (Number)	26	108
Pipelines (Number/Miles)	24/13.41	27
Fences (Number/Miles)	89/147.5	N/A
Brush Control (Acres)	7,732	N/A

Source: BLM 2005c
N/A Not Available

Management challenges facing the livestock grazing program in the planning area include balancing multiple resource uses such as wildlife use of forage and wildlife compatible fences; ongoing coordination with ranchers, the public, and interested stakeholders; spreading of INPS; developing livestock grazing management strategies that improve allotments not meeting rangeland health standards; and addressing long-term monitoring needs. Management actions anticipated to address these challenges are incorporated in alternatives for livestock grazing and are described in more detail in Chapter 2.

3.6.7 Recreation

Public lands provide a broad spectrum of recreation experience opportunities affording visitors the freedom of recreational choice with minimal regulatory constraints (Map 57). Recreational opportunities are available to the public on all BLM-administered lands where legal access exists. Public access is more readily available in the western portion of planning area.

In addition to managing dispersed recreation throughout the approximate 1.4-million acres in the planning area, the BLM Casper Field Office recreation program also has responsibility for developed recreation sites ranging from minor improvements for parking to multisite hosted campground facilities. The BLM manages four Special Recreation Management Areas (SRMAs) and two National Back Country Byways.

In addition to the recreational uses mentioned, NHTs and other historic trails on public lands receive varying levels of use. NHTs are addressed in the National Historic Trails and Other Historic Trails section of this document. OHV use, an important and growing recreational use of public lands, is addressed in the Off-Highway Vehicles section of this document.

Recreation Management

Management prescriptions on public lands emphasize monitoring, education, and enforcement to reduce user conflicts and to provide resource protection. Monitoring and enforcement of dispersed recreation is limited, especially in areas with a small percentage of public lands or limited access.

The BLM places signs to identify public and private land boundaries, interpret resources, and provide regulatory and informational kiosks in high use areas. Detailed information is available to the public through informational pamphlets, land-ownership maps, and online web sites. Moreover, the BLM promotes educational programs that inform the public and increase awareness. Examples of these programs include Tread Lightly, Leave No Trace, and Operation Respect.

The Casper Field Office administers Special Recreational Permits (SRPs) to manage organized commercial and noncommercial recreation activities. These permits are issued to accommodate six categories of recreational use, as follows: commercial, competitive, vending, individual or group use in

special areas, organized group activity, and event use. Lengths of permits depend on the activities proposed, areas in question, and the past record of the potential permittee. Permits may be issued for periods of time up to 10 years.

The Casper Field Office administers numerous commercial SRPs, most of which authorize professional outfitter and guide services. Others authorize historic trail tours and OHV events.

Special Recreation Management Areas

In accordance with BLM's Land Use Planning Handbook, the BLM has identified SRMAs to manage important recreational resources in the planning area. The primary objective of establishing SRMAs under recreation management zone guidance is to direct recreation program priorities toward areas with high resource values, elevated public concern, or significant amounts of recreational activity. Site-specific Recreation Area Management Plans have been developed for these heavily used areas within the planning area (Appendix O). The planning area SRMAs are summarized below.

- **Muddy Mountain Environmental Education Area (EEA).** The 1,419-acre Muddy Mountain EEA was established in 1977 for recreation and wildlife habitats. Current management of the EEA focuses on environmental education, diverse recreation opportunities, and ecosystem health. Goals and objectives seek to preserve the natural character and wildlife habitats within the EEA. Recreational facilities available in the EEA include two campgrounds with a combined total of 22 campsites and a multiple-use trail system. Part of this trail system includes a national recreation trail that provides universally accessible hiking and interpretation. Camping and day fees are collected at the two campgrounds.

Current management actions for the Muddy Mountain EEA include an NSO within the EEA boundary, except for forest and recreation management practices. The EEA is closed to livestock grazing. A protective withdrawal also will be established on the EEA that will segregate from operation of the public land laws, including the mining laws, but not the mineral leasing laws.

- **Goldeneye Wildlife and Recreation Area.** The 894-acre Goldeneye Wildlife and Recreation Area is managed exclusively to protect wetland habitats and provide recreational opportunities, specifically fishing. The popularity of the area has varied over the years and fluctuates with the success of stocking efforts by the WGFD and reaching a long-term agreement with Burlington Northern, the current water-right owner. Use of the area is expected to increase dramatically over the next few years if walleye stocking efforts by the WGFD are successful.

Current management actions for the Goldeneye Wildlife and Recreation Area include an NSO within the boundary, unless the development facilitates recreation use or enhances wildlife habitat; an NSO on BLM-administered lands in Sections 7 and 8, T35N, R82W; an NSO within ½ mile of the shoreline of Goldeneye Reservoir; and an NSO within 600 feet of the Middle Fork of Casper Creek or its tributaries.

- **North Platte River Special Recreation Management Area.** The North Platte River SRMA includes 8 Trappers Route landing sites, the Bessemer Bend Historic site, and 10 riverfront parcels between Casper and the Nebraska state line. The year-round water flow, geologic formations, changing plant communities, and abundance of wildlife all contribute to the recreational experience of visitors at this SRMA. The North Platte River is valued as a Class 1 fishery. For more information, see the Special Designations section of this document.
- **Middle Fork SRMA.** The Casper Field Office manages a portion of the Middle Fork of the Powder River, most of which is located in the Buffalo and Worland BLM field offices. The area provides high quality hunting and fishing and includes two developed recreation sites managed by these offices.

Other areas of high interest to recreational users that are not currently SRMAs include the Poison Spider OHV Park, South Bighorns/Red Wall National Back Country Byway and Seminoe/Alcova National Back Country Byway, the NHTs, and the Casper Field Office Extensive Recreation Management Area, described as follows:

- **Poison Spider OHV Park.** The 187-acre Poison Spider OHV Park, located approximately 15 miles west of Casper, provides visitors opportunities to engage in recreational OHV use, including motorcycle use, all-terrain vehicle use, enduro racing, jeep competition events, and trail events.
- **South Bighorns/Red Wall National Back Country Byway and Seminoe/Alcova National Back Country Byway.** National back country byways offer visitors a variety of recreational opportunities, including driving and touring for pleasure, hunting, camping, fishing, horseback riding, and heritage tourism. See the Special Designations section of this document for more information.
- **National Historic Trails.** See the Special Designations section of this document for more information.
- **Casper Field Office Extensive Recreation Management Area.** The remainder of the planning area (those areas not managed as SRMAs or national back country byways) is managed as an Extensive Recreation Management Area (ERMA), open to dispersed recreational use with minimal regulatory constraints. Occurring in combination with other resource activities, dispersed recreation includes, but is not limited to, sightseeing, touring, photography, wildlife viewing, floating, mountain biking, camping, fishing, and hunting. Fishing and hunting account for the majority of recreation in the planning area. BLM management in ERMAs generally is limited to custodial actions to prevent conflicts between resource uses, provide for health and safety of the public, and provide for health of the lands.

Recreational Use Patterns

Table 3-30 indicates visitation estimates for hunting and fishing for the planning area. These numbers represent the most intensive recreational use in the planning area. Visitor use days related to hunting remain relatively constant over time because they depend on the availability of hunting licenses; they do not depict known increasing recreation trends. Table 3-30 also presents hunting and fishing recreation days for Wyoming, public lands in Wyoming, and public lands within the planning area for 1997 through 2001. These estimates were derived from the percentage of BLM-administered land within the state and from hunting and fishing recreation days. The recreation days used in these calculations are provided by the WGFD (WGFD 2002). Romaniello et al. 2000 developed the calculation method. The results are compared to a USFWS recreation survey conducted in 1996 and were shown to be reliable estimates of recreation use on public lands.

Recreation use trends are expected to increase into the future (Wyoming Travel Industry 2002; Haas 2002; Cole 1996; Mueller et al. 2002). The rising public demand for recreational opportunities will likely increase the complexity of managing dispersed recreation. Management actions are incorporated in the alternatives and described in more detail in Chapter 2.

Table 3-30. Hunting and Fishing Recreation Days (1997 to 2001)

Year	Wyoming	BLM (Public Lands Statewide)	Planning Area (Public Lands Only)
1997	5,119,973	1,464,312	111,287
1998	5,670,691	1,621,894	123,263
1999	5,872,695	1,679,590	127,648
2000	5,865,240	1,677,458	127,486
2001	5,682,137	1,625,091	123,507

Sources: BLM 2005c; WGFD 2002
BLM Bureau of Land Management

3.7 Special Designations

ACECs, SMAs, National Back Country Byways, NHTs and Other Historic Trails, and Wild and Scenic Rivers (WSRs) are discussed within the Special Designations section. Areas managed under Special Designations are regulatory or congressionally mandated and are designed to protect or preserve certain qualities or uses. The Casper Field Office currently manages three types of Special Designations (Maps 58 through 66), as well as two ACECs, NHTs, and one National Back Country Byway. A second National Back Country Byway is cooperatively managed with the Rawlins Field Office.

3.7.1 Areas of Critical Environmental Concern and Special Management Areas

Special designations discussed in this section fall into two categories: ACECs and SMAs. Pursuant to the FLPMA of 1976, Section 103(a), an ACEC is defined as an area “within public lands where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources or other natural systems or processes, or to protect life and safety from natural hazards.”

While an ACEC or SMA may emphasize one or more unique resources, other existing multiple-use management can continue within an ACEC so long as the uses do not impair the values for which the ACEC or SMA was established.

There are 2 existing ACECs—Jackson Canyon and Salt Creek Hazardous Area—in the planning area. In addition, 20 areas were nominated for ACEC consideration during the scoping process of the RMP revision, 7 of which met both the relevance and importance criteria and are being carried forward for additional consideration and analysis in the RMP revision (see Appendix P). In addition, 4 of the nominated areas that did not meet the relevance and importance criteria were carried forward for additional analysis as SMAs.

The following discussion covers the two existing and nine proposed special designations within the planning area and is presented in two sections: Existing ACECs and SMAs and Proposed ACECs and SMAs. Table 3-31 provides a summary of the 9 proposed special designations and their values of concern, as well as the two existing ACECs and SMAs.

3.7.1.1 Existing ACECs and SMAs

Jackson Canyon (Existing ACEC)

The Jackson Canyon ACEC is in south-central Natrona County at the western end of Casper Mountain (Map 58). The ACEC encompasses 14,025 acres, of which 3,938 acres are public surface and 11,104 acres are federal minerals. Most private lands within the ACEC are subject to easements held by The Nature Conservancy, generally designed to preserve resources in a natural state and limit development.

The ACEC includes mountainous topography with steep, partially wooded slopes, escarpments, and deeply incised drainages and canyons. The ACEC was established in 1992 to protect bald eagle habitats and two winter roost sites, one in Jackson Canyon and the other in Little Red Creek. Given the sensitive habitats for which the Jackson Canyon ACEC was established, specific decisions were made in the existing plan to restrict uses that were not compatible with bald eagle use. Bald eagle management prescriptions are described in detail in the *Bald Eagle Habitat Management Plan for the Platte River Resource Area and Jackson Canyon ACEC* (BLM 1992a). Current management includes the following:

- All BLM-administered public lands within or adjacent to bald eagle roosts are designated full fire suppression zones. However, to the extent possible, trees are not to be cut within 200 yards of the

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roosts during fire suppression. A wildlife biologist shall be present when wildfires threaten an eagle roost.

- Prescribed burning is implemented to meet resource management objectives, but is not permitted from November 1 through March 31.
- NSO or development is allowed.
- Public surface and federal mineral estate is to be withdrawn from location and appropriation under the mining laws.
- Mineral materials are not available for disposal.
- Construction of new roads and other facilities on public lands within or leading directly to the ACEC will not be authorized.
- OHV travel is limited to designated roads and trails.
- OHV travel is prohibited on designated routes from November 1 to March 31.
- Acreages identified for timber harvest are removed from the BLM’s commercial base.
- Forest will be actively managed to maintain healthy-aged and structured stands for the benefit of bald eagle roosting habitats.

Management challenges identified for the Jackson Canyon ACEC are forest management issues related to mountain pine beetle infestations, fire management, and OHV use.

Table 3-31. Existing and Proposed ACECs and SMAs in the Casper Planning Area

Area	Existing and Proposed Designation	Value(s) of Concern
Existing ACECs and SMAs		
Jackson Canyon	ACEC	Bald eagle winter communal night roosts and scenic, cultural, and recreational values
Salt Creek Hazardous Area	ACEC	Hazards associated with human activity in the area
Proposed ACECs and SMAs		
Alcova Fossil Area	ACEC or SMA	Rare pterodactyl trackways and additional dinosaur fossils from two geologic periods
Bates Hole	SMA	Sensitive watersheds, soils, and wildlife habitats
Black-tailed Prairie Dog Complex	ACEC	Protection of a keystone prairie species; the USFWS found that the protection of black-tailed prairie dogs is warranted
Cedar Ridge TCP	ACEC or SMA	Prehistoric and historic cultural resources, including a traditional ceremonial site used by the Eastern Shoshone and other tribal groups
North Platte River	ACEC	High recreational and scenic values
Salt Creek	SMA	Oil and gas development potential
Sand Hills	SMA	A variety of natural sand dune communities and sensitive soils
South Bighorns/Red Wall	ACEC or SMA	Crucial wildlife habitat, cultural resources, intact vegetation communities, and outstanding scenery
Wind River Basin	SMA	Oil and gas development potential

ACEC Area of Critical Environmental Concern
 SMA Special Management Area

TCP Traditional Cultural Property
 USFWS U.S. Fish and Wildlife Service

Salt Creek Hazardous Area (Existing ACEC)

The BLM established the 235,325-acre Salt Creek Hazardous ACEC under the natural hazards criterion of ACEC establishment under Section 103(a) of the FLPMA of 1976. Hazards associated with the Salt Creek ACEC resulted from human activity associated with oil and gas extraction (Map 58). The Salt Creek Hazardous Area ACEC plan provided for the monitoring and sampling of produced water discharge and field inspections on an annual basis, even though monitoring and sampling of produced water discharge are under the jurisdiction of the Wyoming DEQ. The Casper Field Office conducted limited stream monitoring in the ACEC area prior to issuance of the existing RMP, but has not conducted produced water monitoring, sampling, and annual field inspections since the early to mid-1980s. The existing RMP also indicates that the BLM would amend the ACEC plan to provide for inventory and evaluation of historic oil and gas sites, structures, and town sites that may be eligible for nomination to the NRHP.

Since the designation of the ACEC, operators have reduced the amount of environmental hazards in the area by taking their own initiatives and working with the BLM and local communities on a case-by-case basis. Operators also have taken steps to improve the visual quality in the area by reclaiming surface disturbance associated with past oil and gas development. BLM management challenges will continue in the area because of environmental hazards associated with ongoing and future oil and gas development.

3.7.1.2 Proposed ACECs and SMAs

Alcova Fossil Area (Proposed ACEC or SMA)

The Alcova Fossil Area near Alcova Reservoir in southwest Natrona County is proposed for ACEC or SMA designation based on the paleontological resources known to exist within the proposed boundaries (Maps 59 through 62). Values associated with the site include the Alcova Pterodactyl Trackway locality (originally designated as an ACEC in 1980, but the ACEC designation was removed in the existing plan), one of only four such trackway occurrences known worldwide. The individual tracks in the proposed ACEC or SMA are larger than any others found in North America and suggest the animals had a wingspan of 10 feet. Recent research has revealed the presence of additional trackways in the area. In addition, exposed outcrops of the Morrison and Sundance formations in the area contain numerous fossilized remains of marine and terrestrial species from the Triassic and Jurassic periods, including plesiosaurs, ichthyosaurs, *Allosaurus*, and *Camarasaurus*. The potential for discovery of additional paleontological resources in the area is high. The USBR has developed the Dinosaur Trail, a hiking trail with interpretive signs explaining the geology and paleontology, on adjacent lands.

Several instances of theft and vandalism aimed at the paleontological resources have occurred in the past, including theft of the flagstone-type rock preserving the tracks at one trackway. Numerous mining claims also exist in the area. Recreationists heavily use the Alcova Reservoir area.

Bates Hole (Proposed SMA)

Bates Hole is a collective term for the area with boundaries of the Bates Creek and North Platte River-Bolton Creek watersheds. The area is located in southwestern Natrona County and extends into northern Carbon County beyond the planning area (Maps 59, 60, and 62); however, management decisions in this document apply only to the 375,221 acres within the planning area, not the portions of the watersheds that are outside the planning area. The proposed Bates Hole SMA is similar to, though larger than, the resource management unit (RMU 9: Bates Hole) defined in the existing plan. Approximately 288,504 acres of public land, including 158,023 public surface acres fall within the SMA boundary.

Bates Hole SMA will protect highly erosive soils, fragile watersheds, and crucial wildlife habitats within the proposed boundary. Approximately 51,617 acres of highly erosive soils occur on public lands within

the boundary, which represent nearly 15 percent of all the high-water erosion potential soils on public land in the entire planning area. Soils with a high wind-erosion potential within the SMA are not a significant feature (1,330 acres), and comprise less than 1 percent of the high wind-erosion potential soils on public land in the planning area. The dominant vegetation types in the area include sagebrush, forests, woodlands, and shrublands. Sagebrush complexes comprise nearly 40 percent of the area and represent the best quality greater sage-grouse habitats in the planning area and some of the finest habitats in Wyoming. There are 30 identified sage-grouse leks, 111 identified raptor nests, and 122,799 acres of crucial wildlife habitat present on public land within the SMA boundary. Crucial wildlife habitats occupy approximately 43 percent of all public land within the SMA. Some lands within the proposed SMA have been converted to agriculture, urban, and industrial uses.

Portions of the North Platte River also fall within the proposed boundary and include some of the highest quality recreation and fishing opportunities in the planning area, including 17 miles of Class I and 88 miles of Class II waters.

The area proposed as the SMA currently encompasses portions of the Jackson Canyon ACEC, Muddy Mountain EEA, proposed North Platte River ACEC or SRMA, and the Alcova Fossil ACEC or SMA.

Ninety-six percent of the proposed SMA is located in a very low oil and gas development potential area, with the other 4 percent rated as having no development potential. Oil and gas leases on 3,478 acres of federal mineral estate (approximately 1 percent of the SMA) are held by production at Government Bridge, Schrader Flats, and Bates Creek oil and gas fields. An additional 13,174 acres (approximately 3.5 percent of the SMA) are presently leased. The remaining portion of the SMA is presently unleased. These three fields combined produced 17,241 barrels of oil and 2,265 thousand metric feet of natural gas during 2004 (see Table 3-11) and appear to be fully developed. This production represents less than 1 percent of oil and gas production in the Casper Field Office during 2004.

The proposed Bates Hole SMA has high potential for locatable minerals, such as uranium, bentonite, limestone, and jade. Numerous mining claims exist in the area, as well as numerous active mineral material pits.

Black-Tailed Prairie Dog Complex (Proposed ACEC)

Black-tailed prairie dogs, like other prairie dog species, are considered a “keystone species” and, as such, play an important role in the ecosystem. Colonies or towns that the prairie dogs establish include extensive underground tunnels, which can extend up to 10 feet in depth and up to 15 feet horizontally. Prairie dog colonies provide habitats for the endangered black-footed ferret, mountain plover, prairie rattlesnakes, and burrowing owls. Black-tailed prairie dogs also are an important source of food for ferruginous hawks, golden eagles, swift fox, coyotes, black-footed ferrets, and badgers. Largely as a result of habitat destruction, poisoning, and disease, a considerable reduction in historic black-tailed prairie dog ranges has occurred (USFWS 2005b).

The black-tailed prairie dog was petitioned for being listed as a threatened species in July 1998. In August 2004, the USFWS concluded that the black-tailed prairie dog was not likely to become an endangered species in the foreseeable future and was removed as a candidate species. However, the black-tailed prairie dog remains a Wyoming BLM sensitive species. Accordingly, the Casper Field Office evaluates the impact any proposed activity on BLM-administered land may have on black-tailed prairie dogs.

Black-tailed prairie dog towns are scattered throughout the planning area, primarily in Converse, Goshen, and Natrona counties. In 2002 the BLM received a proposal from the National Wildlife Federation to nominate black-tailed prairie dog colonies as an ACEC. One concentration area of black-tailed prairie dog colonies in northern Converse County is nominated as a proposed ACEC. The proposed boundary

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for the Black-tailed Prairie Dog ACEC encompasses (T37N, R74W) in the northwestern portion of Converse County. Of the 22,937 acres within this boundary, approximately 3,103 acres (in 8 different parcels) are BLM-administered public surface and 14,846 acres are federal mineral estate.

Oil and gas leases in a portion of the proposed ACEC area (412 acres) are held by production from development at the Phillips Creek Oil and Gas Field. Other portions of the area are presently leased. Oil and gas well spacing is presently one well per 160 acres when developing the Shannon Formation and one well per 640 acres when developing the Frontier Formation. Other oil and gas formations are spaced at one well per 40 acres.

Cedar Ridge Traditional Cultural Property (Proposed ACEC or SMA)

The Cedar Ridge TCP (4,449 acres) and the Periphery (32,710 acres) was proposed as an ACEC or SMA to protect sensitive cultural values present in the area (Maps 59 and 60). Eligible for nomination to the NRHP, the Cedar Ridge site is an extensive prehistoric archeological site containing hundreds of ceremonial structures (e.g., vision quest structures), stone tool-making debris, and fire hearths. The site has been in use for the last 5,000 years and it may have been used as early as 9,000 to 10,000 years ago. The TCP element is of high importance to the Eastern Shoshone in terms of ongoing religious observance. Ceremonial activity is associated with tranquility and any intrusive activities could diminish the suitability of Cedar Ridge for traditional purposes. Cedar Ridge is the only identified Native American TCP in the planning area, although additional sites of sacred or traditional nature could be discovered in the future.

Oil and gas leases in a portion of the area (9,479 acres) are held by production from development at the Madden (Deep) oil and gas field primarily in Fremont County, which is administered by BLM's Lander Field Office. Other portions of the area are presently leased. The Hitchcock Draw Unit (9,640 acres within the proposed boundary) covers most of the eastern half of the TCP and Periphery and the leases in this unit also are held by production.

Numerous mining claims occur in the area. In addition, an increased interest in uranium in this area has increased filings of new mining claims.

North Platte River (Proposed ACEC)

Public lands along the North Platte River below Gray Reef Dam currently are managed as an SRMA and support numerous species of flora and fauna. The riparian habitats in the North Platte River (Map 58) are important in a cold desert environment, as they represent only 1 percent of Wyoming's land area. The riparian area adjacent to the river provides year-round habitats for pronghorn, mule deer, and white-tailed deer. Many species of birds also are found here. Important winter-feeding grounds for bald and golden eagles are located downstream from Gray Reef Dam. The river also provides for aquatic-based recreation.

The North Platte River supports at least 18 species of fish. Stocked with rainbow trout, it is a destination fishery and 1 of only 12 Blue Ribbon streams in Wyoming. The river section from Gray Reef Dam to Goose Egg Bridge (Reefs section) ranks second only to the Miracle Mile section some distance upstream outside the planning area. The latest estimates rank the Reefs section as the largest trout population in Wyoming, with the stretch of river near Bessemer Bend ranking fourth (WGFD 2004d). Blue Ribbon streams are identified as a Wyoming Game and Fish "vital habitat," defined as follows:

“habitat [that] directly limits a community, population, or subpopulation, and restoration or replacement may not be possible. The [Wyoming Game and Fish] Department is directed by the Commission to recommend no loss of habitat function. Some modifications of habitat

characteristics may occur, provided habitat function is maintained (i.e., the location, essential features, and species supported are unchanged).” (WGFD 2004d)

In addition to its regional importance as a recreational resource, the North Platte River is historically significant because of its use as a main conduit for settlers heading west during the mid 1800s. The Oregon, Mormon Pioneer, California, and Pony Express trails all follow the river from the Nebraska state line to Bessemer Bend, just west of Casper.

Salt Creek (Proposed SMA)

The Salt Creek SMA falls completely within the boundary of the existing Salt Creek Hazardous ACEC and facilitates oil and gas exploration and development in the Salt Creek oil field area (Maps 60 through 62). The drilling of the No. 1 Salt Creek (or No. 1 Dutch) in October 1908 opened Salt Creek as one of the most productive fields in the Rocky Mountains. Based on data from the WOGCC, the Salt Creek oil field has produced about 671-million barrels of oil and 723-billion cubic feet of gas as of October 2003 (BLM 2005f). Salt Creek is the oldest and largest oil field in the southern Powder River Basin, the largest sweet oil-producing field in the world, and is currently the third largest oil producer in Wyoming (BLM 2005f). In 2002, Salt Creek produced 36 percent of the total oil produced in the planning area, and well over half of the original oil-in-place in Salt Creek is still there (BLM 2005f). In addition, the implementation of a carbon dioxide flood began in the Salt Creek field in 2002 and will continue for the next 10 years.

After a century of oil and gas development, the Salt Creek oil field area provides important grazing resources and habitats for nesting raptors, black-tailed prairie dogs, mule deer, pronghorn, and other birds and small mammals. The area contains prehistoric archeology sites, historic oil field sites, the Bozeman Trail, and provides for limited recreational opportunities in the form of hunting.

Sand Hills (Proposed SMA)

The approximately 17,633 acre Sand Hills area in east-central Natrona and west-central Converse counties is identified for special management to maintain the integrity of soils and vegetation and to protect highly erosive soils (Maps 59, 60, and 62). Soils in the area are susceptible to moderate to severe wind and water erosion. Ninety-five percent of the proposed SMA has been identified as having high wind-erosion potential, which is nearly one quarter of all high wind-erosion soils on public surface in the planning area. Sand dunes are a dominant feature in the area and provide visual relief from the surrounding landscape. Although the area contains examples of both active and inactive dunes, the majority of the area is stabilized by vegetation. The sand dunes vary in length from 100 to 500 yards; some reach a height of 300 feet. Pioneer native grasses can be observed on many of the dunes.

While a number of sand hills and sand dunes occur in other areas of Wyoming and the Rocky Mountain System, the Sand Hills area occurs in close proximity to Casper and mostly comprises public lands (both surface and mineral estate) within the boundary of the proposed SMA. The Sand Hills area is a system that provides habitats for big game and nongame species. Approximately 13 percent of the area is considered to be a crucial wildlife habitat. No sage-grouse leks and only one raptor nest have been identified within the proposed SMA. A segment of the Bozeman Trail passes through the center of the proposed SMA. Sand dunes within the proposed Sand Hills SMA may meet habitat requirements for blowout penstemon which is adapted to blowout dunes habitat that are caused and maintained by wind erosion. As described in the Special Status Species – Plants section of this document, one management requirement for recovery of blowout penstemon is creating favorable conditions for colonization of new sites.

Livestock grazing is a traditional and historic land use in the area and oil and gas development has occurred in this area since the late 1950s. The area has low-to-moderate development potential for oil and gas. No roads provide legal public access to the Sand Hills. Bladed and gravel roads, as well as unimproved two-track roads, are present in the Sand Hills and serve oil facilities and local ranches. Oil and gas leases in a portion of the area (3,172 acres) are held by production from development at Cole Creek and South Cole Creek. Other portions of the area are leased (10,265 acres) and approximately 42 percent is unleased (7,368 acres).

Ninety-eight percent of the proposed SMA is identified as having low oil and gas development potential; however, a multimillion-dollar three-dimensional geophysical project was recently completed in this area, which could lead to further development and leasing of the area.

No known mining claims occur within the area; however, numerous mining claims for uranium recently have been filed adjacent to the proposed SMA along the northeastern boundary.

South Bighorns/Red Wall (Proposed ACEC or SMA)

The South Bighorns/Red Wall complex includes wildlife habitats, unique vegetation, cultural and historic values, and a high value recreation area (Maps 59, 60, and 62). A comprehensive perspective on management of the Southern Bighorns is described in *The Past, Present and Future Management of the Southern Big Horns* (Bennett 2001). The South Bighorns/Red Wall area generally coincides with the Resource Management Unit (RMU) Number 1 as defined and mapped in the 1985 Platte River Resource Area Resource Management Plan.

The area encompasses mule deer crucial winter range, elk crucial winter range, and sage-grouse habitats. The Red Wall/Gray Wall provides nesting habitats for a variety of raptor species and contributes to the visual quality of the area. The area also contains a unique plant community, curl-leaf mountain mahogany, which is a component of big game crucial winter ranges. Curl-leaf mountain mahogany is an important fall and winter forage for deer and elk and is utilized by livestock. Forests and woodlands provide hiding, escape, and thermal cover for wildlife and provide a small commercial source of wood products. Mountain big sagebrush communities present in the area support a wide variety of wildlife species, as an important food source and as hiding and nesting cover. In addition, the area provides habitats for a variety of wildlife, such as the mountain lion, swift fox, marmot, greater sage-grouse, Hungarian partridge, and various migratory bird species.

The South Bighorns/Red Wall area exhibits a dense and diverse range of cultural and historical resources rivaling that found anywhere within Wyoming, including portions of the Cedar Ridge TCP and the Hole-in-the-Wall region. Evidence that supports Native American use in the South Bighorns includes numerous temporary camps, stone-tool manufacturing localities, and food preparation and processing sites. Native American religious practitioners have identified stone circles found on exposed ridges as having religious significance. The South Bighorns provided several important travel routes used by Native Americans, pioneers, and outlaws.

The area is traversed by the South Bighorns/Red Wall National Back Country Byway, designated in 1990 and originating from two important SDWs, the Arminto and 33-Mile. These SDWs are still used today by the local ranching community, are two of the longest SDWs in the west, and were the first to be established in Wyoming. A shepherd's monument is located at the intersection of these two SDWs. The National Back Country Byway provides access to the area, which offers numerous recreation opportunities, such as camping, hiking, fishing, hunting, and sightseeing. There are two BLM campgrounds within the area accessed by the national back country byway. Recreational OHV use is increasing and is intensive during the hunting season.

The South Bighorns/Red Wall area has high scenic values. The Chugwater Formation interrupts gentle flowing lines with steep vertical escarpments. The most prominent attribute of the Chugwater Formation is its striking crimson color. Buffalo Creek and Badwater Creek canyons, as well as numerous lesser canyons, dissect the area and add important diversity and richness to the visual quality.

Oil and gas leases in a small portion of the area (1,102 acres) are held by production from development at the Madden (Deep) oil and gas field primarily in Fremont County, which is administered by BLM's Lander Field Office. Approximately 20,179 acres, of which 12,539 acres is public surface and 20,179 acres are federal mineral estate, are closed to oil and gas leasing. Presently, a well is being drilled in the Hitchcock Draw Unit (8,277 acres is within the proposed ACEC or SMA). If this well is productive, the leases in this unit also is held by production. The majority of the area rates as having low-to-no oil and gas production potential.

Numerous mining claims occur in the area. An increased interest in uranium has increased filings of new mining claims in the area. There are three active sand and gravel permits in the area; two are free-use permits and the other is a negotiated contract. In addition, there are talc and soapstone claims, with some copper exploration, in the area west of Grave Springs Campground along the EK Trail.

Wind River Basin (Proposed SMA)

Improvements in hydraulic fracturing technology have encouraged extensive oil and gas development in parts of the Wind River Basin lying within the planning area. The proposed Wind River Basin SMA lies in the western portion of Natrona County (Maps 60 through 62) and the Casper Field Office manages it to facilitate oil and gas production.

Although gas production in the planning area declined from 100-to 63-billion cubic feet per year since 1999, drilling in the eastern Wind River Basin portion of the planning area may reverse or at least flatten the decline during the next few years. In addition, the eastern portion of the Wind River Basin is prospective for additional discoveries of natural gas (BLM 2005f).

Estimates for the gas-in-place resource for the portion of the Wind River Basin lying within the planning area range from approximately 228-trillion cubic feet to 268-trillion cubic feet. The estimate for deep gas-in-place is approximately 72-trillion cubic feet present within that part of the Wind River Basin that lies within the planning area (BLM 2005f).

The Wind River Basin provides a diversity of habitats for numerous plant and wildlife species, including mule deer, pronghorn, and various special status species such as the mountain plover, white-tailed prairie dog, raptors, and greater sage-grouse. Portions of the Wind River Basin contain crucial winter ranges for both mule deer and pronghorn. The basin also contains sagebrush habitats for the greater sage-grouse and other sagebrush obligates. The Wind River Basin also contains a large number of prehistoric archeology sites and the Bridger Trail.

The proposed Wind River Basin SMA is managed for energy development. By not applying discretionary timing restrictions for big game crucial winter ranges, and raptor, mountain plover, and greater sage-grouse nesting habitats within the proposed boundaries of the proposed SMA, larger windows of time are provided not only for drilling of new wells but also for reclamation operations. Compliance with federal laws, such as the ESA and Migratory Bird Treaty Act, are still required throughout the SMA area.

Currently, the greater sage-grouse and mountain plover are recognized as Wyoming BLM sensitive species. This designation requires the BLM to ensure that actions on public surface and federal mineral

estate consider the welfare of these species and do not contribute to the need to list the species under the ESA.

3.7.2 National Back Country Byways

The BLM began a byway program in 1989 with a focus on enhancing recreational opportunities. A National Scenic Byway System was created 2 years later under Section 1047 of the Intermodal Surface Transportation Efficiency Act of 1991. This act recognized the BLM National Back Country and Scenic Byways as a component of the National Scenic Byway System (Section 1032, eligible projects). The objectives of this program are to do the following:

- Enhance opportunities for the American public to see and enjoy the unique scenic and historical opportunities on public lands
- Foster partnerships at local, state, and national levels
- Contribute to local economies
- Enhance the visitor's recreation experience and communicate the multi-use management message through effective interpretative programs
- Manage visitor use along the byway to minimize impacts to the environment and to provide protection for the visitor
- Contribute to the National Scenic Byway Program in a way that is uniquely suited to national public lands managed by the BLM.

Two travel routes in the planning area are included in the National Scenic Byway System: (1) South Bighorns/Red Wall National Back Country Byway designated in 1990, and (2) a portion of the Seminoe/Alcova National Back Country Byway (Map 63). Both routes offer recreational enthusiasts the opportunity to explore central Wyoming's natural beauty and remote landscapes. The majority of visitation in the South Bighorns/Red Wall National Back Country Byway occurs during the fall hunting season, while most visitation of the Seminoe byway occurs during the summer season. Visitation use along the byways continues to increase, paralleling overall increases in outdoor recreation (BLM 2005c).

South Bighorns/Red Wall National Back Country Byway

The South Bighorns/Red Wall National Back Country Byway is approximately 102 miles long and traverses the South Bighorns in northwest Natrona County. This byway primarily comprises the Arminto (county roads 105 and 109) and 33-Mile (County Road 110) SDWs. These SDWs are still used by the local ranching communities and were among the first to be established in Wyoming (BLM 1992d). A sheepherder's monument is located at the intersection of these two SDWs. The byway also includes Buffalo Creek Road (County Road 105) and the Bighorn Mountain Road (County Road 109).

The South Bighorns/Red Wall National Back Country Byway offers numerous recreational opportunities, such as camping, hiking, fishing, hunting, and sightseeing. Grave Spring and Buffalo Creek campgrounds are administered by the BLM and are located on the upper loop of the byway along County Road 105. Specific management prescriptions for the unit are in place for the protection of sensitive soils, wildlife habitats, visual resources, and important cultural and historical sites. Interpretive kiosks, which include a map of the area, have been placed at both ends of the byway.

Seminole/Alcova National Back Country Byway

The Seminole/Alcova National Back Country Byway begins off Highway 220, 30 miles southwest of Casper, and is located in and administered by two BLM field offices (Casper and Rawlins). This route passes Alcova, Pathfinder, Kortez, and Seminole reservoirs. Lands along this byway providing public recreational opportunities are managed by the BLM, USBR, and the Wyoming State Parks Department. Common recreational uses of this area include boating, rock climbing, camping, fishing, and sightseeing. Special attractions include Miracle Mile, the North Platte River, Seminole State Park, and Alcova Reservoir. The northern end (approximately 11 miles) of this travel corridor is located within the planning area along County Road 407. The dominant resource values for the area are fossils (pterodactyl track area), recreation, and raptor habitats.

3.7.3 National Historic Trails and Other Historic Trails

In 1968, the National Trails System Act provided for the development of a national system of trails in urban, rural, and wilderness settings. Originally, the Act specified three categories of National Trails: scenic trails, recreation trails, and connecting or side trails. In 1978, historic trails were added as another category. Today, only Congress can designate NHTs. In 1995, the National Park Service (NPS) established the National Trails System Office in Salt Lake City, Utah, which administers the Oregon, California, Mormon Pioneer, and Pony Express NHTs. The National Trails System does not manage trail resources on a day-to-day basis; rather, the responsibility for managing trail resources remains in the hands of current trail managers at the federal, state, local, and private levels.

Four NHTs and other historic trails of regional and national significance cross the planning area. The four NHTs are formally known as the “Oregon-California-Mormon Pioneer-Pony Express Trail,” but generically as the Oregon Trail because the routes overlap in many areas. The NHTs are associated with sites such as Fort Caspar and Fort Laramie. These routes, along with others (Bozeman and Bridger trails) were major thoroughfares for westward expansion, military campaigns, and to the gold fields of California, Idaho, and Montana. John Bozeman’s shorter route to the Montana mining area was one of the catalysts of the Plains Indian wars in the latter half of the 19th Century. Additionally, the Texas Trail, the Cheyenne Deadwood Stage Road, and other historic roads were routes important at a regional level, opening central Wyoming to settlement, commerce, agriculture, industry, and travel.

Congress designated the Oregon and Mormon Pioneer trails as NHTs in November 1978. The purpose of that Act was to identify and protect the trails, along with their historic remnants and artifacts, for public use and enjoyment. The Act also directed the Secretary of the Interior to prepare comprehensive management plans and to adopt uniform markers for both trails (BLM 1986a).

The Bozeman and Bridger trails originate in the planning area. The Bozeman Trail, portions of which are on the National Register as part of a Wyoming thematic nomination (*Bozeman Trail Properties in Wyoming*), was first used by gold seekers in the 1860s as a shortcut to the Montana goldfields, and later used as a military and, subsequently, as a freight road. The Bridger Trail was formalized in the 1860s as well, providing a safer route to the mining areas. NHTs and other historic trail segments can be found on public and private land within the planning area. The Oregon Trail complex stretches 197.0 miles, but is more than 550 miles overall when all routes and variants are included. Altogether, 22.5 miles of trail cross public surface. The Bozeman Trail crosses 60.5 miles of public surface with 87.0 miles lying on private and state lands. The Bridger Trail has 18.3 miles of public surface and 45.9 miles on private or state lands.

Use and Condition of National Historic Trails and Other Historic Trails in the Planning Area

Physically, conditions of the trails range from highly visible, well-developed ruts to segments evidenced only by shallow swales or changes in vegetation to segments where the trail is no longer visible. Segments lacking physical integrity may have been covered by wind- or water-born sediments, or may have been eradicated by erosion. Modern roadways have covered many trail segments, since good travel routes continued to be used until the present. The trail setting has varying degrees of historic integrity.

Both intentional and incidental tourists visit NHTs and other historic trails in the planning area. Portions of the trails can be explored from the comfort of cars and paved surfaces, by hiking, and by horseback. To enhance the experience, there are interpretive developments at Bessemer Bend, Emigrant Gap, and Ryan Hill. The Fort Laramie National Historic Place, managed by the NPS, began as a trading post and developed into a major supply point on the emigrant trails. The interpretive sites are of particular interest to a growing number of heritage tourists, but are also visited by individuals who have only a passing interest in the trails. In recent years, visitor numbers increased at all the locations where visitor numbers are documented. At the National Historic Trails Interpretive Center in Casper, visitor numbers are on a slow but steady increase. This may indicate that professional and citizen interest in NHTs and other historic trails is on the rise. Preservation groups, such as the Oregon/California Trail Association, the Wyoming Archaeological Society, and the Wyoming Historical Society, as well as individual historians and researchers, have a great deal of interest in the interpretive efforts.

Current Management

Because NHTs are unique cultural resources with high public interest, they warrant special management consideration within the planning area. Guidelines have been developed specifically for the trails that allow more precise management planning than is possible for other broad categories of historic or prehistoric cultural resources. The *Oregon/Mormon Pioneer National Historic Trails Management Plan* (BLM 1986a) was prepared in 1986 to guide BLM management of the NHTs and cutoffs. Appendix IV of the *Trails Management Plan* provided specific “Guidelines for the Evaluation and Protection of Historic Wagon Trails” that applied to all historic trails of national, regional, or local significance. Trails within the planning area subsequently have been managed and protected using these guidelines.

Historic trails are among the most difficult resources to manage because of “their varying degrees of preservation and diverse range of environmental settings” (BLM 1986a). The guidelines specifically focus on (1) historical significance and use, (2) the integrity of setting of the trail segment, and (3) the physical integrity of the trail ruts and swales.

Increased pressure as a result of the cumulative impacts of development and especially large-scale projects spurred the BLM to consider the setting for historic trails and to develop a larger statewide context. Current management prescriptions relating to management of trails are detailed in the existing plan Record of Decision.

In 2000 and 2001, BLM personnel used Global Positioning System (GPS) to map the NHT system in Wyoming. This was a preliminary step in a statewide re-evaluation of the historic trails based on their physical remains and overall setting. The results will be used to determine appropriate management or mitigation, including such considerations as settings, trail conditions, limitations on development, and guidelines for recreational trail use.

NHTs currently are managed in the existing plan under Land Use Decisions C-2 (BLM 1985a) and M-1 (BLM 1985c), which specifically address NHTs; Decision C-3 covers tracts on the Bozeman Trail. Under these decisions, sites along the Oregon NHT and the Mormon Pioneer NHT are managed to promote and protect from adverse impacts their significant cultural, scientific, and recreational values, as

outlined in the NPS's *Oregon Trail Comprehensive Management Plan* (NPS 1981). No surface development is allowed on the following sites: Fort Laramie, Old Bedlam, "Prospect" (Ryan) Hill, Horse Creek, Emigrant Gap, Bessemer Bend, Platte Island, Sergeant Custard, and Glade Draw. If the private surface owner desires, the BLM will prohibit surface disturbance on the following Oregon Trail sites: Oregon Trail Monument, Knob Hill, La Prele Station, Parker and Ringo Graves, Battle of Red Buttes, and Poison Spring. Installation of interpretive facilities also is covered by this decision. Surface development is not permitted on certain parcels along the Bozeman Trail in Converse County (Appendix W). Each trail segment was evaluated according to *Guidelines for the Evaluation of Historical Wagon Trails of the Casper District and Wyoming State Office*. Trail segments are protected until their significance is evaluated. Surface disturbance will be prohibited within either ¼ mile or the visual horizon (whichever is closer) of historic trails. Although not specifically mentioned, management of the Bridger Trail falls under this decision.

Management actions for NHTs generally address managing trails for long-term heritage and educational values, reducing imminent threats from natural or human-caused deterioration, and reduction conflicts with other resource uses. Management actions are incorporated in the alternatives and described in more detail in Chapter 2.

3.7.4 Wild and Scenic Rivers

Currently, no WSRs nor congressionally designated study rivers exist within the planning area. In an effort to ensure that no potentially eligible rivers were inadvertently missed, the BLM initiated a WSR review of all BLM-administered public lands along waterways within the Casper RMP planning area. The review, completed in December 2002, was done to determine if any of these public lands meet WSR eligibility criteria and suitability factors, as identified in the Wild and Scenic Rivers Act of 1968, as amended.

Step I – Eligibility Criteria

A total of 162 waterways were assessed. Applicable source lists, such as the NPS Nationwide Rivers Inventory and the American Rivers Outstanding Rivers List also were consulted. Following the inventory, resource specialists assessed each waterway under the eligibility criteria of free-flowing and possessing one or more outstandingly remarkable values. Of the 162 waterways reviewed in the planning area, 156 were found to have no outstandingly remarkable values and were dropped from further consideration, while six were determined to meet the WSR eligibility criteria. Two of these six waterway review segments actually include the main waterway segment and one or more tributaries that together were reviewed as "waterway units." They are Badwater Creek, and Buffalo Creek (upper and lower) units. The six waterways involving public lands determined to meet the eligibility criteria are below:

- Buffalo Creek (lower section)
- Buffalo Creek (upper section)
- Badwater Creek
- Deer Creek
- E.K. Creek
- North Platte River.

While the public lands along the two sections of Buffalo Creek (upper and lower) are along the same waterway, they are treated as separate waterway review segments due to their distance from each other and their unique characteristics. Table 3-32 details the six waterway segments moving forward for additional study.

Table 3-32. Casper Planning Area – List of Eligible Waterways

Waterway Reviewed	Segment	Free Flowing	Outstandingly Remarkable Values on Public Lands	Eligible
Badwater Creek (includes Badwater, Valdez, Pommel creeks, and Mine Draw)	T.39N., R.88W: NE1/4 of Section 1 to SE1/4 of Section 11	Yes	Scenic, Recreational	Yes
North Platte River	T.32N., R.81W: Center of Section 3	Yes	Historical	Yes
Buffalo Creek (lower section)	T.41N., R.84W: NE1/4 Section 33 to NW1/4 Section 34	Yes	Scenic, Recreational, Cultural, Historical	Yes
Buffalo Creek (includes the upper section of Buffalo Creek and Pine Creek)	T.40N., R.86W: SW1/4 Section 23 to T.40N., R.85W: SW1/4 Section 28	Yes	Scenic, Recreational, Cultural, Historical	Yes
EK Creek	T.38., R.87W: SW1/4 Section 7 to T.38N., R.88W: Section N1/2 Section 24	Yes	Cultural	Yes
Deer Creek	T.31N., R.77W: SE1/4 Section 11 to NE1/4 Section 2	Yes	Scenic	Yes

Step II – Suitability Factors

All the waterway segments within the planning area found to meet the eligibility criteria are tentatively classified as wild, scenic, or recreational. The segments were further reviewed to determine if they meet WSR suitability factors. All six waterways were screened in 2002. None of the six met the suitability factors. Tentatively, they have been recommended to be dropped from further consideration, pending public review through the RMP process.

The factors that caused the review team to arrive at a non-suitable determination follow:

Factor 1 – Characteristics that do not make the public lands involved a worthy addition to the NWSRS

Factor 2 – Current status of landownership (including mineral ownership) and land and resource uses in the area, including the amount of private land involved, and any associated or incompatible land uses

Factor 6 – Ability of the BLM to manage and (or) protect the public lands involved as part of the NWSRS, or by other mechanism (existing and potential) to protect identified values other than by WSR designation.

Eligible waterways identified for further study through BLM planning processes are protected under BLM’s discretionary authority. Existing uses occurring at the time of the evaluation may continue in the same manner and degree on rivers determined eligible for further study. New uses or changes in use will be assessed on a case-by-case basis in an environmental analysis to determine whether the identified waterway values, the free flow, or the tentative classification could be degraded with new or changed use.

3.8 Socioeconomic Resources

The Socioeconomic Resources topic includes the individual resources of social conditions, economic conditions, health and safety, environmental justice, and tribal treaty rights. Each individual resource section provides a definition and description of the resource and the current condition of the resource. Management challenges and actions are presented as appropriate for each resource.

3.8.1 Social Conditions

Social conditions concern the human communities in the planning area, including towns, cities, and rural areas, and the custom, culture, and history of the area as it relates to human settlement, as well as current social values. BLM management actions can affect social conditions in the planning area and in nearby communities. This section provides a summary of demographic information and custom and culture, including trends and current conditions. Social conditions often are based on a wide range of community and demographic characteristics and involve broad topics of community interests. Other discussions related to social conditions are provided in the Economic Conditions and Environmental Justice sections of this document.

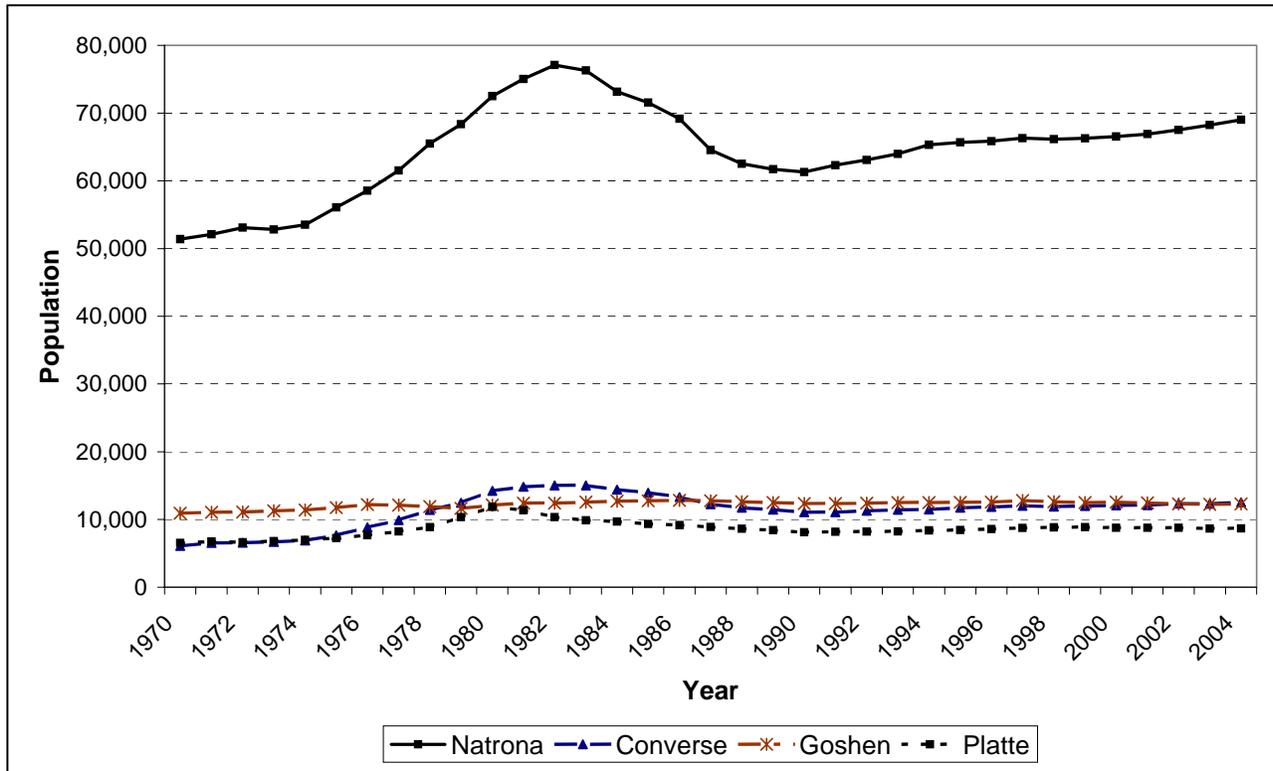
Population and Demographics

The four counties in the planning area are Natrona, Converse, Platte, and Goshen. As of 2004, Natrona was the most populous, with 69,010 people. Converse County had 12,515 people, Platte had 8,666 people, and Goshen had 12,286 people. Since 1970, the population has grown slowly and steadily in Goshen County. The remaining counties experienced rising population in the late 1970s into the early 1980s, a decline in population at some point in the 1980s, and slow growth since about 1990, with overall growth positive from 1970 to 2004 (BEA 2005; U.S. Census Bureau 2005c). Figure 3-9 provides a visual summary of population trends by county from 1970 to 2004.

As of 2004, the largest city in the planning region is Casper, with 51,240 persons (U.S. Census Bureau 2005a). Casper is the county seat of Natrona County. Other relatively large cities and towns include Torrington (5,560 people), the county seat of Goshen County; Douglas (5,489 people), the county seat of Converse; Wheatland (3,500 people), the county seat of Platte County; Mills (2,875 people) and Evansville (2,306 people), just outside Casper; and Glenrock (2,300 people), in Converse County (U.S. Census Bureau 2005a). Although there are several other incorporated towns within the planning area, a substantial proportion of the population lives outside incorporated places. For instance, nearly 11,000 people in Natrona County, or about 16 percent of the county's population, lived outside incorporated areas in 2004. The proportions for the other counties in the planning area are greater: 34 percent of the people in Converse County, 40 percent of the people in Platte County, and 44 percent of those in Goshen County lived outside incorporated places in 2004 (U.S. Census Bureau 2005c). This population pattern contributes to the largely rural character of the planning area.

Because boom and bust cycles can affect the demand for housing, it is important to know the supply of housing in the planning area. Natrona County had 29,882 housing units in 2000, of which just more than 3,000, or about 10 percent, were vacant in April 2000 (Sonoran Institute 2003c). Converse County had 5,669 housing units in 2000, of which about 1,000, or about 17 percent, were vacant in 2000 (Sonoran Institute 2003a). Goshen County had a vacancy rate of 14 percent in 2000, with 820 of the 5,881 housing units vacant, and Platte County had a 20 percent vacancy rate, with 903 vacant housing units out of 4,528 (Sonoran Institute 2003b; Sonoran Institute 2003d).

Figure 3-9. Population Trends in Natrona, Converse, Goshen, and Platte Counties, Wyoming, from 1970 to 2004



Sources: BEA 2005; U.S. Census Bureau 2005c

Although more recent vacancy data are not available at the county level, 2004 data on housing units show an increase of 1.5 to 1.8 percent in Platte, Goshen, and Natrona counties, and an increase of 2.8 percent in Converse County, compared to the year 2000. Thus, in 2004, Natrona County had 30,433 housing units, Converse County had 5,830 units, Platte County had 4,598 units, and Goshen County had 5,972 units (U.S. Census Bureau 2005b).

BLM administers 37 percent of the total area of Natrona County (approximately 1.1-million acres of the total 3.0-million acres) and 5 percent of Converse County (approximately 130,000 of the 2.7-million acres), but administers only 6 percent of Platte County’s land (82,000 of the 1.35-million acres), and only 2 percent of Goshen County (25,000 of the 1.4-million acres). However, BLM also administers the subsurface mineral estate in all four counties of the socioeconomic study area. Thus, BLM’s management decisions have the potential to affect social conditions in all four counties. However, with respect to social conditions related to ranching, BLM’s decisions have more potential to affect conditions in Natrona and Converse counties than in Goshen or Platte counties.

Custom, Culture, and Social Trends

Understanding the social development, culture, and history of an area provides valuable insight into how changes to the planning area might affect the livelihood and quality of life of residents. The planning area is predominantly rural in character and the economy is based primarily on resource development (e.g., mining, agriculture) and services (e.g., retail trade). However, some areas, particularly Casper, have a more diversified economic base.

Ranching has been and remains an important part of the history, culture, and economy of the planning area. However, there are increasing challenges that face ranchers, including changes in federal regulations, economic issues, and land uses and development patterns that can impact the viability of ranching in some locations. Ranchers and livestock permittees face pressure as they compete with demands from other users of public lands. Socially and economically, the agriculture industry is important to local communities. The livestock industry provides direct and indirect employment, maintenance of scenic vistas, active stewardship of remote lands, wildlife habitats, and the continuation of a way of life that helps draw tourists to the state.

The availability of a wide spectrum of recreation opportunities on public lands is another important component of many lifestyles and communities in the planning area. Recreation involves diverse groups with some activities that are compatible and others that are incompatible with one another. Changes in management of public lands can affect the various recreation sectors differently.

Finally, resource development and resource protection are community values within the planning area. Seeking an appropriate balance between these often competing values is central to BLM's mission and the RMP process. Some individuals and groups give a high priority to resource protection, while others give a high priority to resource development.

Each of the views described in the previous discussions are central to both broad and focused social issues within the planning area because they relate strongly to issues of community growth, economic development, and quality of life within the planning area. The following discussion presents more specific county-by-county information on custom, culture, and social trends.

Natrona County, particularly the county seat of Casper, has been an important center of commerce since the mid-nineteenth century. Casper began as a ferry crossing in 1847; soon after, a military fort was built to protect the Platte Bridge. With the discovery of the Salt Creek oil field in the 1880s and the Teapot Dome oil field a few decades later, oil and gas drilling came to dominate Casper's economy. Ranching also has been a historically important base for the county's economy. Today, Casper serves as a service center for the oil and gas industry, as well as a center for coal mining, uranium, and medical and financial services. In 2000, about 87 percent of the population lived in urban areas, as defined by the U.S. Census (U.S. Census Bureau 2002), and in 2004, about 85 percent of the population lived in incorporated places (U.S. Census Bureau 2005c). Note that some incorporated places are classified as rural; thus, these two statistics do not necessarily imply that the county is becoming more rural over time.

Converse County is more rural than Natrona County, with just 44 percent of the population living in urban areas according to the 2000 U.S. Census (U.S. Census Bureau 2002), and 66 percent of the population living in incorporated places in 2004 (U.S. Census Bureau 2005c). The economic base in Converse County includes agriculture, as well as mining of oil, gas, and solid minerals. Converse has the only producing coal mine in the planning area, located in the southern tip of the highly productive Powder River Basin, and the largest active uranium mine in Wyoming. Along with much of the state, Converse County experienced an economic boom in the late 1970s as national energy prices soared followed by a decline in the mid-1980s as they fell.

Platte County's overall population has decreased since about 1980. In 1980, the county population was 11,855, with a decrease to 8,113 in 1990; population remained relatively stable over the next 10 years (with a population of 8,757 in 2000 and 8,666 in 2004) (BEA 2005; U.S. Census Bureau 2005c). The overall percent change in population from 1980 to 2004 was down 26.9 percent. The economic base is primarily agricultural. Mining plays a relatively minor role in the county's economy, and the population is predominantly rural. According to the U.S. Census, 60 percent of residents lived in rural areas in 2000

Economic Conditions

(U.S. Census Bureau 2002); however, the majority of the population (60 percent) lived in incorporated places in 2004 (U.S. Census Bureau 2005c).

Goshen County's population has remained relatively stable over the past 20 years, partly because its economy is primarily rooted in agriculture. Because its climate is relatively mild, Goshen is a highly productive agricultural center. Goshen County leads the state in cattle inventories (as of January 2003), and in 2003, the county produced more dry beans and corn grain than any other county in Wyoming, ranking second in terms of winter wheat, oats, and hay production (Wyoming Agricultural Statistics Service 2004b). In 2000, 45 percent of the population was rural, according to the U.S. Census (U.S. Census Bureau 2002). As in the other counties, a majority of the population (56 percent) lived in incorporated places in 2004 (U.S. Census Bureau 2005c).

3.8.2 Economic Conditions

Economic analysis is concerned with the production, distribution, and consumption of goods and services. Economic conditions describe how individuals and communities participate in the exchange of goods and services by earning a living and consuming products and services they need and want. The BLM has the capacity, through its decisionmaking responsibilities, to manage resource development in the planning area and thereby influence the economy of the wider region. This section provides a summary of demographic and economic information, including trends and current conditions. It also identifies and describes major economic sectors in the planning area that can be affected by BLM management actions.

Economic Activity and Output

Industries most affected by BLM land management policies and programs in the planning area are mining (including oil and gas), travel, tourism and recreation, and agriculture. Some harvesting of forest products occurs in the planning area, but at present, the harvest meets local demands only; there is no known regional or national demand for forest products from public lands in the planning area (see the Vegetation – Forests, Woodlands, and Forest Products section).

Mining, Including Oil and Gas

Mining and mineral production in the planning area constitutes the majority of economic activity in the planning area. Table 3-33 provides a summary of the quantity and value of mining production in the counties in the planning area, and for the state as a whole. Economically, the largest contributors to mining activity are oil and gas in Converse and Natrona counties and coal and uranium mining in Converse County. The Mineral Resources section of this document contains additional information about mineral resources in the planning area.

Recreation

Recreation contributes to the region's economy. In 2003, the WGFD found that direct expenditures from hunting, fishing, and wildlife watching in the counties in the planning area totaled \$50.7 million (WGFD 2003). About \$8.4 million of these expenditures were attributable to those activities on surface area managed by the BLM in the planning area (WGFD 2003). Direct expenditures include visitor spending on lodging, food and groceries, gasoline, motor vehicle repairs and service, outfitters and guides, access fees, entertainment, souvenirs, equipment, and other categories.

Table 3-33. Estimated Mineral Production and Value by County in the Casper Planning Area

Mineral	Natrona	Converse	Platte	Goshen	Wyoming
Production or Sales (units)					
Oil (bbls sold)*	2,920,191	1,863,333	0	0	50,167,571
Gas (mcf sold)	36,246,542	20,683,423	0	0	1,646,021,746
Coal (tons)	0	26,982,654	0	0	376,784,702
Uranium (lbs produced)	0	1,201,376	0	0	1,225,077
Sand and Gravel (tons)	539,519	602,889	727,924	30,292	10,301,766
Limestone (tons)	0	0	55,552	0	792,696
Bentonite (tons)	38,429	0	0	0	3,629,010
Decorative Stone (tons)	75	0	68,408	0	68,483
Leonardite (tons)	0	32,366	0	0	32,336
Taxable Valuation (\$ millions)					
Oil	\$78	\$52	\$0	\$0	\$1,244
Gas	\$138	\$75	\$0	\$0	\$5,265
Coal	\$0	\$119	\$0	\$0	\$1,847
Uranium	\$0	\$8	\$0	\$0	\$8
Sand and Gravel	\$0.8	\$0.7	\$1.0	\$0.02	\$13
Limestone	\$0	\$0	\$0.1	\$0	\$1.1
Bentonite	\$0.2	\$0	\$0	\$0	\$33.4
Decorative Stone	\$0.01	\$0	\$1.36	\$0	\$1.36
Leonardite	\$0	\$0.3	\$0	\$0	\$0.3

Source: Production and valuation are for July 1, 2003, through June 30, 2004, from Wyoming DOR (2005).

Notes: Taxable valuation may differ from market or sales value because it excludes certain costs of production. This table includes all minerals for which the Wyoming DOR (2005) provides data on production from the counties in the planning area.

* Includes stripper oil

bbl barrel

DOR Wyoming Department of Revenue

lb pound

mcf thousand cubic feet

Livestock Grazing

The Casper Field Office manages lands for livestock grazing in Converse, Goshen, Natrona, and Platte counties. Approximately 1.4-million surface acres of public land is available for grazing within 514 grazing allotments. Actual grazing use is about 182,789 AUMs (Fifield 2004). The majority of grazing leases are only for cattle (BLM 2005c).

Grazing allotments occur throughout the planning area, with the majority in Natrona County and western Converse County (BLM 2005c). BLM-administered lands are important to local ranch operations, particularly in Natrona and western Converse counties. In these counties, the majority of ranch operations lease some public lands, and many are dependent on these lands to keep their operations running (BLM 2005c). BLM-administered grazing allotments are leased at lower fees on average than state or private lands: federal grazing fees in Wyoming were \$1.35 per AUM in 2003 and \$1.43 per AUM in 2004 (BLM 2005i). For comparison, grazing fees on state land were \$4.04 per AUM in 2003 and

\$4.13 per AUM in 2004 (Thorson 2004). The average grazing rate on privately owned, nonirrigated land was \$13.40 per AUM in 2003 (Wyoming Agricultural Statistics Service 2004b).

However, it should be noted that it has been argued the lower lease fees correspond to potentially greater use restrictions and responsibilities for the lessee. For instance, federal grazing leases typically restrict the number and species of animals that may be grazed, while on private leases there is normally no penalty for grazing more animals than agreed upon. However, if running more animals on a private lease results in overgrazing, the landowner may not be willing to renew the lease (Fifield 2006). Federal leases also tend to be less flexible than private leases with respect to adjusting turnout and roundup dates, although currently the season of use for most leases authorized by the Casper Field Office is year-round (March 1 to February 28) (Fifield 2006). This does not mean, however, that in the future the BLM will not put specific stipulations on leases if rangeland health evaluations indicate changes in current grazing management are needed (Fifield 2006). There are also differences in terms of construction and maintenance of rangeland improvements, such as fences and water facilities, although a perfect comparison is not possible because there are different specifications that vary for specific private leases. On federal leases, construction of improvements can be done in a variety of ways, and expenses other than materials may be the responsibility of the lessee; the lessee is also generally responsible for maintaining the improvements. On private leases, the landowner typically bears a substantial part of the cost of major range improvements, as well as pays for revegetation, but on many private leases in the planning area, the lessee is responsible for maintaining facilities (Fifield 2006). State leases tend to be intermediate between federal and private leases in terms of use restrictions; on state lands in the planning area, the lessee is generally responsible to construct and maintain improvements (Fifield 2006). Although historically, most of the higher quality lands were homesteaded, leaving less productive lands in federal ownership, in many allotments in the planning area, particularly in upland areas, there is no difference in productivity between the private and state lands and federal lands (Fifield 2006).

In addition to administering federal grazing lands, the BLM provides for two SDWs in the planning area, both used by about 30 leaseholders to drive their cattle between summer and winter ranges. In the absence of the SDWs, ranchers would use trucks to transport their livestock between ranges on a seasonal basis, incurring additional costs.

The number of farms and ranches statewide increased slightly from the late 1980s to the early 1990s and has remained at 9,200 from 1992 to 2002. Land in farms and ranches also has been constant from 1992 to 2002, at 34.6-million acres (Wyoming Agricultural Statistics Service 2004a). In the counties in the planning area, farm numbers and areas have increased between 1992 and 2002, from 1,734 operations on 7.5-million acres in 1992, to 1,846 operations on nearly 8.0-million acres in 2002 (USDA 2004; USDA 1999). Cattle inventories in the counties in the planning area increased steadily from 1997 to 2001, declined in 2002 and 2003, and rose again in 2004; overall, the number has increased from 342,000 in 1997 to 355,000 in 2004. Breeding sheep inventories have declined steadily, from 130,000 in 1997 to 84,400 in 2004 (Wyoming Agricultural Statistics Service 2004a). A 1991 study by economists at the University of Wyoming shows that agriculture is an important source of export income for the state's economy, since many agricultural products produced within the state are sold outside the state. The study also shows that the great majority of inputs to agricultural production come from within the state, and that profits and other income from agricultural production tend to stay within the state. Taken together, these findings indicate that agricultural production is an important contributor to the state's economy (Moline et al. 1991). In a 2000 study, economists at the University of Wyoming compared the income provided to county governments and public schools to the financial demands on community services by agricultural and residential developments. The study shows that on average in Wyoming, ranching activity generates nearly twice as much income for community services as it requires in expenditures on community services, whereas residential development generates about half as much income as it requires in

expenditures (Taylor and Coupal 2000). These findings underscore the importance of agricultural production in terms of its contribution to local economies.

Personal Income

Per capita personal income in 2003 was greatest in Natrona County; residents of Natrona County had an average income of \$35,599, including wages, salaries, and income from investments and rent, and transfer payments such as social security. Per capita personal income was \$29,566 in Converse County, \$27,609 in Platte County, and \$25,786 in Goshen County; the state average was \$32,433. From 1990 to 2003, per capita personal income grew in real terms (i.e., accounting for inflation) in all four counties; the gain was largest in Converse County (32 percent) and was about equal in the other counties (18 percent in Platte County, 16 percent in Natrona County, and 15 percent in Goshen County) (BEA 2005; BLS 2005a).

Table 3-34 provides a summary of the sources of personal income by county. The largest component of personal income in all four counties in 2000 was nonlabor income, including transfer payments (e.g., retirement, disability, insurance payments, Medicare, and welfare), as well as dividends, interest, and rent. Dividends, interest, and rent made up between 58 percent and 68 percent of nonlabor income in all four counties. Income from the services and professional sector was the largest contributor to labor-derived personal income in all four counties; the government sector was among the top three contributors to labor-derived personal income in all counties (Sonoran Institute 2003a; Sonoran Institute 2003b; Sonoran Institute 2003c; Sonoran Institute 2003d).¹

Table 3-34. Personal Income by Source of Income in Natrona, Converse, Platte, and Goshen Counties, Wyoming, for the Year 2000 (percentage of total)

Source	Personal Income ¹			
	Natrona	Converse	Platte	Goshen
Farming, Ranching, and Agricultural Services	0.4	3.1	5.2	14.5
Mining (including oil and gas)	19.6	12.9	0.7	0.5
Manufacturing (including forest products)	2.7	1.5	1.3	3.4
Services and Professional	32.5	28.0	40.6	23.7
Construction	3.9	4.9	7.1	2.8
Government	9.0	12.9	11.2	11.4
Non-Labor Income ²	34.7	38.5	43.2	41.7
Total Personal Income (\$ millions) (2000)	\$2,137	\$283	\$210	\$288
Total Personal Income (\$ millions) (2003)	\$2,429	\$364	\$239	\$315

Sources: Sonoran Institute (Sonoran Institute 2003a; Sonoran Institute 2003b; Sonoran Institute 2003c; Sonoran Institute 2003d); BEA 2005

¹ Percentages may not add to 100 percent because of adjustments made for place of residence and personal contributions for social insurance.

² Nonlabor income includes transfer payments (retirement, disability, insurance, Medicare, welfare), as well as dividends, interest, and rent.

¹ Although more recent data are available for some sectors, there are several sectors for which data are not available due to confidentiality requirements. (The Sonoran Institute, which provided the data summarized in Table 3-34, estimates earnings in some sectors where confidentiality limits data availability; however, the most recent data available with these estimates are from 2000.) Data that are available for 2003 from the Bureau of Economic Analysis suggest the income breakout by sector was similar in 2003 to the breakout in 2000; one notable difference is the percentage of income from mining earnings dropped to 14.0 percent in Natrona County and rose to 17.4 percent in Converse County (BEA 2005).

The table shows that in terms of income, mining is an important sector in Natrona and Converse counties. Mining is responsible for nearly 20 percent of personal income in Natrona County and about 13 percent of personal income in Converse County. The farming, ranching, and agricultural services sector is particularly important in Goshen County, accounting for nearly 15 percent of personal income in that county. Farming and ranching also is an important contributor to personal income in Converse and Platte counties. The majority (77 percent) of farming and ranching income in Goshen County is from livestock and livestock products, while about 14 percent is from crops (the remainder is from government payments, rent, and in-kind income, such as food grown on the farm). Livestock and livestock products also comprise 77 percent of farming and ranching income in Platte County, where just more than 5 percent of personal income derives from farming and agricultural services. About 12 percent of farming and ranching income in Platte County derives from crops (Sonoran Institute 2003a; Sonoran Institute 2003b; Sonoran Institute 2003c; Sonoran Institute 2003d).

The Census County Business Patterns (U.S. Census Bureau 2005a) provides additional data on mining related earnings and employment. Table 3-35 provides a summary of mining-related earnings and employment for Converse and Natrona Counties from this source.

Table 3-35 shows that for Natrona County, oil and gas extraction, oil and gas well drilling, and oil and gas operations support are the largest contributors to employment and earnings. Together, these oil and gas-related activities contribute at least 911 of the 1,208 jobs (75 percent) (note that the data do not reveal exactly how many jobs are in oil and gas well drilling). Mining other than oil and gas, including coal, metal ore, and nonmetallic mineral (e.g., sand and gravel) mining, contributes about 4 percent of the jobs and payroll for mining activities in Natrona County. For Converse County, mining other than oil and gas, led by coal mining, is the largest contributor to mining sector employment and earnings. However, the table also shows that oil and gas operations support activities that contribute substantially to mining employment in Converse County, with between 100 and 249 of the 636 total mining jobs attributable to oil and gas operations support. Oil and gas extraction alone is a small but important contributor, as it provides for 36 of the 636 mining jobs (about 6 percent) and \$1.2 million of the \$36 million in earnings (about 3 percent).

Employment

The breakout of employment by industry shows a pattern similar to that of the personal income statistics, highlighting the importance of the mining industry, as well as the farming, ranching, and agricultural services industry. Table 3-36 provides a summary of total employment by sector for the four counties in the planning area. Again, note that the data in the table are from 2000; although more recent (2003) data are available, employment figures for 2003 are not available for many sectors due to nondisclosure requirements. However, a comparison of data available for 2003 suggest the breakout of employment by industry is generally similar in 2003 to 2000. Although the Sonoran Institute profiles do not contain data on the oil and gas sector broken out from other mining sectors, data on employment for a finer breakout of the mining sector are shown in Table 3-35.

Table 3-35. Earnings and Employment for Mining Activities in Natrona and Converse Counties, Wyoming, for 2002

Source	Natrona		Converse	
	Payroll (\$)¹	Employees	Payroll (\$)	Employees
Mining	\$55,525,000	1,208	\$36,250,000	636
Oil and Gas Extraction	\$13,204,000	249	\$1,221,000	36
Mining (Except Oil and Gas)	\$2,440,000	52	\$29,988,000	450
Coal Mining	N/A²	N/A²	N/A²	250-499
Metal Ore Mining	N/A²	0-19	N/A²	100-249
Nonmetallic Mineral Mining and Quarrying	N/A²	20-99	N/A²	0-19
Mining Support Activities	\$39,881,000	907	\$5,041,000	150
Drilling Oil and Gas Wells	N/A²	250-499	N/A²	0-19
Oil and Gas Operations Support Activities	\$20,553,000	412	N/A²	100-249
Support Activities for Coal Mining	N/A²	0-19	N/A²	N/A²
Support Activities for Metal Mining	N/A²	0-19	N/A²	N/A²
Nonmetallic Minerals Support Activity (Except Fuels)	N/A²	0-19	N/A²	0-19

Sources: U.S. Census Bureau 2005a. Number of employees is for week ending March 12, 2002. Payroll data are for the entire year.

¹For some sectors and subsectors, the data source reveals only a range for the payroll and number of employees so as not to disclose confidential business information (there are very few employers in the sector).

²The data source does not reveal data on payrolls for this subsector due to confidentiality requirements (there are relatively few employers in the sector).

N/A Not Applicable

Table 3-36. Employment by Industry in Natrona, Converse, Platte, and Goshen Counties, Wyoming, for the year 2000 (Percentage of Total)

Industry	Natrona	Converse	Platte	Goshen
Farming, Ranching, and Agricultural Services	2.4	8.5	14.1	14.6
Mining	6.8	10.7	1.1	1.4
Manufacturing (including forest products)	4.0	2.8	2.4	5.1
Services and Professional	67.6	52.4	59.7	55.3
Construction	6.4	7.0	8.2	5.6
Government	12.7	18.5	14.5	18.0
Total Employment (2000)	44,858	7,092	5,810	7,026
Total Employment (2003)	46,609	7,001	5,651	6,884

Sources: Sonoran Institute (Sonoran Institute 2003a; Sonoran Institute 2003b; Sonoran Institute 2003c; Sonoran Institute 2003d); BEA 2005 (Total Employment in 2003).

Note: Percentages may not add up to 100 percent due to rounding.

Average earnings per job in 2003 were lower than the national average in all four counties, and were lower than the state average in Platte and Goshen counties. However, average earnings per job in Natrona County were higher than the state average. Table 3-37 shows the average earnings per job by county.

**Table 3-37. 2003 Average Earnings
Per Job by County**

Locality	Average Earnings Per Job
Natrona County	\$38,626
Converse County	\$34,337
Platte County	\$28,408
Goshen County	\$26,711
Wyoming	\$34,072
United States	\$42,553

Source: BEA 2005 (Table CA30).

All four counties in the planning area had lower unemployment in 2004 than the national average of 5.5 percent. Natrona County had an unemployment rate of 3.7 percent, Converse County had a rate of 4.0 percent, Platte County had a rate of 5.1 percent, and Goshen County had 4.3 percent unemployment. Wyoming had 3.9 percent unemployment overall in 2004 (BLS 2005b; BLS 2005c).

Tax Revenues

Economic activities on BLM-administered land and mineral estate contribute to the fiscal well-being of local governments, as well as to state and federal governments. BLM management actions have the potential to affect tax revenues from the mining sector; the travel, tourism, and recreation sector; and the livestock grazing and ranching sector.

Mining, Including Oil and Gas (Tax Revenues)

The mining industry contributes substantially to state and local tax revenues. For example, a 2003 study by the Wyoming Legislative Service Office (WLSO 2003) indicated that mineral severance taxes have constituted about 20 percent of the state general fund revenue since 1981 and about 24 percent for 2003 to 2004. The same study reported that the mining sector paid about \$806 million in state and local tax revenues in fiscal year 2002. This represents 54 percent of total state and local tax revenues from major tax sources (severance, *ad valorem*, sales and use, cigarette, gross receipts, liquor, and franchise taxes) (WLSO 2003). Wyoming has no personal or corporate income tax.

Oil and gas production on federal lands in Wyoming is subject to state, federal, and local taxes, as described below. *Ad valorem* production and production equipment taxes are payable to the county where the production occurs, and are, therefore, most important for Converse and Natrona counties, since that is the focus of oil and gas production in the planning area.

State severance taxes are levied on current production at the rate of 6 percent of the taxable value of crude oil and natural gas. The taxable value is defined as the gross sales value minus certain allowable costs for royalties, transportation, and natural gas processing. Rates are lower for less-productive stripper wells (Wyoming DOR 2001b). Estimated state severance tax collections for minerals produced in the counties in the planning area are shown below.

Local *ad valorem* production taxes are levied on sales of oil and gas. *Ad valorem* production tax rates vary by county and within counties. In 2004, average tax rates on mineral production were about 5.9 percent in Converse County, 6.7 percent in Natrona County, 6.8 percent in Goshen County, and 7.0 percent in Platte County (Wyoming DOR 2005). Based on these tax rates and the total taxable value of mineral production, it is possible to estimate *ad valorem* production tax assessments in the counties. According to Wyoming Department of Revenue (Wyoming DOR 2005), total taxable value of mineral

production in production year 2003 was \$217 million in Natrona County, \$255 million in Converse County, \$2.5 million in Platte County, and \$22,000 in Goshen County. Based on the average *ad valorem* mineral-production tax rates in 2004, estimated tax assessments is \$14.6 million in Natrona County, \$14.9 million in Converse County, \$0.2 million in Platte County, and about \$1,500 in Goshen County. The relative importance of different minerals in the counties in contributing to these tax assessments is illustrated by the data in Table 3-33, which shows taxable valuation for the different minerals within the counties.

Local *ad valorem* property taxes are levied on the taxable valuation of oil and gas equipment. Rates are the same as those for *ad valorem* production, but the taxable valuation of oil and gas equipment is 11.5 percent of the assessed value (Grenvik 2005; Wyoming DOR 2001a). Data on the taxable valuation or tax assessments on oil and gas equipment are not readily available.

Federal mineral royalties are levied at 12.5 percent of the value of current oil and gas and coal production, after allowable deductions. Half the royalties collected are returned to Wyoming and a portion of the royalties received by the state are disbursed to cities and towns (State of Wyoming 2004). According to the Wyoming Consensus Revenue Estimating Group, federal mineral royalties for production in the state were \$554 million in Fiscal Year 2004 and \$846 million in fiscal year 2005 (CREG 2006). This includes royalties from oil, gas and gas plant products, and coal, including coal lease bonuses.

State and local taxes, including the *ad valorem* property tax, also apply for coal and uranium mining. In past years, uranium producers have not paid state severance taxes due to tax exemptions that are conditional on the market price for uranium (Wyoming DOR 2004). However, recent increases in demand for uranium have pushed the market price higher than the limit for the tax exemptions. Although some coal production has been exempt from severance taxes due to similar exemptions, producers in the Powder River Basin, which includes the production from Converse County, have paid severance taxes (Wyoming DOR 2004).

Using the data from Table 3-33, along with state severance tax rates, it is possible to estimate state severance tax collections for each county for the different mineral products. Table 3-38 shows estimated state severance tax collections for the counties for production between July 1, 2003, and June 30, 2004.

As the table shows, state severance taxes based on production within the counties in the planning area were greatest in Natrona and Converse counties, which is consistent with the importance of mining for employment and earnings in these counties. Natural oil and gas were the largest contributors to state severance taxes within Natrona County, while coal, natural gas, and oil were the largest contributors to state severance taxes in Converse County. Other minerals contributed to state severance taxes within all four counties.

Travel, Tourism, and Recreation (Tax Revenues)

BLM management actions also affect travel and tourism, both directly (through decisions that affect recreation access) and indirectly (e.g., through decisions that affect wildlife populations). The State Office of Travel and Tourism estimates that in 2003, travel and tourism accounted for \$88 million in tax revenues, including \$54 million in state revenues and \$34 million in local revenues, not including property tax collections related to recreation infrastructure (Wyoming State Office of Travel and Tourism 2004). Most of these revenues are due to tourism for pleasure; the Office of Travel and Tourism estimated that 90 percent of visitors to Wyoming came for pleasure, while 10 percent came for business (Wyoming State Office of Travel and Tourism 2004). Table 3-39 shows tax receipts for the counties in the planning area.

Table 3-38. Estimated State Severance Tax Collections in Natrona, Converse, Platte, and Goshen Counties, Wyoming, Production Year 2003

Mineral	Natrona	Converse	Platte	Goshen
Crude Oil	\$1,084,668	\$1,479,997	\$0	\$0
Stripper Oil	\$2,394,146	\$1,074,082	\$0	\$0
Natural Gas	\$8,263,575	\$4,502,353	\$0	\$0
Coal	\$0	\$8,357,456	\$0	\$0
Uranium ¹	\$0	\$0	\$0	\$0
Sand and Gravel	\$15,749	\$13,328	\$20,003	\$433
Limestone	\$0	\$0	\$2,719	\$0
Bentonite	\$4,548	\$0	\$0	\$0
Decorative Stone	\$130	\$0	\$27,135	\$0
Leonardite	\$0	\$5,502	\$0	\$0
Total	\$11,762,818	\$15,432,718	\$49,857	\$433

Source: Wyoming DOR 2005

Note: State severance tax rates are 6 percent of taxable valuation for crude oil and natural gas, 4 percent for stripper oil, 7 percent for coal, and 2 percent for all other minerals shown.

¹Wyoming DOR (2005) notes that uranium production was exempt from severance taxes during this period in accordance with Wyoming Statutes 39-14-505, as amended in 2003 (due to low market prices). Note that current uranium market prices are higher than the levels in Production Year 2003, and current production is subject to severance taxes.

Table 3-39. Local and State Tax Receipts Due to Travel and Tourism in Wyoming, 2003

Locality	Local Tax Receipts ¹	State Tax Receipts ¹
Converse County	\$390	\$733
Goshen County	\$238	\$627
Natrona County	\$2,480	\$4,941
Platte County	\$430	\$900
State of Wyoming	\$34,000	\$53,600

Source: Wyoming State Office of Travel and Tourism 2004.

¹in thousands

Livestock Grazing and Ranching (Tax Revenues)

Livestock grazing and ranching, and agriculture, more generally, contribute directly to local and state tax revenues from local *ad valorem* property taxes and local and state sales and use taxes. According to a 2003 report on state and local tax revenues, agriculture, forestry, fishing, and hunting brought in \$9.2 million in state and local tax revenues due to *ad valorem* property taxes, and \$1.4 million due to sales and use taxes, for a total of more than \$10.6 million (WLSO 2003).

3.8.3 Health and Safety

The BLM’s Hazard Management and Resource Restoration Program addresses a variety of hazards on public surface to reduce risks to visitors and employees. Hazards may include hazardous materials; mine shafts and adits; abandoned equipments and structures; explosives and munitions; and spills from pipelines, tankers, and storage tanks.

Activities directed toward health and safety concerns in the planning area primarily encompass the following:

- Abandoned mine lands (AMLs)
- Formerly used defense sites (FUDS)
- Hazardous wastes and materials.

Abandoned Mine Lands

Currently, 20 known AML sites are in the planning area (Wyoming DEQ, AML Division). These sites include sand, gravel, bentonite, uranium, gold, and miscellaneous mineral mining sites. New AML sites are typically found every year; therefore, current database records might not be all inclusive of every AML site in the planning area (Schuler 2005).

Extreme physical hazards are common at abandoned mine sites; and for the visitor, these hazards are not always apparent. Abandoned mine sites have proven to be a luring and sometimes life-threatening attraction for both children and adults. Serious injury or death may occur at these sites. Common hazards include open vertical shafts; unstable overhead rock and decayed support structures; deadly gases and lack of oxygen; remnant explosives and toxic chemicals; high walls, open pits, and open drill holes; and becoming lost and disoriented while underground. Subsidence at abandoned coal mines and coal fires pose additional hazards. The Wyoming State Office has a prioritized list of AML sites that pose the greatest risk to people and the environment.

AML sites impacting water quality are addressed using the watershed approach. Using this approach accomplishes the following objectives:

- Allows for mitigation to be risk-based by identifying priority sites first
- Fosters collaborative efforts across federal, state, and private administrative boundaries
- Considers all issues important to water resource protection
- Reduces the cost of mitigation
- Provides the most efficient method of remediating AML sites by utilizing a wide range of available resources.

In 1999, the BLM and the Wyoming DEQ, Abandoned Mine Land Division signed a cooperative agreement that further facilitated the reclamation of AML sites on BLM-administered lands. The state program, as required by the Surface Mining Control and Reclamation Act of 1977, focuses on public safety hazards. In addition, the BLM has received some funding within its Soil, Water, and Air Program to address environmental hazards and watershed concerns associated with abandoned mines on a site-specific basis. By combining available funding, safety hazards and environmental impacts to water quality and watershed function can continue to be addressed in a more comprehensive fashion at priority AML sites. In this collaborative partnership approach, the BLM and the Wyoming DEQ, Abandoned Mine Land Division are undertaking several AML reclamation projects on public lands within the planning area.

Formerly Used Defense Sites (FUDS)

Six FUDS are located on public surface within the planning area. Before being reverted to the U.S. Department of the Interior (USDI), these FUDS were military properties primarily used as target ranges. The Department of Defense retains the responsibility for any remaining ordnance, explosives, and

munitions on public surface. The U.S. Army Corp of Engineers (USACE) is responsible for implementing the FUDS cleanup program.

The BLM supports USACE cleanup activities by doing the following:

- Providing access for investigations, surveys, and cleanup activities
- Providing stipulations to protect natural and cultural resources
- Assisting in developing appropriate cleanup standards.

Although no extensive on-the-ground investigations have been performed, initial reports conducted by the USACE indicate that various hazards are potentially present. They include unexploded ordnance, lead contamination, metal fragments, ammunition casings, and abandoned structures.

Hazardous Materials and Wastes

Within the planning area, spills, illegal dumping, and hazardous material releases are investigated to determine the need for immediate cleanup or other long-term remediation actions. This often involves working with the U.S. Environmental Protection Agency, Wyoming DEQ, and potentially responsible parties to fund and expedite the cleanup of hazardous sites and disposal activities that result from recreational use and industrial activities, such as oil and gas development.

3.8.4 Environmental Justice

Environmental justice pertains to fair treatment and meaningful involvement of minority and low-income populations. Where the impacts of a proposed federal action may involve such populations, an analysis of the potential for disproportionate impacts and meaningful community outreach and public involvement is required.

The BLM does not manage environmental justice resources; rather, it manages public lands and the resources and uses that occur on them. Analysis of environmental justice impacts and meaningful involvement of minority and low-income populations in the planning process are required by federal regulations and policies. No specific management issues or concerns have been identified to date, including in the scoping process.

Minority Populations

BLM Instruction Memorandum (IM) 2002-164, "Guidance to Address Environmental Justice in Land Use Plans and Related NEPA Documents," provides policy and guidance for addressing environmental justice in BLM land use planning (BLM 2002e). IM 2002-164 defines minority persons as "Black/African American, Hispanic, Asian and Pacific Islander, American Indian, Eskimo, Aleut, and other non-white persons." Furthermore, IM 2002-164 indicates that an area should be considered to contain a minority population where either the minority population of the affected area exceeds 50 percent, or the percentage of minority population in the affected area is meaningfully greater than the percentage in the general population.

Populations of the four counties that overlap the planning area are predominantly white and non-Hispanic. All four counties have a larger proportion of non-Hispanic white residents than does the state, and only Goshen County has a higher proportion of Hispanic or Latino residents than the state overall. Table 3-40 provides a summary of population by race and ethnicity in 2000.

Table 3-40. Racial and Ethnic Groups for Casper Planning Area Counties, and Wyoming (Percent of Population in 2000)¹

Race or Ethnicity	Natrona	Converse	Platte	Goshen	Wyoming
Non-Hispanic, White	91.7	91.9	92.9	89.1	88.9
Non-Hispanic, Black	0.7	0.1	0.0	0.2	0.7
Non-Hispanic, American Indian/Alaska Native	0.9	0.8	0.4	0.7	2.1
Non-Hispanic, Asian, Native Hawaiian, or Pacific Islander	0.4	0.3	0.1	0.3	0.6
Non-Hispanic, some other race	0.1	0.2	0.3	0.0	0.1
Non-Hispanic, two or more races	1.3	1.2	1.0	0.8	1.2
Hispanic or Latino (of any race) ²	4.9	5.5	5.3	8.8	6.4

Source: U.S. Census Bureau 2002

¹Detail may not add up to 100 percent due to rounding.

²Hispanic/Latino breakout is separate because Hispanics/Latinos can be of any race.

As Table 3-40 shows, the percentage of minority residents does not exceed either 50 percent or the proportion for Wyoming in any of the four counties in the planning area. Thus, none of the four counties contain a minority population that is meaningfully greater than the general population. In addition, there are no Native American reservations in the planning area. The Cedar Ridge site and other sites have cultural significance to members of tribes living in the area. The cultural significance of these sites is addressed in the Cultural Resources section of this document.

Low-Income Populations

With respect to low-income populations, IM 2002-164 indicates that low-income populations can be identified according to poverty thresholds published by the U. S. Census Bureau. In addition, the IM notes that “when considering these definitions, it is important to recognize that some low-income and minority populations may comprise transitory users of the public lands and thus not associated with a particular geographic area.”

The Council on Environmental Quality (CEQ) guidance for environmental justice analysis under NEPA defines a “low-income population” as “either a group of individuals living in geographic proximity to one another, or a set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure or effect” (CEQ 1997). Although CEQ guidance does not provide a quantitative threshold (e.g., a limit on the percent of persons in poverty) for determining whether a population should be considered a low-income population, typically the percent of persons in poverty in the study area is compared to that in a comparison area such as the state. Quantitative criteria for what constitutes a low-income population are not specified in BLM, CEQ, or EPA guidance.

In 1999, 11.4 percent of the persons living in Wyoming had incomes below the poverty level. This compares to 11.8 percent in Natrona County, 11.6 percent in Converse County, 11.7 percent in Platte County, and 13.9 percent in Goshen County (Sonoran Institute 2003a; Sonoran Institute 2003b; Sonoran Institute 2003c; Sonoran Institute 2003d). There are no substantial concentrations of persons living in poverty in the planning area.

3.8.5 Tribal Treaty Rights

American Indians inhabited the planning area region for thousands of years before European contact. American Indians used the region for hunting, fishing, and collecting plant foods, as well as for religious ceremonies and burial of the dead. The lands managed by the Casper Field Office fall within the

judicially established Indian land areas of the Sioux, Northern Cheyenne, and Northern Arapaho (USACE 1999). The planning area also includes traditional lands of the Eastern Shoshone, who were not part of the judicially established lands because they had their reservation. The Casper Field Office consults with the tribes listed below regarding American Indian issues and concerns.

- Blackfeet Nation
- Cheyenne River Sioux Tribe
- Comanche Tribe of Oklahoma
- Confederated Salish and Kootenai Tribe
- Crow Tribe
- Eastern Shoshone Tribe
- Kiowa Tribe of Oklahoma
- Lower Brule Sioux Tribe
- Nez Perce Tribe
- Northern Arapaho Tribe
- Northern Cheyenne Tribe
- Oglala Lakota Nation
- Rosebud Sioux Tribe
- Shoshone-Bannock Tribes
- Ute Tribe.

American Indian treaty rights or trust responsibility issues are not known for the planning area. There are no trust lands in the planning area, no reservation lands, and no tribal properties as far as the BLM is aware. Hunting or fishing rights designated by the treaty are handled by the WGFD and are not part of the BLM planning effort.

During the 1800s, the U.S. government negotiated treaties with Indian tribal governments and obtained the vast majority of public domain land in the lower 48 states. Treaties are negotiated settlements that define federal obligations toward Indian tribes. Some 60 tribes negotiated and reserved their treaty rights to off-reservation lands and resources. The rights reserved to Indian tribes vary substantially from treaty to treaty. Hunting, fishing, and gathering rights and certain other land uses are the most common rights reserved through treaty (BLM 1990; BLM 1994b). Treaties affecting tribes in the planning area region are summarized below.

1851 Treaty of Fort Laramie. This treaty was between and among the U.S. government and the Sioux, Cheyenne, Arapaho, Crow, Assinaboin, Gros Ventre, Mandan, and Arikara people. The treaty established territorial boundaries and annual compensation for the Indian nations involved.

1868 Treaty of Fort Laramie. This treaty was between and among the U.S. government and the Sioux, Brule, Oglala, Miniconjou, Yanktonai, Hunkpapa, Blackfeet, Cuthead, Two Kettle, Sans Arcs, Santee, and Arapaho. The “Great Sioux Reservation” established by this treaty encompassed most of what is now western South Dakota. Unceded Indian hunting lands associated with the treaty extended westward from the reservation into the vicinity of the planning area, east of the Bighorn Mountains and north of the North Platte River. The treaty reserved the right of the Indians to hunt on the unceded lands “so long as buffalo may range there in numbers sufficient to justify the chase.”

1863 Treaty of Fort Bridger. This treaty was an agreement between the U.S. government and the Eastern Bands of Shoshone. The treaty set the boundaries of the Eastern Shoshones to reflect their traditional base since the early 1800s, from the upper Snake River on the north, east to the Wind River Mountains, south into northern Colorado and Utah. The reservation established by this treaty included

44,672,000 acres in Colorado, Utah, Idaho, and Wyoming. It did not include the present-day boundaries of the Wind River Reservation east of the Wind River Mountains. Under the terms of the 1851 Treaty of Fort Laramie, the Crow people had been given almost all of the land now encompassed by the Wind River Reservation (east of the Wind River Mountains) (Stamm 1999).

1868 Treaty of Fort Bridger. This treaty was an agreement between the U.S. government and the Eastern Shoshone and Bannock tribes. It established the boundaries of the Wind River Reservation (now 3,054,182 acres) (Eastern Shoshone Tribe 2004). Unlike the 1863 Treaty of Fort Bridger, which outlined boundaries of Shoshone territory west of the Wind River Mountains, the 1868 Treaty gave the tribe the right to occupy what had been their hunting grounds and winter camps to the east (Stamm 2003). In so doing, it denied claims to the Wind River valley made by competing tribes such as the Arapaho, Crow, or Oglala Sioux (Stamm 2003). The Wind River Reservation was later reduced in size by the Brunot Agreement of 1872 and the McLaughlin Agreement of 1898 (Eastern Shoshone Tribe 2004).

Trust Responsibilities

Trust responsibility is the U.S. government's permanent legal obligation to exercise statutory and other legal authorities to protect tribal lands, assets, resources, and treaty rights, as well as a duty to carry out the mandates of federal law with respect to American Indian tribes. BLM Manual 8160 (BLM 1990)—“Native American Coordination and Consultation”—defines trust responsibility as the obligation of the BLM to make “a reasonable and good faith effort to identify and consider, and to carry out programs in a manner sensitive to and consistent with, Native American concerns and tribal government planning and resource management programs.”

Treaty Rights and Trust Responsibilities Policy

It is the policy of the USDI to recognize and fulfill its legal obligations to identify, protect, and conserve the trust resources of federally recognized Indian tribes and tribal members, and to consult with tribes on a government-to-government basis whenever plans or actions affect tribal trust resources, trust assets, or tribal health and safety (USDI 1995).

It is the policy of the BLM to do the following:

- Recognize traditional Native American cultural and religious values as an important living part of our Nation’s heritage, and develop the capability to address adequately any potential disruption of the traditional expression or maintenance of these values that might result from BLM land use decisions.
- Coordinate and consult regularly with appropriate Native American groups to identify and consider their concerns in BLM land use planning and decisionmaking, and document fully all coordination and consultation efforts.
- Review proposed land use planning decisions and other major BLM decisions for consistency with tribal land use and resource allocation plans.
- Participate in developing consistent interagency guidance, procedures, and expertise to address Native American and tribal government policies and programs.
- Avoid unnecessary interference with Native American religious practices.
- Protect sensitive and confidential information about Native American values, practices, and specific locations with which they are associated from disclosure to the public, to the greatest degree possible under law and regulation (BLM 1990).

There are no management actions specifically identified for Tribal Treaty rights; however, Heritage Resources identifies the ongoing need for Native American consultation.

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