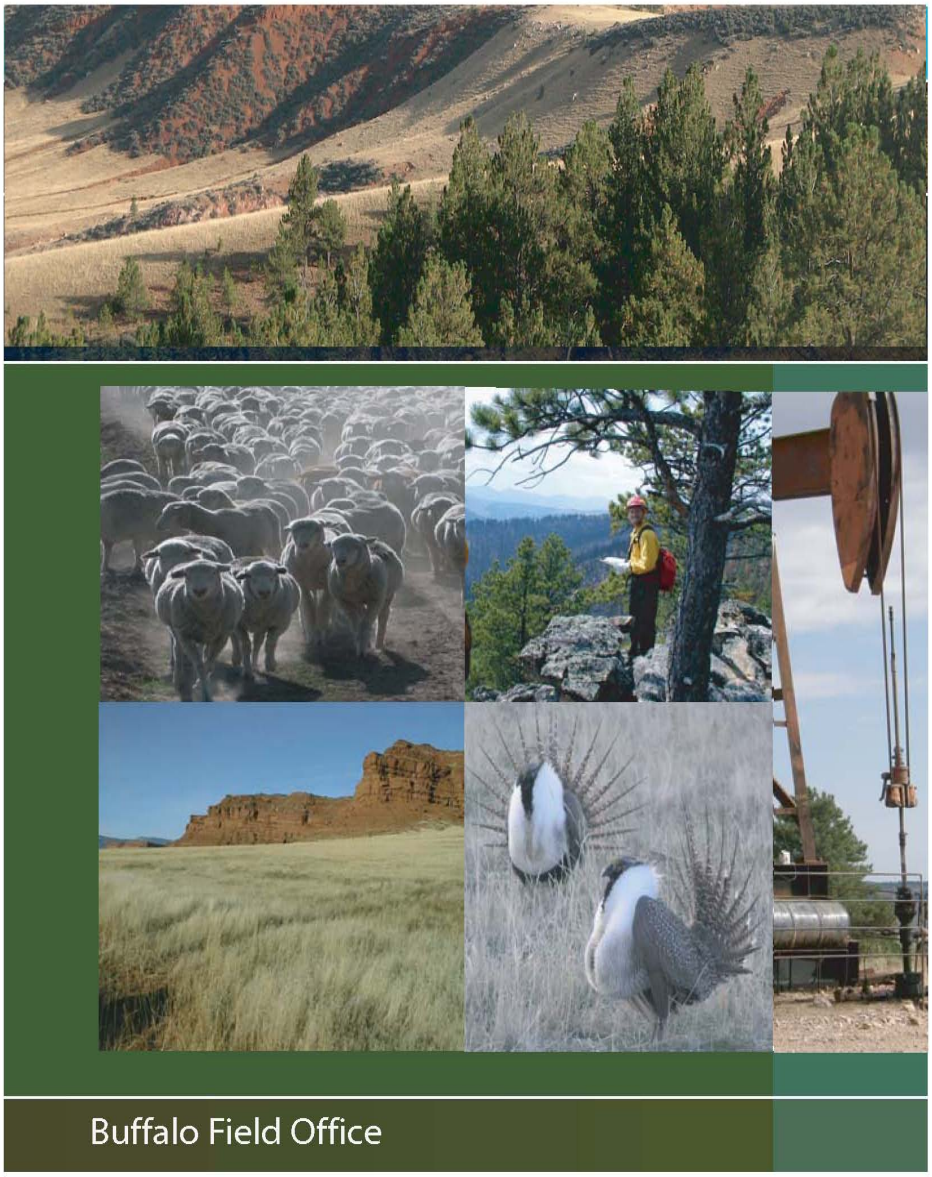
BLM

Summary of the Analysis of the Management Situation
Buffalo Resource Management Plan Revision



March 27, 2009

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

Summary of the
Analysis of the Management Situation
Buffalo Resource Management Plan Revision

U.S. Department of the Interior
Bureau of Land Management
Buffalo Field Office, Wyoming

March 27, 2009

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Acronyms and Abbreviations

ACEC	Area of Critical Environmental Concern
AML	Abandoned Mine Land
AMP	Allotment Management Plan
AMS	Analysis of the Management Situation
APD	Application for Permit to Drill
APHIS	Animal and Plant Health Inspection Service
AQD	Air Quality Division
ATV	All-terrain Vehicle
AUM	Animal Unit Month
BBLS	Billion Barrels
BCF	Billion Cubic Feet
BEA	U.S. Bureau of Economic Analysis
BFO	Buffalo Field Office
BHMA	Burnt Hollow Management Area
BLM	Bureau of Land Management
BMP	Best Management Practice
°C	Degrees Celsius
CBNG	Coalbed Natural Gas
CFR	Code of Federal Regulations
CO_2	Carbon Dioxide
CRMP	Cultural Resource Management Plan
CWA	Clean Water Act
CWPP	Community Wildfire Protection Plan
CRM	Coordinated Resource Management
CSU	Controlled Surface Unit
DEQ	Department of Environmental Quality
DLE	Desert Land Entry
DOI	Department of the Interior
dv	Deciviews
EA	Environmental Assessment
EAC	Early Action Compact
EEA	Environmental Education Area
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ERMA	Extensive Recreation Management Area
EPRI	Electric Power Research Institute
ESA	Endangered Species Act
ES&R	Emergency Stabilization & Rehabilitation
°F	Degrees Fahrenheit
FCRPA	Federal Cave Resources Protection Act
FIA	USDA Forests Inventory Analysis Program
FLPMA	Federal Land Policy and Management Act
FRCC	Fire Regime Condition Classification System
FMU	Fire Management Units
GHG	Greenhouse Gas
GIS	Geographic Information System
HAP	Hazardous Air Pollutant
HMA	Herd Management Area
HMP	Habitat Management Plan
IM	Instruction Memorandum
IMPROVE	Interagency Monitoring of Protected Visual Environments
IPCC	Intergovernmental Panel on Climate Change
LHA	Land Health Assessment
LOC	Levels of Concern
LRR	Land Resource Region
LWCF	Land and Water Conservation Fund Act
MBF	Thousand Board Feet
MIM	Multiple Indicator Monitoring
MMBF	Million Board Feet
Mcf	Thousand Cubic Feet
mg/L	Milligrams per Liter
MLRA	Major Land Resource Areas
MOU	Memorandum of Understanding
mph	Miles per Hour
NAAQS	National Ambient Air Quality Standards
NCCS	National Cooperative Soil Survey
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NRCS	Natural Resources Conservation Service
NOI	Notice of Intent
NRHP	National Register of Historic Places
NSO	No Surface Occupancy
NSS	Native Species Status
OHV	Off-Highway Vehicle
PFC	Proper Functioning Condition
PFYC	Potential Fossil Yield Classification
PNC	Potential Natural Community
PPB	Parts per Billion
PRB	Powder River Basin
PRIA	Public Rangelands Improvement Act
PSD	Prevention of Significant Deterioration
R&PP	Recreation And Public Purposes
RAAT	Reduced Agent Area Treatments
RMP	Resource Management Plan
ROD	Record of Decision
ROW	Rights-of-Way
S&G	Standards & Guidelines
SHPO	State Historic Preservation Office
SLAMS	State and Local Air Monitoring Station
SRMA	Special Recreation Management Area

Acronyms and Abbreviations

SRP	Special Recreation Permit
SSURGO	Soil Survey Geographic Database
SVR	Standard Visual Range
TCP	Traditional Cultural Property
TDS	Total Dissolved Solid
T&E	Threatened and Endangered
TMA	Travel Management Area
U.S.	United States
U.S.C.	United States Code
USDA	U.S. Department of Agriculture
USGS	United States Geological Survey
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
VOC	Volatile Organic Compound
VRM	Visual Resource Management
WAAQS	Wyoming Ambient Air Quality Standards
WEG	Wind Erodibility Group
WGFD	Wyoming Game and Fish Department
WSA	Wilderness Study Area
WSR	Wild and Scenic River
WSEO	Wyoming State Engineer's Office
WUI	Wildland Urban Interface
WYNDD	Wyoming Natural Diversity Database
WYPDES	Wyoming Pollutant Discharge Elimination System

1.0 INTRODUCTION

The United States (U.S.) Department of the Interior (DOI), Bureau of Land Management (BLM), issued a notice of intent (NOI) on November 14, 2008, to revise the resource management plan (RMP) for the Buffalo Field Office (BFO) in Wyoming and prepare an associated environmental impact statement (EIS). Public lands within the planning area are currently managed according to the 1985 RMP, as updated in 2001 and amended in 2003. The BFO will issue a record of decision (ROD) and approved RMP at the completion of the project. The revised Buffalo RMP is scheduled to be completed by September 2012. The RMP and EIS will address the management of BLM-administered lands, including public surface lands (Figure 1-1) and federal mineral estate (Map 2) in the planning area. The Buffalo planning area includes approximately 782,000 acres of BLM-administered surface land and 4.8 million acres of BLM-administered mineral estate in Campbell, Johnson, and Sheridan Counties in north-central Wyoming. The revised Buffalo RMP will establish broad-scale desired outcomes (goals and objectives) and allowable uses and actions anticipated to achieve the desired conditions.

This document, the summary of the analysis of the management situation (AMS), summarizes the current management situation, affected resources, and the condition of resources in the planning area. The summary of the AMS lays the foundation for the process of developing alternatives for the RMP.

1.1 Purpose of the Summary of the Analysis of the Management Situation

The BLM prepares an AMS to analyze available inventory data and other information to characterize a particular resource, portray its existing management situation, and identify management opportunities to respond to identified issues. This summary of the AMS provides, consistent with multiple use principles, the basis for formulating reasonable alternatives, including the types of resources for development or protection (43 Code of Federal Regulations [CFR] 1610.4-4).

The summary of the AMS is intended to describe the current conditions and trends of the resources and uses/activities in the planning area in sufficient detail to create a framework from which to resolve any planning issues through the development of alternatives. This analysis describes the status, or present characteristics and condition, of the public land; the status of physical and biological processes that affect ecosystem function; the condition of individual components such as soil, water, vegetation, and wildlife habitat; and the relative value and scarcity of the resources. The summary of the AMS also addresses social and

economic conditions that influence how people, communities, and economies interact with the ecosystem.

The summary of the AMS is concise and focused on the issues relevant to resource management in the planning area. It is not intended to be an exhaustive review of everything known about the resources and uses/activities in the planning area. Parts of the summary of the AMS will be incorporated into the subsequent RMP and EIS as part of the no-action and action alternatives and in the discussions of the affected environment. Alternatives presented in the RMP and EIS will draw on the management opportunities identified in this document. Each alternative will include desired outcomes (goals and objectives) and the allowable uses and actions anticipated to achieve those outcomes. Considering a reasonable range of alternatives helps the BLM and its cooperators understand the various ways of addressing the planning issues and different scenarios for management of the resources and uses/activities in the planning area.

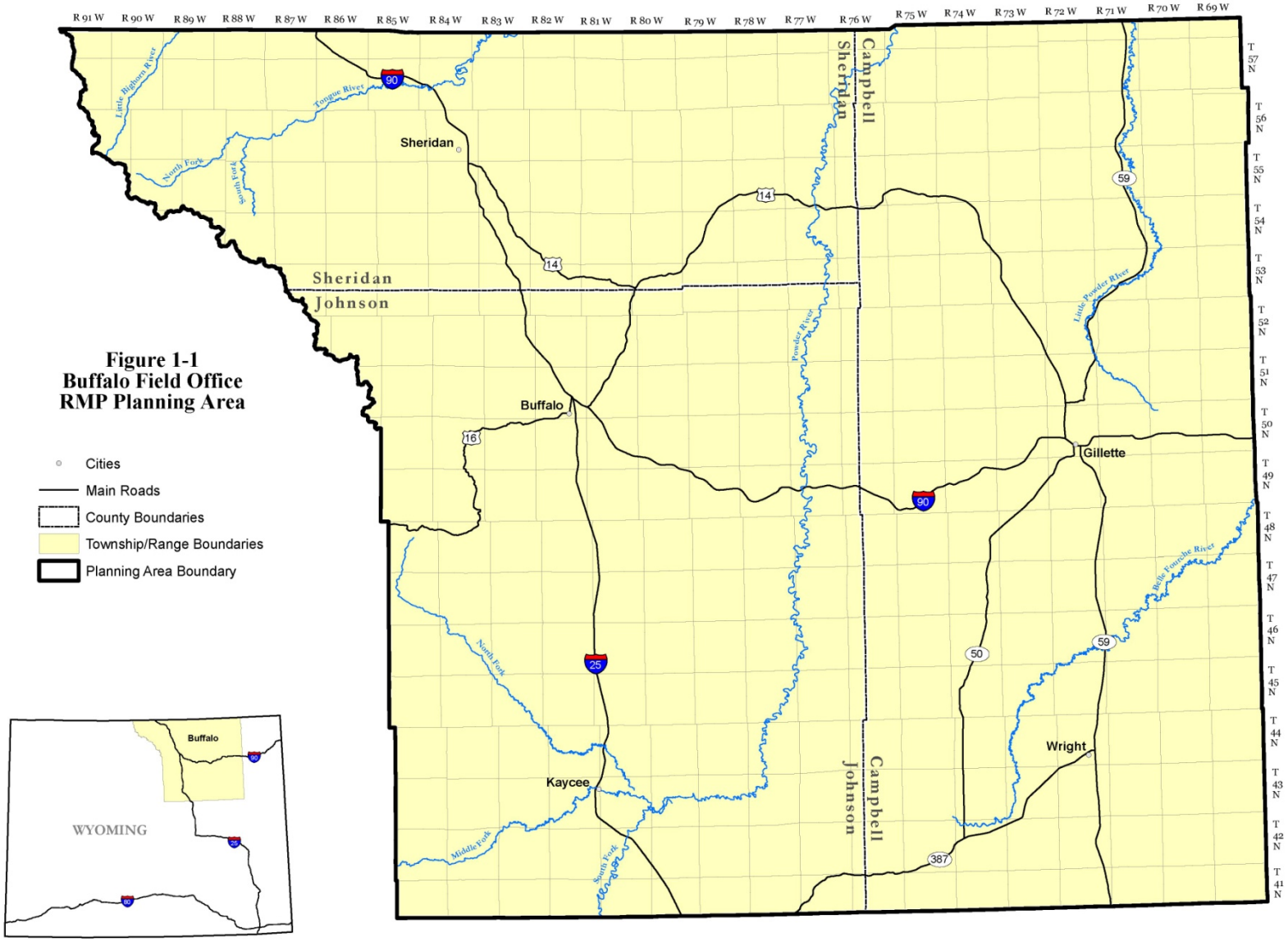


Figure 1-1
Buffalo Field Office
RMP Planning Area
Cities
Main Roads
County Boundaries
Township/Range Boundaries
Planning Area Boundary
Sheridan
Buffalo
Gillette
Wright
Kaycee
Sheridan
Johnson
Campbell
Sheridan
Campbell
Johnson
WYOMING
Buffalo
Little Bighorn River
Tongue River
North Fork
South Fork
Powder River
Little Powder River
Belle Fourche River
North Fork
Middle Fork
South Fork
90
14
16
25
59
50
387

1.2 Overview of the BLM Planning Process

The process for the development, approval, maintenance, and amendment or revision of RMPs is initiated under the authority of Section 202(f) of Federal Land Management Policy Act (FLPMA) and Section 202(c) of the National Environmental Policy Act (NEPA). RMP revisions must comply with the FLPMA; NEPA; Appendix C, "Program-Specific and Resource-Specific Decision Guidance Requirements," of *Land Use Planning Handbook* (BLM 2005a), for affected resource programs; the 2008 *BLM National Environmental Policy Act Handbook* (BLM 2008d); and all other applicable BLM policies and guidance. The overall objective of these planning efforts is to provide collaborative, community-based planning approaches and products to assist the BLM in revising the existing management decisions and resource allocations.

The BLM Planning Process

- Prepare scoping report and AMS.
  - Refine issues and characterize the management situation.
  - Develop planning criteria and identify planning opportunities.
- Prepare a draft RMP and EIS.
  - Refine issues, alternatives, and impact analysis input.
  - Allow a 90-day comment period.
- Prepare the proposed RMP and final EIS.
  - Develop an implementation and monitoring plan for the preferred alternative.
  - Allow a 30-day protest period and a 60-day governor's consistency review.
  - Respond to public comments and protests.
- Prepare a ROD and approved RMP.
  - Publish the approved RMP.
  - Develop an implementation and monitoring strategy.
  - Implement, monitor, and evaluate.

Development of the RMP represents the first tier of the two-tiered BLM planning process: the land use planning tier. As such, the RMP prescribes future management direction for the resources and uses of the BLM-administered public lands in the planning area. In turn, the RMP guides the second tier of the planning process: the more site-specific-activity or implementation-level planning and daily operations.

Activity or implementation-level planning extends the resource and land use decisions of the RMP into site-specific management decisions for smaller geographic units of public lands within the RMP planning area. Activity planning includes such elements as grazing plans, habitat management plans (HMPs), and interdisciplinary or coordinated activity plans. Through these plans, the BLM issues various land and resource use authorizations, identifies specific mitigation needs, and develops and implements other similar plans and actions. All management direction or actions developed as part of the BLM planning process are subject to valid existing rights and must meet the objectives of the BLM's multiple-use management mandate and responsibilities (FLPMA Section 202[c] and [e]).

Valid existing rights are legal rights to use the land that were in existence prior to implementation of the decisions in the RMP. The most important types of valid existing rights

are oil and gas leases, mining claims, and right-of-way (ROW) authorizations. Examples of how BLM views valid existing rights including oil and gas leasing stipulations specified for specific areas in this new RMP would not apply to existing leases. These existing leases would be subject to the specific lease stipulations that were applied under the previous land use plan. Mining claims that exist on the effective day of a withdrawal may still be valid if they can meet the test of discovery of a valuable mineral required under the Mining Laws. An existing ROW would only be subject to the specific terms and conditions that were applied when it was authorized even if it is located within a ROW exclusion or avoidance area specified under the RMP.

1.3 General Description of the Planning Area, Geographic Scope, and Resource/Programs

This RMP planning effort will address lands within the Buffalo planning area in north-central Wyoming (Figure 1-1). The planning area covers approximately 782,000 acres of public surface land and 4.8 million acres of federal mineral estate in three counties (Table 1-1). BLM-administered surface land in the planning area is in scattered tracts intermingled with state and private lands. The southern Big Horn Mountains, the Powder River Breaks, the Rochelle Hills, and some areas in northeast Campbell County contain larger block of BLM-administered surface lands.

Table 1-1. BLM-administered Surface Lands and Federal Mineral Estate within the Buffalo Planning Area

County	BLM-administered Surface Land (acres)	Federal Mineral Estate (acres)
Campbell	223,994	2,418,761
Johnson	504,325	1,682,668
Sheridan	53,724	701,848
Total	782,102	4,803,277

Resources, resource uses, and topics discussed in this summary of the AMS are in Table 1-2. The resources and resource uses have been grouped into eight broad categories and are presented in these categories throughout this document. These categories will also be carried through the development of the RMP and EIS: physical resources, mineral resources, fire and fuels management, biological resources, heritage and visual resources, land resources, special designations, and socioeconomic resources. This AMS does not discuss wild horses, geothermal resources, cave and karst resources, and national historic trails. These resources are not currently found within the planning area.

Table 1-2. Resources, Resource Uses, and Topics Discussed in this Summary of the AMS

Resources	Resource Uses	Special Designations	Social and Economic
Physical Resources - Air Quality - Geology - Soil - Water **Fire and Fuels Management** - Unplanned/Wildland Fire - Planned/Prescribed Fire - Stabilization and Rehabilitation **Biological Resources** - Forests and Woodlands - Grasslands and Shrublands - Riparian/Wetland Resources - Invasive Species and Pest Management - Fish - Wildlife - Special Status Species **Heritage and Visual Resources** - Cultural Resources - Paleontological Resources - Visual Resources	**Minerals and Energy Resources** - Locatable - Leasable Coal - Leasable Oil and Gas - Leasable Other Solids - Salable **Land Resources** - Forest Products - Lands and Realty - Renewable Energy - Rights-of-Way and Corridors - Transportation and Access - Recreation - Livestock Grazing - Wilderness Characteristics	Areas of Critical Environmental Concern Scenic or Back Country Byways Wild and Scenic Rivers Wilderness Study Areas	Social Conditions Economic Conditions Health and Safety Environmental Justice Tribal Treaty Rights

1.4 Key Findings

This section of the summary of the AMS presents key findings identified during the development of the document. Many of these findings are issues and concerns expressed by the public or identified by the BLM and cooperating agencies. Key findings are summarized below.

1.4.1 Physical Resources

Air Quality

- Extensive energy development within the planning area, especially coal and fluid minerals, leads to dust, emissions, and other air quality impacts. Management actions to maintain/enhance air quality should be identified in this RMP revision.

Water

- Desired outcomes and management actions for water resources will be identified during the planning process from sources such as the standards and goals found in the Clean Water Act (CWA) and tribal, state, and local water quality requirements.
- Acceptable parameters for transforming ephemeral streams into perennial streams due to coalbed natural gas (CBNG) discharge should be considered.

- Identify and examine the pros and cons of various acceptable methods to use, store, and dispose of produced water from oil and gas development.
- In riparian areas, identify desired width-to-depth ratios, stream bank conditions, channel substrate conditions, and large woody debris characteristics.
- Management should prioritize water bodies and watersheds based on laws, regulations, beneficial uses, and the value they provide to the public.
- Impacts to groundwater resources due to CBNG development and identify public and private interests that may be affected.

Soil

- Highly erosive soils and soils with poor reclamation potential compose a large percentage of the planning area. Some actions, such as CBNG development, are so widespread that avoidance of these areas is difficult. The RMP should identify management actions that reduce soil loss/erosion while allowing development to occur.

1.4.2 Mineral and Energy Resources

- Reasonable projections of foreseeable development will be made, for use in this planning effort.
- Special attention will be needed to address conflicts between planned mineral development (i.e., salable, locatable, and leasable minerals; renewable energy resources; and related transportation networks) and other land and resource uses and values (e.g., wildlife habitat and new energy corridors/ROW). Principal considerations will include how to mitigate disruptive activities and human presence:
  - in fisheries habitat;
  - in elk crucial habitat (winter range and birthing areas);
  - in Threatened, Endangered, or sensitive species (e.g., greater sage-grouse and mountain plover) habitat;
  - in other important wildlife species (e.g., for raptor and migratory bird) habitats; and,
  - on recreation values, scenic trails, forage uses, air quality, sensitive vegetation types, and sensitive watersheds.
- The RMP revision should review the areas previously identified as suitable, not suitable, or restricted for minerals development activity (oil, gas, CBNG, geophysical resources, and wind energy). Changes to these categories should be made if they are no longer fitting.

- The cumulative effects of increased energy and minerals development on the public lands should be properly and thoroughly analyzed and addressed in the RMP. Appropriate special operating conditions, where necessary, should be developed.
- The revised RMP should examine which areas should be open or closed to energy leasing, non-energy leasing, and renewable energy. The RMP also should identify whether new mineral material sites and locatable mineral withdrawals will be needed to meet growing demand and, if so, where they should be located. The planning process should ascertain the types of new and renewable energy resources likely to be proposed and developed.
- The RMP revision should identify best management practices (BMPs) for existing disturbed land and include directions for using new technology/BMPs as they become available. The BFO should examine how to encourage the timely implementation of BMPs during and after mineral development.

1.4.3 Fire and Fuels Management

- The RMP revision should be consistent with the National Fire Plan (2002) and the Bureau of Land Management Eastern Wyoming Zone Fire Management Plan (2004a) and will need to consider how this guidance will be implemented in the planning area. Objectives may include the use of wildland and prescribed fire to achieve identified resource objectives while protecting private property, and the reduction of dangerous accumulations of fuels.
- The RMP revision should establish the appropriate management strategies for wildland fire throughout the planning area (Fire Use Areas) and should identify how vegetation could be managed to strategically minimize the fire risk to adjacent rural subdivisions, towns, cities, industrial sites, and communication sites (i.e., the “Wildland Urban Interface”).

1.4.4 Biological Resources

Vegetation

- The RMP should determine how management actions can be adapted to drought conditions.
- The western portion of the planning area supports forest and woodland ecosystems that provide multiple benefits. The RMP should maintain and enhance the health, productivity, and biological diversity of forest and woodland ecosystems.
- The RMP should ascertain whether any areas require vegetative manipulation (i.e., prescribed fire, mechanical, and chemical treatments) to enhance ecosystem health.

- Contingency planning is needed for various consumptive uses of vegetation communities. Practices needed for grazing management, for reclamation success, and to meet the goals and objectives of habitat management should be identified during the planning process (mitigation practices).

Riparian/Wetland Resources

- The RMP revision needs to incorporate the Riparian Initiative (BLM 1991a) and pertinent Rangeland Health guidance (43 CFR Ch. II Subpart 4180).
- The RMP revision should address ways to maintain properly functioning conditions in wetland areas and ways to move priority habitats toward a desired future functional condition.

Invasive Species and Pest Management

- Invasive species can be found throughout the planning area. The RMP should address ways to control, prevent, or eradicate invasive species and noxious weeds and will review current management actions and treatment programs for adequacy in preventing and managing weed infestations. The RMP also should identify areas that are priorities for control and eradication efforts.
- The RMP revision should examine how invasive species and noxious weed management actions are incorporated into and affect other resources.

Fish

- The RMP should identify how adverse influences from land-use activities can be mitigated to maintain or enhance aquatic fish habitat and ecosystem health.

Wildlife

- Most wildlife require large areas to meet their life-cycle or seasonal requirements, so it is important to consider the impacts of management actions at the ecosystem level. The RMP revision should examine the existing and desired population and habitat conditions for wildlife, as well as the appropriate actions or use restrictions needed to maintain desired habitat conditions.
- The planning area contains large areas of greater sage-grouse habitat. The RMP should determine what management prescriptions are needed to preserve this habitat in functioning condition.

Special Status Species

- Managing for biodiversity is important in recovering Threatened and Endangered species and preventing BLM sensitive and other special status species from trending toward Endangered Species Act (ESA) listing. The RMP revision should identify what

special status species are present in the planning area and what management practices are needed to provide habitat for these species.

- The RMP revision should pay special attention to the interrelated and interdependent effects of management actions on special status species.

1.4.5 Heritage and Visual Resources

Cultural Resources

- The RMP revision should describe and define conditions where the integrity setting for sites that are eligible for or listed on the National Register of Historic Places (such as, but not limited to, the Bozeman Trail, Cantonment Reno, Crazy Woman Battle Site, historic homesteads, and Pumpkin Buttes) will be maintained. The RMP revision should also outline mitigation measures that may be applied when the integrity of setting for such sites is threatened.
- The RMP should determine the conditions under which the BFO will initiate consultation with tribes to identify sacred sites or traditional cultural properties. The RMP also should outline opportunities for cooperation (i.e., with tribes, other agencies, and private individuals) and appropriate measures to provide access to or protect traditional cultural properties and sacred sites consistent with tribal concerns.
- The planning process should evaluate the cumulative impacts of energy development and other permitted resource uses on historic properties throughout the field office.
- The RMP should identify opportunities to develop or maintain interpretative sites in areas such as, but not limited to, the Bozeman Trail, Cantonment Reno, Crazy Woman Battle Site, the Middle Fork Area and Pumpkin Buttes.
- Hundreds of new historic properties have been identified since the previous RMP. The RMP revision should identify areas that may require special designations.

Paleontological Resources

- The RMP revision should address how to implement the Potential Fossil Yield Classification system in the planning area as well as the best ways to inventory and protect paleontological resources.
- The RMP revision should address whether to assign special management designations or prescriptions to areas and should develop appropriate management actions for these areas.

Visual Resources

- An updated visual resource inventory will be completed with the RMP revision. Much of the surface land in the planning area is privately owned. Visual impacts often are not

considered when minerals and other resources are being developed in these areas. The degree to which visual resource management (VRM) classifications have been compromised by development on non-federal lands should be evaluated.

- The VRM classifications in the planning area should be reviewed, and changes should be made as necessary, during the RMP revision process.

1.4.6 Land Resources

Forest Products

- The RMP should identify forest resources management practices and sustainable levels of forest product harvest for both commercial and personal opportunities. Management should balance forest resource benefits.

Lands and Realty

- The criteria for land disposal and acquisition need to be updated, and the suitability of lands for disposal under various authorities needs to be assessed.
- The RMP revision should assess what land adjustments are necessary to improve access to and management of public lands.
- Occupancy trespass is an issue in the planning area. A strategy is needed to address trespass.

Renewable Energy

- The RMP revision should identify what types of renewable energy resources could be proposed and developed in the planning area. This should include a list of areas that are suitable for geothermal, solar, wind and other renewable energy development and those where this type of development should be avoided.

Rights-of-Way and Corridors

- The RMP revision needs to assess whether previously identified corridors and communication sites are still valid, consider the modification of existing or new corridors and associated management actions as appropriate, and address corridors resulting from ongoing national and regional planning efforts. The RMP revision also should identify specific ROW avoidance and exclusion areas.
- The RMP revision should include a decision regarding whether designated ROW corridors and communication sites will be maximized to the fullest extent before new sites are authorized.

Transportation and Access

- Off-highway vehicle (OHV) use can conflict with other land and resource uses and can cause resource damage. Principal considerations during the RMP revision process should include providing for suitable and sufficient recreational uses and facilities (dispersed, organized, competitive, and commercial), OHV use designations, and VRM direction.
- The field office needs to determine the criteria for designating roads closed, open, or limited. Areas currently identified as each of these designations will be reviewed for continued suitability.
- Roads developed for energy production will be signed according to their designation.
- Inventory the existing road network should be a priority.

Recreation

- Many types of recreation activities occur throughout the planning area, and increased visitation over the years has led to increased concerns about resource protection and conflicting uses. The revised RMP should establish the types, locations, and levels of recreation to be emphasized or limited and should clearly identify areas where recreation is conflicting with other resource values.
- A need exists to assess management opportunities and determine whether any new special recreation management areas should be established for those areas needing additional management emphasis, and whether special recreation permits and other uses need to have carrying capacities.
- Recreation monitoring should be a priority to address the demands on special recreation management areas (i.e., public use and compliance).

Wilderness Characteristics

- The RMP should address appropriate management for lands identified as having wilderness characteristics from the Citizen's Wilderness Proposal (Wyoming Wilderness Coalition 1994). These lands lie adjacent to existing wilderness study areas (WSA) in the planning area

Livestock Grazing

- The RMP revision should determine what constitutes the best grazing management practices to meet Rangeland Health Standards and other resource objectives.
- For areas that are available for grazing, the amount of forage for livestock (in animal unit months [AUMs]) that should be made available for current and future demands should be determined. Any areas that are currently being used for grazing but should

likely be set aside, in whole or in part, to meet other resource needs should be identified in the RMP.

- The revised RMP should identify ways to make the landscape as productive as feasible for grazing while still maintaining its ecological balance. Descriptions of management practices, land treatments, and changes in the season of use or stocking rates will be included.
- Numerous rangeland improvements exist on the grazing allotments in the planning area. The RMP needs to identify what new or existing projects are needed to implement best grazing management practices and to meet other related resource objectives (e.g., water quality or wildlife forage).

1.4.7 Special Designations

Areas of Critical Environmental Concern

- There are unique areas or sensitive lands and resources in the planning area that meet the criteria for protection and management under special designations. The revised RMP should determine whether any or all of the previously nominated areas of critical environmental concern (ACECs) should be officially designated. The appropriateness of other areas of public land for inclusion as ACECs or other special designations should be evaluated.

Wild and Scenic Rivers

- The RMP revision should address appropriate management for the Middlefork of the Powder River, which is eligible for designation as a Wild and Scenic River.

Wilderness Study Areas

- The RMP revision should identify and address management actions necessary to ensure the three existing WSA's are managed for their wilderness characteristics and in accordance with existing laws and policy.

1.4.8 Socioeconomic Resources

Social Conditions

- The study area for the planning area is rural in nature and is both directly and indirectly affected by public land management considerations and decisions. Land allocation decisions (e.g., land tenure decisions, commercial uses, outfitter and guide permits, oil and gas leasing and permits to drill, and mineral leasing and production) affect the communities in the planning area and those affects will be analyzed in the RMP revision process.

Economic Conditions

- Analysis conducted for the RMP revision will identify, describe, and analyze social and economic conditions and relevant trends (including demographics, social organization, attitudes, employment, income, and environmental justice) as described by Appendix D, "Social Science Considerations in Land Use," of the BLM's 2005 *Land Use Planning* Handbook (BLM 2005a). An IMPLAN input-output model that has been calibrated for this area will be used to quantify the employment and income impacts associated with the management alternatives analyzed in the RMP revision.

Health and Safety

- The BLM, in partnership with local communities, will update the land use plan for fire protection, hazardous materials management, abandoned mine land reclamation, and any other public safety concerns.

Environmental Justice

- The RMP revision will provide a narrative describing whether or not any changes current resource management activities would have disproportionately high and adverse human health or environmental effects on the minority, low-income, or tribal communities in the planning area.

2.0 AREA PROFILE

This chapter of the Summary of the Analysis of the Management Situation (AMS) provides an overview of the resources, resource uses, special designations, and social and economic features of the planning area. For each resource, this chapter characterizes the resource in terms b of indicators (used to assess the condition of the resource); current conditions (which describes the existing conditions of the resource); trends (which describes the direction of change in the resource between the present and some point in the past); and forecasts (which predicts the change in the condition of the resource given current management). Resource uses and social and economic features are characterized in terms of current conditions, trends, and forecasts. Special designations are characterized in terms of current conditions and areas being considered for future designation. This chapter of the AMS provides the basis of the affected environment section of the Resource Management Plan (RMP) and Environmental Impact Statement (EIS).

2.1 Physical Resources

2.1.1 Air Quality

The Bureau of Land Management's (BLM) air resources program includes climate and air quality. Climate includes assessment of existing climate, a qualitative description of climate change, and analysis of potential effects of climate change on BLM resources. Air quality includes air quality management, inter-agency coordination, smoke abatement for prescribed fire, and air quality impact assessment. The BLM is responsible for considering and incorporating climate and air quality into multiple-use programs, for managing the public lands in a manner which will protect air quality, and complying with applicable laws, statutes, regulations, standards or implementation plans.

2.1.1.1 Regional Context

This region, the Northern Great Plains grasslands, lies in the rain shadow east of the Rocky Mountains, specifically the Big Horn Mountains. The climate of the Northern Great Plains grasslands is a semiarid continental regime. The average annual temperature is 45° Fahrenheit (^{o}F) throughout most of the region, but can reach as high as 60°F in the south. Winters are cold and dry, and summers are warm to hot. The frost-free season ranges from fewer than 100 days in the north to more than 200 days farther south in Oklahoma. Precipitation ranges from 10 inches in the north to more than 25 inches in the southern part of Wyoming, with maximum rainfall in summer. Evaporation usually exceeds precipitation, and the total supply of moisture is low. When precipitation does occur, it is often in the form of hail or blizzards; and tornadoes and dust storms are frequent.

Mean annual temperature is 45.6 degrees ^{o}F in Buffalo and 45.2 ^{o}F in Gillette. Wind speeds and direction are variable and generally strong, with prevailing direction north-northwest. Annual average wind speeds are 10.2 miles per hour (mph) in the Buffalo area (Johnson County Airport), 10 mph in Gillette, and 7.8 mph in Sheridan.

Precipitation is generally greater at higher elevations. Total mean annual precipitation is 13.2 inches in Buffalo and 15.6 inches in Gillette. Gillette has received consistently greater moisture than Buffalo as demonstrated by the precipitation trends from 1938 through 2008 in Buffalo and Gillette which indicate slightly more precipitation in Gillette than Buffalo. Trends or patterns within a given year are most noticeable for particular months: precipitation tends to increase in the months of May and July and decrease in June.

2.1.1.2 Resource Characterization

Indicators

Air pollutants addressed in this document include criteria air pollutants, hazardous air pollutants (HAPs) and sulfur and nitrogen compounds, which could contribute to visibility impairment and atmospheric deposition. State and National Ambient Air Quality Standards (NAAQS) set the maximum thresholds for criteria air pollutants. The Wyoming Prevention of Significant Deterioration (PSD) program establishes allowable increases of a given pollutant for a particular area from specific sources. These standards and programs typically affect Class I or Sensitive Class II Wilderness Areas.

Criteria Air Pollutants

Air quality standards for criteria pollutants have been established by the U.S. Environmental Protection Agency (EPA) and are identified as the NAAQS. Concentrations of air pollutants greater than the national standards represent a risk to human health. Criteria pollutants include carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM10 and PM2.5), sulfur dioxide (SO_2) and lead (Pb).

Hazardous Air Pollutants

There are a wide variety of hazardous air pollutants including benzene, toluene, ethylbenzene, xylene (also referred to as BETEX), N-hexane and formaldehyde. Although HAPs do not have federal air quality standards (exposure thresholds do exist), some states have established “significance thresholds” to evaluate human exposure for potential chronic inhalation illness and cancer risks.

Wyoming and National Ambient Air Quality Standards

Wyoming Ambient Air Quality Standards (WAAQS) and NAAQS identify maximum limits for criteria air pollutant concentrations at all locations to which the public has access. The WAAQS and NAAQS are legally enforceable standards. Concentrations above the WAAQS and NAAQS represent a risk to human health that by law, require public safeguards be implemented. State standards must be at least as protective of human health as federal standards, and may be more restrictive as allowed by the Clean Air Act.

Prevention of Significant Deterioration

The PSD program of the Clean Air Act ensures that air quality in areas with clean air does not significantly deteriorate, while maintaining an allowable margin for future industrial growth. Under PSD, each area in the United States is classified by the air quality in that region according to the following system:

> ***PSD Class I Areas:*** Areas with pristine air quality, such as wilderness areas, national parks and Native American Indian reservations, are accorded the strictest protection. Only very small incremental increases in pollutant concentration are allowed in order to maintain the high air quality in these areas.
>
> ***PSD Class II Areas:*** Essentially, all areas that are not designated Class I are designated Class II. Moderate incremental increases in pollutant concentration are allowed, although the concentrations are not allowed to reach the concentrations set by Wyoming and federal standards (WAAQS and NAAQS).
>
> ***PSD Class III Areas:*** No areas have yet been designated Class III. Concentrations would be allowed to increase all the way up to the WAAQS and NAAQS in these areas.

Visibility

Visibility can be expressed in terms of deciviews (dv), a measure for describing perceived changes in visibility. One dv is defined as a change in visibility that is just perceptible to an average person which is approximately a 10 percent change in light extinction. To estimate potential visibility impairment, monitored aerosol concentrations are used to reconstruct visibility conditions for each day monitored. These daily values are then ranked from clearest to haziest and divided into three categories to indicate the mean visibility for all days (average), the 20 percent of days with the clearest visibility (20 percent clearest), and the 20 percent of days with the worst visibility (20 percent haziest).

Since 1980 the Interagency Monitoring of Protected Visual Environments (IMPROVE) network has measured visibility in national parks and wilderness areas. These are managed as high visual

quality Class I and II areas by the federal visual resource management (VRM) program. There are six IMPROVE stations in Wyoming.

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 such as nitrogen oxides (NO_x) or sulfur dioxide (SO_2]), which may contribute to acidification of lakes, streams, and soils and affect other ecosystem characteristics, including nutrient cycling and biological diversity.

Air pollutants can be deposited by either wet (precipitation via rain or snow) or dry (gravitational) settling of particles and adherence of gaseous pollutants to soil, water, and vegetation. The BLM works cooperatively with the EPA to measure dry and wet depositions. Three Clean Air Status & Trends Network stations and eight National Atmospheric Deposition Program stations operate in Wyoming to measure dry and wet deposition (EPA 2008a).

Current Condition

Climate

The climate in the planning area is temperate, semi-arid region with long cold winters and short summers. The major factors controlling climate in the planning area are elevation, strong westerly winds, moisture flow, and mountainous barriers to the west. Elevations within the planning area are variable and relatively flat ranging from 4,544 feet near Gillette to 4,645 feet near Buffalo. The Big Horn Mountains along the western edge of the planning area rise to over 13,000 feet. Gillette in the east is located at 4,544 feet, where temperatures range from approximately 31-59 ^{o}F. Wind speed and direction are highly variable because of the effect of local topography in the planning area. Wind speeds are generally strong and gusts above 40 mph are not unusual. Table 2-1 lists temperature, precipitation, and wind speed data for the planning area.

Table 2-1. Temperature, Precipitation, and Wind Speed Data

Climate Component	Description
Temperature	Mean maximum summer temperature[1]: 93.6 °F and 94.4 °F Mean minimum winter temperature[1]: -5.9 °F and -7.8 °F Mean annual temperature[1]: 45.6 °F and 45.2 °F
Precipitation	Mean annual precipitation: 13 to 17 inches Mean annual snowfall: 33 and 67 inches
Winds	Mean annual wind speed: 9.3 mph Prevailing wind direction: north/northwest

Source: EPA 2008b

[1] Buffalo and Gillette respectively

Air Quality

Air quality in the planning area is considered to be good overall. The State of Wyoming has determined that the planning area is in compliance with WAAQS and the NAAQS for all criteria pollutants other than PM10. This PM10 violation occurs due to vehicle travel over unpaved roads, and the Wyoming Department of Environmental Quality (DEQ) Air Quality Division (AQD), has an EPA-approved state implementation plan in place which requires control measures to reduce PM10 levels. The PSD program does not currently apply to the resource because currently the PSD only applies facilities located in Class I areas, and there are no Class I areas located in planning area.

Visibility in the planning area is also considered to be good overall. Two monitors in the IMPROVE network are located in the planning area at Thunder Basin and Cloud Peak Wilderness Area. The entire planning area is considered to have minimal visibility impacts.

Existing sources of HAPs, criteria pollutants, and greenhouse gases within the planning area include fossil fuel combustion that emits HAPs; oil and gas operations that emit volatile organic compounds (VOCs); NO_X; and may emit hydrogen sulfide (H_2S). In addition large fires are a source of emissions. The air quality in the planning area is monitored for PM10 and PM2.5 near the towns of Sheridan, Gillette, Wright, and Antelope Valley and in the rural areas east of Clearmont, southeast of Wright, and north of Gillette. NO_x is monitored at Thunder Basin, Belle Ayre Mine, in Campbell County, and at the Antelope Mine State Monitoring Facilities. Ozone is measured in Campbell County and at the Thunder Basin State Monitoring Facilities. Table 2-2 presents an overview of WAAQS and NAAQS and background concentrations in the planning area.

Trends

The BLM and other federal agencies have collected data in near the planning area related to pollution concentrations, visibility, atmospheric deposition, and HAPs. Trends data is provided for each of these areas below.

Pollutant Concentrations

Pollutant concentration refers to the mass of pollutants present in a volume of air and can be reported in units of micrograms per cubic meter ($\mu g/m^3$) and parts per billion (ppb - means one part per 1,000,000,000 parts by volume).

Figure 2-1 presents the PM10 data collected for the last eight years at the State and Local Air Monitoring Station (SLAMS) located in Sheridan County, Wyoming (EPA 2008b). The data are shown for both the 24-hour and annual averages as a percent of the respective NAAQS.

Table 2-2. Concentrations of Criteria Air Pollutants and Background Air Quality

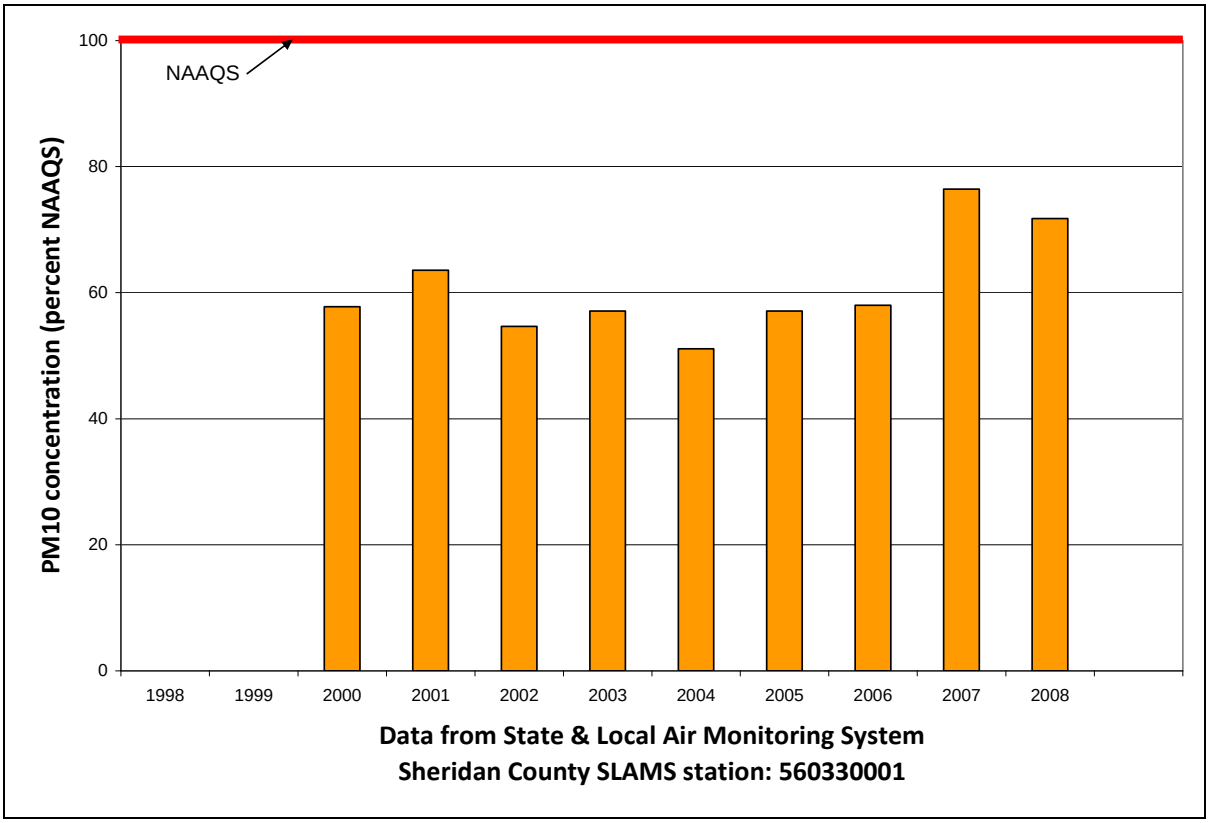
Pollutant	Averaging Time	NAAQS ($\mu g/m^3$)	WAAQS ($\mu g/m^3$)	Background ($\mu g/m^3$)
Carbon Monoxide CO	1 hour[1a]	40,000	40,000	3336
	8 hour[1a]	10,000	10,000	1381
	1 hour[1b]	40,000	40,000	1,979
	8 hour[1b]	10,000	10,000	931
NO2	Annual (Arithmetic Mean)	100	100	3.4[8]
Ozone O3	1 hour	235	235	169[2]
	8 hour	157	157	141.3[3]
PM_{10}	24 hour[4]	150	150	NA
	Annual (Arithmetic Mean)[5]	Revoked Dec. 2006	50	16.1[9] 18.6[10]
$PM_{2.5}$	24 hour[6]	35	65	11[11] 3.9[12]
	Annual[7]	15	15	3.3[13] 7.5[14]
SO2	3 hour	1300	695	93[15]
	24 hour	365	260	32[15]
	Annual (Arithmetic Mean)	80	60	4[15]

NOTE:

- $PM_{2.5}$ Particulate matter 2.5 microns or less – fine.
- PM_{10} Particulate matter 10 microns or less – inhalable

1) 1a: Not to be exceeded more than once per year. Data collected by Amoco at Ryckman Creek for an 8 month period during 1978-1979, summarized in the Riley Ridge EIS (BLM and USFS 1983). 1b: data collected at Yellowstone National Park during 2005.
2) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 235 ug/m^3 is <u>less than</u> 1. As of June 15, 2005 EPA revoked the 1-hour ozone standard in all areas except the fourteen 8-hour ozone non-attainment Early Action Compact (EAC) Areas.
3) Thunder Basin, 2007, 4th high. To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 157 ug/m^3
4) Not to be exceeded more than once per year on average over 3 years.
5) Due to a lack of evidence linking health problems to long-term exposure to coarse particle pollution, the EPA revoked the annual PM_{10} standard in 2006 (effective December 17, 2006).
6) To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 $\mu g/m^3$ (effective December 17, 2006).
7) To attain this standard, the 3-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15.0 $\mu g/m^3$
8) Thunder Basin, 2007 and Green River Visibility Study, 2001
9) Cody, 2007
10) Gillette, 2006
11) Antelope Site, Converse County, 2004
12) Antelope Site, Converse County, 2006
13) Antelope Site, Converse County, 2004
14) Lander, Freemont County, 2007
15) Sulfur dioxide data collected at Lost Cabin Gas Plant (preconstruction monitoring), Fremont County WY, 1986-1987. Data supplied by Wyoming DEQ, 2008a. Not to be exceeded more than once per year.

Figure 2-1. 24 Hour Particulate Matter Concentrations in Sheridan, Wyoming



Visibility

IMPROVE has measured visibility in national parks and wilderness areas in the United States since the 1980s. There are four IMPROVE aerosol monitoring stations in Wyoming: Yellowstone National Park, North Absaroka Wilderness (near Dead Indian Pass), Thunder Basin National Grasslands, and Cloud Peak (in the Big Horn Mountains).

The IMPROVE stations within the planning area are Cloud Peak Wilderness and Thunder Basin National Grasslands. Visibility can be expressed in terms of dv, a measure for describing perceived changes in visibility. One dv is defined as a change in visibility that is just perceptible to an average person, about a 10 percent change in light extinction.

Visibility can also be defined by standard visual range (SVR), and is the farthest distance at which an observer can see a black object viewed against the sky above the horizon; the larger the SVR, the cleaner the air. Visibility conditions can be measured in SVRs (miles). Visibility within the planning area is considered very good; however, average SVR is unknown as no actual monitoring has been conducted within this area.

To estimate potential visibility impairment, monitored aerosol concentrations are used to reconstruct visibility conditions for each day monitored. These daily values are then ranked from clearest to haziest and divided into three categories:

- 20 percent clearest: mean visibility for the 20 percent of days with the best visibility
- Average: the annual median visibility
- 20 percent haziest: mean visibility for the 20 percent of days with the poorest visibility

The IMPROVE sites closest to and within the planning area are the Cloud Peak and Thunder Basin IMPROVE sites. Data have been collected at the Cloud Peak and Thunder Basin sites since 2002 (IMPROVE 2006). SVRs were reconstructed from monitored aerosol (suspended liquid or solid particles) data.

Several Class I and Class II areas exist in the region. Table 2-3 presents a list of these Class I and Class II areas within 100 miles of the planning area.

Table 2-3. Class I and Class II Areas in the Vicinity of the Buffalo Planning Area

National Park	Wind Cave National Park
Recreation Area	Missouri National Recreational River
Wilderness Areas	Cloud Peak Wilderness Area
	Badlands Wilderness Area
National Forests	Big Horn National Forest
	Black Hills National Forest
	Thunder Basin National Grassland
National Monument	Devils Tower National Monument
Historic Trail	Lewis and Clark National Historic Trail
National Memorial	Mount Rushmore National Memorial

Atmospheric Deposition

Atmospheric deposition refers to the processes by which air pollutants are removed from the atmosphere and deposited in terrestrial and aquatic ecosystems; it is reported as the mass of material deposited on an area (kilograms per hectare [kg/ha]). Air pollutants are deposited by wet deposition (in effect 'scrubbed' out of the lower atmosphere by precipitation) and dry deposition (gravitational settling of particles and adherence of gaseous pollutants to soil, water, and vegetation). Substances deposited include:

- Acids, such as sulfuric (H_2SO_4) and nitric (HNO_3), sometimes referred to as acid rain.
- Air toxics, such as pesticides, herbicides, and VOC.
- Nutrients, such as NO_3- and NH_4+.

The estimation of atmospheric deposition is complicated by contribution to deposition by several components: rain, snow, cloud water, particle settling, and gaseous pollutants. Deposition varies with precipitation and other weather variables (wind for example), which in turn, vary with elevation and time.

The United States Department of Agriculture (USDA) Forest Service (USFS) has established guidelines or Levels of Concern (LOCs) for total deposition of N and S compounds in Class I Wilderness Areas (USFS 2007). Total nitrogen deposition of 1.5 kg/ha/year or less is considered to be unlikely to harm terrestrial or aquatic ecosystems. For total sulfur deposition, the LOC is 5 kg/ha/yr. A sulfur LOC of 1.5 kg/ha/yr is being considered. Note that these are the same LOC's used by the National Park Service.

Hazardous Air Pollutants

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 VOCs and may emit H_2S.

Climate

Ongoing scientific research has identified the potential impacts of greenhouse gas (GHG) emissions (including carbon dioxide, CO_2; methane, CH_4; nitrous oxide, N_2O; water vapor; and several trace gasses) on global climate. Through complex interactions at regional and global scales, these GHG emissions cause a net warming effect of the atmosphere which makes surface temperatures suitable for life on earth primarily by decreasing the amount of heat energy radiated by the earth into space. Although GHG levels have varied for millennia (along with corresponding variations in climatic conditions), recent industrialization and burning of fossil carbon sources have caused CO_2 concentrations to increase dramatically, and are likely to contribute to overall climatic changes, typically referred to as global warming. Increasing CO_2 concentrations also lead to preferential fertilization and growth of specific plant species.

Forecasts

Air Quality

Currently air quality is good within the planning area; however, because the EPA is continually reassessing the air quality standards, compliance will be harder to achieve in the future, so constant and effective planning and management for the control of project pollutant emissions will become more challenging.

Global warming and resulting impacts on the air quality of the resource cannot currently be quantified using scientific tools available. However, potential impacts include a warmer and drier climate leading to increased particulate matter impacts. Less snow at lower elevations

may impact the timing and quantity of snowmelt, which, in turn, could result in a longer wildfire season, potentially impacting air quality.

Climate

In 2001, the Intergovernmental Panel on Climate Change (IPCC) pointed out that by the year 2100, global average surface temperatures would increase 2.5 to 10.4°F above 1990 levels (IPCC 2007). The National Academy of Sciences (2006) has confirmed these findings, but also indicated that there are uncertainties regarding how climate change may affect different regions. Computer model forecasts indicate that increases in temperature will not be evenly or equally distributed, but are likely to be accentuated at higher latitudes. Warming during the winter months is expected to be greater than during the summer, and increases in daily minimum temperatures is more likely than increases in daily maximum temperatures.

The lack of scientific tools designed to predict climate change at regional or local scales limits the ability to quantify potential future impacts. However, potential impacts to air quality due to climate change are likely to be varied. Several activities occur within the planning area that may generate GHG emissions: oil and gas development, large fires, and recreation using combustion engines which can potentially generate CO_2 and methane.

Key Features

Key features for this air quality are areas of Class I and Class II Wilderness including: Cloud Peak Wilderness Area; Big Horn National Forest; Thunder Basin National Grassland; and Black Hills National Forest (to the east in South Dakota – not strictly in the planning area). Sensitive lakes or lakes sensitive to deposition of acidic atmospheric chemical species, in the planning area would be found primarily in the Cloud Peak Wilderness and Bighorn National Forest.

2.1.2 Geologic Resources

2.1.2.1 Regional Context

The Buffalo Field Office (BFO) is located within the Powder River Basin in northeast Wyoming. The Powder River Basin is bounded on the west by the Big Horn Mountains and on the east by the Black Hills. The Powder River Basin began to form approximately 50 million years ago with the uplift of the Big Horn Mountains. Over the next 14 million years, the basin slowly rose to its present elevation. During this time, the climate of the area was characterized by very warm temperatures and high levels of rainfall, which caused large quantities of organic matter to accumulate in the basin. Slowly, the climate began to become drier and cooler and erosion from the nearby mountains buried the organic matter. This process caused the organic matter to transform into coal, which is how the large deposits of coal found within the basin

originated. Over the past 10 million years, the thick deposits of sediment that had been deposited in the basin slowly eroded, leaving exposures of coal near the surface of the basin.

2.1.2.2 Resource Characterization

Indicators

Indicators for geologic resources are discussed under paleontology and health and safety.

Current Condition

Current conditions for geologic resources are discussed under paleontology and health and safety.

Trends

Trends for geologic resources are discussed under minerals (salable, locatable and leasable).

Forecasts

Forecasts for geologic resources are discussed under minerals (salable, locatable and leasable).

Key Features

Key features for geologic resources are discussed under paleontology and health and safety.

2.1.3 Soil

Soils in the planning area are diverse; great differences in soil properties can occur within short distances. The distribution and occurrence of soils is dependent on a number of factors including the interaction of relief (slope), parent material (geology), living organisms, climate and time. These variables create complex and diverse soil patterns that influence the use and management of the soil resource. Stable and productive soils provide the foundation for other resources and for resource uses. Soils are also a living system that is linked to nutrient and hydrologic cycles, energy flows, and other ecological processes. Soils are affected by a variety of surface uses that loosen topsoil and damage or remove vegetation or other ground cover, which may result in accelerated erosion.

2.1.3.1 Regional Context

The Planning Area's soils are grouped geographically by Land Resource Regions (LRR) and Major Land Resource Areas (MLRA) for descriptive purposes. The planning area lies in LRR G (Western Great Plains Range and Irrigated Region) and E (Rocky Mountain Range and Forest Region) in MLRA 60B, 58B, 58A, and 43B. MLRA area 60B - Pierre Shale Plains, Northern Part; is an area of old plateaus and terraces that have been deeply eroded. The dominant soil orders are Alfisols, Entisols, and Vertisols (see glossary). The soils in the area dominantly have a frigid soil

temperature regime, an ustic soil moisture regime, and smectitic mineralogy. They are shallow to very deep, generally well drained, and clayey. MLRA 58A and 58B - Northern Rolling High Plains, Northern and Southern Part; is an area of old plateaus and terraces that have been deeply eroded. The dominant soil orders in are Aridisol, Entisols and Inceptisols. The soils in the area dominantly have a mesic or frigid soil temperature regime, an aridic or ustic soil moisture regime, and mixed or smectitic mineralogy. They are shallow to very deep, generally well drained, and loamy or clayey. MLRA 43B - Central Rocky Mountains; is characterized by rugged, glaciated mountains, thrust- and block-faulted mountains, hills, plateaus, and valleys. The dominant soil orders in this area are Inceptisols, Alfisols, and Mollisols. The soils in the area dominantly have a frigid or cryic soil temperature regime and an ustic, udic, or xeric soil moisture regime. Soils on mountain side slopes and ridges formed in colluvium, residuum, and glacial till and have mixed mineralogy. Areas of rock outcrop and rubble land are on ridges and peaks above timberline. Most of the soils are skeletal and are medium textured to coarse textured.

The dominant land uses are grazing and development of mineral resources, including coal, oil, and coalbed natural gas (CBNG), in addition to construction materials and uranium. Recreation is an important use throughout the region. Timber production is important on some of the mountain slopes (USDA-NRCS 2006a).

2.1.3.2 Resource Characterization

Indicators

Indicators are key soil characteristics that are sensitive to change in the environment. Indicators of soil resource condition (quality) can be categorized into four general groups: visual, physical, chemical, and biological. Visual indicators include exposure of subsoil, change in soil color, ephemeral gullies, ponding, runoff, plant response, weed species, blowing soil, and deposition. Physical indicators are related to the arrangement of solid particles and pores. Examples include topsoil depth, bulk density, porosity, aggregate stability, texture, crusting, and compaction. Physical indicators primarily reflect limitations to root growth, seedling emergence, infiltration, or movement of water within the soil profile.

Chemical indicators include measurements of pH, salinity, organic matter, cation-exchange capacity, nutrient cycling, and the concentrations of elements that may be potential contaminants or those that are needed for plant growth and development. The soil's chemical condition affects soil-plant relations, water quality, buffering capacities, availability of nutrients and water to plants and other organisms, mobility of contaminants, and some physical conditions, such as the tendency for crust to form. Biological indicators include measurements of micro and macro-organisms, their activity, or byproducts. The primary indicators for soil resources currently used in the BFO are soil/site stability and hydrologic function. These

indicators are part of the BLM's Land Health Assessment (LHA), and used to assess soil health in the context of BLM's Standards and Guidelines (S&Gs) requirements. These indicators are used primarily in livestock grazing management on public lands.

Current Condition

General soils information for the planning area was obtained from the U.S. General Soils Map (USDA-NRCS 2006a), which is designed primarily for regional, multi-state, river basin, state, and multi-county resource planning, management, and monitoring. The database is intended to give a general overview of soils distribution and occurrence in the planning area, and is not suitable for site specific evaluations. More detailed information is available from the Soil Survey Geographic Database for soil surveys within the planning area. Over 70 general map units are present in the planning area, which represent many unique soil series. However, nine map units comprise approximately 45 percent of the soils in the planning area. Dominant soil surface textures are loams and clay loams, soil depth classes are mainly shallow (less than20 inches) to very deep (greater than 60 inches) deep. These soils are generally well drained, low in organic matter, and have a moderate permeability. When undisturbed, soils in the planning area generally are in good condition capable of producing forage and maintaining watershed integrity and surface water quality.

The major soil resource concerns in this region are wind erosion and water erosion that occur where the ground cover has deteriorated, USDA Agriculture Handbook 296 (USDA-NRCS 2006a). Soil erosion is the detachment and movement of soil particles by the erosive forces of wind or water. Impacts to the soil resource from erosion include changing the capacity of the soil to function and restrict its ability to sustain future uses.

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 194,711 acres of soils are highly susceptible to water erosion and 8,273 acres are highly susceptible to wind erosion. The areas highly susceptible to wind or water erosion in the planning area are summarized by ownership in Table 2-4.

Table 2-4. Soils with High Erosion Potential in the Planning Area

Erosion Type	BLM-Administered Surface		Federal Mineral Estate		All Land Ownership	
	Acres	Percent of BLM-Administered Surface	Acres	Percent of Federal Mineral Estate	Acres	Percent of Lands within Planning Area
Wind	8,273	1.1%	89,860	1.6%	198,349	2.7%
Water	194,711	24.9 %	1,275,376	22.5 %	1,527,128	20.8 %

Source: BLM 2008d

Generally, there is not a direct demand for soil resources from public lands in the planning area. Primarily demands are placed on soil resources through the development of other resources. The most significant regional or national demand placed on soils in the planning area results from the development of mineral resources. Locally soils are also impacted by a variety of surface uses such as livestock grazing, off-highway vehicle (OHV) use, and development of recreation facilities such as trails or campgrounds, timber harvesting, development of rights-of-way (ROW), fire suppression activities, and the use of prescribed fire. The amount of soil disturbance from existing land use is displayed in Table 2-5.

Table 2-5. Soil Disturbance from Existing Actions in the Buffalo Planning Area

Development Action	Initial Disturbance (Acres)	Long Term Disturbance (Acres)
Oil And Gas Development	100,000's of acres	10's to 100,000's of acres
Mining Operations	Acres to 10's of acres	Acres to 10's of acres
Rights-of-Way	Acres to 10's of acres	Acres to 10's of acres
Livestock Grazing	Variable yearly variations 100's to 1000's	Acres to 10's of acres
Timber Harvesting	Variable yearly variations 10's to 100's	Acres to 10's of acres
OHV Use	10's to 100's	Acres to 10's of acres
Fire Suppression	Variable yearly variations 100's to 1000's	100's to 1000's
Prescribed Fire	Variable yearly variations 10's to 100's	Acres to 10's of acres

Source: BLM 2008d

Detailed soils information is available from the Soil Survey Geographic (SSURGO) Database for the individual soil surveys within the planning area. These individual soil surveys include: The Soil Survey of Southern Campbell County (WY605), Soil Survey of Northern Campbell County (WY705), Soil Survey of Southern Johnson County (WY619), Soil Survey of Northern Johnson County (WY719) (preliminary data), Soil Survey of Sheridan County (WY 633) and the Soil Survey of Bighorn National Forest (WY 650). These soil surveys were performed by Natural Resources Conservation Service (NRCS) according to National Cooperative Soil Survey (NCSS) standards, policies and procedures and were conducted at the second and third order of detail. This detailed soils information is used to determine soils suitability and/or limitations for an applied

management action. For site specific analysis, onsite soil investigations and detailed soils information should be considered in management decisions.

Trends

Evaluations indicate that most allotments are maintaining long term soil productivity. In general, reclamation techniques have proven successful, allowing surface-disturbing activities to continue. No long term soil impacts have been identified as a result of fire suppression activities or the use of prescribed fire. There are areas where soil quality and stability is diminishing due concentrated commercial and/or recreational activities. However, since there is no system in place to systematically quantify and evaluate cumulative impacts to soil resources, the level of acceptable disturbance cannot be accurately determined.

Forecasts

Increased mineral development, recreational activities, and the continue dependence on other natural resources will place an increased demand on public lands and the soil resource. Extraction of minerals generally involves surface-disturbing activities; impacts to soil resources can be long term. Disturbance is associated with activities such as pipeline installation, powerline construction, seismic exploration, or exploratory drilling.

Localized impacts on soil resources may occur as a result of livestock grazing, OHV use, and development of recreation facilities such as trails or campgrounds, timber harvesting, development of ROW, fire suppression activities, and the use of prescribed fire. Livestock grazing can result in a loss of vegetative cover leading to increased soil erosion. Livestock can congregate around water sources increasing soil compaction and soil disturbance. Fence building or installation of livestock watering facilities can also cause soil disturbance. OHV use has the potential to damage vegetative cover resulting in soil rutting, concentration of runoff, and increased soil erosion. Building roads, campgrounds, or recreational facilities can result in long term soil disturbance.

Timber harvesting can impact soil resources both through the construction of roads and trails, as well as removal of vegetative cover which protects the soil surface from erosion. Activities associated with timber harvesting can cause soil compaction, concentration of surface runoff, and exposure of the soil surface. ROW development can include a number of surface-disturbing activities such as road building, trenching and clearing of construction sites. All of these activities have the potential to create both short and long term impacts to soils. Fire results in a temporary removal of vegetative cover, and can result in increases in soil erosion. The use of vehicles and heavy equipment to suppress wild fires can create surface disturbance, concentration of surface runoff, and increased soil erosion.

The cumulative amount of surface disturbance or vegetative manipulation that can be supported by soils in the planning area has not been determined. A threshold value for

disturbance in any given watershed in semi-arid regions such as the BFO has not been accurately determined. However, it is widely recognized that there is a limit to the amount disturbance which can occur in any watershed without producing significant impacts to the natural flow conditions.

Climate Change

The effects of climate change on the soil resource may be subtle, and could be difficult to detect until a change threshold has been crossed. In addition, climate change effects on the soil resource may to be synergistic. Land uses, particularly those with surface disturbance, when combined with warmer temperatures and alterations in the hydrologic cycle, and the resulting shifts in vegetative communities could result in an amplification of impacts to the soil resource.

Key Features

Important features of soil in the planning area include soils with low reclamation potential, highly erodible soils, and areas with steep slopes. Successful reclamation efforts are critical in maintaining an effective multiple use land management program. Nearly all authorizations for surface disturbing actions are based upon the assumptions that an area can and ultimately will be successfully reclaimed. Reclamation suitability criteria are based on soil resilience which is the inherent ability of the soil to recover from impacts. Areas of low reclamation potential should be identified using the best available data and onsite evaluations. Authorized surface-disturbing activities would be subject to an evaluation to develop mitigation (if necessary), apply best management practices (BMPs), and plan for reclamation. Authorization denial would occur on areas where erosion cannot be effectively controlled/mitigated and reclamation to BLM standards is likely to be unsuccessful.

There are areas in the planning area that contain highly erodible soils. Wind erosion results in the displacement or loss of topsoil in some areas, increased sediment deposition in other areas, and impacts to ambient air quality from elevated dust levels. Wind erodible soils are determined from each mapping unit's wind erodibility group (WEG), which range from 1 (highest) to 8 (lowest erodibility). Water erosion is the detachment and removal of soil material by water. Variables determining water erodibility are the soils erodibility constant (K factor) and slope. Areas of highly erodible soils should be identified using the best available data, and onsite evaluations and surface-disturbing activities avoided.

Steep slope gradients, the difference in elevation between two points expressed as a percentage of the difference between those points, are another key feature in the planning area. Slope is a component in the determination of soil water erosion potential, slumping, mass wasting and land slide potential.

2.1.4 Water

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

2.1.4.1 Regional Context

Water management within the boundaries of the planning area is primarily the responsibility of the Wyoming State Engineer's Office (WSEO), which administers all of the water resources of the state, and the Wyoming DEQ, which administers water discharges. The BLM is responsible for the management of federal lands and minerals in a manner that maintains or enhances water quality and quantity for other uses. Data collection, resource monitoring, and analysis is generally done to monitor impacts or investigate special concerns related to CBNG development. Other agencies involved in managing and regulating the water resources of the area are the U.S. Army Corps of Engineers, EPA, U.S. Fish and Wildlife Service (USFWS) and Wyoming Game and Fish Department (WGFD).

Surface Water

The planning area is comprised of two distinct hydrologic regions: the mountainous region where snowmelt has a dominant influence on streamflow, and the plains region where runoff from convective storms is the dominant factor controlling peak flow rates (Lowham 1988). Mean annual precipitation in this semi-arid region ranges from about 10 inches to over 14 in the plains region of the planning area, and up to 30 inches in the mountainous region (Lowry et al 1986). About half of the annual precipitation falls in April, May and June (Rankl and Lowry 1990). Average annual snowfall ranges from less than 30 inches to over 100 inches. Annual lake evaporation averages approximately 40 inches per year, greatly exceeding annual precipitation (Whitehead 1996).

The planning area falls within portions of six major watersheds: the Belle Fourche, the Little Big Horn, the Cheyenne, the Little Missouri, the Powder, and the Tongue. Watershed boundaries are shown are shown on Map 3.

The Powder River is the largest watershed and drains over half of the planning area. The Powder River, Clear Creek, Crazy Woman Creek, Little Bighorn River, and Tongue River have headwaters in the Big Horn Mountains and are perennial streams. Except the main stem of the Powder River, these are generally clear water streams with relatively low sediment discharge. The southern Big Horn Mountains contain about 50 miles of perennial streams on public land. These streams and associated vegetation communities represent important fish and wildlife habitat on both public and private land. Intermittent streams that flow long enough to support growth of riparian vegetation also provide important wildlife habitat.

Most of the streams and tributaries with headwaters in the plains region are ephemeral, flowing only in direct response to precipitation events. These channels are formed in fine-grained, unconsolidated Tertiary sedimentary units or Quaternary basin fill. This material is easily eroded, especially in areas where vegetation is relatively sparse. These conditions result in high sediment delivery rates to the Powder River, such that the river is sediment laden. Because it is a meandering stream with relatively flat channel slopes the sediment carrying capacity of the river is exceeded during some periods of the year as it courses through the Powder River Basin.

The Wyoming DEQ, in compliance with the federal Clean Water Act, requires that water quality be maintained or improved for outstanding (Class 1) and most of the high-quality (Class 2) waters (Wyoming DEQ 2007). A description of the classes of water quality is presented in Table 2-6. The Wyoming DEQ permits all surface discharge of water, including produced water from CBNG development, through the Wyoming Pollutant Discharge Elimination System (WYPDES) permit process. WYPDES permits require compliance with specific water quality standards that vary by stream class, and are periodically reviewed and revised for existing uses. The stream classes and water quality standards are defined (Wyoming DEQ 2002), 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 agriculture and livestock, and cannot result in a violation of water quality standards in the receiving stream.

Table 2-6. Surface Water Classes and Uses in Wyoming

Class 1, Outstanding Waters.	No further water quality degradation by point source discharges other than from dams will be allowed. Nonpoint sources of pollution shall be controlled through implementation of appropriate best management practices.
Class 2, Fisheries and Drinking Water.	Support fish or drinking water supplies or where those uses are attainable. Class 2 waters may be perennial, intermittent or ephemeral
Class 3, Aquatic Life Other than Fish	Intermittent, ephemeral or isolated waters and because of natural habitat conditions, do not support nor have the potential to support fish populations or spawning, or certain perennial waters which lack the natural water quality to support fish (e.g., geothermal areas).
Class 4, Agriculture, Industry, Recreation and Wildlife.	Aquatic life uses are not attainable. Uses include recreation, wildlife, industry, agriculture and scenic value.

Source: Wyoming DEQ 2007

Groundwater

Aquifers in the planning area are generally of two types: Quaternary Alluvial Aquifers and the Lower Tertiary Aquifers of the Northern Great Plains Aquifer System. Numerous seeps and springs also occur within the BFO in association with steep topographic relief, discontinuous stratigraphy, and clinker outcrops. Most groundwater utilization in the BFO occurs within the Powder River Basin where considerable groundwater resources are available.

Quaternary Alluvial Aquifers occur in stream valley alluvium, generally along rivers and larger drainage channels within the Powder River Basin. These alluvial aquifers are composed of unconsolidated deposits of silt, sand, and gravel and occur as floodplains, stream terraces, and alluvial fans (Whitehead 1996). Coarser alluvial deposits occur in valleys of the Belle Fourche, Cheyenne, Powder, and Little Powder Rivers. The thickest and coarsest-grained alluvium occurs near the Big Horn Mountains along the western margin of the Powder River Basin, where saturated horizons are thick and high water yields are possible.

Lower Tertiary Aquifer System

The Northern Great Plains Aquifer system is an extensive sequence of aquifers and confining units arranged in a stack of layers that may be discontinuous locally, but which functions regionally as a single aquifer system. This system includes the lower Tertiary aquifers that are exposed at the surface in the Powder River Basin, and underlying, deeply buried regional aquifers that are stacked with intervening confining layers. The lower Tertiary aquifer system consists of semi-consolidated to consolidated Paleocene to Oligocene sediments and sandstones and coal seams contained in the Paleocene Fort Union Formation and the Eocene Wasatch Formation (Whitehead 1996). Stratigraphically from youngest to oldest, the Lower Tertiary Aquifer System consists of the Wasatch aquifers, the Fort Union aquifers, the Lebo confining layer, and the Tullock aquifer.

Scoria, which plays an important role as an aquifer in the storage and flow of water within the Powder River Basin, has been formed from these geologic formations in locations where sediments have been altered in place by the spontaneous combustion of coal beds (Coates and Heffern 1999). Rainfall and snowmelt infiltrate rapidly in scoria exposure areas. The stored water is discharged slowly to springs, streams, and aquifers, which helps maintain flow in perennial streams during dry periods (Coates and Heffern 1999). Scoria outcrops cover about 460 square miles of the planning area and are concentrated in the following areas: along the eastern boundary of the planning area in the Rochelle Hills; within the Powder River Breaks in the northern portion of the planning area; within the Tongue River Breaks north of Sheridan; within the Lake De Smet area north of Buffalo; and within the Felix coal outcrop area west of Gillette and northeast of Wright (Coates and Heffern 1999).

Water Wells

Groundwater in the planning area is used for a variety of purposes, including domestic, municipal, industrial and agricultural uses. Domestic and livestock wells are usually low yield (1 to 25 gallons per minute). Water for domestic and livestock use is generally found at depths less than 1,000 feet. Many flowing wells have historically been completed in the Powder River Basin. Occasionally, flowing springs also provide domestic and livestock water sources in the area. Industrial water wells are used primarily for secondary recovery of petroleum.

2.1.4.2 Resource Characterization

Indicators

Natural processes and human actions influence the chemical, physical, and biological characteristics of water. Water quality varies from place to place, seasonally, and according to the kind of substrate through which water moves. Indicators of water quality include, but are not limited to:

- Chemical characteristics (e.g., pH, conductivity, dissolved oxygen);
- Physical characteristics (e.g., sediment, temperature, color); and
- Biological characteristics (e.g., macro- and micro-invertebrates, fecal coliform, and plant and animal species).

Indicators of watershed health include:

- Channel morphology characteristics (e.g., aggradation, degradation, bank failure)
- Watershed conditions (e.g., soil erosion, vegetation condition)

Water resource monitoring in the planning area ideally is designed and managed to provide the BLM with baseline information on the water quantity and quality conditions, as well as changes due to management activities. Monitoring activities include the collection of hydrological and climatological data, water quality sampling, channel cross-section and profile surveys to track erosion, erosion pins to document headcut migration, evaluation of stream health conditions, and evaluation of springs and other water sources for use by livestock and wildlife. In addition to the Proper Functioning Condition (PFC) assessments (discussed in the "Vegetation: Riparian and Wetland Resources" section), which are indirect indicators of water quality and watershed health, are also used to monitor water resources. Other survey methods such as Multiple Indicator Monitoring (MIM) (Burton et al 2008) provides further detail in data collection to assess steam corridor conditions.

Other direct methods include gauging stations, grab samples, and bio-assessment protocols. Within the planning area, grab water quality samples historically have been collected at springs,

wells, streams, lakes, and reservoirs. Samples are collected and analyzed under both existing and condition-specific situations.

Current Condition

The BLM has developed various types of water resource monitoring plans and stipulations to manage water resources. Watershed and water resources monitoring activities are conducted out of the Technical Services Group in the Minerals Program.

Surface and Groundwater Quantity and Use

Waters in the planning area are used primarily for agricultural, mining, municipal, and industrial purposes. Water-based recreation is also present in the planning area; however, consumptive use for these purposes is low. Agricultural use consists primarily of livestock watering and irrigation. The irrigation use by far the greatest source of withdrawals and is primarily for forage production for the livestock industry. Table 2-7 shows an approximate breakdown of annual water use in the planning area in the year 2000.

Table 2-7. Water Use Summary in the Buffalo Planning Area

Type of Water Usage	Current Use (acre-feet/year)		
	Groundwater	Surface Water	Total
Domestic (2000 Census)	3,125	7,326	10,451
Commercial	NA	NA	NA
Industrial	426	258	684
Livestock	NA	NA	NA
Irrigation (withdrawal)	1,815	425,986	427,801
Mining (including CBNG)[A]	66,821	15,201	82,023
Total	72,187	44,8771	520,959

Source: USGS 2000

[A] Water extracted during CBNG production accounts for most of the volume. This water may be used for other purposes after extraction.

Active water wells in the planning area are permitted through the WSEO within the three counties of the planning area. Table 2-8 shows a summary of the uses and active permits within each county.

Table 2-8. Uses of Active Well Permits by County

County	Use	Number of Active Permits
Campbell	CBNG	22,543
	Domestic	1,025
	Domestic, stock	893
	Industrial	404
	Irrigation	23
	Miscellaneous	1,322
	Monitoring	3,172
	Municipal	30
	Stock	2,846
	Test Well	43
Johnson	CBNG	6,034
	Domestic	2,205
	Domestic, stock	407
	Industrial	50
	Irrigation	32
	Miscellaneous	210
	Monitoring	783
	Municipal	4
	Stock	2,020
	Test Well	12
Sheridan	CBNG	5,895
	Domestic	2,693
	Domestic, stock	664
	Industrial	3
	Irrigation	26
	Miscellaneous	289
	Monitoring	962
	Municipal	5
	Stock	1,097
	Test Well	12

Source: WSEO 2001

Table 2-9 summarizes permitted, non-CBNG groundwater wells by aquifer in the planning area. Aquifer formation names were associated with completed wells by Applied Hydrology and Associates (2001) wherever well depths were available from WSEO data.

Surface Water Quality

Baseline water quality of the perennial streams, reservoir water, and springs within the planning area is influenced by the soils and bedrock type that water has contacted as well as the amount of water flowing into a water body at a given time. Streamflows resulting from snowmelt and precipitation are in contact with soils and rocks for only a limited time; thus, these waters have only small amounts of dissolved minerals. Surface water type also changes with elevation. Streams in the higher elevations are typically calcium bicarbonate type waters. As the streams flow across the lowlands, both as natural flow and irrigation return flow, they change to sodium sulfate type waters. The waters are typically alkaline and have moderate to high levels of hardness. Changes to the natural water quality conditions include affects related to changing thermal and turbidity conditions, sedimentation, salinity, trace metals, nutrients, and pesticides.

Table 2-9. WSEO-Permitted Non-CBNG Water Wells in the Planning Area by Aquifer

Well Type	Aquifer Formation Name	Number of Wells
Domestic		
	Fort Union	2,218
	Wasatch	3,173
	Unknown	1,192
	Total	6,583
Municipal		
	Fort Union	50
	Wasatch	42
	Unknown	43
	Total	135
Irrigation		
	Fort Union	45
	Wasatch	92
	Unknown	117
	Total	254
Other		
	Fort Union	6,771
	Wasatch	9,115
	Unknown	4,088
	Total	19,974
Total		26,946

Source: Applied Hydrology 2001; Wyoming State Engineer's Office 2001.

Water quality impacts within the planning area may be associated with activities related to CBNG, conventional oil and gas development, minerals extraction, road maintenance, rangeland grazing, and agriculture. These types of surface disturbing and other activities can result in watershed hillslope disturbance, stream bank destabilization, channel bed modification, and riparian vegetation removal. Increases in trace metals, salinity, and sedimentation are usually associated with mining and with oil and gas extraction, whereas increased nutrients, pesticides, sedimentation, and some trace metal influences are often associated with agricultural and grazing runoff. Water quality varies as a function of streamflow rates. Properly implementing mitigation measures can minimize or eliminate these sources of water pollution.

Stream bank degradation and erosion, as well as upland sheet and gully erosion due to poor vegetative cover and surface disturbances (e.g., roads and construction activities) within the watersheds are the predominant sources of sediment found in the streams. As water quality decreases, the ability of aquatic benthos, food base, and fisheries to maintain themselves is diminished. Proper management of livestock grazing, road construction, forestry, oil and gas activity, mining, and recreation within the BFO can mitigate the impacts of these activities.

The Wyoming DEQ identifies water bodies that are water quality impaired. This list of streams, rivers, ponds, and lakes is updated every two years by the state and is used to develop a total maximum daily load allocation of pollutants. The streams that the Wyoming DEQ considers impaired, either due to watershed degradation or because waters in the stream exceed water quality limits, are listed on the state 303(d) list. The 303(d) list includes 642.3 miles of impaired or “not supporting” streams and 37.9 miles of “threatened” streams within the boundaries of the planning area (Table 2-10). BLM is developing measures to manage and monitor the streams on the 303(d) list that flow through land it administers.

Groundwater Quality

Government agencies, the oil and gas industry, and mining industries in the planning area have collected data on existing groundwater quality conditions. These data have been collected during the development of water resources, the drilling of wells for oil and gas extraction, and in mining and pre-mining activities. The greatest amount of water resource monitoring in the planning area is performed in connection with CBNG development. The primary program consists of series of deep and shallow groundwater wells that are monitored on a quarterly schedule. In addition, the United States Geological Survey (USGS) maintains gauging stations on all major drainages in the BFO. Water quantity is generally the focus, but water quality is monitored at several surface water and groundwater stations as well.

Table 2-10. Impaired or Not Supporting Rivers, Creeks, and Intermittent/Ephemeral Streams Located Within the Buffalo Planning Area

Surface Water Feature	Location	Use Support	Cause
Belle Fourche River	Arch Cr to Rush Cr (85.2 mi)	Not Supporting	*E.coli,* Ammonia Chloride, and unknown
Donkey Creek	Belle Fourche R to Antelope Butte Cr (56 mi)	Not Supporting	*E. coli*
Stonepile Creek	Donkey Cr to 7.5 mi u/s	Not Supporting	Fecal Coliform
Powder River	Crazy Woman R to S Fork Powder R (157.3)	Not Supporting	Selenium and Chloride
Middle Prong of Wildhorse Creek	Wild Horse Cr to 4.6 mi u/s	Not Supporting	*E. coli*
S Fork Powder River	Middle Fork to Lone Tree Creek (57.1 mi)	Not Supporting	Selenium
Willow Creek	S Fork Powder River to 10.7 mi u/s	Not Supporting	Selenium
Posey Creek	S Fork Powder River to 8.0 mi u/s	Not Supporting	Selenium
Murphy Creek	S Fork Powder River to 12.0 mi u/s	Not Supporting	Selenium
Salt Creek	Powder River to Castle Cr (21.4 mi)	Not Supporting	Selenium, oil spills
North Fork Crazy Woman Creek	T49N R82W (28.0 mi)	Threatened	Habitat Nutrients, Bio indicators
Crazy Woman Creek	Powder River to ?? u/s	Not Supporting	Manganese
North Piney Creek	S Piney Cr to 6.4 mi u/s	Not Supporting	*E. coli*
Little Powder River	Mt/Wy line to u/s Olmstead Cr (15.9 mi)	Not Supporting	*E. coli*
North Tongue River	Bull Cr to 5.2 mi u/s	Not Supporting	*E. coli*
Columbus Creek	Tongue R to 3.4 mi u/s	Not Supporting	*E. coli*
Smith Creek	Tongue R to 5.2 mi u/s	Not Supporting	*E. coli*
Little Tongue River	Tongue R to Frisbee Ditch (5.7 mi)	Not Supporting	*E. coli*
Fivemile Creek	Tongue R to 2.0 mi u/s	Not Supporting	*E. coli*
Wolf Creek	Tongue R to 9.9 mi u/s	Threatened	*E. coli*
Park Creek	Big Goose Cr to 2.9 mi u/s	Not Supporting	*E. coli*
Rapid Creek	Big Goose Cr to 3.2 mi u/s	Not Supporting	*E. coli*
Big Goose Creek	Sheridan to Beckton (18.7 mi)	Not Supporting	*E. coli*
Beaver Creek	Big Goose Cr to 5.7 mi u/s	Not Supporting	*E. coli*
Sackett Creek	Little Goose Cr to 3.0 mi u/s	Not Supporting	*E. coli*
Jackson Creek	Little Goose Cr to 6.1 mi u/s	Not Supporting	*E. coli*
Little Goose Creek	Sheridan to Big Horn (15.3 mi)	Not Supporting	*E. coli*, Habitat, Sediment
Mc Cormic Creek	Little Goose Cr to 2.1 mi u/s	Not Supporting	*E. coli*
Kruse Creek	Little Goose Cr to 2.5 mi u/s	Not Supporting	*E. coli*
Goose Creek	Little Goose Cr to 12.6 mi u/s	Not Supporting	*E. coli*, Habitat, Sediment
Soldier Creek	Goose Cr to 2.8 mi u/s	Not Supporting	*E. coli*
Tongue River	Goose Cr to MT line (22.4 mi)	Not Supporting	Temperature
Prairie Dog Creek	Tongue R to 56.6 mi u/s	Not Supporting	*E. coli, Manganese*

Source: Wyoming DEQ 2008b

Groundwater quality depends on the source geologic formation or aquifer and varies throughout the planning area. Lowry et al (1986) report total dissolved solid (TDS) concentrations for alluvial aquifers varying from 106 to 6,610 mg/L, and averaging 2,128 mg/L for 38 samples. Water from surficial deposits that contain less than 600 mg/L TDS may be divided into two chemical types, a calcium magnesium carbonate type and a calcium magnesium sulfate type (Rankl and Lowry 1990). TDS concentrations greater than 600 mg/L generally are due to increased values for sodium and sulfate (Rankl and Lowry 1990). There is no one dominant water type (Hodson et al. 1973).

Water in alluvium near the Big Horn Mountains and the Black Hills is of better quality than water in alluvium in the central part of the Powder River Basin. Water in the Powder River's alluvial deposits is dominated by sodium, calcium, and sulfate ions, while the water in the underlying bedrock is dominated by sodium and bicarbonate ions. Water contained in alluvium in the southwest part of the Powder River Basin and along the Powder River is generally of poorer quality than water in alluvium elsewhere in the Powder River Basin, thus limiting its use as a water supply. Water quality in the Wasatch aquifer is quite variable. Wasatch aquifers have TDS concentrations varying from 227 to 8,200 mg/L, and averaging 1,298 mg/L, with sodium sulfate and sodium bicarbonate as the dominant water types (Hodson et al. 1973; Lowry et al 1986). Water quality in the Fort Union aquifer has been shown to have TDS concentrations ranging from about 200 to more than 3,000 mg/L, generally ranging between 500 and 1,500 mg/L, with sodium bicarbonate and sodium sulfate as the dominant water types (Hodson et al. 1973).

TDS concentration within scoria varies widely from under 500 mg/L to over 7,000 mg/L. Water in clinker from recharge areas near the burn line tends to be a calcium sulfate type, and water in clinker from discharge areas tends to be a sodium bicarbonate type similar to water in coal seams. Ash residue at the base of the clinker may contribute to high TDS concentrations (Coates and Heffern 1999).

Mineral developers who produce water from aquifers with high salt and heavy metal concentrations as part of their extraction process must handle this water in prescribed ways, such as containment in evaporation ponds, treatment, re-injection into a formation containing water of lower quality, or direct surface discharge. In all cases where the water is to be discharged into Waters of the State, the operator must obtain a Wyoming Pollutant Discharge Elimination System permit from the Wyoming DEQ. The BLM manages the impacts of federal actions on watersheds and water resources.

Trends

Surface and Groundwater Quantity and Use

Increased discharge of CBNG-produced water into ephemeral streams enhances the survival and spread of invasive species, such as tamarisk or salt cedar. Due to increased water availability, stands of tamarisk have become established in several Powder River Basin drainages where it would not normally survive. Once established, tamarisk is difficult to eradicate. The replacement of desirable grasses such as western wheatgrass with salt tolerant grasses such as foxtail barley and inland salt grass in perennial channels can reduce or destroy high quality grazing areas found in valley bottoms in the Powder River Basin. In worse case locations all grasses may be eradicated in channel bottom areas due to saturated soils and the concentration of salts in upper soil horizons. Disposal of water in Powder River Basin channels may be limited to a period of 10 to 15 years, but will likely increase erosion and promote sediment delivery to trunk streams during this time.

Groundwater resources in some coal zones in the Powder River Basin are being depleted by CBNG development. In most cases other groundwater zones are available to replace those that are lost, but the quantity of the useable resource is being reduced considerably.

Surface Water and Groundwater Quality

Infiltration of CBNG-produced water from holding ponds has shown the potential to impact shallow groundwater. The more significant cases, however, are limited to few locations relative to the thousands of reservoirs existing in the planning area. The Wyoming DEQ regulates these impacts with a groundwater monitoring program tailored for CBNG development. Similarly, many reservoirs holding CBNG water have leaked water to downstream channels. As water infiltrates through the reservoir bottom and migrates through the bedrock, there is the potential to dissolve and transport undesirable constituents, such as selenium and sulfate, that may then show up as surface water at down-gradient seepage zones. Several locations have produced severely impacted water that has damaged bottom land and riparian vegetation and may have the potential to harm livestock and wildlife, if ingested. CBNG water discharged into ephemeral drainages has caused substantial erosion in several cases, and has transported sediment to main stem channels. Likewise, miles of new roads and drilling pads associated with CBNG development has increased erosion and sediment transport relative to background rates. Spills of drilling fluids and fluids produced as a result of oil and gas development have increased as development has accelerated and have the potential to cause impacts to surface and groundwater systems.

Forecasts

Surface and Groundwater Quantity and Use

Groundwater sources are adequate to meet the demand of all current uses on public land (primarily livestock, wildlife, and recreation). Groundwater sources are being affected in the Powder River Basin by CBNG development. Coal seams are being completely dewatered in some cases, and sand aquifers in communication with these zones may also be affected. If a well completed into a coal seam being produced by a nearby CBNG operator is impacted, the operator generally has the responsibility to replace the well with another groundwater resource. There are cases, however, where wells have been impacted and the cause cannot be defined. Such cases will likely occur in the future. Surface water sources are generally adequate to meet existing uses on public lands. However, natural climatic fluctuations (such as drought) can make marginally adequate sources unreliable. Watershed condition also affects the effective life (and associated costs) of water development projects such as reservoir and spring developments.

The construction of numerous reservoirs in the Powder River Basin may increase the recurrence interval for channel maintaining flow events, which could affect the fluvial geomorphology of trunk streams or change the nature of riparian vegetation (e.g., cottonwood seedling germination and survival) and general water availability in the dry season.

With the ongoing drought and increasing demand for water for agriculture, wildlife, and recreation, new and alternative water sources are continually being sought. One such source that has become more prevalent in recent years is the conversion of wells associated with oil and gas development (both water supply wells as well as oil and gas production wells) to water wells. This can be beneficial to resource management on BLM-administered lands in many areas. It is generally a relatively low cost method of developing new water sources. The negative side of taking over these wells is that the BLM is assuming all down-hole liability – that is, if problems arise in the future, the BLM could be facing a substantial plugging and abandoning, or rehabilitation cost. This can be minimized if adequate down-hole construction information is available (or can be supported with geophysical logs or video inspection) and the conversion properly designed and supervised by an experienced geo-hydrologist or petroleum engineer.

Surface Water and Groundwater Quality

The development and use of other resources (e.g., minerals, range, forestry, and recreation) can affect surface and groundwater quality. However, water quality can be maintained by prudent resource development and use, and proper application of mitigation measures. Such measures are identified in site specific management or development plans.

Key Features

The following surface water features, watersheds, and groundwater resources have all been identified to help guide land use management decisions.

Surface Waters/Watersheds

BLM-administered lands within the planning area contain Wyoming DEQ Class 1, outstanding waters. These are waters of the state that are of the highest importance and meet criteria for water quality, aesthetic, scenic, recreational, ecological, agricultural, botanical, zoological, municipal, industrial, historical, geological, cultural, archeological, fish, and wildlife, and have the presence of significant quantities of developable water and other values of present and future benefit to the people (Wyoming DEQ Rules and Regulations, Chapter 1, Section 4A).

Class 1 water found within the planning area include the main stem of the Middle Fork of the Powder River through its entire length above the mouth of Buffalo Creek, the main stem of the Tongue River, the North Fork of the Tongue River, and the South Fork of the Tongue River above the USFS boundary. These streams are found at higher elevation watershed recharge areas and provide perennial streamflow for fisheries along with its associated riparian habitat and downstream water to the public. The BLM manages tracts of land on these waters including the Middle Fork Recreation Area on the Middle Fork of the Powder River and the Welch Recreation Area on the main stem of the Tongue River, along with other miscellaneous tracks of BLM surface estate.

Class 2 waters are those waters other than those designated as Class 1 that are known to support fish habitat or drinking water supplies (or where those uses are obtainable). The Class 2 waters that are tributaries of the Powder River include the North Fork of the Powder River, Clear Creek, and Crazy Woman Creek. Other streams that may have special attributes include Beartrap Creek, the North, Middle, and South Forks of Crazy Woman, Billy Creek, and Pole Creek. These creeks are ecologically important and have been identified by the state of Wyoming to meet their designated uses. The BLM also manages some smaller tracts on these waters that provide for habitat and fisheries. All provide good quality water and riparian habitat for the use of wildlife, recreation, and fisheries.

Groundwater

Primary regional aquifers contain drinking water that supply developable amounts of good quality water to communities and individuals within the planning area. This includes many coal and sand units within the Wasatch and Fort Union Formations, as well as deeper formations including the Madison Limestone in some areas and Fox Hills Sandstone. The protection of these aquifers at depth is important because they also supply water to numerous wells within the planning area.

2.2 Mineral and Energy Resources

2.2.1 Locatable

Locatable minerals (metallic and nonmetallic) are those that are open to mining claim location under the General Mining Law of 1872, as amended (30 United States Code [U.S.C.] 22-54 and 611-615). The primary locatable minerals that occur in commercial quantities within the planning area are bentonite clay, gypsum, and uranium. Base and precious lode metals such as gold, silver, platinum, and copper are not known to occur in commercial quantities in the planning area.

2.2.1.1 Resource Characterization

Current Condition

Bentonite, uranium, and gypsum are the only locatable minerals for which the BFO has received Notices of Intent or Mine Plans of Operations since the Buffalo RMP Record of Decision (ROD) was signed October 4, 1985. Uranium is a radioactive metallic element used primarily as a fuel for nuclear power generation, in various capacities in military arms and armor production, and in certain fields of medicine and biology. Bentonite is a volcanic ash-based clay used in the production of cat litter, cement, and as an absorbent in various other products. Gypsum is water soluble mineral used primarily in the construction industry in products such as plaster, drywall, and as a cement additive. The bentonite and gypsum deposits are found along the western Powder River Basin margins near the base of the Big Horn Mountains in southern Johnson County. The uranium deposits are found in scattered roll front deposits in southeastern Johnson and southwestern Campbell Counties.

There are four active mining plans of operation within the planning area: the Mayoworth and Willow Creek Mines, which both actively mine bentonite; and the Nichols Ranch and Christensen Ranch, which are both planning to mine uranium due to recent price increases. The known commodities where mining claims have been located on federal lands (both federal surface/federal minerals and private surface/federal minerals) are listed in Table 2-11. The majority of the uranium claims are located on private surface/federal minerals. Map 4 shows locatable mineral withdrawals within the planning area.

Table 2-11. Active Mining Claims in Campbell, Johnson, and Sheridan Counties, Wyoming

Mineral	Number of Claims
Bentonite	47
Gold	3
Gypsum	1
Uranium	3,604
Two or more minerals (mineral not defined on location notice)	4,793*
Total	8,448

Source: BLM 2008d

* Based on exploration interest and production, it is assumed that the majority of the claims were located for bentonite and uranium.

Trends

The demand for bentonite has remained nearly the same since the current RMP was completed on October 4, 1985. Bentonite has many uses that vary from year to year, but the demand remains the same. Uranium mining has been cyclic since the current RMP was completed. Several operations shut down in 2000 and began groundwater restoration and mine reclamation. In the past several years, the price of uranium began to increase and the result was an increased interest in development in southeastern Johnson and southwestern Campbell Counties. Production figures are listed in Table 2-12.

Forecasts

Given the estimated quantities of clay reserves, a sustainable level of bentonite clay resource appears to be available to meet demand. The areas where bentonite and uranium are located will have a high mineral development potential. The estimated recoverable amount of in-situ uranium is less known for the planning area; however, based on exploration activities and well log interpretation from CBNG wells, deposits can be further defined by interested operators. Powder River Basin uranium companies have staked and are currently staking lode mining claims at an accelerated pace. These claims should provide sufficient uranium deposits through the next planning cycle if the markets stabilize to maintain a suitable profit margin. The development potential for gypsum in the planning area is considered to be low due to the physical location of the mineral in relationship to markets.

Table 2-12. Annual Mine Production in the Planning Area

Year	Bentonite (tons)	Uranium (pounds)
2000	312,482	63,381
2001	400,309	37,990
2002	338,507	33,284
2003	431,718	23,693
2004	458,770	8,174
2005	492,368	3,104
2006	491,188	0
2007	548,066	0

Source: Wyoming Office of the State Inspector of Mines 2000-2007

Key Features

The only locatable minerals mined in the planning area are bentonite and uranium. The primary environmental issues related to bentonite and uranium mining are a loss of wildlife habitat, including sagebrush habitat; stockpiling practices; erosion as a result of strip mining; and issues with post-mining reclamation. Most bentonite mining in the planning area is concentrated

west and southwest of the town of Kaycee. Uranium mining occurs in the Pumpkin Buttes area east of the town of Kaycee, on the east side of the Pine Ridge area in southeastern Johnson County, and in southwest Campbell County.

2.2.2 Leasable – Coal

Wyoming has the largest federal coal program in the BLM. Most Wyoming coal is used for steam generation in the electrical utility industry. Coal production in Wyoming comes from four primary areas: (1) the Powder River Basin in northeastern Wyoming, (2) the Hanna Basin in south central Wyoming, (3) the Rock Springs area, and (4) the Kemmerer area in southwestern Wyoming. The coal program in the BFO represents the largest part of the coal activity in the Powder River Basin Coal Federal Production Region. Communities in the Powder River Basin, especially Gillette and Wright, are economically dependent on the coal mining activity. BLM-administered lands in central Campbell County and north central Sheridan County are the priority areas available for consideration for coal leasing.

2.2.2.1 Resource Characterization

Current Condition

Coal is produced from 13 existing mines in Campbell County and one additional mine is currently proposed in Campbell County. These 13 existing mines produce approximately 436.5 million tons of coal annually. Table 2-13 identifies leased federal coal acres in the planning area.

Table 2-13. Leased Federal Coal (acres) in the Planning Area

Existing Leases	Pending Lease by Applications	Pending Coal Exchanges	Total
127,999	31,738	Unknown*	159,737

Source: BLM 2008g

*The only pending exchange is the Buffalo alluvial valley floor exchange. Since it has not been adjudicated, acreages are unknown.

In the current RMP, the priority coal lease areas contained approximately 484,000 acres. After the coal screening process was applied, approximately 378,000 acres containing approximately 26 billion tons of coal remained. An updated inventory in 2001 indicated that there were 494,000 acres in Campbell County and 73,000 acres in Sheridan County available for consideration for coal leasing. All competitive leasing is limited to the high priority areas.

Leasing is conducted under 43 Code of Federal Regulations (CFR) 3425. There is no longer any authority to do coal leasing under the prior noncompetitive leasing procedures. In 1989, the Powder River Coal Production Region was decertified which means that the regional coal leasing as described under 43 CFR 3420 was no longer applicable to the Powder River Basin.

However, emergency leasing, leasing by application, noncompetitive lease modification, and authorized lease exchanges are still completed in the Powder River Basin. In the 1985 RMP and 2001 RMP update discussion of decisions regarding coal leasing, 567,000 acres in Campbell and Sheridan counties are acceptable for further consideration for coal leasing. These lands have been reviewed against the four coal planning screens (federal lands review – unsuitability for coal mining) specified under 43 CFR 3461 lands.

Trends

Coal from Wyoming's Powder River Basin is shipped nationwide. When the Powder River Basin Federal Coal Production Region was decertified, U.S. coal production increased 11 percent from 1,029.1 million tons in 1990 to 1,145.6 million tons in 2007. Wyoming coal production increased from 184 million tons in 1990 to 453.6 million tons in 2007, an increase of 247 percent (DOE 2008a).

Forecasts

Wyoming Powder River Basin coal represented 38 percent of the nation's coal production in 2007, with total production expected to grow at an annual rate of two percent to three percent per year, which is in line with electric power demand. BLM most recently completed long range forecasts of demand for Wyoming Powder River Basin in the *Coal Planning Estimates Report* (BLM 2003b), as well as the *Powder River Basin Coal Review, Task 2 Report* (BLM 2005b). These forecasts have been refreshed as needed by the BLM mineral economist for each leasing action.

While all mines are expected to increase production through 2020, it is expected that there will be a relative shift of production from southern mines near Wright to northern mines near Gillette through 2020. This is because the coal in the southern part of the Powder River Basin is of better quality than in the north, and southern mines are at or approaching air quality permit limits and stripping ratios are rapidly increasing.

Lands identified as having high coal development potential were reviewed (coal screening) as part of the 2001 Buffalo RMP update. Based on forecast demand, there is no need to screen additional lands beyond those already subjected to the four coal screens. The lands that would most logically meet reserve demand into the future, and the presently available lands sufficient to meet leasing demand through 2020 and beyond have been projected. In the event there is leasing interest in lands beyond those screened, beyond the current delineated high potential development area, BLM has a mechanism for screening additional lands as needed as part of application processing under cost recovery.

<u>Climate Change</u>

The Electric Power Research Institute (EPRI) has attempted to identify a scenario of how the full portfolio of technologies to provide for electric energy would respond to a national policy that

may require carbon dioxide (CO_2) be brought down to 1990 levels (Revis 2007 and Revis 2008). No regulatory structure or CO_2 emission levels or limits have been set by national policy or law. However, the EPRI scenario provides some analysis of the possible effect of regulation as well as decreased demand through energy efficiency, at the user end, in transmission and at the producer end. Table 2-14 indicates how the mix of technologies used to generate electricity might change under this scenario.

Table 2-14. Possible Technology Mix Under a CO_2 Reduction Scenario

Source	2007	2030
Coal	51%	52%
Nuclear	21%	29%
Natural Gas	18%	5%
Petroleum	1%	0%
Hydro Power	7%	5%
Renewables	2%	9%

Source: Revis 2007 and Revis 2008

Key Features

Coal underlies the entire Powder River Basin structure and varies in depth, thickness and quality. The eastern side of the structure (in Campbell and Converse Counties) contains coal of minable depth, quality and thickness, and an area of high development potential has been delineated there. This is the location of active mining in the Wyoming Powder River Basin. Along the western side of the structure there is also coal of depth, quality and thickness that has been, and could again become, attractive for development. An area of high development potential has been delineated for this area as well.

2.2.3 Leasable – Oil and Gas

Oil and gas production within the planning area comes from conventional oil and gas reservoirs, as well as from CBNG fields.

2.2.3.1 Resource Characterization

Current Condition

Oil and gas resources are often found in the pore spaces of sedimentary rocks, such as sandstone and limestone, having migrated there from source rocks rich in organic material, such as marine shales. 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. CBNG occurs in areas where the gas has been trapped in the coal bed where it was generated during the coalification process.

Oil: Wyoming ranks seventh in the United States in the production of oil. Collectively in Wyoming, more than 38,000 wells produced 52.9 million barrels of oil in 2006. In the three counties found within the BFO planning area, approximately 9.8 million barrels of oil were produced in 2007.

Natural gas: Wyoming ranks second in the United States in the production of natural gas. Collectively in Wyoming, more than 38,000 wells produced 2.11 trillion cubic feet of natural gas in 2006. In the three counties found within the BFO planning area, approximately 13,000 thousand cubic feet (Mcf) were produced in 2007.

Coalbed Natural Gas: The Powder River Basin CBNG field ranks eleventh in proved gas reserves in the United States (DOE 2008b). Proven reserves are (1) the portion of an oil and/or gas reservoir delineated by drilling and defined by oil/water, gas/oil/water, and/or gas/water contacts, if any; and (2) the immediately adjoining portions not yet drilled, but which can be reasonably judged as economically productive based on available geologic and engineering data. The Powder River Basin CBNG covers portions of Campbell, Johnson, and Sheridan Counties. Collectively in the three counties found within the BFO planning area, approximately 429 billion cubic feet (Bcf) of CBNG were produced in 2007.

Exploration

Oil and gas reservoirs can be discovered by either direct or indirect exploration methods. Direct methods include mapping of surface geology, observing seeps, and gathering information on hydrocarbon shows observed in drilling wells. Indirect methods, such as gravity, magnetic, and seismic surveys, are used to delineate subsurface features that may contain oil and gas that are not directly observable. The petroleum industry utilizes 2D and 3D seismic technology to gain subsurface stratigraphic information to aid them in searching for oil and gas reserves. Seismic technology utilizes explosives in drilled shot holes for source points along linear survey lines and/or vibroseis or shaker trucks/buggies for source points in a grid pattern over a large area that can cover hundreds of square miles.

Leasing and Production

BLM reviews and approves Notices of Intent, applications for permits to drill (APDs), and applications from companies to lease, explore, develop, and produce oil, gas, and geothermal resources on both federal and Indian lands. BLM is also responsible for inspection and enforcement of oil, gas, and geothermal wells and other development operations, to ensure that lessees and operators comply with lease requirements and BLM's regulations.

The main objectives of the oil and gas program are to foster a fair return to the public for its resources, ensure environmentally acceptable activities within the program, and provide for conservation of the fluid mineral resources without compromising the long-term health and diversity of the land. BLM's management of the oil and gas program accomplishes several functions in support of the main objectives including: (1) supporting the domestic need for energy resources, (2) making eligible lands available for leasing through proper planning, (3) timely processing of applications and notices for exploration and development, and (4) conducting inspections of operations and ensuring compliance with lease terms and regulations.

As of October 1, 2008, federal oil and gas leases covered approximately 2,533,955 acres in the planning area (Map 5) (BLM 2008e). By county, the number of leases and total number of acres under lease are included in Table 2-15. Federal mineral estate in coal bearing areas of the Powder River Basin has not been offered for lease since 2004 as a result of a Tenth Circuit Court of Appeals ruling (Pennaco Energy v. DOI, 377 F.3d 1147). Oil and gas leasing in these coal bearing areas will not resume until completion of this RMP.

Table 2-15. Number of Oil and Gas Leases by County in the Planning Area

County	Number of Leases	Acres Under Lease
Campbell	3,149	1,428,517
Johnson	1,092	803,511
Sheridan	255	301,947

Source: BLM 2008d

Table 2-16 provides well statistics for the planning area. After the BLM approves a permit, the developing company may proceed with drilling in accordance with the conditions of the permit's approval. Table 2-17 lists producing oil and gas fields, wholly or partially, within the planning area by county. Table 2-18 displays the CBNG and non-CBNG production for all three counties in 2007.

Table 2-16. Well Statistics for Campbell, Johnson, and Sheridan Counties, November 2008

	Federal	Fee or State	Total
Campbell County			
Number of Plugged and Abandoned Wells	3,911	5,236	9,147
Number of Dormant Wells	105	136	241
Number of Completed Wells	7,582	12,085	19,667
Number of Monitoring Wells	11	23	34
Notice of Intent to Abandon	204	415	619
Number of Spuds	385	513	898
Number of Expired Permits	9,079	8,825	17,904
Number of Permits To Drill	1,349	480	1,829
Permits Issued	22,626	27,713	50,339
Waiting On Approval	27	16	43
Total	**22,653**	**27,729**	**50,382**
Johnson County			
Number of Plugged and Abandoned Wells	1,000	698	1,698
Number of Dormant Wells	95	14	109
Number of Completed Wells	2,995	1,745	4,740
Number of Monitoring Wells	17	9	26
Notice of Intent to Abandon	34	39	73
Number of Spuds	219	113	332
Number of Expired Permits	4,075	2,854	6,929
Number of Permits To Drill	875	226	1,101
Permits Issued	9,310	5,698	15,008
Waiting On Approval	19	16	35
Total	**9,329**	**5,714**	**15,043**
Sheridan County			
Number of Plugged and Abandoned Wells	104	366	470
Number of Dormant Wells	0	9	9
Number of Completed Wells	457	3,976	4,433
Number of Monitoring Wells	6	13	19
Notice of Intent to Abandon	2	91	93
Number of Spuds	18	125	143
Number of Expired Permits	1,187	4,631	5,818
Number of Permits To Drill	173	200	373
Permits Issued	1,947	9,411	11,358
Waiting On Approval	13	22	35
Total	**1,960**	**9,433**	**11,393**

Source: WOGCC 2008b.

Table 2-17. Oil and Gas Producing Fields in Campbell, Johnson, and Sheridan counties, 2007

Field	Oil (Bbls)	Gas (Mcf)	Water (Bbls)
Campbell County			
Adon North	1,199	0	91,159
Adon Road	5,497	0	35,260
Adon Road North	13,104	0	204,013
Ag Farm	6,321	0	272,570
Alicia	2,310	84,100	1,162
Allison	4,592	0	0
Alpha	40,985	0	900,970
Am-Kirk	24,902	7,385	221,737
Amos Draw	14,346	509,475	7,026
Andy	5,838	258,755	3,896
Archibald	14,803	11,785	12
Ash	20,412	0	197,592
Ash Draw	14,765	0	479,397
Barber Creek	20,951	4,038	276,499
Basin Northwest	11,594	3,317	23,805
Bethlehem	5,039	0	0
Big Hand	83,655	6,368	158,140
Big Mac	3,595	0	94,131
Bigfoot	4,227	0	21,360
Bishop Ranch South	21,524	0	93,568
Black Bill	3	10,419	0
Black Rock Draw	2,927	0	0
Bone Pile	74,448	0	695,615
Booton	5,717	0	28,618
Bracken	44,529	0	732,987
Breaks	42,799	0	1,504,592
Breen	31,067	0	217,801
Brennan	28,678	838	379,757
Bridge Draw	36,210	911	95,477
Bronco	412	0	1,625
Buck Draw	3,693	18,624	7
Buck Draw North	77,868	2,932,355	38,291
Buff	2,704	53,820	152
Bull Creek	19,455	0	549,497
Bull Creek North	181	0	1,810
Butte	3,070	1,128	83
Camp Creek	37,527	0	160,243

Table 2-17. Oil and Gas Producing Fields in Campbell, Johnson, and Sheridan counties, 2007

Field	Oil (Bbls)	Gas (Mcf)	Water (Bbls)
Camp Creek Nw	7,455	0	10,264
Cancun	5,963	0	2,558
Candy Draw	32,696	0	411,248
Cardinal	4,657	0	151,930
Carson	7,629	1,477	3,880
Cedar Draw	1,323	50,127	919
Chan	15,732	0	44,023
Clabaugh	10,899	0	19,347
Clearwater	2,275	0	0
Coal Creek	10,696	0	183,816
Collins	17,380	6,558	1
Collums	12,476	0	1,003,443
Corona	269	0	314
Culp Draw	5,688	0	7,042
Dead Horse Creek	15,891	2,148	114,643
Dead Horse Creek South	34,586	2,354	188,220
Deep Draw	17,287	0	0
Deer Fly	3,689	0	12,222
Deer Fly South	6,072	0	22,409
Demott Draw	2,542	0	1,200
Dillinger Ranch	17,200	0	1,988,060
Dillinger Ranch East	1,875	953	0
Ditto Lake	76	0	0
Donkey Creek	8,771	0	903
Double Shield	22,419	0	163,441
Dry Gulch	27,312	3,302	1,489,090
Duck Creek	272	0	0
Dutch	55,756	0	390,389
Duvall Ranch	112,851	0	727,224
East Fork	1,525	0	0
Echeta	0	3,212	258
Elk Draw	6,050	205,840	2,132
Empire	18,144	14,426	39,564
Falcon Ridge	15,566	0	187,918
Fd	103,607	0	829,579
Felix	2,027	84,053	550
Fence Creek	5,697	0	31,497
Fenton	2,327	11,389	18

Table 2-17. Oil and Gas Producing Fields in Campbell, Johnson, and Sheridan counties, 2007

Field	Oil (Bbls)	Gas (Mcf)	Water (Bbls)
Fish	26,985	0	0
Fishing Lake	614	0	0
Flat Creek	37,640	0	0
Florida	1,252	555	11,069
Gaither Draw	5,397	289	25
Gap	9	0	0
Garner Lake	9,764	0	9,777
Garner Lake North	7,461	0	39,897
Gas Draw	31,785	0	756,907
Gas Draw East	2,469	447	65,167
Gibbs	48,612	473	201,896
Gibbs South	11,966	7,278	74,669
Glasser Draw	1,374	675	46
Glo	26,855	0	5,736
Glo North	35,774	0	310,670
Goer Draw	238	90	0
Gold Mine Draw	1,534	0	1,537
Gray South	6,620	0	42,460
Ha Creek	5,390	234,369	341
Haight	24,217	7,333	520,726
Hal	2,519	0	501
Halverson	59,795	604	1,386,955
Halverson North	26,246	0	1,097
Hamm	22,573	0	1,164,224
Harper Draw	3,066	1,055	240
Hartzog Draw	1,083,636	415,647	2,379,813
Hawkeye	4,237	0	15,665
Heldt Draw	31,140	0	59,937
High Road	24,719	1,486	234,543
Hilda	10,189	0	162,467
Hilight	142,153	3,680,523	1,065,673
Hines	463	7,007	0
Hirsch	2,493	0	0
Hoover Gulch	13,510	34	51,594
House Creek	1,254,782	88,951	3,680,816
House Creek West	33,657	598	87,437
Hughie Draw	3,542	0	65,879
Hunter Ranch	5,069	0	65,256
Iberlin	12,781	0	8,837

Table 2-17. Oil and Gas Producing Fields in Campbell, Johnson, and Sheridan counties, 2007

Field	Oil (Bbls)	Gas (Mcf)	Water (Bbls)
Indian Tree	21,131	0	324,500
Interstate	152	426	0
Jazbo	49,111	0	697,128
Jeffers Draw	140	1,375	0
Joe Creek	17,561	0	158,436
Kane	408	0	33,171
K-Bar	56,031	31,187	106,305
Kicken Draw	41,624	0	104,266
Kingsbury Creek	3,255	115,256	677
Kitty	82,141	885,014	7,385
Kuehne Ranch	22,941	0	297,745
Kuehne Ranch East	69,975	0	65,994
Kuehne Ranch Southeast	14,584	0	11,775
Lazy B	17,121	36,176	30,440
Little Mitchell Creek	46,408	521	356,290
Little Pine	3,291	0	68,864
Little Thunder	39	15,661	10
Logan Draw	1,110	545	331
Lone Cedar	4,235	0	206,539
Long Tree	19,267	0	41,495
Mac	3,461	0	90,598
Mader Draw	3,344	0	4,419
Malmquist	15,674	0	25,975
Mapes	15,586	0	168,016
Marnie	4,667	0	195,732
Marnie South	11,719	0	14,391
Maysdorf	54,893	0	1,414,776
Mccreery	4,343	0	23
M-D	9,319	0	1,032,969
Miller Creek Road	3,220	0	120,159
Mill-Gillette	9,146	2,999	23,070
Mitchell Breaks	5,744	0	19,882
Mitchell Creek	1,349	0	2,099
Mongoose	218	8,364	0
Moran	34,915	0	71,438
Mosebar Draw	4,852	0	83,799
Napier Road	811	131	131
Neta	17,866	0	17,510
Night Creek	607	0	0

Table 2-17. Oil and Gas Producing Fields in Campbell, Johnson, and Sheridan counties, 2007

Field	Oil (Bbls)	Gas (Mcf)	Water (Bbls)
Ninemile	1,474	3,357	0
North Star	41,144	4,683	0
O'connor	1,887	0	0
Oedekoven	1,341	12	30,000
Ok	15,582	0	567,632
Olsen	8,417	0	82,137
Ottie Draw	18,336	0	46,188
Oxbow	5,127	0	7,246
Parnell Draw	550	0	0
Paul	2,358	0	0
Paul Draw	104,253	0	3,078,466
Payne	15,289	44,736	268
Pierce	5,005	0	176,140
Pine Tree	94,282	384,970	6,443
Piney	804	0	677
Pinnacle Divide	6,499	0	49
Pleasant Valley	6,429	314	124,709
Pleasantdale	13,863	0	5,904
Porcupine	42,068	817,067	2,678
Powell	6,735	227,890	1,382
Pownall Ranch	52,781	0	147,844
PRB Coal Bed	0	166,754,278	343,081,375
Prep	7,276	1,718	2,665
Pumpkin Buttes	17,603	0	24
R W Creek	1,671	42,476	0
Rainbow Ranch	21,139	975	366,225
Rainbow Ranch North	23,216	0	2,113,652
Raven Creek	85,757	0	4,248,411
Recluse	62,969	314,085	137,244
Recluse Southeast	1,364	0	0
Reel	36,254	0	808,606
Reservoir Creek	1,084	169	48
Ridgeview	7,429	0	24,192
Right A Way	19,010	0	52,129
Rock Creek	14,126	0	9,262
Rockhopper	6,153	0	143,455
Rocky Hill	343	4,042	0
Rocky Point	172,843	24,726	30,695,239
Roehrs	8,930	0	102,863

Table 2-17. Oil and Gas Producing Fields in Campbell, Johnson, and Sheridan counties, 2007

Field	Oil (Bbls)	Gas (Mcf)	Water (Bbls)
Roehrs South	9,145	0	77,241
Rourke Gap	4,112	0	27,441
Rozet	113,754	4,310	1,450,281
Rozet East	49,196	69	214,020
Rozet South	47,257	0	511,556
Rozet West	40,085	0	718,021
Rule	26,871	1,619	178,033
Rumph	9,743	0	728,917
Sa Creek	64,628	0	206,652
Sandbar East	73,203	0	1,336,772
Sandbar West	3,424	0	9
Sawgrass	14,716	0	827,467
Sawmill Draw	1,753	0	0
S-Bar	253	1,744	0
School Creek	12,540	218,289	1,063
Scribner	4,413	0	0
Se Doud	1,459	0	73
Sharp	26	0	192
Shell Draw	2,334	59,571	717
Shippy	32,791	0	196,342
Sievers	2,087	36	0
Simpson North	4,136	0	173,565
Simpson Ranch	10,656	0	155,352
Slattery	178,961	12,609	797,279
Smeltenn	2,110	48,352	313
Soda Well	16,938	0	642,663
Soda Well East	12,115	0	7,956
Spotted Horse	363	17,513	123
Spring Hole	46,428	0	48,594
Springen North	2,530	1,839	733
Springen Ranch	7,612	0	602
Stewart	77,438	423	690,270
Stewart East	16,127	0	86,941
Store	9,466	91,323	65,655
Summerfield	10,368	0	660
Superhornet	11,269	0	140,854
Swartz Draw	39,089	0	137,883
T.A. Buttes	3,898	0	29,981
Tanner	31,366	0	236,989

Table 2-17. Oil and Gas Producing Fields in Campbell, Johnson, and Sheridan counties, 2007

Field	Oil (Bbls)	Gas (Mcf)	Water (Bbls)
Taylor	2,622	35,088	257
Terrace	75,957	0	881,846
Tholson	23,214	117	515,150
Throne	2,168	11,414	0
Thunder Creek	6,246	218,155	1,404
Timber Creek	344,142	2,930	205,204
Timber Creek North	30,426	0	101,316
Timber Creek North Shallow	1,591	0	0
Timber Creek Northwest	9,572	0	65,881
Timber Creek South	1,695	0	0
Triangle U	44,241	6,917	37,896
Triangle U East	27,246	9,489	11,909
Trout Pond	84,779	0	19,341
Tuit Draw	20,936	99,128	7,679
Turnercrest	4,323	38,421	1,380
Twenty-One Mile Butte	15,350	2,102	3,816
Upper Duck Creek	54,722	0	94,654
Ute	17,646	0	449,175
Victor	24,330	0	196,600
Wagensen	3,891	20,306	46,071
Wagon Spoke	3,883	0	350,086
Wallace	24,152	0	339,214
Wallace North	26,046	0	10,032
Wallace South	31,708	1,685	202,301
Wc	763,541	83,269	1,075,667
Wd	6,358	0	499,521
West Fork	12,788	0	4,144
Wheat Draw	19,425	0	994,291
Whisler	9,510	0	26,156
Widge	20,961	1,781	19,088
Widge North	2,552	0	0
Wildhorse Creek	2,291	16,149	0
Windmill	49,080	122	866,885
Winter Draw	41,182	0	1,005,634
Wolff	16,940	0	100,588
York	12,106	0	103,465
York North	1,483	0	17,990
Zoe Draw	596	0	28,400

Table 2-17. Oil and Gas Producing Fields in Campbell, Johnson, and Sheridan counties, 2007

Field	Oil (Bbls)	Gas (Mcf)	Water (Bbls)
Johnson County			
Barber Creek West	7,153	1,618	3,053
Big Cat	13,344	2,400	0
Bozeman Trail	4,009	51,263	161
Cellars Ranch	53,606	0	1,079,709
Crawford Draw	18,093	350,566	152
Culp Draw	120,286	0	120,883
Empire	4,524	5,185	0
Fourmile	41,795	0	220,129
Hartzog Draw	2,598	0	5,574
Hatch	606	0	3
Heldt Draw	32,987	0	77,754
Holler Draw	31,414	5,070	174,475
Indian Creek	22,833	4,141	0
Jepson Draw	57,616	14,338	419
Juniper Draw	411	243	14
Meadow Creek	39,944	5,319	155,986
Million Creek	0	666	0
Nipple	5,334	0	0
North Fork	83,921	0	7,047,694
Pheasant	6,586	0	6,243
Phoenix	2,561	17,204	0
PRB Coalbed	0	200,649,964	179,805,201
Pumpkin Creek	1,058	0	0
Reno	78,171	0	102,088
Schoonover Road	155	0	0
Sussex	136,328	12,935	308,018
Sussex West	64,701	0	359,364
Table Mountain	118,060	14,532	282,514
Taylor	1,994	20,824	0
Tisdale East	12,225	0	573,164
Tisdale North	70,611	0	1,811,556
Wc	170	0	229
Whiskey Butte	0	3,036	57,118
Sheridan County			
Ash Creek South	13,076	0	603,660
Fence Creek	7,981	0	86,916
PRB Coal Bed	0	61,286,258	115,052,474

Source: WOGCC 2008b.

Table 2-18. CBNG and Non-CBNG Production for Campbell, Johnson, and Sheridan Counties in 2007

County	Coalbed Natural Gas (Mcf)	Non-CBNG (Mcf)
Campbell	166,754	12,710
Johnson	200,650	509
Sheridan	61,286	0

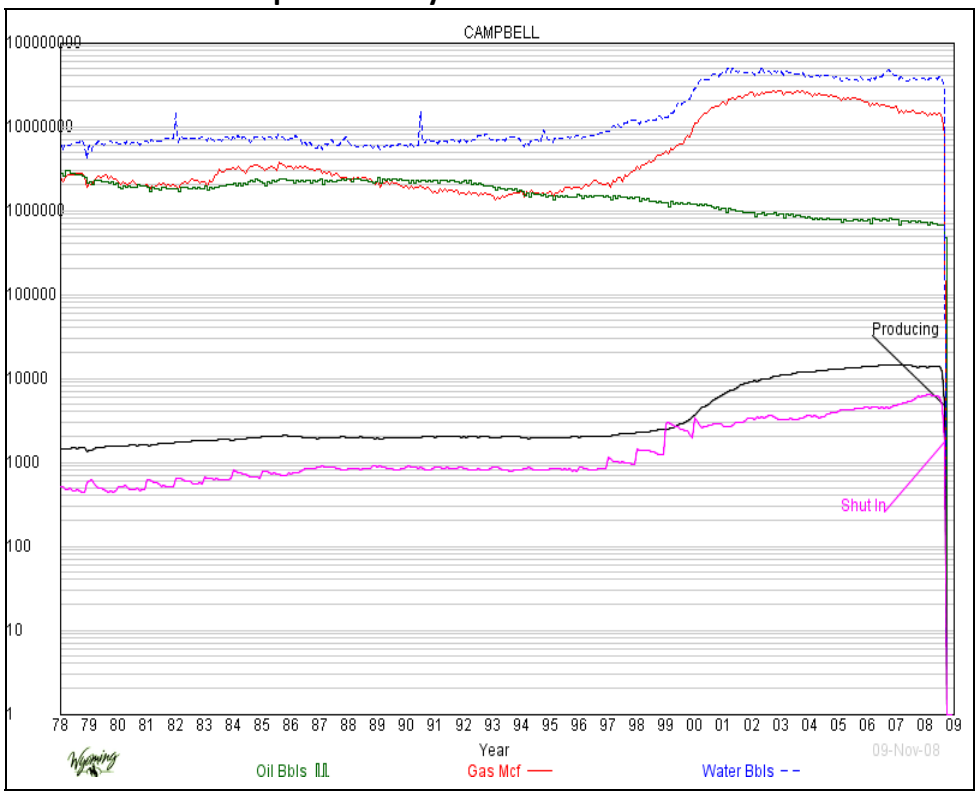
Source: WOGCC 2008b.

Trends

Completed Wells – Well completions remained steadily at under 100 completions per year through the early and mid 1990's. Beginning in 1998, completions increased sharply on state and fee minerals with CBNG development. The number of completions on federal minerals began increasing in 2000 with CBNG development. Well completions dropped off irrespective of mineral owner in 2003. This follows the decline of approved APDs in 2002. Federal well completion increased in 2004 after the Powder River Basin Oil and Gas Final EIS ROD was signed in 2003 (BLM 2003a). Increases in well completions from 2003 to 2005 follow the trend of approved APDs between 2002 and 2004. The decline in well completion per year starting in 2005 correlates with a change in well completions techniques. Prior to 2004/2005 each CBNG well was typically drilled to and completed in a single coal seam. In areas where three or four coal seams existed, three or four wells would be drilled and completed. Beginning in 2004/2005, CBNG operators began using subsurface commingling. With subsurface commingling a single well can be drilled through and completed in multiple coal seams. Areas that previously required three, four or five wells, now only require one or two wells. The downward trend of well completions per year between 2005 and 2008 correlates with the increased use of the subsurface commingling technique.

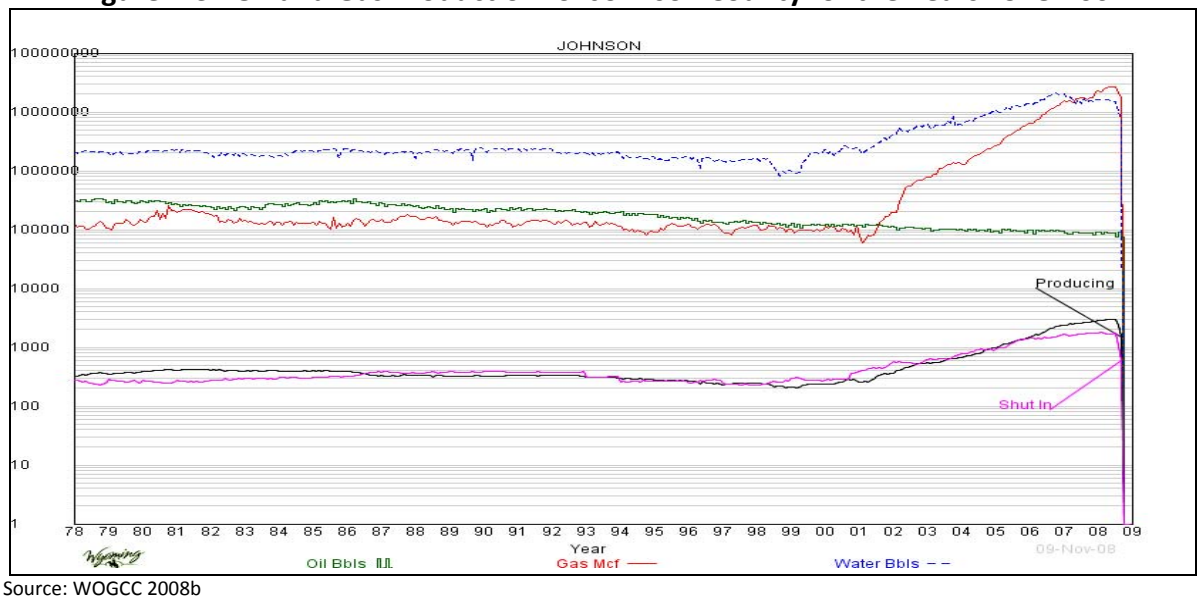
Oil and Gas Production – Figures 2-2, 2-3, and 2-4 display oil and gas production for Campbell, Johnson, and Sheridan Counties for the years 1978-2007. Oil production in Campbell County has declined since the early 1990s. Oil production in Johnson County has declined since the late 1980s. Oil production in Sheridan County has declined between the mid 1980s and 2006, after which, production started to increase. Gas production in Campbell, Johnson, and Sheridan Counties was on decline until CBNG production started in the mid 1990s. **Applications for permits to drill –** The BFO has processed approximately 3000 APD's per year since 2004, following the approval of the Powder River Basin EIS in 2003 (BLM 2003a). This level of processing is expected to continue through approximately 2012-2014, and then decline. The majority (greater than 98%) of the applications to drill are for CBNG wells.

Figure 2-2. Oil and Gas Production for Campbell County for the Years 1978-2007



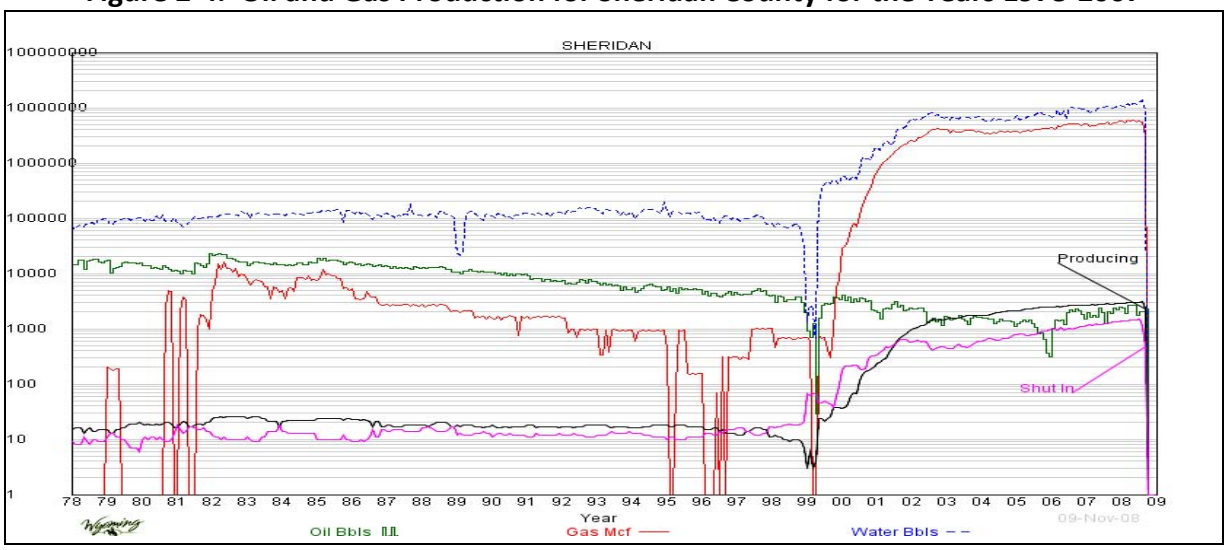
Source: WOGCC 2008b

Figure 2-3. Oil and Gas Production for Johnson County for the Years 1978-2007



Source: WOGCC 2008b

Figure 2-4. Oil and Gas Production for Sheridan County for the Years 1978-2007



Source: WOGCC 2008b

Well Plugging – Over the last 15 years, oil and gas wells in the planning area have been plugged at an average rate of 230 wells per year, with a minimum of 135 wells plugged in 1994 and a maximum of 315 wells plugged in 2005.

Forecasts

Completed Wells – Well completions in the Powder River Basin will continue to be overwhelmingly associated with CBNG development. Between 1,000 and 1,500 well completions can be expected per year through 2013 – 2015. While not all APDs become drilled and completed wells, the correlation between them is expected to remain. Therefore, a decline in well completions is expected after 2015.

Oil and gas production – The United States consumed, on average, 20.65 million barrels of liquid fuels (5.10 million barrels were from domestic crude oil production) and 59.34 Bcf of gas each day in 2006 (DOE 2008b). Based on the *Annual Energy Outlook 2008*, total energy consumption in the United States is projected to increase over the next 25 years. Total consumption of liquid fuels, including both fossil liquids and biofuels, is projected to grow from 20.7 million barrels per day in 2006 to 22.8 million barrels per day in 2030. Natural gas consumption is projected to increase from 21.7 trillion cubic feet in 2006 to 23.8 trillion cubic feet in 2016, then decline to 22.7 trillion cubic feet in 2030 (DOE 2008b).

An increase in the demand for oil and gas resources is also expected in the planning area based on the projected increases in prices for oil and gas and the rising national demand for energy. The National Energy Policy of 2005 has influenced the demand on federal oil and gas leases in

the planning area. The use of CO_2 to enhance oil recovery in mature fields is also expected to occur in the planning area in the immediate future.

Applications for Permits to Drill – The BLM expects approximately 2,500 to 3,000 APDs per year to be submitted until 2013. After 2013, the number of APDs submitted is expected to decline in tandem with the number of available CBNG spacing units. One unknown in this forecast is the number of mineral estate acres in coal bearing areas of the Powder River Basin that could be available for leasing upon completion of the BFO RMP (i.e. authorized leases in coal bearing areas could expire and would not be released until an RMP was approved).

Well Plugging – CBNG wells in the planning area have an anticipated production life of between 7 and 10 years. The upsurge of APDs due to CBNG began 10 years ago in 1999. A corresponding upsurge in well pluggings is expected to start in 2009 and follow the drilling trend with a 10 year lag.

Key Features

Until 2004 all federal minerals in the planning area were open to leasing, with the exceptions of incorporated towns and cities and three Wilderness Study Areas (WSAs). A 2004 Tenth Circuit Court of Appeals (Pennaco Energy v. DOI, 377 F.3d 1147) ruling prohibited the leasing of federal minerals in coal bearing areas until a National Environmental Policy Act (NEPA) analysis is completed.

2.2.4 Leasable – Other Solid Leasables

Other solid leasable minerals are those solid minerals, other than coal and oil shale, which are leased under the Mineral Leasing Act of 1920 and not related to energy production. Examples of solid leasable minerals include chloride minerals, sulfate minerals, carbonate minerals, silicate minerals, borate minerals, and other “hardrock minerals.” 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.

2.2.4.1 Resource Characterization

Current Condition

There are no other solid leasable minerals being leased or produced within the planning area. Other solid leasable minerals found within the planning area are not considered to be economically viable to produce.

Trends

There are no other solid leasable minerals being leased or produced within the planning area.

Forecasts

Future demand for other solid leasable minerals will likely increase over time in parts of Wyoming and the west, but this is not anticipated to result in any new leasing or production in the planning area.

Key Features

There are no other solid leasable minerals being leased or produced within the planning area.

2.2.5 Salable

Salable minerals, also known as mineral materials, include common varieties of sand, stone (e.g., decorative stone), gravel, pumice, clay, rock and petrified wood. These non-energy related materials are typically used in everyday construction, agriculture, and decorative applications. Under the BLM minerals materials program (43 CFR 3600) the BLM manages exploration, development, and disposal of salable minerals either by sale or free use. Recreational collecting of this material is allowed, but large volume removal requires a mineral sale. The BLM does not sell salable minerals at less than fair market value.

2.2.5.1 Resource Characterization

Current Condition

The primary salable minerals found in commercial quantities in the planning area include sand, gravel, and scoria (coal ash and overlying baked sediments). Sand and gravel deposits are found scattered along major drainages throughout the planning area and are more plentiful near the base of the Big Horn Mountains. Scoria is found in eastern and northern Campbell County, northwestern Sheridan County, and northern Johnson County. The majority of the mineral material resources in the planning area are located on private land (both split-estate and private minerals).

The various types of mineral materials that are available for disposal under a sales contract or free use permit from the BLM include sand, gravel, scoria, clinker, stone (building and decorative), fill dirt, common clay, non-metallurgical grade limestone or dolomite, petrified wood for commercial purposes, and any other common variety mineral as demand occurs. In 2007, the BFO authorized a total of approximately 1.7 million cubic yards of mineral materials disposals (including both sales and issuance of free use permits). Map 6 shows mineral materials permit areas within the planning area.

Trends

Demand for salable minerals nationwide is on the increase, with an increase in construction and general growth. Matching this trend, the BFO has seen an increase in the amount of salable

minerals sold and in the number of contracts and request for contracts for salable minerals. Annual authorized sales and free use permits showing the approximate cubic yards per calendar year for the period 2000–2007 are listed in Table 2-19. The cubic yards listed on the table were for the amount authorized, but the actual annual production may be less. The contracts and free use permits were issued from two to five years. Most of the large sales are scoria sales in the coal mines utilized for mine development. The remainder of the sales for both sand and gravel and scoria were primarily for CBNG and other oil field development. The free use permits were issued to county and municipalities for road maintenance.

Table 2-19. Mineral Material Disposals for the Buffalo Planning Area

Year	Free Use Permits (cubic yards)	Free Use Permits (Tons)	Sales (cubic yards)	Sales (tons)
2000	60,000	57,500	745,100	6,450
2001	100,000	222,000	550,450	8,600
2002	60,000	182,000	897,250	18,000
2003	62,800	423,650	1,122,650	14,900
2004	37,000	121,500	881,100	107,200
2005	73,000	290,000	679,935	22,000
2006	30,000	275,000	698,650	158,000
2007	400,000	113,000	1,306,050	87,800

Source: BLM 2008d

Exploration and production of salable minerals is increasing. Local demand and the ongoing needs for more mineral material from the public lands for various private and public projects have resulted in a large volume mineral materials-related activity to be processed by the BFO.

Forecasts

Exploration and production of commercially-available mineral materials in the planning area currently includes moderate to high levels of activity. The BFO will continue to work with the mineral materials industry and the public to insure resource viability while protecting other resources on the ground and preventing unnecessary and undue degradation. It is anticipated that demand will continue to remain about the same in the future, but will depend on oil, gas, coal, and other mineral development and population growth.

BLM-administered lands in the planning area are the source of a number of important mineral material resources, including sand, gravel, and rock used in construction. Significant quantities of mineral material reserves are present in the planning area, therefore, a sustainable level of mineral material resources are available to meet anticipated demand.

Key Features

Mineral material disposals are scattered across Campbell, Johnson, and Sheridan Counties in the planning area. These disposals include scoria, sand, and gravel through both sales contracts and free use permits. The BFO also maintains eight common use areas for moss rock and flagstone where these resources may be removed by hand.

2.3 Fire and Fuels Management

The BLM fire management program seeks to protect public safety, life, and property while focusing on two categories of fires: unplanned/wildland fires and planned/prescribed fires. Vegetative types and their respective fire regimes vary throughout the planning area. Table 2-20 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.

Table 2-20. Annual Average Acreage of Planned and Unplanned Fires and Treated Acres in Different Vegetative Types in the Planning Area

Vegetation Type	Planned Fire (acres)	Unplanned Fire (acres)	Chemically Treated Acres	Mechanically Treated Acres
Aspen Forest	0	73	0	0
Douglas-fir Forest	124	0	0	100
Dry-Land Crop	0	9,175	0	0
Greasewood Flats	0	1,499	0	0
Juniper Woodland	221	0	0	62
Lodgepole Pine	34	3,874	0	18
Mountain Shrub	12	2,042	0	0
Mixed Grass Prairie	2,553	23,190	0	0
Ponderosa Pine	4,024	44,915	0	283
Riparian Forest-dominated	0	1,391	0	12
Riparian Herbaceous-dominated	69	85	0	0
Riparian Shrub-dominated	0	558	0	0
Wyoming Big Sagebrush	2,643	63,008	0	304
Unclassified/Other	4	165	0	0
Total	9,680	149,974	0	779

Source: BLM 2008i

The planning area is divided into two fire management units. A fire management unit is a geographic area with similar vegetation communities and resource and fire management objectives. Map 7 shows the fire management units found within the planning area.

2.3.1 Unplanned/Wildland Fire

An unplanned and/or wildland fire is one that burns outside the parameters defined in land use and fire management plans for that location under current and expected conditions. Unplanned and wildland fires include fires burning in areas where fire is specifically excluded; fires that exhibit burning characteristics (intensity, frequency, and seasonality) that are outside

prescribed ranges, including fires expected to produce severe fire effects; unauthorized human-caused fires (e.g., arson, escaped camp fires, and equipment fires); and fires that occur during periods of high fire danger.

Unplanned fires are not the same as unscheduled fires. For example, the timing of a lightning fire ignition is not known; however, a lightning-caused fire could still be used to meet fuels and ecosystem management objectives. This might happen if that type of fire is expected within the parameters of an approved plan; the fire is burning within the parameters for the area; the fire is not causing, or does not have the potential to cause, unacceptable impacts; and funding and resources to manage the fire are available.

2.3.1.1 Regional Context

Suppression actions on small (1 to 100 acres) unplanned/wildland fires that occur in areas having relatively little BLM surface ownership and/or on railroad/highway right of ways are often addressed unilaterally by the county jurisdictional fire authority. These fires are oftentimes not reported to BLM or the Interagency Dispatch Center or included in BLM's fire database. BLM estimates that within the planning area an annual average of 15 wildland fires burning 120 acres are not included in the database.

The Bighorn National forest averages 25 unplanned/wildland fires with an average of 300 acres burned per year (USFS 2005). The lowest recorded number of fires and acres burned in a single year was 2008, with 15 fires burning 15 acres; the highest recorded number of wildland fires was 2007, with 30 fires burning 18,000 acres (USFS 2005).

2.3.1.2 Resource Characterization

Indicators

National fire policy requires current and desired resource conditions related to fire management to be described in terms of three condition classes and five fire regimes. The Fire Regime Condition Classification System (FRCC) classifies existing ecosystem conditions to determine priority areas for treatment as mandated by national direction. It measures the vegetation's degree of departure from reference conditions, or how different the current vegetation condition is from a particular reference condition (see Table 2-21). This could result in changes to key ecosystem components, such as vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances, such as insect- or disease-related mortality. FRCC involves two pieces of information: (1) the historic fire regime, and (2) the condition class. Fire regime is the inferred historic fire return interval and severity on a given landscape. Condition class is the departure of the given area from the historic fire interval.

Table 2-21. Fire Regime

Regime	Frequency	Severity	Severity description
I	0-35 years	Low / mixed	Generally low-severity fires replacing less than 75% of the dominant over story vegetation; can include mixed-severity fires that replace up to 75% of the over story
II	0-35 years	Replacement	High-severity fires replacing greater than 75% of the dominant over story vegetation
III	35-100 years	Mixed / low	Mixed-severity with less than 75% of the over story vegetation replaced
IV	35-200 years	Replacement	High stand replacement-severity fires with greater than 75% of the dominant over story vegetation replaced.
V	200+ years	Replacement / any severity	High (stand replacement) severity

Source: FRCC 2008

Condition classes for the fire regimes presented in Table 2-21 are as follows:

- **Condition Class 1:** For the most part, fire regimes in this class are within historical ranges. Vegetation composition and structure are intact. Therefore, the risk of losing key ecosystem components from the occurrence of fire remains relatively low.
- **Condition Class 2:** Fire regimes on these lands have been moderately altered from their historical range by either increased or decreased fire frequency. A moderate risk of losing key ecosystem components has been identified on these lands.
- **Condition Class 3:** Fire regimes on these lands have been substantially altered from their historical return interval. The risk of losing key ecosystem components from fire is high. Fire frequencies have departed from historical ranges by multiple return intervals. Vegetation composition, structure, and diversity have been substantially altered. Consequently, these lands verge on the greatest risk of ecological collapse.

Current Condition

The Gardner Mountain and North Fork portions of the WSA Fire Management Units (FMU) are classed primarily in Fire Regime Group IV (stand replacement) and Condition Class 3 (high risk). Fuels in these WSAs are primarily mixed timber and sagebrush grassland. The sagebrush grassland and juniper woodlands of the Fortification Creek WSA are classed primarily in Fire Regime Group III (mixed severity) and Condition Class 2 (moderate risk).

The FMU in the three county area is a very large and diverse unit. Portions of the unit have forest fuel types primarily classed as Fire Regime Group III and IV (stand replacement) and Condition Class 2 (moderate risk). Almost all of the Fire Regime Group IV is rated Condition Class 3 (high risk). Within the planning area, about 56 percent is classified as Fire Regime Group

III (mixed severity) with a Condition Class 2 (moderate risk) rating. This area is primarily the sagebrush grassland fuel type that predominates in the Powder River Basin. The second largest FRCC unit accounting for 30 percent of the planning area is classified as Fire Regime I (low severity) with a Condition Class 2 rating. Fuels in this unit are predominately mixed grass prairie fuel type and occurs extensively in the lower elevations of Powder River Basin. Acreages for FRCCs in the planning area are included in Table 2-22.

Table 2-22. Acreages of Fire Regime Condition Classes in the Planning Area by Fire Management Unit, 2007

Fire Management Unit	Acres in Condition Class I	Acres in Condition Class II	Acres in Condition Class III	Total Acres
Counties	26,306	5,319,378	808,574	6,154,258
WSA	0	13,622	17,989	31,611
Total	26,306	5,333,000	826,563	6,185,869
Percent Acres	**<1%**	**86%**	**13%**	

Source: BLM 2008i

One of the key goals of the fire program is to move more of the planning area toward Condition Class 1 and 2. The movement of high-priority, high-condition class areas to a lower condition class is also one of the key performance measures identified in the National Fire Plan and Health Forest Initiative (USFS 2004, National Fire Plan 2002).

All three counties within the planning area have completed Community Wildfire Protection Plans (CWPPs). The Sheridan and Johnson County plans were completed in 2005 and Campbell County in 2007. The CWPPs identify communities at risk from wildland fire and establish priorities for fire mitigation and protection within the county. The areas of concern are prioritized based upon fuel hazards, risk from wildfire, infrastructure, and other values such as viewsheds and watersheds. The plans are initiated by the county commissioners and prepared by the county fire wardens. The Wyoming State Forestry Districts provide technical and logistical assistance and facilitate participation with other cooperating agencies within the counties.

Campbell County CWPP

Prior to development of the Campbell County CWPP, the county identified six communities located in conifer vegetation types as being at high risk to wildland fire. Of the named communities, BLM has significant land resources in close proximity to Bitter Creek, Cedar Hills, and Wildwood Camp. The county did not identify specific priority areas. The CWPP classified any areas of industrial development or homes as high risk wildland fire areas. Since almost all

of Campbell County has commercial infrastructure and/or rural housing, this approach resulted in essentially all of Campbell County being rated at high risk for wildland fire.

Johnson County CWPP

The Johnson County CWPP identifies 13 communities (areas) of concern and assigns a priority ranking of one through five. The areas and assigned priority where BLM has significant land resources are shown in Table 2-23.

Table 2-23. Areas of Fire Concern within the Buffalo Planning Area, Johnson County, Wyoming

CWPP Priority Ranking	CWPP Area of Concern	Associated BLM Fuel Treatment Unit	BLM Fuel Treatment Project Number
1	Clear Creek Watershed	Buffalo West/Mosier Gulch	TD32
2	Billy Creek Cabins Area	Billy Creek Wildland Urban Interface	TD39
	Dull Knife Area	Powder River Properties	TD57
3	Hazelton East	None	None
4	Whispering Pines	Dull Knife WUI	None
5	Gardner Mountain	Eagle Trap/Martin Draw	TD63
	Middle Fork Area	Middle Fork/Eagle Creek	TD17/TD59

Source: Johnson County, Wyoming 2004
CWPP Community Wildfire Protection Plan

Sheridan County CWPP

The Sheridan County CWPP maps hazardous fuels as Low, Medium, and High Hazard and identifies urban and wildland urban interface (WUI) communities throughout the county. Detailed community specific assessments of risk associated with wildland fire, fuels, and community/property values, are provided for fifteen areas or WUI communities. The CWPP did not rank or assign priorities for the individual communities, but lists municipal water supply watersheds, and communication sites as high priority values at risk. Of the fifteen communities receiving specific risk assessments, three contain BLM administered public land (Table 2-24).

Table 2-24. Wildland Urban Interface Communities with Risk Assessments in the Buffalo Planning Area, Sheridan County, Wyoming

Wildland Urban Interface Community	Public Land Acres/Percent of Unit	Fuel Hazard Rating	BLM Fuel Treatment Project Number
Dayton Area	1,600 acres/10%	Moderate to High	None
Lower Big Goose	480 acres/3%	High 50%, Moderate and Low 50%	None
Stumpy - Teepee - Red Grade	320 acres/3%	Moderate and High	TD66

Source: Sheridan County, Wyoming 2005

Interagency Wildland Fire Management Annual Operating Plan (Campbell, Johnson, and Sheridan Counties)

BLM maintains Interagency operating plans which include agreements with the three county fire organizations as well as with the Wyoming State Forestry Division, Medicine Bow National Forest, Bighorn National Forest, Crow Tribal Agency, and neighboring BLM offices.

The Operating Agreements are reviewed and renewed annually and provide specific conditions for applying fire suppression actions by the jurisdictional fire authorities on cooperating agency lands. Under the Operating Agreement, Campbell and Sheridan Counties take total initial attack of BLM fires on a reimbursable basis. The BLM only sends resources if requested for assistance or, if the number of fires exceeds their capabilities. Johnson County provides initial attack of BLM fires under mutual aid agreements that provide for reimbursement after specified periods or fire conditions are met.

In conjunction with the operating plans, the BLM identifies Special Designations and other management areas and attempts to obtain compliance with various restrictions on fire suppression actions within the area. Table 2-25 identifies the special designation and other management areas, pertinent activity planning documents, and restrictions for each of the counties in the planning area.

Trends

All fires within the planning area are managed using suppression actions consistent with the resource management objectives identified in the High Plains District Fire Management Plan. Tactics and strategies are based on the current and predicted weather and fire behavior. Firefighter and public safety is always the first priority.

Fire Data from the 2001 RMP update shows that during the period of 1985–1993, the planning area averaged eight fires per year that burned an average of 402 acres of public land. During this period, years 1985, 1988, and 1991 had more than 10 fires. The highest number of fires in a year occurred in 1988 with 22 fires reported. The highest acres of public land burned in a year occurred in 1991 with about 2,200 acres burned.

Archive Geographic Information System (GIS) fire data from 1994-2007 showed 97 fires burning about 157,300 acres giving an annual average of 7 fires with 1,622 acres burned. Years having the most fires reported were 1996 (24 fires), 2002 (12 fires), and 2006 (17 fires). The highest acreage in a single year was 2006 with about 72,000 acres burned. Since 2003 when accurate records of fire cause were recorded, about 80 percent of the reported fires were caused by lightning. Fire cause was unknown for 19 percent of the fires and one percent were caused by humans.

Table 2-25. Special Designations and Other Management Areas in the Buffalo Planning Area

Special Designations and Other Management Area Name	Planning Document	Fire Suppression Restrictions
Sheridan County		
Welch Management Area	Interdisciplinary Activity Plan	1 Light on land suppression tactics 2. Restricted use of heavy equipment for fire suppression
Campbell County		
Weston Hills Recreation Area	Interdisciplinary Activity Plan	1. Light on land suppression tactics 2. Restricted use of heavy equipment for fire suppression
Burnt Hollow Management Area	Cooperative Management Plan	1. Light on land suppression tactics 2. Restricted use of heavy equipment for fire suppression
Johnson County		
Fortification Creek*, Gardner Mountain, & North Fork Powder River Wilderness Study Areas	WSA Interim Management Plan	1. Prohibits helispots construction. 2. Prohibits use of heavy equipment except for protecting human life.
Petrified Forest Environmental Education Area	Recreation Activity Plan	1. Light on land suppression tactics 2. Restricted use of heavy equipment for fire suppression
Cantonment Reno	Cultural Site Plan	1. Minimum surface disturbing construction of fire line. 2. Restricted use of heavy equipment for fire suppression
Middle Fork Management Area	Interdisciplinary Activity Plan	1. Restricts aerial application of fire retardant in Middle Fork Powder River. 2. Restricted use of heavy equipment for fire suppression

The Fortification Creek WSA also extends into Sheridan and Campbell Counties

Forecasts

Human development continues to expand in all portions of the planning area and especially in the southern Big Horn Mountains and foothills. Lack of zoning and strategic planning at the state and especially the county levels of government together with the low interest rates in the early 2000s resulted in rapid expansion of development in many areas. In the Billy Creek area this new development is taking place in an area of extremely hazardous fuels. County, state and federal fire protection agencies have worked cooperatively in the past to plan and implement hazardous fuel reduction projects that focus on the WUI areas. There needs to be continued emphasis on preparation of cooperative and collaborative fuel reduction projects as well as fire mitigation education for property owners in the WUI.

Over the next ten years, the BLM expects there to be little change in fire occurrence in the lower elevation areas of the Powder River Basin where the predominant fuel is mixed grass and

sagebrush. Fuel loading in the mixed grass and sagebrush vegetation is generally low and is primarily dependent on the moisture received during the current or preceding year. In sagebrush/grass fuel types, the number and size of unplanned fires is primarily dependent on the current year environmental conditions. Discounting effects of significant changes in climate over the next ten years, the BLM expects that both the number and size of fire will be similar to the previous ten year period.

In the portions of the planning area having a significant component of forest and woodland vegetation, the BLM expects the ten year trend will be toward an increase in both the number and size of fires. Fuels in forest vegetation persist over a period of several years or decades. The fuel loading levels in the forest have been building steadily over large areas due to exclusion of fire, lack of logging, and impacts of disease and drought. The increase in fire activity is expected because the volume of fuels in the timber vegetation/fuel type is expected to continue to outpace human efforts to control them. Assuming that environmental conditions will be similar in the next ten years to those of the previous ten, and fuel loading and susceptibility to fire are higher, there is likely to be an increase in fire activity.

Key Features

Key areas for fire management are the urban interface, special feature areas, and BLM special management areas listed in Tables 2-23, 2-24, and 2-25 above. The greater sage-grouse focus areas and any large (greater than 100 acres) stand of mature Wyoming big sagebrush are key feature areas for protection from wildland fire.

2.3.2 Planned/Prescribed Fire

Planned or prescribed fire is applied under specific fuel and environmental conditions to achieve resource objectives, such as improving habitat and plant community health and reducing hazardous fuels. The fire program in the planning area has been managed to protect public safety, life, and property while utilizing both wildfire and fuels treatments. Fire and fuels treatments are management tools used to maintain or increase age-class diversity within vegetation communities (e.g., big sagebrush/grassland); rejuvenate fire dependent vegetation communities (e.g., aspen and ponderosa pine); maintain or increase vegetation productivity, nutrient content, and palatability; and maintain or improve wildlife habitat, rangeland, and watershed condition. Fire is considered a management tool for disposal of timber slash, seedbed preparation, reduction of hazardous fuels, control of disease or insects, rangeland health improvement, grazing management, thinning, or species manipulation in support of forest management objectives. Fire is also considered a management option for disposal of timber slash, seed bed preparation, hazard fuel reduction, control of disease or insects, thinning, or species manipulation in support of forest management objectives.

2.3.2.1 Regional Context

Planned/prescribed fire on the Bighorn National Forest averages six prescribed fire treatments burning about 2500 acres annually (USFS 2005). Recent amendments to the Bighorn National Forest Fire Management Plan allow for application of wildland fire use. The Forest Service projects that over the next five years, less than 100 acres on the Bighorn National Forest will burn under wildland fire use management (USFS 2005).

Most of the prescribed fire that occurs solely on state and private land within the planning area is associated with forest management activities such as thinning and logging. The BLM estimates that prescribed fire is applied to an average of 300 acres annually to clear logging slash. Most of the broadcast prescribed fire applied on non-federal land occurs in sagebrush grass vegetation type. The primary objective of non-federal broadcast prescribed fire is to increase forage for livestock. Broadcast prescribed fire is applied to an estimated 1,500 acres annually on private land within the planning area.

2.3.2.2 Resource Characterization

Indicators

See the "Unplanned/Wildland Fire" section for a discussion of the FRCC system used to classify ecosystem fire characteristics and prioritize areas for treatments.

Current Condition

See the "Unplanned/Wildland Fire" section for discussion of the current condition in the planning area, based on FRCC criteria.

Trends

Prescribed Fire – From 1985 through 2001 most prescribed fires were broadcast burns of sagebrush/grass fuels conducted to meet livestock and big game wildlife forage objectives. Secondary objectives were to reduce or break the continuity of fuels, thereby reducing the risk of catastrophic loss from wildland fire. Most of the prescribed burns were done in cooperation with individual grazing lessees and/or habitat units managed by the WGFD. During the 17 year period, BLM had the lead role in conducting about 12 prescribed fires covering an estimated 6,000 acres of which about 30 percent was public land surface.

From fiscal year 2003 through 2008 BLM conducted 15 prescribed fire projects in the planning area to treat about 3,100 acres of public land in the WUI. During the same period the BLM conducted 17 prescribed fire projects in the planning area to treat about 5,200 acres of public land outside the WUI.

Mechanical Treatment – From 2003 to 2008 the BFO implemented 13 mechanical fuel treatments utilizing both contract machinery and BLM force account crews to reduce hazardous fuels on about 224 public land acres within the WUI. During the same period, eight mechanical fuel treatments were applied on 582 acres of public land outside of the urban interface. Most of the non-WUI treatments were associated with timber harvest or salvage actions following wildland fire.

Forecasts

The number of planned fires associated with activities, such as forest thinning and timber sales, on public land is expected to decline slightly during the next five years. Over a ten-year period the BLM expects the housing and sawtimber market to recover, resulting in steadily increasing logging and associated prescribed fire used to remove logging slash and timber management activity slash piles.

Broadcast prescribed fire on public land in the planning area is likely to continue at approximately the same level as the previous ten years. The BLM expects 75 percent of the broadcast fire projects and acres treated to occur in areas outside the wildland urban interface. Based on past performance, BLM will likely have the lead role in implementing 2-3 broadcast prescribed fires covering an average of 700 acres, annually. Most of the broadcast burns will include non-federal lands which are expected to constitute 30-50 percent of the acreage treated annually.

The emphasis for mechanical fuel treatments in the next 10 years is most likely to be on public lands within and adjoining the WUI. BLM expects to implement three to four mechanical fuel treatments annually covering 30-40 acres of Public Land. Mechanical treatments occurring under forest and rangeland management but having fuels management objectives (non-National Fire Plan projects) are expected to be applied on an average of two projects covering 100 acres annually. Most of the non-National Fire Plan projects mechanical fuels treatments will occur outside of the wildland urban interface.

Key Features

Wildland Urban Interface areas and timber sale units are the key management areas for planned ignition fire associated with mechanical treatments (slash pile burning). Key feature areas for planned broadcast fire are ponderosa pine and juniper woodlands, especially where these vegetation types are encroaching on sagebrush and sagebrush/grassland park areas. Areas that typify juniper and ponderosa pine encroachment and/or high incidence of insect and disease tree mortality include Fortification Creek, Weston Hills, Burnt Hollow, Fence Creek, Billy Creek, The Horn, Middle Fork, and Gardner Mountain.

2.3.3 Stabilization and Rehabilitation

2.3.3.1 Regional Context

See the "Unplanned/Wildland Fire" section for a discussion of the FRCC system used to classify ecosystem fire characteristics and prioritize areas for treatments.

2.3.3.2 Resource Characterization

Indicators

See the "Unplanned/Wildland Fire" section for a discussion of the FRCC system used to classify ecosystem fire characteristics and prioritize areas for treatments.

Current Condition

The current RMP provides for emergency stabilization and rehabilitation of any areas within the planning unit impacted by wildland fire and/or fire suppression damage. Most rehabilitation actions are directed at soil and vegetation damage resulting from use of heavy equipment for suppression of the fire. BFO policy emphasizes minimal use of heavy equipment for direct fire line construction preferring instead to confine equipment use to existing roads and trails. Success in implementing this policy has been mixed with most fires where heavy equipment is used requiring follow up rehabilitation. Typically, this type of disturbance requires the greatest amount of rehabilitation/reclamation. However, large fires in forest fuel types, accelerated invasive weed conditions, and fire occurrence within critical watersheds or WUI areas may be cause to initiate formal Emergency Stabilization and Rehabilitation (ES&R) planning.

Trends

Since 1985, the BFO has developed a formal ES&R plan for one fire, the 2003 Big Spring Fire. The Big Spring Fire ES&R Plan specified both emergency actions, such as hazard tree falling, and non-emergency rehabilitation actions, such as road grading and facilities replacement. About half of the wildland fires in the planning area have required varying degrees of rehabilitation of suppression damage consisting primarily of re-contouring slopes, reseeding, and water barring fire lines.

Forecasts

The BLM expects one to two formal ES&R plans to be completed for fires over the next ten years. Another 12-15 fires are likely to require rehabilitation of fire suppression damage.

Key Features

The key area for ES&R planning and application are the Clear Creek watershed which is the municipal water supply watershed for the town of Buffalo. Secondary areas of importance are

those public lands having public access where fire killed trees could fall and endanger the public. Areas of this type include the Mosier Gulch, Billy Creek, Middle Fork, Burnt Hollow, and Weston Hills.

2.4 Biological Resources

This section describes the biological resources found within the planning area. It describes vegetation, fish, wildlife, invasive species, 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 (see Section 2.4.7) found in the planning area. Common names for species are used throughout this section and the rest of the Summary of the AMS. A complete list of scientific names for species referenced in this document can be found in Appendix A.

Throughout this section, reference will be made to vegetation types that are found in the planning area (Map 8). Table 2-26 summarizes the extent of vegetation and land cover types found in the planning area. Descriptions of these vegetation types are found in their relevant sections.

Table 2-26. Acreages of Vegetation Resources within the Buffalo Planning Area, Wyoming

Vegetation and Land Cover Type	BLM-administered Surface (acres)	Federal Mineral Estate (acres)	Total Acreage for the Planning Area
Agricultural	91	15,797	121,732
Barren	8,923	33,477	48,343
Forest	51,225	116,984	651,001
Herbaceous Riparian	0	0	10,819
Mixed-grass Prairie	83,349	765,547	1,479,890
No Record	2,711	47,093	90,531
Other Shrubland	14,250	21,989	30,737
Riparian Forest	3	11	20,086
Riparian Willow & Wet Shrub	91	2,210	39,889
Sagebrush Shrubland	167,884	1,320,673	1,748,952
Short-grass Prairie	453,153	2,454,815	3,036,170
Water	102	2,399	10,967
Wet Meadow	261	21,904	69,706

Source: BLM 2008i

Regional Context

The planning area lies within two MLRAs, as categorized by the USDA. The Central Rocky Mountains and the Northern Rolling High Plains, Southern Part. Elevations in the planning area range from 2,900 feet to 8,000 feet, with mountain peaks of 10,000 feet and greater.

2.4.1 Vegetation – Forests and Woodlands

The majority of the forests and woodlands are located in the Central Rocky Mountains in Johnson County; however, scattered parcels exist throughout the tri-county area (Johnson, Sheridan, and Campbell). Forests and woodlands provide wildlife habitat, recreational opportunities, air quality control, soil conservation, biodiversity, water quality control, and economic opportunities.

2.4.1.1 Regional Context

The regional context for Vegetation – Forests and Woodlands is described under regional context in the introduction to biological resources.

2.4.1.2 Resource Characterization

Indicators

Indicators for forest and woodland health are indicative to the forest resources across the landscape and are used, developed, and protected at a rate and manner to meet current environmental, economic, and social needs and to assure that they will meet the needs of future generations. These indicators are:

1. Ecosystem Health;
2. Diversity in Plant and Animal Populations and Habitat;
3. Soil and Water;
4. Carbon Storage;
5. Socioeconomic Benefits;
6. Legal, Institutional, and Economic Framework; and,
7. Productive Capacity (which is discussed under forest products).

Current Condition

Desired conditions and trends are the pathway for long-term sustainable planning. There is a need for forest-related monitoring, research, and assessments to support the indicators and track important issues. The inventory of the forest stands is a starting point to further define and develop indicators. There is no predetermined formula for calculating sustainable forest management. The BLM and the public will define the outcomes for sustainable forest management.

Forest and Woodland Communities

The forests and woodland communities are found on 689,463 acres in the planning area, of which 51,302 acres are BLM-administered surface and 117,845 acres are federal mineral estate. The dominant species are ponderosa pine, lodgepole pine (including early successional lodgepole pine), and Douglas fir. The majority of these forests have variations in stand composition, structure, and diversity. Other forest/woodland species include Engelmann spruce, blue spruce, subalpine fir, limber pine, cottonwood, aspen, and junipers. Based on the indicators listed above, the condition of the forest and woodlands varies across the planning area. The indicator of productive capacity and socioeconomic benefits of the forest and woodlands will be discussed in the forest products section of this document.

Ecosystem Health

Pest, Weather Events, Natural Disasters

Ecosystem health involves the major disturbances, which cause tree mortality within the context of active forest management and natural disasters. Tree mortality from pests, weather events, and fire constitute important and interrelated disturbances in the forests.

Forest/Woodlands within the planning area have experienced insect, diseases, and weather events that have prompted forest salvage operations. The desired outcome is to protect, maintain, and enhance the forest ecosystem.

Tree mortality and volume estimates are available from the USDA Forests Inventory and Analysis (FIA) program, along with aerial surveys flown by the State of Wyoming and USDA Forest Service Health Monitoring and Forest Health Protection. The aerial surveys detect clusters of recent dead and dying trees based on fading crowns. The BLM continues to inspect these areas on the ground, develop maps, plans of action, and implementation of salvage operations to remove mortality and infested trees, and to open areas for regeneration.

Invasive species

Invasive species have become a component of the forest/woodlands ecosystems. These species reduce the diversity and adversely affect the native populations through predation, competition, altered fire regimes, or destruction of habitat. Based on identification, location, and threat, natural resource agencies have partnered to take action to eradicate and control these organisms.

Some of these invasive organisms, such as blister rust on limber pine, do not have a limited distribution, and have the potential to destroy these woodlands.

Program development is ongoing and cooperative efforts between BLM and land managers to identify, locate, exclude, eradicate, and/or contain the introduction of these threats.

Wildfires

In the planning area, forest fuel conditions are also a contributor to the forests and woodlands ecosystem health. Wildfires are a natural part of Wyoming forests and woodlands. Passive management actions, in some of these ecosystems, have led to natural buildups of fuels, which increase the intensity of wildfires. The intensities of these fires, with these buildups, are not only biologically unacceptable, but socially unacceptable (especially in those areas that have homes and communities).

Stand replacement fires, for example, are a natural part of some forests, such as lodgepole pine forests. This is impractical for forests that have human development in or nearby.

The current fuel treatment program includes the identification of the forest and woodlands that are not resilient to wildfires and treatment of these fuel conditions to produce forest and woodlands that are resilient to wildfires. The management activities incorporate silvicultural treatments, such as group selection cuts in lodgepole pine to create diversity in species, age, and structure; this removes the continuation of fuel for a crown fire.

Fuel condition data are in the process of being mapped by the Landscape Fire and Resource Management Planning Tools Project and will provide information on a consistent manner, along with ground surveys. The Natural Fire Plan Operating and Reporting System tracks federally funded fuel reduction projects.

Composition, diversity, and structure of forest/woodlands within the context of active management and natural disturbances

The composition, diversity, and structure of vascular plants are important indicators of a healthy forest/woodland ecosystem. Vegetation is the source of primary production and a determinant of habitat for many species. Observed changes in the ecosystem could result from health problems, invasive species, and array of other circumstances and problems.

Currently, the planning area is rich in diversity, vegetation structure, and composition, though structure and density often times needs to be altered. Within these forests/woodlands, there exists a variety of plant species that define the composition, structure and diversity of these individual stands. For example, a ponderosa pine forest may have an understory vegetation that includes limber pine, juniper, and various native shrubs, grasses and forbs. Within these individual forest/woodland stands there are a variety of soils, slopes, aspects, and elevations that are conducive to growing particular plant species.

Changes in composition, structure, and diversity may be the result of land management activities (example is fuel reduction), health problems, or other events. Changes resulting from management activities and/or problems should be monitored. An example of this is the infestation of mountain pine beetles in a lodgepole pine forest. The tree mortality offers changes in composition (tree/plant species), structure (no longer a closed canopy allowing for new growth), and diversity (opens the forest floor to allow growth of new plants that prefer sunlight).

Maintaining, enhancing, and retention of the public forests land base are critical to providing diverse ecology and reducing land use change (i.e., development).

Soil and Water

Surface water from Wyoming's forests supplies 35 percent of Wyoming residents. The Wyoming BMPs are guidelines that are utilized by the BLM forestry program. These guidelines assure that the water and soils are protected in the planning and implementation of forest management operations.

Maintaining water quality for aquatic life and human use is important to the BLM and resource area.

These BMP guidelines also apply to road construction and maintenance. The implementation of the guidelines provide many benefits, as well as access, to property owners, public recreation, fire suppression, vegetation and wildlife management, and product transportation. While most current forest operations utilize existing roads when possible, the BLM partners with private landowners, companies, and state and federal agencies.

Carbon Storage

Many scientists, policy- makers, and others believe that climate change is resulting from increasing levels of greenhouse gases, in particular carbon dioxide. Though unfavorable and extreme weather for a few years is often confused with climate change, there are opportunities for healthy productive forest to mitigate carbon dioxide emissions.

Land satellite imagery produces models of change of carbon stores with remote sensing data for forest cover and forest canopy losses due to natural disturbances and forest activity. The models show the status of a forest/woodland as either a source, a sink, or as neutral. Disturbances by natural agents and processes, land use change, forest management, and the efficiency of the forest in producing wood and utilization are controlling factors that determine whether a forest is producing carbon emissions or acting as a sink for removing carbon. Ground truthing data should be included in this strategy.

Reports by the USFS serve as a measurement of this process.

Socioeconomic Benefits (a portion of this indicator will be discussed in forest products section)

Cultural and Social Needs

There are substantial gains to be made by implementing programs that educate and make the public aware of the forests. Unfortunately, much focus is placed on political issues involving the forests, with minimal attention given to the public's need for a more basic understanding. Communicating the role of the forest will allow people to treat it with respect and encourage their investment in their management.

Programs such as Public Lands Day, Trails Day, along with others outdoor activities and educational programs are catalyst for increasing informed citizens, workers, and others disciplines.

Recreation and tourism

Many people utilize forests as recreational areas and spend time with various forms of recreation such as mountain biking, camping, hiking, to name a few. The forests are managed for multiple uses and management techniques can compliment recreational activities. Many of BLM's recreational facilities are located in or near the forests.

Legal, Institutional, and Economic Framework (also discussed in Forest Products section)

This indicator is utilized to create forest policy and to enforce the forests laws, regulations, policies, and guidelines. It clarifies property rights, and a means for resolving disputes. It provides for a review of policies, laws and regulations and opportunities for public participation. It also is utilizes scientific information to assess consequences and to integrate environmental policy with forest policy.

Trends

Forest and Woodland Communities

The conditions of the forest/woodlands are variable across the resource area. There are concerns with ecosystem health and area of dead trees resulting from mountain pine beetles, rust, mistletoe, weather events such as wind and ice, and wild fire. Invasive plant species, while not a threat to the tree species(other invasive organisms such as rust are), are changing the plant structure, composition, and diversity within forest and woodland stands.

Fuel buildup, especially in dense stands of lodgepole, are creating wildfire conditions that are unacceptable to the communities surrounding the forest and woodlands. There is an expansion of communities in and around forest and woodland areas and management is required to make these stands more resilient to wildfire.

The composition, plant diversity and structure of many forest/woodlands is being challenged by various agents. For example the aspen communities throughout the interior appear to be declining (Brown 1995, Bartos and Campbell 1998, and Rogers 2002).There is approximately 70 percent mortality in limber pine stands as a result of blister rust. Mountain pine beetles have caused areas of mortality in lodgepole and ponderosa pines. These are a few of the agents that the forest/ and woodlands are currently challenged with.

There is age class diversity, species diversity, and healthy riparian areas within the planning area. Portions of the forest have been managed and are healthy and productive.

Forecasts

Forest will be managed on a sustainable basis and relevant information will be compiled and updated to make sound forest/woodland management decisions. Information needed to measure the indicators will be collected and analyzed.

Forest management practices will be performed on a regular basis to promote healthy forest/woodland ecosystems. The fuel buildup will increase as more wildland fires are suppressed and the buildup of communities in and around the forest/woodland areas will continue. The cyclic stages of pests will continue to be a problem and create tree mortality which will precipitate silvicultural practices.

Forest/woodland diversity (species, age class, structure, density) will be emphasized as a method of management for protection and creation of healthy ecosystems.

Key Features

The forests management areas in the Big Horn Mountains will be the focus of silvicultural practices. The areas included are: Graves Corral, Bear Trap Meadow, Eagle's Trap, Billy Creek, Gold Mine, Billy Creek, and the Horn.

2.4.2 Vegetation – Grassland and Shrubland Communities

Grasslands and shrublands are the most productive grazing land in the planning area. Typically, sod-forming grasslands east of the continental divide historically were subjected to heavy grazing pressure from bison and other native ungulates. Grasslands represent the majority of topographical positions, from the open plains to the foothills, to dry mountain slopes. Grasslands in the plains are dominated by cool-season grasses, sedges, and shrubs, mainly sagebrush. The warmest and driest grasslands also may have warm season species with few shrubs. Sagebrush is the most dominant shrubland type and sagebrush communities are dominated by Wyoming big sage, mountain big sage, mountain mahogany, and greasewood. Wyoming big sage tends to grow within the mid- to low-elevations on the drier sites, while mountain big sage occurs in upper elevations under moister conditions. Vegetation supports clean water, soil health, fish and wildlife habitat, livestock forage, recreation, carbon sequestration, and scenery.

2.4.2.1 Regional Context

The regional context for "Vegetation - Grassland and Shrubland Communities" is described under regional context in the introduction to biological resources.

2.4.2.2 Resource Characterization

Indicators

Characteristics of the vegetation that produce common indicators of vegetation health include cover, composition, bare ground and litter, structural diversity, species' diversity, and the presence and density of invasive plant species. These indicators are associated with ecological sites and with Standards 1, 3, and 4 of the Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for Public Lands Administered by the BLM in the State of Wyoming (BLM 1998).

The presence of invasive plant species may indicate a disturbance to the native vegetation community. Denser populations of invasive species are generally associated with soil disturbing activities, extended overgrazing, wildfire, or other major events.

Current Condition

Grasslands and shrubland communities account for approximately 6,365,455 acres of the planning area, of which 718,897 acres are BLM-administered surface and 4,584,928 acres are federal mineral estate. Most grassland and shrubland communities in the planning area have been influenced by livestock grazing, fire or fire suppression, and surface-disturbing activities. See the "Livestock Grazing," "Fire and Fuels Management," and "Vegetation – Invasive Species

and Pest Management" sections of this document for additional information. The following sections describe the grassland and shrubland vegetation communities found within the planning area.

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 vegetative communities. Many of the species prefer moist environments associated with riparian systems and wet meadows. Since riparian type systems comprise only two percent of the land cover type in the planning area, these areas become vitally important for their species richness. Some species prefer higher altitude, alpine riparian, others prefer more lower riparian systems associated with open grassland, and all zones in-between. Species prefer soil gradients from deep, organic rich soils to shallow gravelly sites. Some can only be found on the edges of snowlines, the forest understory, in drying mud of ponds, others in dry sandy prairie, and others prefer disturbed sites. Due in large part to their rarity, precise information regarding the location and number of population so special status plant species in the planning area, the percent of populations occurring in public lands, the number of individual plants in each population, and the condition of each population on the public land in the planning area, is not available. See Table 2-34 for more specific information.

Short-grass Prairie

This vegetation type represents very sparse, sparse, and thin dry herbaceous rangeland types, as defined by the WGFD. Short-grass prairie occurs on drought-prone, mildly alkaline, medium and fine-textured soils. Few shrubs grow consistently in short-grass prairie because the soils are too dry and compacted to support them. Precipitation is an important determinant of the composition of plant species in grasslands. Within the planning area, short grass prairie habitats are most common in the south, occurring as the dominant plant community from the southern foothills of the Bighorn Mountains to the eastern BFO boundary. The two dominant vegetation species are blue grama and buffalo grass. Other plant species common to the short-grass prairie include western wheatgrass, sand dropseed, needle-and-thread, scarlet globemallow, and four-wing saltbush.

Mixed-grass Prairie

This vegetation type is a combination of low, medium, and high herbaceous rangeland types, as defined by WGFD. Mixed-grass prairie can be divided into several types and is characterized by several common species including needle-and-thread, western wheatgrass, blue grama, prickly pear cactus, and scarlet globemallow. Wyoming big sagebrush is a common shrub of this grass community in the Powder River Basin (Knight 1994). Within the planning area, mixed-grass prairie habitats are most common along the eastern foothills of the Bighorn Mountains and sporadically occur throughout much of the northern and central portions of the planning area.

Sagebrush Shrubland

This vegetation type includes a combination of sparse, moderately dense, and dense big sagebrush crown closure with a variety of understory grasses and forbs. The sagebrush shrubland is widely distributed and occupies a large proportion of the planning area. Generally speaking, Wyoming big sagebrush communities are found below 6,000 feet and mountain big sagebrush communities above 7,000 feet. However, between 6,000 and 7,000 feet the two plants often are found growing together and are difficult to discern. Black sagebrush is generally found at mid elevations, between 5,000 and 7,000 feet on shallow to very shallow rocky soils, in areas with 10 to 14 inches of precipitation. Black sagebrush grows in association with both Wyoming and mountain big sagebrush. Basin big sagebrush is generally restricted to moderately deep to deep soils in drainage bottoms and stream terraces. Basin big sagebrush communities do not make up much area and for the most part are components of other shrub communities. Silver sagebrush is usually found at lower elevations on sandy textured soils. It is more abundant in the southern part of the public lands and is the principal shrub on sand dunes.

Wyoming Big Sagebrush/Grassland

Wyoming big sagebrush is usually found on drier sites while mountain big sagebrush is found on deeper soils and places that receive 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 20 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 junegrass, threadleaf sedge, and bottlebrush squirrel tail. 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 antelope and greater sage-grouse. Many of the Wyoming big sagebrush communities consist of even aged stands of mature and often decadent plants. This presents a problem on winter ranges due to the poorer forage quality of the plants and lack of recruitment of younger plants.

Mountain Big Sagebrush/Grassland

Mountain big sagebrush accounts for approximately 801 acres of BLM-administered surface and 0 acres of mineral estate within the planning area. Mountain big sagebrush is located on shallow to deep soils at elevations above 7,000 feet. In areas where it grows in conjunction with Wyoming big sagebrush it 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 will vary from 10 to 30 inches, with canopy cover reaching 20 to 40 percent.

Other shrubs that can be found in mountain big sagebrush communities are antelope bitterbrush, serviceberry, three tip sagebrush, and snowberry. Grasses that are present include Idaho fescue, king spike fescue, green needlegrass, Colombia needle grass, mutton bluegrass, big bluegrass, western wheatgrass, and basin wildrye. Common forbs found in these areas include Indian paintbrush, lupine, larkspur, groundsel and violets.

Mountain big sagebrush is palatable to wildlife, although browsing is limited during the winter, when these habitats become unavailable due to snow. 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 do other sagebrush types, often resuming dense canopy cover after only 20 to 30 years.

Other Shrubland

This vegetation type is composed of three distinct shrub-dominated vegetation communities: mountain and greasewood shrubland. Mountain mahogany shrubland community is the largest component of the other shrubland vegetation type and has two species-dominated sub-classes. The first community occurs primarily in the foothills of the Bighorn Mountains in southwestern Johnson County and is dominated by curl-leaf mountain mahogany. The second community, occurring in the southern portion of the planning area, is dominated by true mountain mahogany. The two mountain-mahogany shrubland communities occur on poorly developed soils derived from sandstone, limestone, and shale (Knight 1994). Plant species found in the undergrowth of this community include fringed sage, sulfurflower buckwheat, bluebunch wheatgrass, and junegrass.

Greasewood

Greasewood-dominated shrublands occur primarily on lowland positions adjacent to streams, playas, 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 than most of the local shrub species. 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, Hoods phlox, and pepperweed. Although greasewood is not considered to be very palatable to livestock or big game animals, pronghorn antelope, and sheep will eat the spiny twigs and leaves in the spring and early summer, and cattle use this species in summer and fall as a source of salt. Greasewood contains soluble oxalates that can be poisonous to both sheep and cattle. Greasewood does provide food and cover for small animals and birds.

Mesic Upland Shrub Steppe

Chokecherry is the primary shrub in this community. It often grows in conjunction with snowberry, currant, Wood rose, and serviceberry. This community type is usually found at lower 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 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 and serviceberry may grow to 15 feet high. Herbaceous understory vegetation includes basin wildrye, green needlegrass, Columbia needlegrass, bluebell, columbine, aster, yarrow, and violet.

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 stay within reach. These shrubs will 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- Mountain Mahogany

Mountain mahogany is found in the southern portions of the BFO along the southern slopes of the Big Horn Mountains. The species grows on dry sites, usually rocky slopes and ridges with very 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, locoweed, and milkvetch. Cheatgrass is a major 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 amount of browsing and soil depth. Fire generally lessens the density of the shrub stands, allowing grasses and other herbaceous plants to increase, while still providing wildlife browse. If cheatgrass is present fire can lead to the increase of this species. Mountain mahogany is an important fall and winter forage for deer and elk. It is also utilized by livestock. Mountain mahogany communities usually provide crucial winter range for mule deer. Many of these communities consist of mature and often decadent plants with little recruitment of young plants.

Resource Condition

The condition of the grassland and shrublands within the planning area was evaluated utilizing the ecological site inventory. An ecological site is defined as "a distinctive kind of land with specific characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation". Any land inventory, analysis, and resulting management decisions require the knowledge of these individual sites and their interrelationships to one another on the landscape. The ecological site description will contain information about the individual ecological sites.

The data comprising an ecological site description is presented in four major categories:

- Site Characteristics – Identifies the site and describes the physiographic, climate, soil, and water features associated with the site.
- Plant Communities – Describes the ecological dynamics and the common plant communities comprising the various vegetation states of the site. The disturbances that cause a shift from one state to another are also described.
- Site Interpretations – Interpretive information pertinent to the use and management of the site and its related resources.
- Supporting Information – Provides information on sources of information and data utilized in developing the site description and the relationship of the site to other ecological sites.

Since December 1982, the ecological site inventory has been the BLM's standard vegetation inventory technique. Ecological site inventory involves the use of soils information to map ecological sites and plant communities; in addition, natural resource and vegetation attributes are measured. Natural resource inventories are mandated by Congress in Section 201(a) of the Federal Land Policy and Management Act (FLPMA) of 1976 (BLM 2001b). Congress reaffirmed this mandate in Section 4 of the Public Rangelands Improvement Act (PRIA) of 1978—in particular, to develop and maintain an inventory of range condition and trends on public rangelands, and to keep that inventory updated on a regular basis. Ecological site inventory is intended to satisfy that mandate.

In the planning area less than 25 percent of rangeland acres have been inventoried using ecological site inventory. This methodology compares the weight of the plant species presently occupying a range site against the weight of the plant species that would be occupying the same site if it was at climax or Potential Natural Community (PNC). The amount of similarity or difference between the present-day species and weights with those that would be present on the same site if it was at climax or PNC is used to assign a condition or seral state. If the present-day similarity/difference is between 0 and 25 percent of climax/PNC the range site is considered to be in poor condition or in an early successional state; 26 and 50 percent = fair condition or mid-seral state; 51 – 75 percent = good condition or late seral state; and 76 – 100 percent = excellent condition or climax/PNC. Only about 100,000 public rangeland acres have been evaluated, and the majority of rangelands have been determined to be in the "late seral' condition class, averaging at 72 percent.

Wyoming has more sagebrush than any other state. Sagebrush-associated vegetation types can provide habitat for approximately 87 species of mammals, 297 species of birds and 63 species of fish, reptiles and amphibians (Wyoming Interagency Vegetation Committee 2002). Many of Wyoming species of greatest conservation need depend upon healthy sagebrush communities during some part or all of their lives.

Over time, sagebrush communities have turned into monotypic stands of late successional stage plants that are typically greater than 50 years old (Wyoming Interagency Vegetation Committee 2002). This has resulted in reduced plant species quantity and diversity. The 2003 Strategic Habitat Annual Report (WGFD 2004) reported that many big sagebrush communities were in advanced seral stages and characterized by a poor understory, plant diversity, and cover. There has been a downward trend in big sagebrush production since 1993. The loss of big sagebrush and loss of diversity and vigor in Wyoming's big sagebrush systems has adversely affected sagebrush-obligate species and other species associated with these ecosystems (Paige and Ritter 1999). Now that many of these sagebrush communities are predominantly old and descendent, they lack the vigorous younger plants that keep them viable and productive for sagebrush-dependent wildlife. Also, as sagebrush plants become denser, they can dominate the site and become very competitive for water and nutrients. Site domination reduces the forb and grass diversity necessary for a healthy sagebrush community and reduced forb and grass availability decreases the amount of essential food and cover available for wildlife species.

Wyoming is arguably the energy capital of the United States and mineral development occurs throughout the sagebrush ecosystems in northeastern Wyoming and involves the extraction of gas, oil, coal, uranium, bentonite, and other minerals. Extraction of these minerals results in direct removal of sagebrush and grasslands, and habitat fragmentation is caused by mine excavation, roads, drill pads, fences, powerlines, pipelines and other mining activities. These

activities directly and indirectly reduce the food, cover, and special habitat requirements available for native species (WGFD 2005).

Condition of other shrublands, namely mountain-mahogany shrublands and greasewood shrublands, are predicted to remain at present levels. The primary driving force for change would be the occurrence of wildfires which would reduce acreages of mountain mahogany and increase acreages of greasewood.

Trends

It is estimated that the trend for grasslands/shrubland will remain about the same. Some areas, especially those subject to CBNG development, will likely experience a slight downward trend in vegetative health due to the number of associated impacts. In other areas, the health trend will be upward due to grazing lessees opting for reduced livestock numbers, conservation use, deferred rotation for a portion of the ranch, set aside for wildlife habitat, and the trend toward hobby ranches where the main source of income is not from agricultural production.

Impacts of drought on grassland/shrubland vary widely. Primary impacts of the extended drought are reduced vegetative production, reduction of cover canopy, heights of grasses, production of palatable herbage, and reduced livestock performance and wildlife physical condition. Drought is also thought to give a growing advantage to cheatgrass, since even low amounts of snowfall are adequate to provide moisture to initiate growth up through seedset. Other vegetation relies on spring/summer rains to initiate growth and completion of their life-cycle, those rains may or may not come.

Forecasts

Agents that will drive future conditions on both grasslands and shrublands, primarily sage brush areas, include: the continuation of CBNG development, including the number of acres of soil/vegetation disturbance; increasing number of impoundments which often are located in the highest producing vegetative areas (draw bottoms) and provide a premium medium for noxious and invasive plants; introduction of nonnative species used in reclamation practices which may outcompete the natives; disturbance of grazing systems during site development and reclamation projects; CBNG water disposal land applications; occurrence or lack of wildfires; and possible futuristic development of wind and solar energy. Additional factors that may bring change include global warming and carbon sequestration.

Key Features

Key features include those shrublands currently in greater sage-grouse focus areas; potential habitat for Sensitive, Threatened, or Endangered Species, including black-tail prairie dog colonies; and wildlife habitats containing mountain mahogany.

2.4.3 Vegetation – Riparian/Wetland Resources

Wetlands and riparian areas occur throughout the BFO and are typically restricted to the lands immediately surrounding major and minor rivers, streams, creeks, draws, topographical depressions, lakes, and ponds. Many plant and wildlife species are found in no other habitat types (for example, certain plant and bird species, amphibians and turtles), while other wildlife species such as shorebirds, waterfowl, and weasels frequent these habitat types. These small, but important, ecosystems serve as a biological oasis and represent a vegetation structure, soil, and hydrology that is unique relative to the vast expanses of sagebrush and prairie grass that dominate the landscape of the region. They are some of the most productive resources found on public and private lands. They comprise less than two percent of the land mass in the State of Wyoming, yet are prized for their fish and wildlife habitat, water supply, cultural, and historic and recreational values as well as for their economic values which stem from use in livestock production, forest management, and mineral extraction. For management purposes, the BLM separates riparian-wetland areas into those associated with flowing water (lotic) or those associated with non-flowing water (lentic).

Riparian areas are ecosystems whose soils and soil moisture are influenced by the adjacent river, stream, or creek and are unique because of their linear form. Riparian areas are often called riparian corridors or riparian zones because of the linear form that is related to the dependency of the ecosystem's structure and junctions on nearby water. Riparian ecosystems usually occur as an ecotone between aquatic and upland ecosystems but have distinct vegetation and soil characteristics. Aridity, topographic relief, and presence of depositional soils most strongly influence the extent of high water tables and associated riparian ecosystems. Riparian ecosystems are uniquely characterized by the combination of high species diversity, high species densities, and high productivity. Continuous interactions occur between riparian, aquatic, and upland terrestrial ecosystems through exchanges of energy, nutrients, and species.

Similar to riparian ecosystems, hydrology determines the structure and functions of wetlands. Wetlands are, like riparian ecosystems, transitions between terrestrial and aquatic ecosystems and contain elements and life forms of both ecosystems. Several important features that include soil and water conditions and vegetation type distinguish wetlands from all other ecosystems. The scientific definition of a wetland that was developed and is used by the USFWS (Cowardin et al. 1979) is as follows: Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. Wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes, (2) the substrate is predominantly undrained hydric soil, and (3) the substrate is nonsolid is saturated with water or covered by shallow water at some time during the growing season of each year.

Healthy riparian-wetland areas support stable banks; floodplain maintenance; clean and stable water supplies; aquifer recharge; flood energy dissipation and moderation; fish and wildlife habitat; livestock and wildlife forage; opportunities for recreation; carbon sequestration; and scenery.

Many local individuals/entities depend on the products and services supported by riparian-wetland areas found on BLM-administered land for a portion of their livelihood. Recreation and agriculture are the number two and three economic sectors respectively in Wyoming (the energy industry is number one). Other local residents utilize the public land and its resources (including riparian-wetland vegetation) to enhance the quality of their lives, i.e., recreation (e.g., hunting, fishing, boating, hiking, birding, and sight-seeing), sources of water.

2.4.3.1 Regional Context

The regional context for "Vegetation – Riparian/Wetland Resources" is described under regional context in the introduction to biological resources.

2.4.3.2 Resource Characterization

Indicators

The BLM uses a qualitative method for assessing the condition of riparian-wetland areas called PFC and refers to both the assessment process and the on-the-ground condition of a riparian-wetland area. The assessment process consists of an approach that considers the hydrology, vegetation, and erosion/deposition attributes of riparian-wetland areas. The on-the-ground condition termed PFC refers to how well the physical processes that have been assessed are functioning. PFC is a state of resiliency that will allow a riparian-wetland area to hold together during high-flow events with a high degree of reliability. This resiliency allows an area to then produce desired values, such as fish habitat, neotropical bird habitat, or forage, over time. Riparian-wetland areas that are not functioning properly cannot sustain these values.

A riparian-wetland area is considered to be in PFC when adequate vegetation and landforms are present to:

- Dissipate stream energy associated with high water flow, thereby reducing erosion and improving water quality
- Filter sediment, capture bedload, and aid floodplain development
- Improve flood-water retention and ground-water recharge
- Develop root masses that stabilize stream banks against cutting action

- Develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses
- Support greater biodiversity

For areas that are not functioning properly, changes have to be made that allow them to recover (e.g., acquire adequate vegetation). A change such as acquiring vegetation leads to other physical changes, which allows the system to begin to function. If a riparian-wetland area is not in PFC, it is placed into one of three other categories:

- Functional – At Risk – Riparian-wetland areas that are in functional condition, but an existing soil, water, or vegetation attribute makes them susceptible to degradation
- Nonfunctional – Riparian-wetland areas that clearly are not providing adequate vegetation or landforms to dissipate stream energy associated with high flows, and thus are not reducing erosion, improving water quality, etc.
- Unknown – Riparian-wetland areas that managers lack sufficient information on to make any form of determination

Current Condition

The four types of riparian ecosystems, including wetlands, which have been identified in planning area are: forested riparian, willow and west site shrub riparian, moist grass/sedge/ rush/riparian, and wet meadow. Approximately 88 percent of the riparian areas and wetlands within the planning area are located on private lands. The proportion of riparian areas in the planning area that are located on public lands managed by the BLM is 2.5 percent for forested riparian, 1.3 percent for shrubby riparian, 3.6 percent for herbaceous riparian, and 0.5 percent for wet meadow. Table 2-27 presents the acreages for different types of wetland/riparian habitats found in the planning area.

Table 2-27. Watersheds and Associated Habitat Types within the Planning Area

Watershed	Habitat Type (acres) Managed by BLM			
	Forest Dominated Riparian	Willow and Wet Site Shrub Riparian	Moist Grass/Sedge/Rush Riparian	Wet Meadow
Upper Tongue	3,172	32,931	67	75,985
Little Bighorn	601	10,607	0	5,450
North Fork	1,628	0	0	1,864
Dry Fork Cheyenne	1,518	771	5,198	0
Total	6919	44,309	5,265	83,299

Source: BLM 2003a

Forest Dominated Riparian

In the planning area, forest dominated riparian areas are usually characterized by cottonwood species, but can also be aspen, box elder, or a variety of conifer species. Deciduous tree species generally dominate at lower elevations in the planning area, whereas conifers and aspen dominate the higher elevations. Trees must occupy more than 25 percent of the vegetative cover within the riparian zone to be considered forest dominated riparian.

Willow and Wet Site Shrub Riparian

These riparian areas are characterized by areas where shrubs comprise more than 25 percent of the vegetative cover and where trees occupy less than 25 percent of the total vegetative cover. Shrubs often include willow species, sagebrush species, and/or greasewood. Other shrubs (e.g., hawthorn, wild plum, birch, alder, tamarisk, and shrubby cinquefoil) may be present or dominant. Includes alpine riparian zones dominated by *willow* species or other shrubs.

Moist Grass/Sedge/Rush Riparian

This vegetation type consists of a variety of riparian moist grasses, sedges, and rushes, as defined by WGFD. The herbaceous riparian vegetation type occurs near drainages including rivers, streams, and creeks.

Wet Meadow

This vegetation type is a combination of green and very green herbaceous rangeland types, as defined by WGFD. Wet meadow is a grassland community that typically occurs on fine-textured soils in valley of the growing season. In addition, this community commonly occurs where springs emerge, along reservoirs, and in irrigated pastures (Knight 1994).

Ecosystem Types

A lotic ecosystem has flowing waters. Examples include creeks, streams, runs, rivers, springs and channels. A lentic ecosystem has still waters. Examples include ponds, basin marshes, ditches, reservoirs, seeps, lakes, and pools. Table 2-28 presents the results of the wetland inventories that have been conducted in the planning area.

Table 2-28. Wetland Inventory Data, 2007

	Lentic Wetlands (acres)	Lotic Wetlands (miles)
Wetlands Evaluated	533	110
Proper Functioning Condition	24	74
Functioning-at-Risk Upward Trend	0	7
Functioning-at-Risk Downward Trend	0	2
Functioning-at-Risk No-apparent Trend	22	17
Non-Functioning	103	11
Unknown	384	0

Source: BLM 2007

Trends

The riparian/wetland areas in the planning area are anticipated to increase in acreage as long as impoundments are the primary source of dealing with CBNG water disposal. As the number of impoundments and the use of natural drainages for CBNG water transportation and disposal increase, the acreage of lentic and lotic systems also will increase.

Forecasts

When CBNG development reaches its peak, lentic/lotic systems in the planning areas will also reach their peak acreages. Once all the permitted wells are developed and the excess water disposed of, these CBNG-created 'wet' systems will decline. When impoundments are no longer needed for excess water holding/disposal, the vast majority of these structures will be reclaimed and the riparian/wetlands systems created by these temporary structures will disappear.

Key Features

All riparian areas are considered key features and will be managed according to each system's values.

2.4.4 Invasive Species and Pest Management

Invasive plant species are plants that disrupt or have the potential to disrupt or alter the natural ecosystem function, composition, or diversity of the site it occupies. These species can complicate the use of local natural resources and may interfere with management objectives for the site. Noxious weeds are native or nonnative plants that are unwanted in a particular area at a particular time, as designated by the state of Wyoming or declared by Weed Control Districts. Although noxious weeds are almost always nonnative, a distinction is made in this document because they can and do include undesirable native plants. With the exception of vascular plants classified as invasive plant species, a pest can be any biological life form that poses a threat to human or ecological health and welfare.

2.4.4.1 Regional Context

The regional context for "Invasive Species and Pest Management" is described under regional context in the introduction to biological resources.

2.4.4.2 Resource Characterization

Indicators

Invasive species are everywhere and can cause damage to crops, affect entire industries, and harm the environment and public health. For centuries people have moved plants, animals, and microbes around the world. Most countries now rely on plants and animals from other regions of the world in order to meet their dietary needs. Organisms that have been moved from their native habitat to a new location (often in a different country) are typically referred to as "nonnative." A small percentage cause serious problems in their new environments and are collectively known as "invasive species."

On the public lands, the degree of impact from an invader species depends on the type of invader- plant, insect, parasite etc., the specific specie(s), the growth characteristics of that specie(s), density, size of infestation, the land cover type being invaded, the resources threatened, and the potential economic impacts to the resources and the cost of control or eradication of the invader.

Any vegetative community is susceptible to a noxious weed invader(s), but sites that are especially vulnerable include areas where soils have been disturbed and the native plant community has been displaced or destroyed. Road corridors are also vulnerable since vehicles are known vectors for transporting seeds from other locations. Riparian corridors also provide the perfect growing medium including nutrient rich soils, ample moisture, and remote locations. Other areas that can easily be invaded include areas of over grazing, recreational sites, active mining, mineral development, and areas that have experienced wildfires.

Current Condition

In the planning area, invasive plant species infestations begin as small patches in disturbed areas such as pipeline and utility corridors, roads, oil and gas locations, undeveloped vehicle trails, range improvement projects, and mining operations. Other means of invasive plant species establishment come from plant and seed transport with purchased forage and hay for winter livestock feeding. Invasive plant species seeds are unknowingly transported to these areas where they can out compete native vegetation. Although the county weed districts and other BLM permitted entities are controlling a majority of the invasive plant species, invasive control objectives are not being fully met due to the scale of infestations and lack of appropriate resources.

In addition to invasive plant species, invasive insects (called pests) also exist in the planning area. Table 2-29 lists the state of Wyoming's designated invasive plant species and pests. Additionally, Table 2-30 lists invasive plant species and pests that are declared on the Johnson, Campbell, and Sheridan County designated lists.

Table 2-29. Wyoming Weed and Pest Control Act Designated List

Weeds			
Canada thistle	Field bindweed	Perennial sowthistle	Scotch thistle
Common burdock	Hoary cress (whitetop)	Plumeless thistle	Skeletonleaf bursage
Common St. Johnswort	Houndstongue	Purple loosestrife	Spotted knapweed
Common Tansy	Leafy spurge	Quackgrass	Yellow toadflax
Dalmatian toadflax	Musk thistle	Russian knapweed	
Diffuse knapweed	Ox-eye daisy	Russian olive	
Dyers woad	Perennial pepperweed (giant whitetop)	Saltcedar	
Pests			
Beet leafhopper	Grasshopper	Mountain pine beetle	
Black-Tailed Prairie Dog	Mormon Cricket	Wyoming Ground Squirrel	

Source: Wyoming Department of Agriculture 2008

Table 2-30. Declared List of Weeds and Pests by County in the Planning Area for 2008

Campbell County	
No declared weeds or pests.	
Johnson County	
Buffalobur	Puncturevine
Common cocklebur	Tall larkspur
Common mullein	Wild licorice
Mosquito	
Sheridan County	
Alfalfa weevil	Plains prickly pear
Buffalobur	Plains pocket gopher
Common cocklebur	Puncturevine
Common mullein	Showy milkweed
Curly dock	Wild licorice
Mosquito	

Source: Wyoming Weed and Pest Council 2008

Invasive Plant Species Control

A complete invasive plant inventory has never been completed in the planning area. In some areas, efforts have gained substantial control and reduced the spread of certain species. Other species, especially diffuse and Russian knapweed, white top, Russian olive, and salt cedar, have

continued to expand their populations and the number of infested acres is increasing. In addition, new weed species such as Dalmatian toadflax and black henbane are beginning to appear in multiple locations of the planning area.

The BFO controls invasive plant species on public lands through cooperative agreements with the Johnson, Sheridan, and Campbell County Weed and Pest Control Districts, and with commercial applicators. In addition to the county weed and pest districts, the BFO works in cooperation with other federal and state agencies, private landowners, and energy production companies. The BFO also addresses invasive plant management by incorporating prevention and control measures in realty, wildlife, range, recreation, oil and gas, and other mineral related actions. Generally speaking, the county weed districts, as well as BLM's resource users through pesticide use proposals, have not been able to meet all the control needs of BLM.

The primary species being targeted on public lands include leafy spurge, salt cedar, Russian knapweed, spotted knapweed, diffuse knapweed, scotch thistle, Canada thistle, hounds tongue, Russian olive, halogeton, black henbane, dalmation toadflax, and hoary cress (whitetop). Some species, including cheatgrass, plains pricklypear, and Canada thistle have become so ubiquitous throughout the planning area that it is considered economically unfeasible to attempt to control them, and they are considered part of the vegetative landscape, despite their adverse impacts on other vegetation. Canada thistle, though common throughout the planning area, is not treated on a plant-by-plant basis, but is treated when plant populations reach densities where it is a the majority species, when it is found in the bottom of dry reservoirs, in recreational sites, and along established roads and undeveloped vehicle trails. All primary invasive plant species continue to colonize new areas. Invasive plants are typically found in sagebrush/grassland, mixed grassland, and riparian/wetland community types. It is unlikely that most of these invasive plant species will ever be eradicated. The present goal is to contain and reduce densities of invasive species populations to levels that are considered manageable. The tolerance level is dependent on the species, location, and resources at risk. Table 2-31 presents that invasive plant species that are being treated annually in the planning area.

Table 2-31. Treatment of Invasive Plant Species in the Planning Area

Species Being Treated	Acres of Treatment per year
Leafy spurge	212
Diffuse knapweed	27
Scotch thistle	32
Halogeton	38
Salt cedar	62
Canada thistle	43
Houndstongue	21
Common mullein	19

Source: BLM 2005-2008

Pest Control

In February 2003, USDA Animal and Plant Health Inspection Service (APHIS) and the BLM signed a memorandum of understanding (MOU) detailing cooperative efforts between the two entities on suppression of grasshoppers and Mormon crickets on BLM lands (Document #03-8100-0870-MU, February 27, 2003). This MOU clarifies that APHIS will prepare and issue to the public site-specific environmental documents that evaluate potential impacts associated with proposed measures to suppress economically damaging grasshopper and Mormon cricket populations. The MOU also states that these documents will be prepared under the APHIS NEPA implementing procedures with cooperation and input from the BLM. The MOU further states that the responsible BLM official will request in writing the inclusion of appropriate lands in the APHIS suppression project when treatment on BLM land is necessary. The BLM must also approve a Pesticide Use Proposal (Form FS-2100-2) for APHIS to treat infestations. According to the provisions of the MOU, APHIS can begin treatments after appropriate decision document is issued and BLM approves the Pesticide Use Proposal.

The preferred method for treating grasshoppers and Mormon crickets is by Reduced Agent Area Treatments (RAATs). RAATs are a grasshopper suppression method in which the rate of insecticide is reduced from conventional levels, and treated swaths are alternated with swaths that are not directly treated. The RAATs strategy relies on the effects of an insecticide to suppress grasshoppers within treated swaths while conserving grasshopper predators and parasites in swaths not directly treated. Grasshopper and Mormon cricket treatments occur on a 7-10 year cycle and occur for one to three years concurrently in the planning area.

With the recent emergence of West Nile virus, the BLM has overseen the control of mosquitoes in the planning area. Many of the pits and ponds associated with the development of CBNG in northeastern Wyoming now provide breeding habitat for the mosquito that carries West Nile Virus. These pits, that number in the thousands, were created to hold CBNG-produced waters and have provided mosquitoes with breeding grounds. Greater sage-grouse are attracted to these wet areas for their forbs and insects, and as a result are exposed to greater numbers of mosquitoes that are potential vectors for the virus. Current evidence demonstrates that greater sage-grouse have little biological resistance to the virus and the effects are usually fatal. Because mosquitoes are the primary vector of West Nile Virus in the United States, the only effective way to control the spread of West Nile Virus is to control mosquito populations. One of the oldest mosquito control products is Bacillus thuringiensis (commonly called BTi), which is a bacterium that is deadly to larval mosquitoes but essentially non-toxic to other creatures. BTi briquettes, or "mosquito dunks," are simply tossed onto the surface of the water in the correct quantity for the surface area being treated, during the several days before or after mosquito eggs start hatching.

Trends

Observations indicate that invasive plant species are rapidly spreading and increasing in density in the planning area, especially in the CBNG development areas, the interstate corridors, and some watersheds.

Two nonnative annual grasses, cheatgrass and Japanese bromes, have populations that have steadily increased, invaded every type of plant community, and received minimal control treatments. These annual bromes, particularly cheatgrass, are invading grassland, sagebrush grassland, mixed grass prairie, and mountain shrub community types. These plant species are very competitive with native plants for soil nutrients and available water. Using currently approved available herbicides, funding availability, and methodologies; it is not economically feasible to initiate large scale control efforts on nonnative annual bromes at this time.

Historically, the highest populations of grasshoppers and Mormon crickets are found south of Kaycee, Wyoming from Salt Creek west to the Hole-In-the-Wall. Grasshopper populations have also been at levels capable of forage destruction northeast of Buffalo, Wyoming between Clear Creek and Crazy Woman Creek.

Forecasts

Invasive plant species are expected to continue to spread. The degree to which these species spread is directly correlated to human activities and control efforts in the area. Areas surrounding the planning area, particularly in Montana, are heavily infested. Some of these species, such as leafy spurge and spotted knapweed, are very invasive and are readily transported to non-infested areas. Although natural elements, such as wind and wildlife, could contribute to weed proliferation, range animals (livestock and horses), vehicular travel, and surface-disturbing activities also increase the opportunities for invasive plant species to spread and become established.

The potential for invasive plant species expansion is very high in areas of CBNG development. Without adequate control efforts it is estimated and projected that invasive plant species will infest thousands of acres of rangeland within twenty years. This infestation will contribute to the loss of rangeland productivity due to competition for water and nutrients, increased soil erosion, reduced water quantity and quality, reduced structural and species diversity, and loss of wildlife habitat. They also will continue to serve as fuel and post fire invaders, interfere with recreational opportunities, and be hazardous to human health and welfare. This will result in economic and public safety impacts and degradation to rangelands and riparian areas. It is impossible to predict future introductions of other listed invasive species. Historical evidence would indicate that new invasive species will be introduced in the planning area and become established if not eradicated immediately. Future land applications and management practices will need to be analyzed for their potential to promote or reduce populations of invasive

species, including annual bromes, with special consideration given to the current greater sage-grouse designated focus areas. Future management should include the development of an Integrated Weed Management Plan and the establishment of Weed Management Areas in accordance with BLM's "Partners Against Weeds", to provide a strategy tool for the prevention and control of existing and new species and infestations. The best tool for controlling pests is prevention. An Integrated Pest Management approach, which is decision-making process using site-specific information to make decisions about treatment choices, should be incorporated into the planning process. These choices include, but are not limited to, chemical formulation application, physical applications such as mowing, cutting, pulling etc., and biological controls such as natural pathogens. Implementation of plans and projects must be evaluated for their potential to promote or hinder pest management and appropriate actions taken. It is anticipated that control efforts will continue for years to come. Target species and locations of treatments will change but control efforts will continue. Surrounding states and counties have species that will eventually find their way into the planning area as other species that have a historical presence will slowly fade as control efforts gain over population levels.

Control of cheatgrass will be dependent on the cost and feasibility of available treatment methods. Resource management strategies, control of wildfires, reduction of wildfire fuels, construction of fuel breaks, minimizing surface disturbance, and surface-disturbing activities will all contribute to maintaining current levels or reducing the expanse of cheatgrass communities. Research continues in developing new herbicide formulations and the existence and effectiveness of biological agents including pathogens to serve as future tools in controlling cheatgrass and other species that create a similar threat, such as medusahead.

Key Features

Key features for invasive species include areas of known infestations identified on County Weed and Pest Maps, as well as areas of potential infestations including CBNG and associated developments, riparian zones, and transportation and utility corridors.

2.4.5 Fish and Wildlife Resources – Fish

Fish habitats are managed according to laws, regulations, BLM policies, and principles of fisheries management within BLM's multiple use mandate. Aquatic species are overseen by state and federal wildlife management agencies. The WGFD is responsible for regulating the sport take of all fish within the planning area. The USFWS has oversight over Threatened or Endangered species. No USFWS listed fish species are found in the planning area. The BLM manages the habitat that supports both game and non-game fish species where they are found on BLM-administered lands. BLM also manages activities that indirectly affect all aquatic species both upstream and downstream of BLM-administered lands.

2.4.5.1 Regional Context

The planning area lies within the southern portions of the Upper Missouri freshwater ecoregion. This ecoregion covers all of Montana east of the continental divide, most of northern Wyoming, the northwestern corner of Nebraska, western South Dakota, southwestern North Dakota, and a small portion of extreme southeastern Alberta and southern Saskatchewan. The Upper Missouri freshwater ecoregion is largely defined by the watershed of the Upper Missouri River.

This region represents the uppermost drainages of the Mississippi Basin, the largest watershed on the North American continent. The headwaters of this drainage are on the arid eastern slope of the Rocky Mountains. The land gradually slopes downward to the east. The streams change from high gradient mountain streams to larger, slower moving rivers on the plains.

The ecoregion is important for its large-river habitat, which supports numerous species, such as the pallid sturgeon. This large, ancient fish is completely restricted to the main channels of the Mississippi and Missouri rivers from Montana all the way to Louisiana. Quite uncommon, it requires the turbid, sediment-filled waters of large rivers for its habitat. It does occur in the Yellowstone River, downstream of tributaries that drain the planning area. The Yellowstone River has been designated by the USFWS as the priority recovery zone for the pallid sturgeon. Also present in these streams is the shovelnose sturgeon, the pallid sturgeon's smaller cousin (Cross et al. 1986). This ecoregion forms the southernmost extent west of the Mississippi for some northern fishes such as the brook stickleback and the burbot. The Upper Missouri has no known endemic fish, mussel, crayfish, or aquatic herpetofauna species.

Minor threats to this ecoregion include urban land cover, irrigation, and converted lands. Much more substantial threats to the freshwater habitats of this ecoregion are human footprint and surface water abstraction. Current land use allocations and management of waters related to BLM mineral extraction within the planning area are contributing to the human footprint threats to this watershed.

The condition of fisheries in the planning area is similar to that of the rest of the ecoregion. The stream system within the planning area, because of water discharge practices associated with CBNG projects, experiences an influx of water, rather than a reduction. Though concerns exist for the resulting affects of increased water quantities and decreased water qualities, no evidence of detrimental impacts to fisheries have been documented to date.

The planning area is located within the headwaters of this ecoregion. It is one of the most ecologically important portions of the ecoregion. Sustaining the condition of the streams and river within the planning area is vital for maintaining the ecosystem function of the entire watershed.

2.4.5.2 Resource Characterization

Indicators

Fishery habitat conditions are closely tied to riparian conditions and water quality. Riparian vegetation moderates water temperatures, increases bank stability, supports insects used as important food source, filters sediment, provides in stream habitat for fish, and provides organic material for aquatic insects. The following are indicators of the overall health of fish species:

- Population numbers
- Water quality
- Water quantity
- Bank cover
- Insect/macroinvertebrate populations
- Habitat quality
- Gain or loss of important habitats
- Listing of species as Threatened or Endangered or as Wyoming BLM sensitive species
- Species listed on WGFD's "Species of Greatest Conservation Need"
- Rangeland health standards
- Riparian PFC ratings
- Disease occurrence/impacts

Current Condition

Aquatic resources in the planning area occur within major and minor drainage systems, playa lakes, reservoirs, and ponds. Habitats range from high gradient mountain creeks to meandering prairie rivers, as well as standing waters such as reservoirs, ponds, and desert playas. These aquatic habitats support a variety of species. Some aquatic species require moving water, others are found only in standing water systems, while many are found in both. Table 2-32 lists fish species known to occur in the planning area and their preferred habitats.

Some streamflow regimes in the planning area are altered by discharged water from oil and gas activities, which may impact native fish populations. The status of fish populations in the planning area is influenced by water quality and quantity, as well as habitat conditions. Published journals, agency records (USFWS, BLM, WGFD, and Wyoming Natural Diversity Database [WYNDD]), and other available peer-reviewed scientific literature were examined for information on populations and distribution of fish and invertebrates within the planning area. Information was limited regarding invertebrate populations, patterns of occurrence, and habitats in all, or portions of, the sub-watersheds.

According to the WGFD database, a number of streams on BLM-administered lands support a fishery, (Map 9). The rest of the streams either have no fish present or populations too low to adequately sample.

The WGFD manages brook trout, black bullhead, brown trout, channel catfish, largemouth bass, rainbow trout, smallmouth bass, stonecat, shovelnose sturgeon, green sunfish and rock bass in the streams, ponds and reservoirs throughout the planning area (Map 9).

Trends

There are a relatively small percentage of waters in the planning area with available fish population estimates. These estimates show that there have not been any significant declines in overall fish assemblages in recent years. However, fish populations within the planning area do exhibit minor fluctuations due to naturally occurring events such as drought, fire and floods.

Forecasts

Improving and maintaining water quality in streams and rivers, as well as improving the conditions of riparian habitat are key components to managing aquatic resources. Continuing threats to fish populations in the planning area include sedimentation, high concentration of salts and metals, fuel/drilling fluid runoff, degradation of riparian habitat (including vegetation removal, cottonwood depletion, and livestock impacts), changing water levels, and construction of stream/river crossings.

Key Features

Riparian areas represent a key feature in fisheries health. Four types of riparian ecosystems, including wetlands, have been identified in the planning area: forested riparian, shrubby riparian, herbaceous riparian, and wet meadow. Approximately three percent of the planning area is made up of riparian and wetland areas. The ecological community-scale functions of riparian ecosystems include: (1) the presence of surface water and abundant soil moisture that attract or facilitate plant and animal occurrence; (2) high productivity within various food chains; (3) disproportionate species richness and abundance relative to surrounding areas; (4) diversity and interspersion of habitat features that create more niches for plants and animals; and (5) corridors for animal dispersion and migration (Brinson et al 1981).

Hunters, anglers, bird watchers, and biologists have long recognized the value of riparian ecosystems to fish and wildlife. Riparian ecosystems are particularly valuable in a dry environment such as Wyoming. It has been estimated that, although only a small percent of the planning area is classified as riparian land, about 80 percent of the native animals depend on riparian zones for food, water shelter, and migration routes during some time of the year (Olson and Gerhart 1982).

Alteration of the hydraulic conditions can affect the physical and chemical properties in a wetland, such as pH, soil salinity, sediment properties, oxygen content, and nutrient availability. Small changes in the hydraulic conditions can result in massive responses by wetland biota in terms of species composition, species richness, and ecosystem productivity. Changes to the interrelationships among surface water dynamics, groundwater level, and river channel processes can lead to changes in the establishment and maintenance of dependent riparian plant communities (Busch and Smith 1995). These changes are rapidly occurring within the planning area. The primary impacts to the riparian ecosystems of the planning area are (1) livestock grazing and agricultural water withdrawals; (2) physical disturbances created by the extraction of oil and gas resources; and (3) discharge of coal bed natural gas produced water directly into riparian corridors.

Special management of these areas will be necessary to ensure our riparian corridors are healthy, that these ecosystems remain intact, and that they can meet the needs of present and the future demands on public lands.

Table 2-32. Fish Species Known to Occur and Their Preferred Habitat in the Planning Area

Common Name	Preferred Habitat
Black bullhead	Small muddy lakes; pools in large and small streams
Brassy minnow	Weedy streams; clear creeks with sand and gravel bottoms; lakes (occasionally)
Brook trout	Small, cold stream and beaver ponds; mountain lakes and plains lakes (occasionally)
Brown trout	Larger foothill streams with slower moving waters
Channel catfish	Large clear rivers (can tolerate turbid water)
Common carp	Lakes, pools, and backwaters in rivers
Creek chub	Clear, gravel bottomed creeks
Cutthroat trout	Cool mountain streams, preferably of moderate (6 percent or less) gradient
Flathead minnow	Slow-flowing, weedy streams, and shallow lakes and ponds
Flathead chub	Large silty rivers
Goldeye	Lakes and streams (adapted for turbid conditions)
Green sunfish	Pools in small to medium-sized streams; small lakes, ponds, and sloughs
Largemouth bass	Ponds and reservoirs
Longnose dace	Riffle areas in streams and rivers
Longnose sucker	Clear, gravel bottomed creeks
Mountain sucker	Clear, gravel bottomed creeks
Shorthead redhorse	Large, turbid streams and rivers
Plains killifish	Large, turbid streams and rivers
Plains minnow	Large, turbid streams and rivers
Rainbow trout	Large foothill streams, ponds and reservoirs
River carpsucker	Large, turbid streams and rivers
Rock bass	Streams, pond, and reservoirs
Sand shiner	Large, turbid streams and rivers
Sauger	Large, turbid streams and rivers
Shovelnose sturgeon	Large, turbid streams and rivers
Smallmouth bass	Streams, ponds, and reservoirs
Stonecat	Turbid streams and rivers
Sturgeon chub	Large, turbid streams and rivers
Western silvery minnow	Large, turbid streams and rivers
White sucker	Streams, ponds and reservoirs

Source: WGFD 2005

2.4.6 Fish and Wildlife Resources – Wildlife

Wildlife resources include both game species (i.e., big game, trophy game, waterfowl, upland bird, and small game) and non-game species (i.e., raptors, reptiles and amphibians, non-game mammals, and neotropical migrant birds), as well as their habitat. The BLM is responsible for managing wildlife habitats. Management of wildlife species is overseen by state and federal wildlife management agencies. The WGFD manages resident wildlife populations and game birds in the planning area. The USFWS provides regulatory oversights for all species that are listed, proposed for listing, or are candidates for listing under the Endangered Species Act (ESA) (see the Special status species sections). 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).

2.4.6.1 Regional Context

The planning area is located within the southern portions of the northern short grasslands ecoregion. The northern short grasslands is the largest grassland ecoregion in North America, covering almost 247,000 square miles. This ecoregion covers parts of southeastern Alberta and southwestern Saskatchewan, much of the area east of the Rocky Mountains, central and eastern Montana, western North and South Dakota, and northeastern Wyoming. Four major features distinguish this unit from other grasslands: the harsh winter climate, with much of the precipitation falling as snow; short growing season; periodic, severe, droughts; and vegetation.

Two environmental gradients determine species composition in mixed and shortgrass prairies: increasing temperatures from north to south and increasing rainfall from west to east. With increasing latitude, the shortgrass prairies take on an aspect more similar to mixed-grass such as in this ecoregion, where many cool-season species predominate (Sims 1988). In general, this ecoregion has an arid grassland ecoclimate.

The dominant grass communities include grama, needlegrass and wheatgrass (Kuchler 1964). A variety of shrubs and herbs also occurs, but sagebrush is most abundant, and on drier sites yellow cactus and prickly pear can be found. On shaded slopes of valleys and river terraces, scrubby aspen, willow, cottonwood, and box-elder occur. Saline areas support alkali grass, wild barley, greasewood, red samphire and sea blite.

The northern short grasslands are surprisingly rich in mammals for an ecoregion so far north. Much of the bird fauna is composed of species typically associated with the prairie potholes.

In pre-settlement times, drought, fire, and grazing were probably the major disturbance factors, with fire playing less of a role than in other grassland ecoregions. Today, virtually all of this

ecoregion is either converted to wheat farms or rangelands. However, the potential for large-scale restoration is perhaps greater in this ecoregion than in almost any other in North America.

More than 85 percent of the ecoregion is now grazed by livestock or converted to dryland farming. Considerable potential exists for habitat recovery in some areas to the extent of only partially modified grazing lands. However, oil and gas development and the creation of road networks are very significant factors and tame grazing and hay crops are increasingly replacing more native grasslands. A combination of oil and gas pipelines and road network densities contribute to the greater dissection of the landscape.

A major threat is the conversion of altered habitat (rangeland) to wheat production. Major degradation threats are exotic species such as leafy spurge and yellow sweet clover. There is increased industrial activity (particularly oil and gas), road expansion (with associated access issues), and widespread application of pesticide and herbicide in agricultural production. Historic, current, and predicted activities within the planning area directly contribute to all of the threats to this ecoregion. The planning area is ecologically important to the continuity of the ecoregion as a whole.

2.4.6.2 Resource Characterization

Indicators

Relevant wildlife indicators include population numbers; species recruitment; wildlife observations; habitat quality; gain or loss of valuable habitats; identified high value habitat areas and important habitat features for various species; species listed as Threatened or Endangered or as Wyoming BLM sensitive species; species listed on WGFD's "Species of Greatest Conservation Need"; Rangeland Health Standards; riparian PFC ratings; disease occurrence/impacts; numbers of hunting permits issued; harvest rates; poaching rates; population indices; and harvest statistics for individual herd units.

Current Condition

Terrestrial Wildlife Habitat

In their natural condition, the major vegetation types in the planning area provide high-quality habitats for many wildlife species. Because these habitats tend to occur in a mosaic across the landscape, many wildlife species use more than one habitat. The majority of the habitat consists of short- and mixed-grass prairie, sagebrush shrubland, other shrubland, and riparian areas (including herbaceous, shrubby, and forested riparian areas). In addition to the common vegetation types, wet meadows tend to provide habitat for wildlife species associated with nearby dominant vegetation cover types, such as prairie or sagebrush shrubland; although, in areas of large wet meadow complexes, species common to riparian habitats may also occur. Furthermore, although they occur only sporadically throughout the planning area, coniferous

woodlands support a different set of wildlife species than the main habitat types, primarily as a result of seed production and potential nest substrates provided by the various conifer species.

Three habitat management plans (HMPs) currently guide management in the planning area: the South Bighorns Habitat Management Plan (BLM 1986), the Buffalo Resource Area – Wetland (HMP) (BLM 1988), and the Middle Fork Powder River (HMP)(BLM 1980). Though they remain relevant, all of these plans need to be revised.

The terrestrial vertebrate wildlife species that occur in the planning area represent all major vertebrate classes: reptiles, amphibians, birds, and mammals. The descriptions of these species are based on the WGFD's statutory wildlife categories to facilitate the discussions. The primary headings are: game species (big game, trophy game, small game, waterfowl and other water birds, upland game birds, and furbearers); non-game species (raptors, neotropical migrants; and non-game mammals); predatory animals; and reptiles and amphibians. Species of special concern (Threatened, Endangered, and BLM sensitive species) are discussed in the Special status species sections.

Game Species

The WGFD collects and compiles considerable data regarding their population levels and habitat since these species populations are monitored to track their supportable harvest.

Big Game

Big game species in the planning area include pronghorn, elk, moose, mule deer and white-tailed deer. 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. Boundaries of the herd unit areas are set up to encompass all of the seasonal ranges and habitats or special life function areas (e.g., calving and lambing areas) utilized by a more or less discreet population or herd. The intention is to incorporate the herd unit within physical boundaries that meet all the biological needs of that species population. Because there will always be some interchange of animals between adjacent populations and significant use patterns by portions of populations do change over time, these boundaries are not necessarily well defined or permanent. They do represent the best data currently available and represent identified population units consistent with most recent biological and climatic conditions. Table 2-33 provides information on the relative size and amount of BLM-administered lands within big game herd units in the planning area.

Pronghorn

Pronghorn are a unique animal of the western plains and are the only living species in their taxonomic family (Antilocapridae). Wyoming is the center of the pronghorn's range.

Pronghorn inhabit a wide variety of open rangeland habitat types throughout the planning area and forage primarily on shrubs, especially on sagebrush species.

Table 2-33. Relative Size and Amount of BLM-Administered Lands Occupied by Big Game Herd Units

Species	Seasonal Range	Acreage	Percent of Planning Area*
Pronghorn	Spring, Summer, Fall	161,000	2.19
	Winter	156,906	2.13
	Winter Yearlong	1,507,609	20.50
	Yearlong	3,825,611	52.02
Total Pronghorn		5,651,126	76.85
Elk	Crucial Winter	46,415	0.63
	Crucial Winter Yearlong	175,588	2.39
	Spring, Summer, Fall	755,920	10.28
	Winter	1,398	0.02
	Winter Yearlong	81,287	1.11
	Yearlong	288,117	3.92
Total Elk		1,348,727	18.34
Mule Deer	Crucial Winter	6,979	0.09
	Crucial Winter Yearlong	64,929	0.88
	Spring, Summer, Fall	844,054	11.48
	Winter Yearlong	3,526,262	47.95
	Yearlong	2,447,353	33.28
Total Mule Deer		6,889,577	18.34
White Tail	Winter Yearlong	4,655	0.06
	Yearlong	725,632	9.87
Total White Tail		730,287	9.93
Moose	Crucial Winter	11,430	0.16
	Crucial Yearlong	71,561	0.97
	Spring, Summer, Fall	29,040	0.39
	Winter Yearlong	28,312	0.39
	Yearlong	258,377	3.51
Total Moose		398,719	5.42

* Percent was calculated from total acreage of each data layer, which varied by species. The following totals were used: Pronghorn – 7,353,846 total acres; Elk – 7,353,860 total acres; Mule Deer – 7,353,877 total acres; White Tail Deer – 7,352,444 total acres. For moose, the seasonal range layer did not cover the planning area, so the acreage for white tail deer was used.

Deer

Both mule deer and white-tailed deer occur in the planning area. Mule deer are distributed throughout the seasonal ranges, and generally prefer habitat types in the early stages of plant succession and with numerous shrubs. They use the woody riparian, shrublands, juniper woodland, and aspen woodland habitat types extensively during spring, summer, and fall. These habitat types provide adequate forage areas with succulent vegetation for lactating females and adequate cover for security and fawning. They are often found in juniper and limber pine woodlands, sagebrush/rabbitbrush, bitterbrush/sagebrush steppe, and riparian habitat types. White-tailed deer use woody riparian habitats along the creeks and rivers for both forage and cover.

Elk

Elk are concentrated in the Bighorn Mountains and associated foothills, the Fortification Creek area west of Gillette, the Pine Ridge area in the south, and the Rochelle Hills in the southeast. This species occurs in a variety of habitats, including coniferous forests, mountain meadows, short- and mixed-grass prairies, and sagebrush and other shrublands. Elk rely on a combination of browse, grasses, and forbs, depending on their availability throughout the seasons. Elk tend to be migratory, moving between summer and winter ranges.

Moose

Moose ranges are extremely limited, restricted to areas along the western boundary in the Bighorn Mountains. Typical moose habitats in the Rocky Mountains include willow, spruce, fir, aspen, or birch. These habitats are common to forested riparian, shrubby riparian, and wet meadow vegetation types. Moose tend to have strong affinity for specific home ranges, but would make seasonal migrations in search of suitable forage and habitat.

Trophy Game

Mountain lions and black bears are classified as trophy game by the WGFD. Mountain lions are typically found in remote areas that have dense cover and rocky, rugged terrain. They are found in most habitats where deer, their primary prey base, are present.

Black bears prefer forested and shrubby areas. They are also known to inhabit ridgetops, burned areas, riparian areas, agricultural fields, and avalanche chutes. Black bears can be found in dry sage and pinyon-juniper habitats. In mountainous areas, they seek southerly slopes at lower elevations for forage and move to northerly and easterly slopes at higher elevations as summer progresses. Black bears use dense cover for hiding and thermal protection, as well as for bedding. They climb trees to escape danger and use forested areas and rivers as travel corridors. Black bears are found along the western boundary of the planning area in the Bighorn Mountains.

Game Birds/Small Game

Small game includes upland game birds and small game mammals. Most of the data on these species come from harvest statistics kept by the WGFD for management areas within the state.

Upland Game Birds

Upland game birds in the planning area include chukar, Hungarian or gray partridges, ring-necked pheasants, wild turkeys, Columbian sharp-tailed grouse, and greater sage-grouse. Chukars are found in hilly and rolling terrain along mountain foothills and to some extent in badland topography. Hungarian partridges prefer habitat of open, grassy areas in a cool, dry climate. Preferred nesting areas include grasslands, hay and grain fields, and especially alfalfa

fields. Heavily wooded areas are almost always avoided. Ring-necked pheasant habitat includes farmlands, pastures, and grassy woodland edges. Wild turkeys occur in wooded areas in the upper elevations and along riparian corridors. Chukars, Hungarian partridges, ring-necked pheasants, and wild turkeys occur within their preferred habitats throughout the planning area.

Columbian sharp-tailed grouse inhabit short and mixed-grass prairie, sagebrush shrublands, woodland edges, and river canyons. Throughout the planning area, this species is found where grasslands are intermixed with shrublands, especially wooded draws, shrubby riparian area, and wet meadows. Greater sage-grouse, though listed as an upland game bird by WGFD, is a BLM Wyoming sensitive species and will be discussed in detail in the Special Status Species – Wildlife portion of this document.

Mammals

The small game mammals are cottontails, snowshoe hares, and red, gray, and fox squirrels. These species are found throughout the planning area and are hunted during both fall and late winter. No estimates of population size, mortality and natality rates for these species are available.

Migratory Game Birds

Ducks and geese occur in aquatic areas throughout the planning area. Some individuals or species breed, winter, or remain yearlong in the state, while larger numbers pass through during spring or fall migration. The planning area is in the central flyway (east of the continental divide). The various source of water, natural lakes, streams, and man-made reservoirs are important resting areas for a variety of waterfowl species, including ducks, geese, snipe, rails, and shorebirds. Scattered aquatic resources found throughout the planning area support various waterfowl species during nesting periods and private agricultural lands provide important foraging habitat where grains and hay are grown. Most of these species depend on wetlands or open water that is sufficiently shallow to support rooted vegetation, and they feed on the biotic communities developed in such habitats.

Furbearers

Badger, beaver, bobcat, marten, mink, muskrat, and weasel are found throughout the planning area. Population figures are available only on a statewide basis. Trapping seasons apply to most furbearers.

Predatory Animals

In the planning area, several species are legally classified as predatory animals. These include coyote, red fox, raccoon, porcupine, skunk, and jackrabbit. These species may be hunted or trapped without a license, and there is no closed season.

Non-game Species

Non-game species include raptors, neotropical migrants, reptiles, amphibians, and mammals not discussed above. Such species are numerous and diverse, especially given the range of habitats present in the planning area. Only a few of these species or groups are addressed. Many species discussed in the following subsections are present on the BLM Wyoming State Director's Sensitive Species List and are addressed in the Special Status Species Wildlife section of this document. The hundreds of additional bird species that inhabit the planning area for all or a part of their life-cycles are important components of the ecosystem and an important focus of the segment of recreationists who enjoy bird-watching. The diversity of these species is supported by the wide range of habitats present.

Raptors

Raptor species (eagles, hawks, owls, and falcons) in the planning area include the bald eagle, short-eared owl, ferruginous hawk, golden eagle, northern harrier, peregrine falcon, prairie falcon, Swainson's hawk, red-tailed hawk, great-horned owl, and long-eared owl. Raptors are sensitive to environmental disturbance and occupy an ecological position at the top of the food chain, thus they act as biological indicators of environmental quality; several of these species are further discussed under the Special Status Species Wildlife section. Raptors are found in habitats throughout the planning area.

Most species have specific nest site requirements, which are key factors in nest site selection and in reproductive success. These generally include nesting strata, available prey base and nest site disturbance. Nests can occur in a myriad of habitats, including steep cliffs and rock ledges, trees, and on the ground. Individual raptors, tolerant of human activity may nest on man-made structures, such as barns, utility poles, and tanks. The nesting-reproductive season is considered the most critical period in the raptor life-cycle since it determines population productivity, short-term diversity, and long-term trends.

Generally, raptors will concentrate their nests along a cliff or in trees and use this stratum for nesting year after year. Ferruginous hawks, a BLM sensitive species, usually nest on rock outcrops, promontories, tall sagebrush or in junipers where numerous small mammals provide abundant prey base. Golden eagles and prairie falcons also usually build their nests on steep cliffs and rock ledges, though golden eagles will frequently nest in large cottonwood trees throughout the planning area. Swainson's hawks prefer the more open plains area and usually nest in trees along drainage courses. Northern harriers are ground nesters generally associated with riparian wetland sites and nest in marsh habitats.

Neotropical Migrants

This category includes shorebirds, water birds, and songbirds. A myriad of these species are found throughout the planning area. Every vegetation community type in the planning area supports various bird species. The community typically having the most diverse array of species is the riparian/wetland community.

There are no population estimates for most avian species. However the WGFD has been conducting breeding bird surveys which provide some limited information and the BLM has observation and occurrence data for some species. In general, habitat specific information related to migratory birds is incomplete or unknown and population status is undetermined.

Mammals

Non-game mammals include species such as gophers, mice, rats, voles, ground squirrels, shrews, bats, and prairie dogs. These species are found in habitats throughout the planning area.

Reptiles and Amphibians

Compared to the above mentioned species, little is known or documented about the native reptiles and amphibians within the planning area. No estimates of population size are available for any of these species. Some of the species encountered in the planning area include the prairie rattlesnake, eastern short-horned lizard, garter snake, eastern racer, gophersnake, terrestrial gartersnake, plains gartersnake, painted turtle, snapping turtle, and bull snake. These species are found throughout the planning area. Amphibian species found in the planning area include the northern leopard frog, spotted frog, boreal chorus frog, Woodhouse's toad, and tiger salamander. Several species occur on the Wyoming BLM sensitive species list due to reduction in suitable riparian/wetland habitat.

Trends

Terrestrial Wildlife Habitat

Trends for terrestrial wildlife habitat are discussed the trends section for Vegetation: Forest and Woodlands, Grassland and Shrublands, and Riparian/Wetlands.

Game Species

Big Game

Pronghorn

The pronghorn population in the planning area remains at or above WGFD herd unit objectives. Several herd unit population levels do fluctuate, likely due to natural phenomena such as poor winter weather conditions or limited forage availability during drought.

Deer

The population estimates for white-tailed deer are thought to be substantially higher than WGFD objectives for the herd unit within the planning area, with a stable to increasing trend. Mortality to white-tailed deer is typically related to hunting, winter starvation, collisions with automobiles, and predation. The stated cause for populations that are substantially higher than the goals is lack of public access for hunting and urbanization in many parts of the planning area.

The mule deer population in the planning area remains at or above WGFD herd unit objectives for all except one herd unit, the Upper Powder River herd unit. The population in this herd unit is below objectives, but is increasing in numbers. The population decline for this herd unit occurred in 2001 due to winter mortality and low productivity and recruitment. Several herd unit population levels do fluctuate, likely due to natural phenomena such as poor winter weather conditions and limited forage availability during drought. In several herd units, lack of public access for hunting has resulted in herd numbers that greatly exceed population goals. A lack of reliable population estimates for some herd units also makes it difficult to determine if they are meeting herd unit levels.

Elk

Based on trend and classification surveys data, elk populations within the planning area are at or above desired levels on the east side of the Bighorn Mountain and well above objective for the Rochelle Hills herd unit, with nearly all segments of this herd above desired levels. The Fortification Creek elk herd unit was well above objective from 1995 to1999, when regular harvests began to reduce elk numbers and return the herd to a level only slightly above objective. Harvest strategies specific to each hunt area and desired level have been adjusted to address elk numbers. Lack of access in some areas has hampered efforts to achieve desired the desired harvest level.

Moose

The moose population within the planning area is believed to be at or below the objective at this time. Management during the early 1990s was designed to reduce this population to address willow utilization concerns. However, sustained female harvest and reduced production through the early and mid-1990s reduced a segment of the population. This decline was most noticeable in easily accessible areas. During the late 1990s, harvest was reduced to address population concerns. Harvests have been increased since then in areas where surveys have indicated populations above desired levels, especially Area 34.

Trophy Game

Populations for both mountain lions and black bear are thought to be stable or increasing within the planning area.

Game Birds/Small Game

Upland Game Birds

Chukars, Hungarian partridges and ring-necked pheasant populations all appear to be relatively stable throughout the planning area. These populations do periodically fluctuate as a result of naturally occurring phenomena such as drought, fire and floods. Sharp-tailed grouse population trends are unknown at this time; however, populations are thought to be declining due to habitat removal and fragmentation by oil and gas development and urbanization throughout the planning area.

Greater sage-grouse populations are experiencing an overall decline within the planning area. This species is listed as a BLM Wyoming sensitive species and will be discussed in detail in the Special Status Species – Wildlife section later in this document.

Mammals

Small game population trends within the planning area are unknown, though these populations appear to be relatively stable. Small game populations likely fluctuate as a result of naturally occurring phenomena such as drought, fire and floods.

Migratory Game Birds

Migratory game bird population trends within the planning area are unknown at this time.

Furbearers

Furbearer population trends within the planning area are unknown at this time. These populations likely fluctuate as a result of naturally occurring phenomena such as drought, fire and floods. Population fluctuations of their prey base also affect furbearer abundance.

Predatory Animals

Predatory animal population trends within the planning area are unknown at this time. These populations likely fluctuate as a result of naturally occurring phenomena such as drought, fire and floods. Population fluctuations of their prey base also affect these animals' populations.

Non-Game Species

Raptors

Though extensive data has been collected on raptors within the planning area, population trends are unknown at this time.

Neotropical Migrants

Ground-nesting birds are experiencing decreasing population trends due to increased human-adapted predator populations. Similarly, disturbance-sensitive species are experiencing decreasing population trends due to disruptive human activity (e.g., OHV use, recreation, livestock grazing, construction of oil and gas wells, roads, pipelines, powerlines, mines, livestock facilities) within important buffer zones or during critical time periods (e.g., breeding or nesting).

Mammals

Non-game mammal population trends within the planning area are unknown at this time.

Reptiles and Amphibians

Though baseline data is available, reptile and amphibian population trends within the planning area are unknown at this time.

Forecasts

Continuing threats to native ecosystems and species diversity in the planning area include fragmentation and loss of critical/important habitat due to human activities. The cumulative impact from all disturbances is of concern, particularly for those species that are sagebrush obligates, prairie dog colony obligates, and riparian corridor dependent. Additionally, invasive species may continue to displace native vegetation, which indirectly impacts the distribution and populations of wildlife species.

Key Features

Riparian Corridors

Riparian areas represent a key feature in fisheries health. Four types of riparian ecosystems, including wetlands, have been identified in the planning area: forested riparian, shrubby riparian, herbaceous riparian, and wet meadow. Approximately three percent of the planning area is made up of riparian and wetland areas. The ecological community-scale functions of riparian ecosystems include: (1) the presence of surface water and abundant soil moisture that attract or facilitate plant and animal occurrence; (2) high productivity within various food chains; (3) disproportionate species richness and abundance relative to surrounding areas; (4) diversity and interspersion of habitat features that create more niches for plants and animals; and (5) corridors for animal dispersion and migration (Brinson et al. 1981).

Hunters, anglers, bird watchers, and biologists have long recognized the value of riparian ecosystems to fish and wildlife. Riparian ecosystems are particularly valuable in a dry environment such as Wyoming. It has been estimated that, although only a small percent of the planning area is classified as riparian land, about 80 percent of the native animals depend

on riparian zones for food, water shelter, and migration routes during some time of the year (Olson and Gerhart 1982).

Alteration of the hydraulic conditions can affect the physical and chemical properties in a wetland, such as pH, soil salinity, sediment properties, oxygen content, and nutrient availability. Small changes in the hydraulic conditions can result in massive responses by wetland biota in terms of species composition, species richness, and ecosystem productivity. Changes to the interrelationships among surface water dynamics, groundwater level, and river channel processes can lead to changes in the establishment and maintenance of dependent riparian plant communities (Busch and Smith 1995). These changes are rapidly occurring within the planning area. The primary impacts to the riparian ecosystems of the planning area are (1) livestock grazing and agricultural water withdrawals; (2) physical disturbances created by the extraction of oil and gas resources; and (3) discharge of coal bed natural gas produced water directly into riparian corridors.

Special management of these areas will be necessary to ensure our riparian corridors are healthy, that these ecosystems remain intact, and that they can meet the needs of present and the future demands on public lands.

Elk Crucial Winter Ranges

In Wyoming, elk occur throughout the state in a variety of habitats, including, coniferous forests, mountain meadows, short- and mixed-grass prairies, and sagebrush and other shrublands. In the planning area, elk ranges are concentrated in the Bighorn Mountains and associated foothills, the Fortification Creek Area west of Gillette, the Pine Ridge area in the south, and the Rochelle Hills in the southeast. Similar to other members of the deer family, this species relies on a combination of browse, grasses, and forbs, and depends on their availability throughout the seasons. Elk tend to be migratory, moving between summer and winter ranges. These areas are important and therefore are designated as crucial winter range by WGFD. Typically, mortality is a result of predation on calves, hunting, and winter starvation.

Prairie Dog Colonies

The black-tailed prairie dog was added to the list of Candidate species for federal listing on February 4, 2000 (USFWS 2000). On August 12, 2004, the U.S. Fish and Wildlife Service removed the black-tailed prairie dog's Candidate status; however, the BLM Wyoming considers prairie dogs as a sensitive species and continues to afford this species related protections. The black-tailed prairie dog is a diurnal rodent inhabiting prairie and desert grasslands of the Great Plains.

The black-tailed prairie dog is considered common in Wyoming, although its abundance fluctuates with activity levels of Sylvatic plague and the extent of control efforts by landowners.

Comparisons with 1994 Digital Ortho Quads indicated that black-tailed prairie dog acreage remained stable from 1994 through 2001. However, aerial surveys conducted in 2003 to determine the status of known colonies indicated that a significant portion (approximately 47 percent) of the prairie dog acreage was affected by Sylvatic plague and/or control efforts (Grenier, et al 2004). Due to human-caused factors, black-tailed prairie dog populations are now highly fragmented, and isolated (Miller 1994). Most colonies are small and subject to potential extirpation due to inbreeding, population fluctuations, and other problems, such as landowner poisoning and disease that affect long term population viability (Primack 1993, Meffe and Carroll 1994, Noss and Cooperrider 1994). Prairie dogs have declined as much as 98 percent throughout North America since European settlement.

Prairie dogs have been described as a keystone species and an ecological engineer. They build prairie dog towns, which provide habitat for over 170 species. Of those species regularly associated with prairie dog colonies, six are on the Wyoming BLM sensitive species list: swift fox, mountain plover, ferruginous hawk, burrowing owl, loggerhead shrike, and long-billed curlew. This biodiversity issue is relevant in the planning area.

Sagebrush Steppe ecosystems

Sagebrush Steppe ecosystems support a variety of species. Sagebrush obligates are animals that cannot survive without sagebrush and its associated perennial grasses and forbs; in other words, species requiring sagebrush for some part of their life-cycle. Sagebrush obligates within the Powder River Basin, listed as sensitive species by BLM Wyoming include greater sage-grouse, Brewer's sparrow, sage thrasher, and sage sparrow.

Greater sage-grouse are found in prairie, sagebrush shrublands, other shrublands, wet meadows, and agricultural areas; they depend upon substantial sagebrush stands for nesting and winter survival (BLM 2004b). The greater sage-grouse is listed as a sensitive species by BLM (Wyoming). In recent years, several petitions have been submitted to the USFWS to list greater sage-grouse as Threatened or Endangered. On January 12th, 2005, the USFWS issued a decision that the listing of the greater sage-grouse was “not warranted” following a Status Review. The decision document supporting this outcome noted the need to continue or expand all conservation efforts to conserve sage-grouse. In 2007, the U.S. District Court remanded that decision, stating that the USFWS’ decision-making process was flawed and ordered the USFWS to conduct a new Status Review as a result of a lawsuit and questions surrounding the 2005 review (Winmill 2007).

Sage sparrows, Brewer’s sparrows, and sage thrashers all require sagebrush for nesting, with nests typically located within or under the sagebrush canopy. Sage thrashers usually nest in tall dense clumps of sagebrush within areas having some bare ground for foraging. Sage sparrows prefer large continuous stands of sagebrush, and Brewer’s sparrows are associated closely with

sagebrush habitats having abundant scattered shrubs and short grass (Paige and Ritter 1999). Other sagebrush obligate species include pygmy rabbit, sagebrush vole, pronghorn antelope, and sagebrush lizard. This biodiversity issue is relevant in the planning area.

2.4.7 Special Status Species – Plants

BLM Manual 6840, Special Status Species Management (BLM 2001a) defines special status species as those species officially listed, proposed, or candidates for listing as Threatened or Endangered under the ESA; species listed by BLM Wyoming as Sensitive; and species listed by the state of Wyoming in a category implying potential endangerment or extinction. The BLM Wyoming Sensitive Species List is intended to be dynamic and re-evaluated as new information becomes available. The BLM 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.

2.4.7.1 Regional Context

The regional context for "Special Status Species – Plants" is described under regional context in the introduction to biological resources.

2.4.7.2 Resource Characterization

Indicators

For a discussion of indicators related to special status plant species, please see the "Vegetation-Grassland and Shrubland Communities" section of this Summary of the AMS.

Current Condition

One Threatened plant species, Ute ladies'-tresses and one Endangered plant species, blowout penstemon, potentially occur within the planning area. Forty-five WYNDD Wyoming plant species of concern and two Wyoming sensitive plant species are found within the planning area. There are also two BLM sensitive plant species found in the planning area (see Table 2-34).

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. Table 2-34 presents habitat associations for special status plants that are known to or may be found on land managed in the planning area. 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.

Trends

Most of the trends that affect other plant species in the planning area also affect special status species. These include habitat degradation and fragmentation, grazing practices and management, invasive species, motor vehicles, and climate.

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 invasive species, maintaining PFC for riparian and wetland habitats, 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 impacted by natural succession and the lack of fire, flooding, or other disturbance factors necessary to retain early successional habitat.

Forecasts

Under current management, the forecast for special status species in the planning area is predicted to decline overall. Many of the forecasts presented for other species of plants in the planning area also apply to special status species. This is because the forecast changes would also alter the habitat quality and availability for special status species.

Key Features

Ute ladies'-tresses populations – Ute ladies'-tresses is listed as Threatened under the Endangered Species Act. It is extremely rare and occurs in moist, sub-irrigated or seasonally flooded soils at elevations between 1,780 and 6,800 feet above sea level (Map 10). Habitat includes wet meadows, abandoned stream channels, valley bottoms, gravel bars, and near lakes or perennial streams that become inundated during large precipitation events. The WYNDD model predicts undocumented populations may be present particularly within southern Campbell and northern Converse Counties.

Table 2-34. Special Status Plant Species Potentially Occurring in the Planning Area

Common Name	Habitat	Status
Blowout Penstemon	Sand dune habitat on sandy aprons or the lower half of steep sandy slopes deposited at the base of granitic or sedimentary mountains or ridges.	Endangered
Ute ladies'-tresses	Mesic to wet riparian meadows, marshes, and stream banks.	Threatened.
Williams' Wafer-Parsnip	Open ridgetops and upper slopes with exposed limestone outcrops or rockslides 6,000 to 8,300 feet	Wyoming plant species of concern, BLM Sensitive Plant Species
Porter's sagebrush	Sparsely vegetated badlands of ashy or tufaceous mudstones and clay slopes	Wyoming plant species of concern, BLM Sensitive Plant Species
Alpine poppy	Open, rocky slopes with delayed snowmelt in the alpine zone.	Wyoming plant species of concern
Blue elderberry	Stream banks, riverside woodlands, and open areas in the forest understory.	Wyoming plant species of concern
Broad-leaved twayblade	Grows with moss and grasses in damp, often shady, spots with cool, moist growing conditions.	Wyoming plant species of concern
Coil-beaked lousewort	Ridge tops and meadows in the upper subalpine and alpine zones.	Wyoming plant species of concern
Cusick's alkali-grass	Moist riparian areas and alkaline seeps and draws.	Wyoming plant species of concern
Dwarf woolly-heads	Drying mud of ponds and other vernally wet soil in the valleys and on the plains.	Wyoming plant species of concern
Fall knotweed	Gravelly or sandy hills and plains	Wyoming plant species of concern
False agoseris	Wetland riparian areas	Wyoming plant species of concern
Field pussytoes	Subirrigated meadows within broad stream channels.	Wyoming plant species of concern
Fragile rockbrake	Sheltered calcareous cliff crevices and rock ledges, typically in coniferous forest or other boreal habitats.	Wyoming plant species of concern
Green spleen wort	Rock crevices in forest cover.	Wyoming plant species of concern
Hairy tranquil goldenweed	Sagebrush grasslands and montane meadows, often on limestone substrates.	Wyoming plant species of concern
Hall's fescue	Montane meadows, slopes, and edges of open coniferous woods and meadows. Usually on soils derived from calcareous parent material or volcanic soils.	Wyoming plant species of concern
Kotzebuei's grass-of-parnassus	Mesic to wet arctic and alpine habitats at high elevation.	Wyoming plant species of concern
Lance-leaved moonwort	Mature as well as second-growth mesic northern hardwood forests in soil with a rich humus layer.	Wyoming plant species of concern
Large bur-reed	Continuous fringe with sedges, flags, and reeds along the sides of a river or stream.	Wyoming plant species of concern
Large yellow lady-slipper	Moist woods and bogs.	Wyoming plant species of concern
Large-leaved pondweed	Riparian wetland areas.	Wyoming plant species of concern
Leafy thistle	Moist soil, grasslands, meadows, edges, and openings in boreal forest, subalpine forests, and alpine slopes.	Wyoming plant species of concern
Longleaf dropseed	Open forests and grasslands on the plains.	Wyoming plant species of concern

Table 2-34. Special Status Plant Species Potentially Occurring in the Planning Area

Common Name	Habitat	Status
Mingan moonwort	Dense shade, sparse understory, with an alluvium substrate.	Wyoming plant species of concern
Moschatel	Clay soils and shaded areas in fields and woodland areas.	Wyoming plant species of concern
Mountain lady-slipper	Dry or moist, open or lightly shaded, brushy or wooded valleys and slopes.	Wyoming plant species of concern
Northern arnica	Open woods and slopes on sandy-gravel or limestone and shady, moist north-facing birch-hazelnut forests from 6,500-8,000 feet.	Wyoming plant species of concern
Northern blackberry	Damp soils in sunny-edged woodlands.	Wyoming plant species of concern
Pretty dodder	Floodplains of creeks and streams.	Wyoming plant species of concern
Puzzling moonwort	Mesic to wet subalpine mountain meadows dominated by grasses, sedges, and in some cases, dense herbaceous cover.	Wyoming plant species of concern
Rattlesnake fern	Rich moist or dry woods, moist thickets, or higher spots in bogs.	Wyoming plant species of concern
Russet cotton-grass	Wet areas, preferably the acidic, nutrient-poor conditions of peatlands.	Wyoming plant species of concern
Sartwell's sedge	Dense large stands, rich fens and swamps, and sometimes on the edges of ponds.	Wyoming plant species of concern
Sea purslane	Damp, sandy locations such as mangroves, beaches, dunes, salt flats, and marsh edges.	Wyoming plant species of concern
Sheathed musineon	This species is found on rocky slopes, and in meadows, aspen groves, and ponderosa pine communities.	Wyoming plant species of concern
Short-leaf sedge	Wet meadows, along stream banks, in willow thickets, and in stony or turfy places in the alpine and upper subalpine zones	Wyoming plant species of concern
Single-head pussytoes	Wind-swept, open slopes and ridges in alpine or subalpine tundra. Areas dominated by forbs and bunchgrass with occasional patches of whitebark pine and Engelmann spruce.	Wyoming plant species of concern
Slender bulrush	Lake edges and wetlands.	Wyoming plant species of concern
Slim-pod Venus' looking-glass	Dry, sandy prairies, pastures, and disturbed areas.	Wyoming plant species of concern
Small-flowered fame flower	Bare sandy, acidic soils overlying rocks.	Wyoming plant species of concern
Teal love grass	Borders of streams and rivers, edge of ponds and lakes, or in sloughs.	Wyoming plant species of concern
Three-flower rush	Montane stream banks, bogs, and short willow and sedge meadows on wet to saturated soils, sometimes influenced by limestone.	Wyoming plant species of concern
Upward-lobe moonwort	Well-drained natural and artificially maintained habitats including alpine meadows, avalanche meadows, pastured forest meadows and grassy roadsides.	Wyoming plant species of concern
Watson goosefoot	Found in a variety of habitats from desert, cliffs, talus, and moist shaded areas under aspen, junipers, or pinyons, often in riparian habitats.	Wyoming plant species of concern
White arctic whitlow-grass	Found in talus and scree, on rocky slopes and flats, and in alpine meadows.	Wyoming plant species of concern
Woodland horsetail	Lowland wet conifer forests and mixed upland, dry conifer, and deciduous forest habitats. Moist open woods, bogs, swamps, prairies, meadows, and stream banks.	Wyoming plant species of concern

Table 2-34. Special Status Plant Species Potentially Occurring in the Planning Area

Common Name	Habitat	Status
Woolly twinpod	Extending from plains to montane zones.	Wyoming plant species of concern
Zephyr windflower	Big Horn Mountains from fellfields to alpine meadows, to tundra. Usually moist or swampy soil.	Wyoming plant species of concern

Source: BLM 2002

Prior to 2005, only four populations had been documented within Wyoming. Five additional sites were located in 2005 and one in 2006 (Heidel 2006). The new locations were in the same drainages as the original populations, with two on the same tributary and within a few miles of an original location. Drainages with documented orchid populations include Wind Creek and Antelope Creek in northern Converse County, Bear Creek in northern Laramie and southern Goshen Counties, Horse Creek in Laramie County, and Niobrara River in Niobrara County.

2.4.8 Special Status Species – Fish

The BLM is responsible for managing habitat for special status fish 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, those designated by the BLM State Director as sensitive, or those listed by the WGFD as species of concern.

2.4.8.1 Regional Context

For a discussion of regional context of special status fish species, please see the Fish section of this Summary of the AMS.

2.4.8.2 Resource Characterization

Indicators

For a discussion of indicators related to fish species, please see the Fish section of this Summary of the AMS.

Current Condition

Two state agencies in Wyoming maintain lists of special status species: the WYNDD and the WGFD. WYNDD tracks, studies, and documents special status species in Wyoming, as well as species that may become rare due to environmental disturbance, in a list of species of concern. Table 2-35 lists fish species that potentially occur in the planning area that are listed as Threatened or Endangered under the ESA, as sensitive by BLM Wyoming, or as species of

concern by WYNDD. If any of these species have been given a native species status by WGFD, that designation is included.

One Endangered fish species, the pallid sturgeon, occurs in the Yellowstone River, downstream of tributaries that drain the planning area. The Yellowstone River has been designated by the USFWS as the priority recovery zone for the pallid sturgeon (USFWS 1993). Although it does not occur within the boundaries of the planning area, the pallid sturgeon is considered in planning projects because of the management implications that it presents under the ESA.

Another fish species, the Yellowstone cutthroat trout, has been designated as sensitive by BLM Wyoming and as a species of concern by WYNDD. This species was recognized as in need of special management attention due to its restricted distribution, low abundance, and high biological vulnerability. The remaining four species in Table 2-35 are identified as species of concern by WYNDD.

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 2001a), or the BLM Wyoming Sensitive Species Policy and List (BLM 2002). Activities and management challenges affecting special status species fish are similar to those discussed in the Fish section of this chapter.

Trends

Most of the trends that have affected other species of fish in the planning area have also affected special status species. These include the adverse impacts of grazing practices and management, drought, and degraded habitat conditions. See the Fish section for additional information.

Forecasts

Many of the forecasts described in the Fish section for other species of fish in the planning area also apply to special status species. This is because the forecast changes would also alter the habitat quality and availability for special status species. Refer to the Fish section of this chapter for more information.

Table 2-35. Special Status Fish Species in the Planning Area

Common Name	Habitat	Status
Goldeye	Tolerant of widely fluctuating environmental conditions, such as turbidity, salinity, and water temperature.	Wyoming Fish Species of Concern, Wyoming Game and Fish Native Status Species 2
Pallid sturgeon[1]	Moderate to swift river currents and turbid waterways, depths 3 to 24 feet, with sandy substrates.	Endangered
Shovelnose sturgeon	River bottoms, often in areas with swift current and sand or gravel bottom and turbid water.	Wyoming Fish Species of Concern, Wyoming Game and Fish Native Status Species 2
Sturgeon chub	Turbid water with moderate to strong current over bottoms ranging from rocks and gravel to coarse sand.	Wyoming Fish Species of Concern, Wyoming Game and Fish Native Status Species 1
Western silvery minnow	Sluggish pools and backwaters, usually over mud or sand, of small to large rivers.	Wyoming Fish Species of Concern, Wyoming Game and Fish Native Status Species 1
Yellowstone cutthroat trout	Relatively clear, cold creeks, rivers, and lakes at temperatures between 4 and 15 degrees C.	BLM Sensitive Species, Wyoming Game and Fish Native Status Species 3

[1] Species does not occur in the planning area, but occurs in habitat subject to hydrologic influence of actions occurring within the planning area.
Source: BLM 2002

Key Features

Riparian corridors - Four types of riparian ecosystems, including wetlands, have been identified in the planning area, including forested riparian, shrubby riparian, herbaceous riparian and wet meadow. Three percent of the planning area is made up of riparian and wetland areas. The ecological community-scale functions of riparian ecosystems include: (1) the presence of surface water and abundant soil moisture that attract or facilitate plant and animal occurrence; (2) high productivity within various food chains; (3) disproportionate species richness and abundance relative to surrounding areas; (4) diversity and interspersion of habitat features that create more niches for plants and animals; and (5) corridors for animal dispersion and migration (Brinson et al 1981).

Hunters, anglers, bird watchers, and biologists have long recognized the value of riparian ecosystems to fish and wildlife. Riparian ecosystems are particularly valuable in a dry environment such as Wyoming. It has been estimated that, although only 3 percent of the planning area is classified as riparian land, about 80 percent of the native animals depend on riparian zones for food, water shelter, and migration routes during some time of the year (Olson and Gerhart 1982).

Alteration of the hydraulic conditions can affect the physical and chemical properties in a wetland, such as pH, soil salinity, sediment properties, oxygen content, and nutrient availability. Small changes in the hydraulic conditions can result in massive responses by wetland biota in terms of species composition, species richness, and ecosystem productivity. Changes to the interrelationships among surface water dynamics, groundwater level, and river channel processes can lead to changes in the establishment and maintenance of dependent riparian plant communities (Busch and Smith 1995). These changes are rapidly occurring within the planning area. The primary impacts to the riparian ecosystems of the planning area are (1) livestock grazing and agricultural water withdrawals; (2) physical disturbances created by the extraction of oil and gas resources; and (3) discharge of coal bed natural gas produced water directly into riparian corridors.

Special management of these areas will be necessary to ensure our riparian corridors are healthy, ecosystems remain intact, and we can meet the needs of present and the future increasing demands on our public lands.

2.4.9 Special Status Species – Wildlife

The BLM is responsible for managing habitat for special status wildlife 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.

2.4.9.1 Regional Context

Please refer to the Wildlife section for a discussion of the regional context for Special Status Species – Wildlife.

2.4.9.2 Resource Characterization

Indicators

For a discussion of indicators related to wildlife species, see the Wildlife section of this Summary of the AMS.

Current Condition

Numerous special status wildlife species occur or have habitat available in the planning area (Table 2-36). The list includes one species listed as Endangered under the ESA (black-footed ferret) and one that is under review for listing (greater sage-grouse). The planning area also includes habitat for 23 additional species listed by BLM Wyoming as sensitive and 39 species listed by WYNDD as species of concern.

Game Species

Trophy Game

No special-status trophy game species are found in the planning area.

Game Birds / Small Game

Upland Game Birds

The greater sage-grouse is listed as a sensitive species by BLM (Wyoming). In recent years, several petitions have been submitted to the USFWS to list greater sage-grouse as Threatened or Endangered. On January 12th, 2005, the USFWS issued a decision that the listing of the greater sage-grouse was "not warranted" following a Status Review. The decision document supporting this outcome noted the need to continue or expand all conservation efforts to conserve sage-grouse. In 2007, the U.S. District Court remanded that decision, stating that the USFWS' decision-making process was flawed and ordered the USFWS to conduct a new Status Review as a result of a lawsuit and questions surrounding the 2005 review (Winmill 2007). On April 28, 2009 the USFWS announced it would begin a status review to determine whether the western sage-grouse qualifies for protection under the Endangered Species Act (ESA).

Greater sage-grouse are found in prairie, sagebrush shrublands, other shrublands, wet meadows, and agricultural areas; they depend upon substantial sagebrush stands for nesting and winter survival.

Impacts from CBNG development and urbanization are likely to be significant and additive to the long-term impacts afflicting the sage-grouse population (WGFD 2004). Greater sage-grouse habitat is being directly lost with the addition of well sites, roads, pipelines, powerlines, reservoirs and other infrastructure in the Powder River Basin (WGFD 2005, WGFD 2004). Sage-grouse avoidance of CBNG infrastructure results in even greater indirect habitat loss. Noise can affect sage-grouse by preventing vocalizations that influence reproduction and other behaviors (WGFD 2003).

Vegetation communities within the planning area are naturally fragmented, as they represent a transition between the intermountain basin sagebrush communities to the west and the prairie communities to the east. The planning is also near the eastern edge of greater sage-grouse range. The planning area sage-grouse habitat patch size has decreased by more than 63 percent in the past forty years (Rowland et al. 2005).

Mammals

No special status small game species are found in the planning area.

Migratory Game Birds

No special status migratory game bird species are found in the planning area.

Furbearers

No special status furbearer species are found in the planning area.

Predatory Animals

No special status predatory animal species are found in the planning area.

Non-Game Species

Raptors

The bald eagle was removed from the Endangered species list in 2007, but remains a BLM Wyoming sensitive species. The peregrine falcon was removed from the Endangered species list in 1999 and remains a BLM Wyoming sensitive species.

Neotropical Migrants

Listing of the yellow-billed cuckoo under the ESA was found to be warranted, but precluded in 2001, and the species remains a candidate species under the ESA and a BLM sensitive species in Wyoming. The mountain plover was withdrawn from consideration for listing under the ESA in September 2003, but retains status as a BLM sensitive species in Wyoming.

Mammals

No black-footed ferrets are known to exist within the planning area, but WGFD has identified seven prairie dog complexes located at least partially within the planning area as potential black-footed ferret reintroduction sites. The black-tailed prairie dog was a candidate for listing under the ESA, but was withdrawn from consideration in 2004 and remains a BLM Wyoming sensitive species.

Table 2-36. Special Status Wildlife in the Planning Area

Common Name	Habitat	Status
Small Game		
Bighorn mountain snowshoe hare*	High elevation riparian or shrubby habitats.	Wyoming Animal Species of Concern
Upland Game		
Greater sage-grouse	Sagebrush habitats.	BLM Sensitive Species, Wyoming Animal Species of Concern
Columbian sharp-tailed grouse	Mountain-foothills shrub communities of serviceberry, snowberry, chokecherry, and Gambel oak, sagebrush-grassland, and willow riparian habitats. Mountain-foothills shrub and sagebrush-snowberry habitats in the transitional zone between sagebrush-grass and forested habitats.	BLM Sensitive Species
Trumpeter Swan	Foraging grounds during migration include wetlands, lakes and reservoirs.	BLM Sensitive Species
Furbearers		

Table 2-36. Special Status Wildlife in the Planning Area

Common Name	Habitat	Status
Swift fox	Grasslands, plains, and foothills in short-grass prairies and deserts.	BLM Sensitive Species
Raptors		
Bald eagle	Near large lakes and rivers in forested habitat where adequate prey and old, large-diameter cottonwood or conifer trees are available for nesting.	BLM Sensitive Species, WGFD Native Species Status 2, Wyoming Animal Species of Concern
Boreal owl	Mature, high elevation forests of Engelmann spruce, subalpine fir, and lodgepole pine interspersed mature aspen.	WGFD Native Species Status 4, Wyoming Animal Species of Concern
Ferruginous hawk	Arid and semiarid grassland regions with is open, level, or rolling prairies. Foothills or middle elevation plateaus largely devoid of trees, and cultivated shelterbelts or riparian corridors.	BLM Sensitive Species, WGFD Native Species Status 3, Wyoming Animal Species of Concern
Northern goshawk	Mature, high-elevation forests of Engelmann spruce, subalpine fir, and lodgepole pine interspersed with mature aspen stands. Need a home range of over 2,500 acres.	BLM Sensitive Species, WGFD Native Species Status 4, Wyoming Animal Species of Concern
Peregrine falcon	Open habitats from open woodlands and forests to shrub-steppe, grasslands, marshes, and riparian habitats. Nests in cliffs.	BLM Sensitive Species, WGFD Native Species Status 3, Wyoming Animal Species of Concern
Swainson's hawk	Open grasslands, prairies, farmlands, and deserts that have some trees for nesting.	BLM Sensitive Species
Western burrowing owl	Arid and semiarid environments, with well-drained, level to gently sloping areas characterized by sparse vegetation and bare ground. It prefers open prairie, grassland, desert, and shrub-steppe habitats, and may also inhabit agricultural areas. Dependent on burrowing mammals, like prairie dogs and ground squirrels.	BLM Sensitive Species, WGFD Native Species Status 4, Wyoming Animal Species of Concern
Neotropical Migrants		
Baird's sparrow	Native mixed-grass and fescue prairie.	BLM Sensitive Species, Wyoming Animal Species of Concern
Black-billed cuckoo	Nests in groves of trees, forest edges, moist thickets, overgrown pastures in deciduous or evergreen tree or shrubs.	Wyoming Animal Species of Concern
Brewer's sparrow	Northern Rocky Mountains including sagebrush and alpine meadows.	BLM Sensitive Species
Calliope hummingbird	Mountains (along meadows, canyons and streams), in open montane forests, and in willow and alder thickets. Commonly found in chaparral, lowland brushy areas, and deserts during migration and in winter.	Wyoming Animal Species of Concern
Chestnut-collared longspur	Shortgrass and open mixed-grass prairies. Prefers relatively mesic areas. Low, moist areas and wet-meadow zones around wetlands may provide suitable habitat.	Wyoming Animal Species of Concern
Loggerhead shrike	Grasslands interspersed with scattered trees and shrubs that provide nesting and perching sites.	BLM Sensitive Species
Long-billed curlew	Plains, grasslands, and prairies.	BLM Sensitive Species, WGFD Native Species Status 3, Wyoming Animal Species of Concern

Table 2-36. Special Status Wildlife in the Planning Area

Common Name	Habitat	Status
McCown's longspur	Open, dry, sparsely vegetated areas. It prefers shortgrass prairie and basin-prairie shrubland habitats, and also inhabits plowed and stubble fields, grazed pastures, dry lakebeds, and other sparse, bare, dry ground.	WGFD Native Species Status 4, Wyoming Animal Species of Concern
Mountain plover	Low, open habitats such as arid shortgrass, and mixed grass prairies dominated by blue grama and buffalo grass with scattered clumps of cacti and forbs, and saltbush habitats of the shrub-steppe of central and western Wyoming.	BLM Sensitive Species, WGFD Native Species Status 4, Wyoming Animal Species of Concern
Sage sparrow	Sagebrush flats, alkaline flats with saltbush, and semi-desert shrublands in the lowlands.	BLM Sensitive Species, Wyoming Animal Species of Concern
Sage thrasher	Open, shrub-steppe country dominated by sagebrush or bitterbrush, with native grasses intermixed, generally avoiding cheatgrass-dominated landscapes.	BLM Sensitive Species
Virginia's warbler	Middle elevations, where coniferous woodland or forest mixes with deciduous shrubs or trees.	Wyoming Animal Species of Concern
Williamson's sapsucker	Open, mixed coniferous and deciduous forests in mountain areas up to 10,000 feet.	Wyoming Animal Species of Concern
Non-Game Bird Species		
Common loon	Lakes at least 10 acres, secluded from humans, with clear water, and islands or protected shores for nesting between 6,000-8,000 feet.	WGFD Native Species Status 1, Wyoming Animal Species of Concern
Pygmy nuthatch	Ponderosa pine forests, although it also occurs in other coniferous habitats. It prefers mature to old-growth stands that are fairly open with a component of vigorous trees of intermediate age.	WGFD Native Species Status 4, Wyoming Animal Species of Concern
Three-toed woodpecker	Coniferous forests, primarily above 8,900 feet. Must include unfragmented blocks of old-growth and an abundance of dying trees with occasional disturbances.	Wyoming Animal Species of Concern
White-faced ibis	Shallow lake waters, muddy ground of wet meadows, marshes, ponds, lakes, rivers, flooded fields, and estuaries.	BLM Sensitive Species
Mammals		
Bighorn mountain pika	High-elevation talus fields fringed by suitable vegetation on rocky slopes of alpine and sub-alpine areas throughout western North America.	Wyoming Animal Species of Concern
Black-footed ferret	Shortgrass and midgrass prairies in close association with prairie dog colonies.	Endangered
Black-tailed prairie dog	Dry, flat, open, shortgrass and mixed-grass grasslands with low, relatively sparse vegetation, including areas overgrazed by cattle.	BLM Sensitive Species, WGFD Native Species Status 3, Wyoming Animal Species of Concern
Fisher*	Extensive coniferous forests (mature to late successional) with a high degree of continuous overhead cover.	Wyoming Animal Species of Concern
Fringed myotis	Hot desert scrubland, grassland, xeric woodland, sage-grass steppe, mesic old-growth forest, and multi-aged sub-alpine coniferous and mixed-deciduous forest. Xeric woodlands (oak and pinyon-juniper).	BLM Sensitive Species, WGFD Native Species Status 2, Wyoming Animal Species of Concern

Table 2-36. Special Status Wildlife in the Planning Area

Common Name	Habitat	Status
Hayden's shrew	Grasslands, prairies, marshes, riparian areas, and wet meadow. Nests under logs or rocks or in crevices.	Wyoming Animal Species of Concern
Long-eared myotis	Coniferous forests in mountain areas. Roosts in small colonies in caves, buildings, and under tree bark.	BLM Sensitive Species
North American wolverine*	Subalpine coniferous forests, especially dense, continuous stands in remote mountain areas, and alpine habitats.	WGFD Native Species Status 3, Wyoming Animal Species of Concern
Spotted bat	Prominent rock features in extreme, low desert habitats to high elevation forests.	BLM Sensitive Species, WGFD Native Species Status 2, Wyoming Animal Species of Concern
Townsend's big-eared bat	Mines, caves, and structures in woodlands and forests to elevations above 9,500 feet.	BLM Sensitive Species, WGFD Native Species Status 2, Wyoming Animal Species of Concern
Water vole	Moist subalpine and alpine meadows of willows, grasses, and forbs atop deep soils.	WGFD Native Species Status 3, Wyoming Animal Species of Concern
Yuma myotis	Arid desert shrubland as long as open water is present.	Wyoming Animal Species of Concern
Reptiles And Amphibians		
Northern leopard frog	Permanent ponds, swamps, marshes, and slow-moving streams throughout forest, open, and urban areas. Water bodies with abundant aquatic vegetation.	BLM Sensitive Species
Spotted frog	Sub-alpine forests grasslands and sagebrush habitats at elevations from 1,700 feet to 6,400 feet.	BLM Sensitive Species

Source: BLM 2002

* Occurrence in the planning area is vague or unsubstantiated, according to WYNDD

** Canada lynx is listed as Threatened under the ESA. Although WYNDD considers the Canada lynx a species of concern in Johnson and Sheridan Counties, USFWS has not designated critical habitat within the planning area, and impacts to this species are therefore not considered in management decisions.

BLM – BLM; WGFD –; WYNDD – Wyoming Natural Diversity Database; ESA – Endangered Species Act; USFWS – US Fish and Wildlife Service.

The black-footed ferret is one of the most Endangered mammals in North America. The black-footed ferret has not been documented in the planning area.

Loss of habitat is the primary reason black-footed ferrets remain listed as Endangered. Conversion of grasslands to agricultural uses, widespread prairie dog eradication programs, and incidences of the plague have reduced ferret habitat to less than two percent of what once existed. Remaining habitat is now fragmented, with prairie dog towns separated by great expanses of cropland and human development. Many other sensitive species, such as burrowing owls, mountain plovers, swift fox, and ferruginous hawks are strongly linked to this habitat for their survival.

Reptiles and Amphibians

The snapping turtle is reptile species of concern found within the planning area. The northern leopard frog and spotted frog are BLM sensitive species and the northern leopard frog is WGFD amphibian species of concern.

Trends

Most of the trends that affect other species of wildlife in the planning area also affect special status species. These trends include habitat degradation and fragmentation, livestock grazing management, invasive species, motor vehicles, and climate. See the Wildlife section for additional information.

Game Birds / Small Game

Upland Game Birds

The sage-grouse population within the planning area is exhibiting a steady long term downward trend (WGFD 2005). Sage-grouse populations naturally exhibit a ten-year cycle of periodic highs and lows. Population trends within the planning area are indicating that each subsequent population peak is lower than the previous peak. Long-term harvest trends are similar to that of lek attendance (WGFD 2005).

Current research suggests that impacts to leks from energy development are discernable out to a minimum of four miles, and that some leks within this radius have been extirpated as a direct result of energy development (state wildlife agencies' ad hoc committee for sage-grouse and oil and gas development 2008). Even with a timing limitation on construction activities, sage-grouse may avoid nesting within CBNG fields because of the activities associated with operation and production. In a typical landscape in the planning area, energy development within two miles of leks is projected to reduce the average probability of lek persistence from 87 percent to 5percent percent (Walker et al. 2007).

Another concern for greater sage-grouse populations is that reservoirs created for water disposal, associated with CBNG development, provide habitat for mosquitoes associated with West Nile virus (WGFD 2004). West Nile virus represents a significant new stressor, which in 2003 reduced late summer survival of sage-grouse an average of 25 percent within four populations including the Powder River Basin (Naugle et al. 2004). In northeastern Wyoming and southeastern Montana, West Nile virus-related mortality during the summer resulted in an average decline in annual female survival of 5 percent from 2003 to 2006 (Walker et al. 2007). Sage-grouse losses in the planning area during 2004 and 2005 were not as severe. Summer 2003 was warm and dry, more conducive to West Nile virus replication and transmission than the cooler summers of 2004 and 2005 (Cornish pers. comm.).

Wyoming BLM has listed the Columbian sharp-tailed grouse as a sensitive species. The WGFD classifies the Columbian sharp-tailed grouse as a Species of Special Concern with a Native Species Status of 3 (NSS3) because populations are restricted in numbers and distribution, and habitat is vulnerable, although there is no ongoing significant loss. Conversion of low elevation mountain-foothills shrub, sagebrush, and grassland communities to cropland and other human

development has contributed to a loss of Columbian sharp-tailed grouse habitat. Loss of vegetative cover, invasion of nonnative annual vegetation, pesticides, and fire (too much in some areas, not enough in other areas) have reduced the quality of existing Columbian sharp-tailed grouse habitat. Lek sites isolated by more than 40 km (25 mi) from other lek sites may be vulnerable to demographic and genetic stochasticity. Human activities, including loud noises and mechanical, recreational, and photographic activities, near active leks can interrupt and disturb breeding activity.

The WGFD classifies the trumpeter swan as a Species of Special Concern with a Native Species Status of 2 (NSS2) and Wyoming BLM considers it a sensitive species because breeding populations are restricted in numbers and distribution, there is ongoing significant loss of nesting habitat, and it is sensitive to human disturbance. The rapidly increasing number of swans migrating from Canada and wintering in the Greater Yellowstone Area could out-compete the resident swans for the limited amount of winter and early spring forage. Early spring habitat is necessary for the reproductive success of swans nesting in Wyoming and is probably a primary limiting factor. The Wyoming nesting population appears stagnant and unable to expand into adjacent habitats. Collisions with powerlines and fences and illegal shooting are responsible for nearly 60 percent of trumpeter swan deaths in Wyoming. For as yet undetermined reasons, the number of trumpeter swans that successfully nest in Wyoming is extremely limited and recruitment of sub-adults into the population is low. Many of the historical nesting sites are not occupied by nesting pairs or are not productive. Human activity in swan habitat, including housing developments, tourism, and recreation, is increasing dramatically.

Non-game Species

Raptors

The bald eagle is considered an uncommon resident in Wyoming, although the number of nesting pairs in the state has increased from 20 in 1978 to over 100 in 2002. This is a Wyoming BLM sensitive species. The WGFD classifies it as a Species of Special Concern with a Native Species Status of 2 (NSS2) because breeding populations are restricted in numbers and distribution, there is ongoing significant loss of nesting habitat, and it is sensitive to human disturbance. Human activity and development (residential and recreational) near rivers and lakes continues to escalate and is degrading bald eagle nesting habitat. Pioneering pairs of bald eagles often have difficulty becoming established in areas that are disjunct from other successful nesting pairs. Bald eagles are still accumulating organochlorines and relatively high levels of heavy metals, and may also be at risk from organophosphate or carbamate pesticides. These contaminants could affect production and survival.

The abundance of the boreal owl is unknown in Wyoming. The WGFD classifies it as a Species of Special Concern with a Native Species Status of 4 (NSS4) because its population status and trends are unknown, although they are expected to be stable, and because its habitat is restricted and vulnerable, although there is no ongoing significant loss of habitat. The population status and trends of boreal owls in Wyoming are largely unknown. The Breeding Bird Survey does not adequately census this species because of a lack of routes in its preferred habitat and the timing of the Breeding Bird Survey, which is asynchronous with its nesting period. Impacted by forest fragmentation and removal of mature forest habitats on a regional scale, which result in reductions of prey populations, nesting cavities, and foraging habitat.

The ferruginous hawk is considered a common resident in Wyoming. Wyoming BLM considers it as a sensitive species. The WGFD classifies it as a Species of Special Concern with a Native Species Status of 3 (NSS3) because populations are restricted in distribution, and because it is sensitive to human disturbance. Impacted by conversion of native prairie to cropland or other uses, urbanization, loss of vegetative cover, poisoning, human disturbance near the nest site, and reduced prey availability, including the elimination of prairie dog towns and ground squirrel colonies. Resource development is occurring or proposed for a significant portion of ferruginous hawk nesting habitat in Wyoming, and can decrease prey abundance and/or reduce availability of nesting sites. Current monitoring efforts are not adequate to document population trends or identify needed management over large areas of the state.

The northern goshawk is considered a common resident in Wyoming. Wyoming BLM considers it as a sensitive species. The WGFD classifies it as a Species of Special Concern with a Native Species Status of 4 (NSS4) because its population status and trends are unknown, although they are expected to be stable; because its habitat is vulnerable, although there is no ongoing significant loss of habitat; and because it is sensitive to human disturbance. The population status and trends of northern goshawks in Wyoming are largely unknown. The Breeding Bird Survey does not adequately census this species. Incompatible timber harvesting techniques may remove suitable nest stands and degrade habitat by reducing stand density and canopy cover. Fire suppression, catastrophic fires, loss of vegetative cover, and insect and tree disease outbreaks can result in the deterioration or loss of nesting habitat. Human disturbances (such as timber harvesting) may cause nest abandonment.

The peregrine falcon is considered a rare resident in Wyoming. Wyoming BLM considers it as a sensitive species. The species suffered severe population declines and was extirpated from much of its range because of widespread use of pesticides, especially DDT, that caused extensive eggshell thinning and reproductive failure. By the late 1970s, viable breeding populations no longer existed in Wyoming. In 1972 the use of many pesticides, including DDT, was limited by federal legislation, and in 1980 the WGFD formed a partnership with The Peregrine Fund, Inc., and began a 15-year cooperative reintroduction effort. Since 1984,

Wyoming's nesting population has increased by about 35 percent every year, and more than 60 pairs nested in the state in 2002. The WGFD classifies the peregrine falcon as a Species of Special Concern with a Native Species Status of 3 (NSS3) because its populations are restricted in distribution; its habitat is restricted, although there is no ongoing significant loss of habitat; and it is sensitive to human disturbance. The development and use of new chemicals along with growing pollution could increase environmental contamination and again threaten production and nesting populations. Increasing numbers and distribution of peregrines in Wyoming mean a dramatic increase in survey efforts to continue adequate documentation of the population increase, but funding is increasingly inadequate to monitor peregrine populations.

The Swainson's hawk is considered a common summer resident in Wyoming. Wyoming BLM considers it as a sensitive species. The WGFD classifies it as a Species of Special Concern with a Native Species Status of 4 (NSS4) because population status and trends are unknown, although they are suspected to be stable, and because its habitat is restricted and vulnerable, although there is no ongoing significant loss of habitat. The Swainson's hawk is impacted by the loss of native grasslands and nest trees, conversion of suitable agricultural land to urbanization, pesticide use (especially on the wintering grounds), and shooting during migration.

The western burrowing owl, a Wyoming BLM sensitive species, has declined significantly throughout its North American range. Current population estimates for the United States are not well known but trend data suggest significant declines (McDonald et al. 2004). The last official population estimate placed them at less than 10,000 breeding pairs. The majority of the states within the owl's range have recognized that western burrowing owl populations are declining. It is listed as a sensitive species by the BLM throughout the west and by the USFS. Primary threats across the North American range of the burrowing owl are habitat loss and fragmentation primarily due to intensive agricultural and urban development, and habitat degradation due to declines in populations of colonial burrowing mammals (Klute et al. 2003).

Mammals

Black-tailed prairie dogs are listed as a Wyoming BLM sensitive species. The WGFD classifies the black-tailed prairie dog as a Species of Special Concern with a Native Species Status of 3 (NSS3) because populations are declining, although extirpation is not imminent, and because its habitat is vulnerable, although there is no ongoing significant loss of habitat. Population trends and status are not well documented. Current trend data have not been readily available to the general public and resource managers. There are extreme differences of opinions concerning acceptable statewide population objectives and appropriate management responses if objectives are not maintained. Prairie dogs have been targets of intensive eradication programs and conservation efforts may be poorly understood and not supported. Sylvatic

plague has the potential to have substantial adverse impacts on prairie dog populations. There are currently no effective management approaches to mitigate the spread of plague. Listed as a pest under Wyoming's Weed and Pest Act, and recreational shooting is currently not regulated or monitored by the WGFD.

Swift foxes are listed as a Wyoming BLM sensitive species. The WGFD classifies it as a Species of Special Concern with a Native Species Status of 4 (NSS4) because population status and trends are unknown, although they are suspected to be stable, and because its habitat is vulnerable, although there is no ongoing significant loss of habitat. Human related activities in the early 1800s through the mid 1900s contributed to a restricted distribution and abundance throughout the range of the swift fox. Some of these activities include the loss of native prairie habitat, predator control campaigns, unregulated trapping and hunting, and rodent control programs. Swift foxes are very vulnerable to trapping, poisoning, and death on highways. Population trends and distribution are poorly known in Wyoming.

The WGFD classifies the fisher as a Species of Special Concern with a Native Species Status of 3 (NSS3) because populations are restricted in numbers and distribution, and its habitat is restricted. Population, status, trends, and distribution of the fisher are unknown, precluding effective management. There are no efforts to identify key habitats in Wyoming. Populations may be limited in some areas by timber harvesting (including firewood cutting) and high-intensity fires in spruce-fir forests.

The fringed myotis is a Wyoming BLM sensitive species. The WGFD classifies it as a Species of Special Concern with a Native Species Status of 2 (NSS2) because populations are restricted in distribution and there is ongoing significant loss of habitat. Of all the populations in Wyoming, the Black Hill population is considered to be of special concern due to its restricted distribution. Population status, trends, and distribution of the fringed myotis are unknown in Wyoming, precluding effective management. Roosting habitat has been lost in Wyoming and continues to be threatened by abandoned mine reclamation, removal of old buildings, and renewed mining. The fringed myotis is extremely sensitive to disturbance at roost sites, particularly maternity colonies. Recreational activities (such as spelunking and rock climbing) may impact roosting bats in caves, abandoned mines, and rock crevices. Timber harvest and the removal of snags may result in loss of roosting habitat. Broad-scale insect control projects may impact the prey base of bats and other insectivores.

The Hayden's shrew is considered rare in Wyoming. WGFD classifies it as a Species of Special Concern with a Native Species Status of 4 (NSS4) because populations are restricted in distribution and habitat is vulnerable, although there is no ongoing significant loss of habitat. Population status, trends, and distribution of the Hayden's shrew are unknown, precluding effective management. There are no efforts to identify or maintain key habitats in Wyoming.

Sampling and identification of shrews requires special methods, equipment, and experience to be successful and scientifically useful.

Although it is scattered throughout most of the state at elevations between 1525 and 2990 m (5000 and 9800 ft), the long-eared myotis is considered uncommon. It is considered a sensitive species by Wyoming BLM. The WGFD classifies it as a Species of Special Concern with a Native Species Status of 2 (NSS2) because populations are restricted in distribution and there is ongoing significant loss of habitat. Population status, trends, and distribution of the long-eared myotis are unknown in Wyoming, precluding effective management. Roosting habitat has been lost in Wyoming and continues to be threatened by abandoned mine reclamation, removal of old buildings, and renewed mining. Recreational activities (such as spelunking and rock climbing) may impact roosting bats in caves, abandoned mines, and rock crevices. Timber harvest and the removal of snags may result in loss of roosting habitat. Broad-scale insect control projects may impact the prey base of bats and other insectivores.

The spotted bat is considered rare in Wyoming. This species is listed as a Wyoming BLM sensitive species. The WGFD classifies it as a Species of Special Concern with a Native Species Status of 2 (NSS2) because populations are restricted in distribution and there is ongoing significant loss of habitat. Population status, trends, and distribution of the spotted bat are unknown in Wyoming, precluding effective management. It is an extremely difficult species to inventory and monitor. Activities such as rock climbing and quarry operations may impact roosting bats in rock crevices and cliffs. Broad-scale insect control projects may impact the prey base of bats and other insectivores.

The Townsend's big-eared bat is considered rare in Wyoming. This is a Wyoming BLM sensitive species. The WGFD classifies it as a Species of Special Concern with a Native Species Status of 2 (NSS2) because populations are restricted in distribution and there is ongoing significant loss of habitat. Population status, trends, and distribution of the Townsend's big-eared bat are unknown in Wyoming, precluding effective management. Roosting habitat has been lost in Wyoming and continues to be threatened by abandoned mine reclamation and renewed mining. The Townsend's big-eared bat is extremely sensitive to disturbance at maternity roosts and hibernacula. Recreational activities (such as spelunking) may impact roosting bats in caves and abandoned mines. Broad-scale insect control projects may impact the prey base of bats and other insectivores.

The water vole is considered rare in Wyoming. The WGFD classifies it as a Species of Special Concern with a Native Species Status of 3 (NSS3) because populations are restricted in distribution, and because its habitat is vulnerable, although there is no ongoing significant loss of habitat. Special concern has been expressed over the status, distribution, and condition of the Bighorn Mountain population of water voles. Population status, trends, and distribution of

the water vole are unknown in Wyoming, precluding effective management. Efforts to identify key habitats in Wyoming have been limited. In some areas, vegetative cover has been removed from stream banks. Although suitable habitat in Wyoming is widely distributed, it is naturally fragmented and very limited. Geographical isolation of existing sub-populations may leave them vulnerable to demographic and genetic stochasticity.

Reptiles and Amphibians

While leopard frogs were once very common, their populations are currently undergoing a dramatic decline. While no single factor has been flagged as the overwhelming cause for the reduction in leopard frog populations there are several contributing factors: disease (red-leg, chytrid), introduced species (bullfrogs, fish, crayfish), chemicals (atrazine, rotenone etc.) and habitat loss/alteration/fragmentation. Habitat changes and other factors may be adversely affecting this species, but lack of data precludes identification of specific problems and development of management recommendations. Population status, distribution and habitat data are lacking for this species. The Northern leopard frog is a Wyoming BLM sensitive species.

In Wyoming, the spotted frog is found in the following counties: Bighorn, Sheridan, Johnson, Teton, Sublette, Fremont and Lincoln. A large population of these frogs is located in Yellowstone National Park. The Bighorn Mountain population is probably limited in its range and vulnerable to extirpation. Introduced species, such as the bullfrog, are thought to be a factor in the decline of this species. Other factors such as alterations in habitat quality may be a factor as well. The source and extent of these alterations is not well understood. This is a Wyoming BLM sensitive species.

Forecasts

Under current management, the forecast for special status species in the planning area is predicted to decline. Many of the forecasts presented in the Wildlife section for other species of wildlife in the planning area also apply to special status species. This is because the forecasted changes (e.g., increased habitat disturbance/loss and climate change-related habitat alteration) would also alter the habitat quality and availability for special status species. Please refer to this the Wildlife section for more information.

Key Features

Riparian corridors – Four types of riparian ecosystems, including wetlands, have been identified in the planning area, including forested riparian, shrubby riparian, herbaceous riparian and wet meadow. Three percent of the planning area is made up of riparian and wetland areas. The ecological community-scale functions of riparian ecosystems include: (1) the presence of surface water and abundant soil moisture that attract or facilitate plant and animal occurrence;

(2) high productivity within various food chains; (3) disproportionate species richness and abundance relative to surrounding areas; (4) diversity and interspersion of habitat features that create more niches for plants and animals; and (5) corridors for animal dispersion and migration (Brinson et al. 1981).

Hunters, anglers, bird watchers, and biologists have long recognized the value of riparian ecosystems to fish and wildlife. Riparian ecosystems are particularly valuable in a dry environment such as Wyoming. It has been estimated that, although only 3 percent of the planning area is classified as riparian land, about 80 percent of the native animals depend on riparian zones for food, water shelter, and migration routes during some time of the year (Olson and Gerhart 1982).

Alteration of the hydraulic conditions can affect the physical and chemical properties in a wetland, such as pH, soil salinity, sediment properties, oxygen content, and nutrient availability. Small changes in the hydraulic conditions can result in massive responses by wetland biota in terms of species composition, species richness, and ecosystem productivity. Changes to the interrelationships among surface water dynamics, groundwater level, and river channel processes can lead to changes in the establishment and maintenance of dependent riparian plant communities (Busch and Smith 1995). These changes are rapidly occurring within the planning area. The primary impacts to the riparian ecosystems of the planning area are (1) livestock grazing and agricultural water withdrawals; (2) physical disturbances created by the extraction of oil and gas resources; and (3) discharge of coal bed natural gas produced water directly into riparian corridors.

Special management of these areas will be necessary to ensure our riparian corridors are healthy, ecosystems remain intact, and we can meet the needs of present and the future increasing demands on our public lands.

Prairie Dog Colonies – The black-tailed prairie dog was added to the list of Candidate species for federal listing on February 4, 2000 (USFWS 2000). On August 12, 2004, the USFWS removed the black-tailed prairie dog's Candidate status. BLM Wyoming, considers prairie dogs as a sensitive species and continues to afford this species protections. The black-tailed prairie dog is a diurnal rodent inhabiting prairie and desert grasslands of the Great Plains.

The black-tailed prairie dog is considered common in Wyoming, although its abundance fluctuates with activity levels of Sylvatic plague and the extent of control efforts by landowners. Comparisons with 1994 Digital Ortho Quads indicated that black-tailed prairie dog acreage remained stable from 1994 through 2001. However, aerial surveys conducted in 2003 to determine the status of known colonies indicated that a significant portion (approximately 47percent) of the prairie dog acreage was impacted by Sylvatic plague and/or control efforts (Grenier et al 2004). Due to human-caused factors, black-tailed prairie dog populations are

now highly fragmented, and isolated (Miller 1994). Most colonies are small and subject to potential extirpation due to inbreeding, population fluctuations, and other problems, such as landowner poisoning and disease that affect long term population viability (Primack 1993, Meffe and Carroll 1994, Noss and Cooperrider 1994). Prairie dogs have declined as much as 98 percent throughout North America since European settlement.

Prairie dogs have been described as a keystone species and an ecological engineer. They build prairie dog towns, which provide habitat for over 170 species. Of those species regularly associated with prairie dog colonies, six are on the Wyoming BLM sensitive species list: swift fox, mountain plover, ferruginous hawk, burrowing owl, loggerhead shrike, and long-billed curlew. This biodiversity issue is relevant in the planning area.

Sagebrush Steppe ecosystems – Sagebrush Steppe ecosystems support a variety of species. Sagebrush obligates are animals that cannot survive without sagebrush and its associated perennial grasses and forbs; in other words, species requiring sagebrush for some part of their life-cycle. Sagebrush obligates within the Powder River Basin, listed as sensitive species by BLM Wyoming include greater sage-grouse, Brewer's sparrow, sage thrasher, and sage sparrow.

Greater sage-grouse are found in prairie, sagebrush shrublands, other shrublands, wet meadows, and agricultural areas; they depend upon substantial sagebrush stands for nesting and winter survival (BLM 2003a). The greater sage-grouse is listed as a sensitive species by BLM (Wyoming). In recent years, several petitions have been submitted to the USFWS to list greater sage-grouse as Threatened or Endangered. On January 12th, 2005, the USFWS issued a decision that the listing of the greater sage-grouse was “not warranted” following a Status Review. The decision document supporting this outcome noted the need to continue or expand all conservation efforts to conserve sage-grouse. In 2007, the U.S. District Court remanded that decision, stating that the USFWS’ decision-making process was flawed and ordered the USFWS to conduct a new Status Review as a result of a lawsuit and questions surrounding the 2005 review (Winmill 2007).

Sage sparrows, Brewer’s sparrows, and sage thrashers all require sagebrush for nesting, with nests typically located within or under the sagebrush canopy. Sage thrashers usually nest in tall dense clumps of sagebrush within areas having some bare ground for foraging. Sage sparrows prefer large continuous stands of sagebrush, and Brewer’s sparrows are associated closely with sagebrush habitats having abundant scattered shrubs and short grass (Paige and Ritter 1999). Other sagebrush obligate species include sagebrush vole, pronghorn, and sagebrush lizard. This biodiversity issue is relevant in the planning area.

2.5 Heritage and Visual Resources

2.5.1 Cultural Resources

Cultural resources are tangible, physical evidence or expression of past human activity in the form of material items produced by human workmanship or use, and elements of the natural environment that were altered by people's activities. Examples of cultural resources include artifact scatters, animal traps, rock art, battle sites, trails and structures. Cultural resources can possess important scientific information about the past and may be valuable to the cultural and social heritage of our citizens, locally, regionally and nationally. Archeologists, anthropologists, ethnographers, historians and other researchers study the remains of the past in an effort to identify the forces that have shaped human history, and to define how cultures originate, develop and interact with the environment. Cultural resources in the form of emigrant trails, rock art, campsites, mines, ghost towns, homesteads, or sacred sites can provide people with visible links to their past and reminders of their ancestral heritage. In turn, this can help to foster a sense of belonging and pride in our cultural and historical backgrounds.

2.5.1.1 Regional Context

Prehistoric cultural resources are those materials deposited or left behind prior to the entry of non-American Indian (i.e., European) explorers and settlers into an area. Protohistoric refers to the variable transition period from prehistoric to historic. The latter is that time after the European presence was permanently established. The Prehistoric Period, subdivided into a number of sub-periods (e.g. Paleoindian Period, Archaic Period, Late Prehistoric Period), began with the entry of human beings into North America somewhere around 12,000 to 15,000 years ago, or perhaps much earlier, according to recent data. The Protohistoric Period in the planning area began with the entry of horse and Euro-American trade goods into northeastern Wyoming by approximately 1750. The Historic period began in the early 1800s as fur trappers entered the region.

2.5.1.2 Resource Characterization

Indicators

The primary indicator for cultural resources is whether there is a loss of those characteristics that may qualify the property for listing on the National Register of Historic Places (NRHP) or would diminish the cultural value of areas important to Native American or other traditional communities.

Current Condition

Although there are no current academic excavation projects in the planning area, several such excavations occurred in the 1970s. Generally led by Wyoming State Archeologist Dr. George Frison, excavations were undertaken at the Sisters Hill, Carter-Kerr-McGee, Ruby, Piney Creek, Big Goose, Cordero Mine, Mavrakis-Bentzon-Roberts, Powder River and Mooney sites (Frison 1991). Data from these excavations was used by Dr. Frison the creation of the definitive text on Northwestern Plains archaeology, Prehistoric Hunters of the High Plains. Since the 1970s, excavations related to mitigating impacts from energy development have occurred in the field office, but such projects are rare. The majority of such excavation is associated with data recovery mitigation prior to coal mining which has not resulted in academic investigations.

With the onset of coalbed natural gas in the late 1990s, over one thousand archeological sites are evaluated each year for their eligibility to the NRHP. Subsurface testing may occur during such evaluations, but is very limited. Monitoring of construction projects in the planning results in a few unanticipated discoveries each year. None of the discoveries has led to a major excavation to date.

The current focus of the BFO cultural resource program is to avoid or mitigate impacts to cultural resources as a result of federally approved undertakings. The program is also responsible for identifying and protecting significant cultural resources on public lands. In addition, it is responsible for interpreting publically owned cultural resources for the public. Nearly all the above responsibilities are mandated by the National Historic Preservation Act (NHPA).

Hundreds of archeological sites are discovered and recorded each year as a result of inventory associated with energy development. The majority of these sites are assessed for their eligibility for the NRHP. As part of the eligibility determination, the site condition is assessed. Site condition can change over time due to erosion, grazing, unauthorized collection, vandalism, etc. Since the condition of a site can readily change, monitoring of site condition is necessary. Due to the recent increased emphasis on energy development, the field office has had little time to focus on tasks other than permitting. Very little site condition monitoring has been performed. Assuming that the emphasis on energy permitting in the field office will continue for several years, it is likely that thousands of new sites will be discovered over the next 10 to 20 years and the resources may not be available to perform follow up monitoring to assess site condition after the permitting process is completed.

It is also unclear if there are impacts to cultural resources resulting from any activity that is not subject to Section 106 compliance, such as dispersed recreation. Unauthorized site collection and vandalism may be occurring, but many significant sites in the field office have not been regularly monitored. Sites important to the nation's heritage such as Cantonment Reno, the

Dull Knife Battle and the numerous prehistoric sites in the Outlaw Cave area may be experiencing adverse impacts.

Prehistoric Trails

There are no documented prehistoric trails in the planning area.

Historic Trails

The planning area contains the Bozeman Trail, which is listed on the NRHP. Examples of historic trails that are eligible for the National Register in the planning area are the Deadwood Trail, the Sawyers Trail, Crooks 1876 Scout, and the Black and Yellow Road. The Texas Trail (historic cattle drive trail) is in the planning area, although there are no documented physical remains of the actual route. To date, there are no documented prehistoric trails in the planning area.

National Historic Landscapes

There are no National Historic Landscapes in the planning area.

Traditional Cultural Properties

Several sacred sites and one traditional cultural property (TCP), the Pumpkin Buttes, have been identified within in the planning area. TCP's are properties that are both eligible for the National Register and have traditional religious and/or cultural importance to a specific cultural group. It is likely that there are unidentified TCPs in the planning area. Sacred sites are not necessarily eligible for the National Register, but the American Indian Religious Freedom Act and Executive Order 13007 charge the agency with protecting these localities, consistent with other rights, and ensuring tribal access.

Native American Concerns

The BFO primarily consults Native American tribes over impacts to sacred sites or TCP's as mandated by NHPA, although tribal concerns can go beyond site specific impacts. Tribal concerns are documented and incorporated into decisions. BFO primarily initiates consultation in order to identify archeological sites that may have importance to the tribes. Some consultants expressed that archeologists are not adequately trained to locate areas that are important to a tribe, and suggest the use of trained tribal members to locate such sites. Tribes have expressed that sacred sites are not necessarily archeological in nature and may be more properly associated with specific geographic features or plant communities. BFO has not incorporated this specific type of inventory prior to a land use decision to date, but it should be considered during the RMP process. Some tribes have expressed an interest in gaining access to areas such as the Pumpkin Buttes for traditional uses and tribal education. Native American

burials have been located and in some cases inadvertently removed from public lands in the planning area. The Native American Graves Protection and Repatriation Act mandates that all Native American human remains and associated funerary objects on public lands are protected, and if they are removed, they are to be repatriated. BFO is actively working to repatriate Native American human remains and associated funerary objects which were removed from BLM lands. Occasionally, tribes request that such remains or funerary objects are re-interred on BLM-administered surface.

Trends

As the demand for production of federally owned minerals increases, there will be an increased demand to identify cultural resources. Prior to the approval of any surface disturbing activity associated with minerals development, intensive inventory is required. All minerals development related inventory and associated report writing in the field office is performed by contractors who hold a BLM cultural resource use permit . In the Powder River Basin EIS, BFO suggested that operators have their permittee perform large block inventories to better plan large projects with multiple wells and associated infrastructure, and the majority of operators have complied with this request. The contracted reports are used to determine if archeological sites which are eligible for the NRHP (eligible sites are also referred to as “historic properties”) will be impacted by the proposed action. Sites that are not eligible for the NRHP are not avoided and may be destroyed during construction. It is the BLM’s policy (as outlined in BLM Manual 8140) that historic properties are avoided by at least 100 feet. If historic properties cannot be avoided they must be mitigated. Site mitigation most often takes the form of data recovery through excavation. All site identification, determinations of effect, and avoidance or mitigation are done in consultation with the Wyoming State Historic Preservation Officer.

The demands of recent heightened federal minerals production has created, and will continue to create impacts to cultural resources. BFO archeologists often perform pre-approval field checks of contracted class III inventories, but are primarily focused on the project footprint and are unable to adequately verify the accuracy of large block inventories. As a result it is unclear if the contracted inventories are adequately locating all cultural resources. The emphasis on report review and permitting does not allow BFO archeological staff the time to adequately perform post approval duties. Although post-approval site monitoring is rare in the field office, many sites in developed areas appear to have been subject to unauthorized collection or vandalism. Protective measures are often required as conditions of approval for federal undertakings, but it is unclear if those measures are adequately followed.

Forecasts

As the demand for production of federally owned minerals increases, there will be an increased demand to identify cultural resources. Recreation (hiking, OHV use, hunting, and fishing) may

indirectly result in damage to cultural resources through unauthorized collection or vandalism. Grazing or any range improvement activity that removes vegetation or leads to soil erosion can cause impacts to cultural resources. Livestock concentration areas (such as those that form near water sources, supplemental feeding areas, and fence corners) and livestock trail formation may result in impacts to cultural resources.

Key Features

Numerous archeological sites that can be considered key features are identified throughout the planning area. Site types range from prehistoric sites that are significant for their scientific value, historic structures or the locations of significant historic events, and sacred sites that are significant to Native American tribes. There are undoubtedly additional key features throughout the planning area that have yet to be discovered.

Prehistoric sites

1) Buried sites:
    - Sisters Hill Site, Carter-Kerr-McGee Site, Ruby Site, Piney Creek Site, Big Goose Site, Cordero Mine Site, Mavrakis-Bentzen-Roberts Site, Powder River Site, Mooney Site
2) Rock Shelters:
    - Schiffer Cave Site, Grey-Taylor Site, Sweem-Taylor Site

Historic Sites

1) Features
    - Cantonment Reno, Fort Reno, Fort Phil Kearney, Fort McKinney, LX Bar Ranch, K Ranch, Sievers Ranch
2) Trails
    - Bozeman Trail, Deadwood Trail, Sawyers Expedition Route, Crook Scout Route, Black and Yellow Trail, Texas Trail
3) Battle Sites
    - Dull Knife Battle, Connor Battle, Crazy Woman Battle, Wagon Box Fight, Fetterman Battle,

Sacred Sites

1) TCPs
    - Pumpkin Buttes
2) Rock Art
    - Stone Circle/Cairn Sites

Areas with a high potential for buried cultural resources:

Alluvial deposits, and to a lesser extend colluvial deposits, typically have a high potential to contain intact buried cultural resources. Areas containing high to moderate potential for buried

cultural resources are key features that must be considered during the planning process. Buried archeological sites are nearly impossible to locate during a standard Class III inventory. When a federal undertaking is permitted in an area with a high potential for buried cultural material, archeological monitoring is often included as a condition of approval. Construction monitoring is performed by a qualified archeologist working in unison with construction crews. If buried cultural resources are located by the archeologist, construction is halted and the BLM consults with the SHPO relating to eligibility determinations and mitigation or avoidance.

South Bighorns:

The 1985 RMP necessitated the creation Cultural Resources Management Plan (CRMP) for the Outlaw Cave Archeological District. Although limited inventory indicates a high density of significant sites (rock shelters, rock art, and stratified buried sites) near Outlaw Cave and in the drainage of the Middle Fork of the Powder River, the density of significant sites is undoubtedly not limited to that specific of an area. The entire southern Big Horn Mountain foothills in the planning area most likely contain the same high density of significant sites, as indicated by limited inventories.

2.5.2 Paleontological Resources

Fossils are the remains, imprints, and traces of once-living organisms preserved in the Earth's crust. Fossils can be the remains of plants or animals (body fossils), or reflect their actions (trace fossils). Fossils are typically preserved in sedimentary rocks, or, in a few unique situations, igneous rocks. They can be microscopic, as in single-celled animals (bacteria) or pollen; or macroscopic, such as fossils of leaves, petrified wood, shells of invertebrate animals, bones, teeth, tracks, feeding traces, coprolites, and burrows. Typical public conceptions of fossils are those of animals, especially dinosaur bones or teeth, or petrified wood.

Management of paleontological resources on public surface lands is aimed at protecting vertebrate and other scientifically significant fossils for the benefit of the public as a whole. Significant fossils are defined by BLM policy as including all vertebrate fossil remains, or those plant and invertebrate fossils determined to be scientifically unique on a case-by-case basis. Abundance of these resources varies, with some geologic formations containing few or no significant fossils, to other formations known to commonly produce significant fossils throughout the formation.

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, using only hand tools. Commercial collecting of fossils is not permitted, except for petrified wood, which may be purchased under contract for commercial purposes. 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 one square meter or require mechanized equipment, the researcher must apply for an excavation permit. Prior to authorization of an excavation permit, the BLM must prepare a NEPA analysis for the proposed location. All fossils collected under a permit remain public property and must curated in an approved repository.

2.5.2.1 Regional Context

Nearly all of the geologic formations exposed within the planning area are found throughout the northern great plains and Rocky Mountain regions. The Wasatch Formation within the Powder River Basin is somewhat different both geologically and paleontologically from the Wasatch Formation in its type area in southwestern Wyoming, and is probably best thought of as a different formation here. The paleontological resource most noted from the Wasatch Formation within the planning area is the abundance of petrified wood, often found as nearly intact large logs and even still-standing trees preserved in place.

With the exception of the Wasatch Formation described above, which is confined to the Powder River Basin, the remaining formations in the planning area are all commonly found across the northern great plains with nearly identical geological and paleontological characteristics, meaning there are no unique resources in this planning area. Most of these geologic formations are better exposed in other areas, leading to more extensive fossil discoveries elsewhere. However, it is probable that significant fossils do occur in these formations within the planning area, and may be discovered whenever bedrock is uncovered during surface-disturbing activities.

2.5.2.2 Resource Characterization

Indicators

The primary resource indicator is whether there is a loss of those characteristics that make the fossil locality or feature important for scientific use. Natural or accelerated erosion, decay, improper collection, and vandalism can remove, alter, or damage those characteristics that make the paleontological resource scientifically important or enjoyable for the public.

Current Condition

The BLM utilizes the Potential Fossil Yield Classification (PFYC) system to classify the potential to discover or impact significant paleontological resources. Approx 3.1percent of the total acreage (all ownerships) is Class 5; approx 3.6percent of BLM lands (surface) is Class 5. BLM Class 5 acres amount to about 0.4percent of total acres of entire planning area. Class 5 is the

highest classification and indicates a very high potential for paleontological resources. The PFYC is intended to assist in determining proper mitigation approaches for surface-disturbing activities, disposal or acquisition actions, recreation possibilities or limitations, and other BLM-approved activities. The PFYC system also highlights areas likely to be a focus of paleontological research efforts or illegal collecting.

Geologic Formations are the basic units of geology, indicating a discrete rock type and representing a certain depositional environment or method of development. Paleontological resources are closely tied to the geologic formations containing them; different aged rocks contain different types of fossils. Most of the geologic formations found at the surface of the landscape within the planning area are Jurassic to early Eocene in age (approximately 150 million to 45 million years old). Older rocks are present near the Bighorn Mountains. A few exposures of younger rocks are preserved, primarily as the higher buttes and landforms, such as the Pumpkin Buttes. Pleistocene and younger alluvium and terraces are found throughout the planning area, primarily associated with major stream courses.

Most of the geologic formations within the planning area contain fossils. However, there is a relatively low percentage of bedrock exposures of these formations in the planning area due to the generally rolling and well-vegetated landscape. Therefore, although most of the formations in the planning area contain fossils, very few fossil localities are recorded here. Below is a listing of several formations within the planning area, listed by youngest to oldest in geologic age, that are commonly known to contain fossils within Wyoming.

Quaternary aged deposits – Alluvium found along river courses, isolated river terraces of gravel and sand, and other deposits formed from ongoing geologic processes. These recent deposits represent about five percent of the total land surface in the planning area. Occasional occurrences of Ice Age animals such as mammoths, mastodons, and extinct bison species are found in some of these deposits. These deposits have a PFYC ranking of 2.

White River Formation – The mid-Tertiary White River Formation is known from only a very few outcrops in the planning area, but this unit contains many significant mammal fossils in many other areas of Wyoming and elsewhere. This unit has a PFYC ranking of 5.

Wasatch and Fort Union Formations – The Wasatch Formation along with the underlying Fort Union Formation account for 75 percent of the land surface in the planning area. Representing the time period just after the extinction of the dinosaurs and the beginning of the rapid evolution of the mammals, these units typically contain early mammal and plant fossils. Of note is the Dry Creek Petrified Tree Environmental Education Area (EEA) which exhibits large standing remnants of *dawn redwood* trees

preserved in the Wasatch Formation. The EEA is visited by several hundred school children each year and is featured in regional, cultural and historical interpretation efforts. Overall, these formations have a PFYC ranking of three; however, two subunits of the Wasatch Formation, the Moncrief and the Kingsbury Conglomerate members, have a PYFC ranking of five.

Lance Formation – The Cretaceous Lance Formation makes up approximately two percent of the land surface in the planning area and 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. Noted for *Triceratops* and *Tyrannosaurus* fossils, this formation has a PFYC ranking of five.

Cloverly Formation – The Cretaceous Cloverly Formation is known for its diverse dinosaur fauna, as well as other Mesozoic reptiles and early mammals. This formation has a PFYC ranking of five.

Morrison Formation – The well-known Jurassic-aged Morrison Formation contains the familiar dinosaurs *Allosaurus*, *Apatosaurus*, and *Stegosaurus*. 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. This unit has a PFYC ranking of five.

Sundance Formation – The Jurassic aged 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. This unit has a PFYC ranking of five.

The Mesozoic aged Cloverly, Morrison, and Sundance Formations collectively comprise less than one percent of the planning area.

There are presently 23 active paleontological survey permits issued on a statewide basis, but there are no permits issued specifically for the planning area. Currently, only one researcher focuses his research on paleontological resources within the planning area.

While it is likely that some hobby collecting of fossils occurs within the planning area, no information documenting use levels exists. Similarly, there is presently no documentation of illegal fossil collecting occurring in the planning area.

Trends

No formal monitoring of the resource use is presently being conducted. The relatively low level of fossil collection for both hobby and scientific use and the ongoing application of mitigation

efforts during surface-disturbing activities are likely resulting in acceptable levels of protection to the paleontological resources.

Forecasts

Availability of fossils for collection or research is unlikely to change within the planning area. Similarly, a significant change in the number of researchers working in the planning area is not anticipated. Less predictable is the change in use by hobby collectors. This activity closely follows the general public interest in fossils. If there is an increase in hobby collecting, some local areas may be adversely impacted due to the removal of the majority of exposed fossils.

The planning area does not have the large numbers of paleontological researchers that work in some of the other Wyoming field offices. The one paleontological permittee who works principally in the planning area will probably continue working for at least the next few years. It is expected that the number of researchers working in the area will not increase substantially.

It may be possible for the rate of collection to exceed the rate of exposure (i.e., the rate of erosion) by removing all exposed fossils from a localized area, but that would be a temporary situation when viewed in the time scale of natural erosion. However, some areas may undergo collection efforts that would remove all available fossils in the short term. This would impact the collecting opportunities for subsequent collectors for a number of years. It is believed that this condition is not common in the planning area.

Key Features

Two types of key features occur in the planning area – a site-specific location containing significant paleontological resources, and broad areas of those geologic formations rated as having a High or Very High potential for containing significant fossils (PFYC 4 or 5).

The Dry Creek Petrified Tree Environmental Education Area (40 acres) near Buffalo contains fossilized trees preserved in nearly-upright position, as well as additional fallen logs and stumps. The area has been developed by the BLM to provide an educational area for schoolchildren and other members of the public, with interpretive signs and walkways. Some stabilization of the petrified trees has been done, and a No Surface Occupancy (NSO) stipulation has been applied to the site to restrict any surface disturbances.

Several geologic formations have a High (PFYC Class 4) or Very High (Class 5) potential to produce significant paleontological resources. These formations are: the White River Formation, the Moncrief and Kingsbury Conglomerate Members of the Wasatch Formation, and the Lance, Cloverly, Morrison, and Sundance Formations. These geologic units, plus some additional related units, amount to approximately 230,250 acres or about 3percent of the entire planning area; on BLM-administered surface lands, they total about 28,208 acres or about 3.6percent. Where these units appear at or near the surface, mitigation measures may

be required to protect significant paleontological resources. These mitigation measures, determined on a case-by-case basis, may include avoidance of known fossil localities, predisturbance field surveys, onsite monitoring, or recovery of fossils prior to construction.

Nearly all the geologic formations in the planning area have the potential to produce significant paleontological resources. However, the formations with the highest potentials are very limited in their surface extent. Additionally, because the present landscape is predominately rolling and relatively well-vegetated, bedrock exposures are uncommon. There are known fossil localities scattered throughout the planning area, which have produced a variety of important fossils, so the potential exists for additional significant discoveries.

Presently, petrified wood fossils are probably the most widespread important fossils in the planning area. The large, nearly-intact logs and upright tree trunks are a unique resource to this area. The Dry Creek Petrified Tree EEA is an outstanding example of this resource.

Future research may uncover significant fossil resources that are presently unknown and may require special management to protect them or develop them for the public's enjoyment.

2.5.3 Visual Resources

The VRM classes for the planning area were established with the Buffalo RMP of 1985. Class determinations were completed by assessing scenic quality, sensitivity levels, and distance zones of the landscape in objective terms. The degree of visual modifications allowed is specific for each VRM class. The goal of VRM, however, is to minimize the visual impacts of all surface-disturbing activities regardless of the class in which they occur. The BLM categorizes visual resources into five distinctive classes (see below) which are based on scenic quality evaluations, sensitivity level analysis, and the delineation of distance zones.

Class I: The objective of this class is to preserve the existing character of the landscape. 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. Contrasts would be seen, but must not attract attention.

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. Contrasts would be seen but remain subordinate to the existing landscape character.

Class IV: The objective of this class is to provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high.

Class V: The landscape character has been so disturbed that rehabilitation is needed.

2.5.3.1 Regional Context

Nearly 60 percent of the planning area is included in the Powder River Basin ecoregion (EPA 2004). This region includes gently rolling to steep dissected plains and wide belts of steeply sloping badlands that border the Powder and Tongue River valleys. In places, flat-topped, steep-sided buttes rise sharply above the surrounding plains, such as the Pumpkin Buttes in the southeast part of the planning area. The vegetation is primarily sagebrush and grassland, with patches of juniper-pine woodland.

The foothill shrublands and low mountains ecoregion of the Wyoming Basin is the second largest region represented on BLM surface within the planning area (approximately 14 percent). It is located in the southwest part of the area, in the foothills of the Bighorn Mountains. The vegetation is shrub steppe, desert shrubland, and juniper-pine woodland.

The large areas of undisturbed sagebrush-grasslands and mountain foothills within the planning area are unique, in comparison to the more densely populated Great Plains regions to the east and south.

The planning area is somewhat isolated and visual resources impacts caused by human disturbance have been relatively minor, prior to the mineral development of the last one or two decades. Natural disturbances have been principally fire and drought. Within the Powder River Basin portion of the planning area, current land use related to mineral extraction is contributing to visual resource degradation.

2.5.3.2 Resource Characterization

Indicators

Visual quality is an important factor in land use decisions. Proper VRM helps to prevent environmental degradation and maintain sociologically important resource values. Public perception of and concern for visual resources is critical in land use planning. The objective of the VRM system is to manage public lands in a manner that will preserve its scenic values. This objective is documented in Sections 102, 103, 201 and 505 of FLPMA. BLM Manual Handbook 8410-1, Visual Resource Inventory, dated January 17, 1986, sets the management structure by which these scenic (visual) resources are to be protected and includes guidelines for conducting visual resource inventories and determining the relative values of differing landscapes. VRM

classes are established through the RMP process and adjusted as necessary to reflect resource allocation decisions made in the RMP.

Current Condition

Visual Resource Management within the Planning Area

The predominant VRM classes in the planning area are Class III and IV, making up about 80 percent of the total area (Map 11). Some scenic areas have been rated Class II, including the Bighorn National Forest and the foothills of the Big Horn Mountains, the Tongue River east of Interstate 90, State Highway 336 in the vicinity of Wyarno, US Highway 14 and Interstate 90 in the vicinity of the Powder River, and Interstate 90 between Rozet and Wyodak. Only about one percent of the area is rated Class V, primarily in the vicinity of coal mines and densely populated areas. None of the planning area is designated as Class I.

The Fortification Creek planning area is designated Class III (BLM 2008i). An NSO restriction for mineral development exists for the WSA within the planning area. A Controlled Surface Use restriction has been set for the Fortification Creek planning area to protect scenic values, which prohibits overhead powerlines on federal surface.

Visual Resource Conditions

Visual resources in the planning area vary widely, from mountains and foothills on the west to low rolling prairie on the east. The Powder River Basin dominates the central portion of the planning area and contains a large portion of the BLM surface ownership. It is distinguished by rolling grasslands, isolated rock outcrops, and broken badlands along the river and its tributaries. The Chugwater formation is prominent in the southern foothills of the Big Horn Mountains, near the forks of the Powder River in the southwest part of the area. It interrupts the gentle flowing lines with abrupt topography, steep vertical escarpments and mosaic patterns of the foothill communities. The most outstanding attribute of the Chugwater formation is its striking crimson color. The Powder River's tributaries cut deep vertical canyons in the Big Horn Mountain's foothills, and then break out into broad riparian zones that provide visual diversity across the grasslands.

CBNG development has had the most significant visual impact in the Powder River Basin. Long-term disturbance to visual resources has occurred with the construction of well pads, access roads, overhead powerlines, water handling facilities, central metering facilities, and compressor stations. Increased night lighting of facilities has introduced intrusive and potentially undesirable elements into the visual landscape. Visibility has been impacted by fugitive dust emissions and exhaust from vehicles and production facilities. In Class II areas along major transportation routes, facilities constructed on state and private surface that were not part of a federal action have resulted in substantial visual impacts to the area and eroded

the usefulness of mitigation measures taken on federal surface. Surface-disturbing activities associated with these areas are easily noticed due to the amount of contrast with the representative landscapes.

Trends

Visual intrusions normally associated with smaller projects are considered to have less impact on visual resources. Contrasts in the basic elements are generally moderate and the majority of these projects remain subordinate to the representative landscape. These projects include a wide variety of range improvements, fuel reduction projects, and two-track roads and are found throughout the planning area.

OHV use in the planning area associated with both oil and gas development and recreation use has adversely impacted visual resources by damaging vegetation and increasing erosion. Enforcement of OHV regulations within the Weston Hills management area near Gillette has been minimal, resulting in resource damage including visual resource impairment.

Two areas of particular concern for visual impacts are the Bozeman National Historic Trail and the Pumpkin Buttes Traditional Cultural Property. Visual intrusions in both of these locations can greatly impact visitor experience and the integrity of areas where viewshed is integral in the historical significance. Once again, oil and gas facilities constructed on private surface that were not part of a federal action have resulted in impacts to the viewshed, despite mitigation measures taken on federal surface.

Forecasts

Current management practices would reduce some impacts to the visual resources in the area. However, the long term continuation of the current management practices would reduce the visual quality in many areas. In some cases, present VRM class determinations do not adequately reflect the visual quality of the region. The cumulative impacts of oil and gas development projects, in particular, have reduced visual quality in sensitive areas and not met the management objectives for the designated VRM classes. Frequent exceptions for development within 200 feet of highway corridors have been allowed, creating notable contrasts to the existing landscape. Class II areas along Interstate 90 and Highway 14 near the Powder River have suffered significant impacts to visual resources.

Landscapes that will bear the greatest impacts in the future with current management include the Interstate 90 and Highway 14 corridors west of the Powder River and the Tongue River northeast of Sheridan.

New oil and gas wells in the planning area are expected to be permitted at a relatively constant rate through 2010. Campbell and Johnson counties are forecasted to experience twice the average population growth of Wyoming between 2005 and 2020 (Headwaters Economics

2007g, Headwaters Economics 2007h). OHV use on accessible public land will likely increase with the rise in population.

Key Features

The following visually sensitive areas have been identified to help guide land use management decisions.

Unique Visual Landscapes

The Middle Fork of the Powder River is located in the southwest portion of the planning area. It includes steep incised canyons, ranging in elevation from 5,000 to over 8,000 feet. It is a popular recreation area, frequented by fishermen, hikers, and history buffs. Outlaw Cave is located in the bottom of the Middle Fork canyon next to the river.

The Red Wall, near the Middle Fork, is a unique geologic formation running north to south along the foothills of the Bighorn Mountains. It is characterized by its steep cliffs and red stone of the Chugwater formation. The Middle Fork and its tributaries run in the valley between the Red Wall and the Bighorns, creating a picturesque riparian corridor. The Hole-in-the-Wall historic site is located on the southern end of the Red Wall, on BLM-managed surface.

Two wilderness study areas, Gardner Mountain and the North Fork, are located in the Bighorn Mountain foothills, also in the southwest part of the planning area. They are approximately five miles apart, in a very remote portion of the mountains. The Red Fork of the Powder River runs through the Gardner Mountain WSA and the North Fork WSA is bisected by the Powder River's North Fork. The scenic rugged canyons and rock outcrops have prevented any development in the region, other than isolated range facilities.

A third, visually unique WSA is located in the north-central portion of the planning area. Fortification Creek WSA is east of the Powder River and is dominated by steep draws, erosive soils, and a mosaic of vegetation types. It includes juniper/ponderosa pine woodland patches that provide cover for a resident elk herd.

The Big Horn Mountains and foothills form the western boundary of the planning area and dominate the view from many observation points to the east. River canyons cutting through a variety of geologic formations interrupt the foothills. Flatiron rock slabs crop out in several places along the eastern slope of the Big Horn Mountains.

Primary visual corridors and locations

The planning area is divided by two interstate highways: I-90 which runs primarily east-west through the Powder River Basin and then north to the Montana state line; and I-25 which runs north-south along the Bighorn Mountains to its intersection with I-90. I-90 is a major

transportation highway across the northern tier of the United States and is one of the main vacation routes to Yellowstone and Grand Teton national parks.

The US Highway 14/16 corridor runs east-west across the northern portion of the Powder River Basin. It is an alternative route to the Big Horn Mountains, following riparian valleys for approximately half its distance across the planning area.

US Highway 59 runs north-south along the eastern side of the planning area. It is a main industrial transportation route between Gillette and Douglas, Wyoming, to the south. The northern portion of the route, between Gillette and the Montana state line, is largely undeveloped.

2.6 Land Resources

2.6.1 Forest Products

Active forest management practices in the resource management area provide a variety of forest products including the following; post and poles, sawlogs, biomass, firewood, and specialty products.

2.6.1.1 Resource Characterization

Current Condition

Since 2003, the forest program has slowly been re-energized, as the relationships between private landowners and the BLM has developed into a partnership for managing all the forest lands. Resolutions for many of the access issues and seasonal restrictions concerning hunting seasons, have allowed for a more active forest management program.

Harvest levels were set in the current RMP. The annual allowable harvest was set at 10 million board feet (MMBF) for a 10 year harvest period beginning in 1999 in 11 timber areas. This would include the woodland areas which could supply up to 11 MMBF.

The indicators for the forest products are:

1. Productive capacity, and
2. Socioeconomic Benefits

Productive Capacity

The forest management areas inventoried could produce a sustainable yield of an array of forest products for commercial extraction. Some commercial extraction could occur in the woodlands, as well. Forest/woodlands encompass approximately 83,000 acres. Using conservative estimates and 26 cf/ac growth on average, the planning area is growing seven MMBF annually on commercial forest land. Much more than the current RMP allows for annual harvest.

Socioeconomic Benefits

Forests related activities are significant to the local communities in that they offer employment and goods and services.

The forests make non-commodity contributions to the people of Wyoming and their way of life. Values, such as clean air and water, habitat to wildlife, recreation, and scenery are often taken for granted because they have no “price.” These ecosystems seem to be provided for free, but would actually costs billions to replace.

Trends

Production and values of wood in Wyoming and the Bighorn area in particular, become stable or increasing. Forest products, from the public lands, will be utilized to fill niches such as biomass, firewood, post and poles, Christmas trees, and traditional logs. Stewardship contracting and timber sales will be utilized to remove salvage timber, fuels, pests, and for thinning applications.

Forecasts

The focus on forest products will be in areas with a buildup of fuels, to increase wildlife habitat, to improve forest resiliency to pest and weather events, and to improve watersheds. The product removal and regeneration of forest in these areas will produce a multitude of products. The forest products market and the forest products markets and community will determine the wood products utilization categories.

Key Features

The forests management areas in the Big Horn Mountains will be the focus of silvicultural practices. The areas included are; Graves Corral, Bear Trap Meadow, Eagle's Trap, Billy Creek, Gold Mine, Billy Creek, and the Horn.

2.6.2 Lands and Realty

The lands and realty program supports all resource and management programs. Lands and interests in lands are acquired or identified for disposal to improve management of natural resources through consolidation of federal, state, and private lands; secure key property necessary to protect species of management concern, obtain access, promote biological diversity, increase recreational opportunities, and preserve archeological, paleontological, and historical resources; and implement specific acquisitions authorized or directed by acts of Congress, by acquiring non-federal lands or interest in lands.

2.6.2.1 Resource Characterization

Current Condition

The lands and realty program in the planning area is designed to manage the underlying land base that hosts and supports all resources and management programs. The primary 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 planning area lands and realty program with federal agencies, the State of Wyoming, counties and cities, and other public and private landholders. BLM-administered surface lands within the planning area are shown on Map 1.

Land use authorizations include various authorizations to use public surface for leases, permits, and easements under Section 302(b) of the FLPMA; Recreation and Public Purposes (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 public lands. The BFO currently administers one long-term land use permit for soil testing on a one acre plot of land. Approximately 1,567 easements have been granted on approximately 27,000 acres. The BFO has not issued any short-term permits for commercial filming projects.

Recreation and Public Purposes Act Leases and Conveyances

The R&PP Act authorizes BLM to lease or convey public lands to state and local governments and to 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 act are historic monument sites, campgrounds, schools, city and county parks, public works facilities, and hospitals. The land involved must be used for an established or definitely proposed project, and the lessee or patentee must commit to a plan of physical development, management and use as well as certain other requirements before a lease or patent is issued. Usually, lands are first leased until development is substantially completed, at which time the patent may be issued. The BLM periodically reviews areas leased or conveyed under the R&PP Act to assure continued compliance with the terms and conditions. A lease may be terminated or title to patented land may revert to the United States if the entity involved is not complying with the terms.

The BFO has issued R&PP patents for the Buffalo Rifle Range (129 acres), Sheridan Recreation Complex (560 acres; the only patent issued since publication of the 1985 RMP), and Buffalo Green Belt (261 acres). An R&PP application from the town of Kaycee for a shooting range is currently being considered. There are no existing leases in the BFO under the R&PP.

State Indemnity Selections

The Wyoming Enabling Act (or Statehood Act) of July 10, 1890, admitted the Wyoming Territory into the union and granted to the state title to Sections 16 and 36 in each township, unless those lands were otherwise appropriated (referred to as state school sections). Title to these lands transferred to the state on the date of statehood or the date of acceptance or approval of the survey. The state was entitled to select other unappropriated public lands in lieu of these school sections if they were unavailable.

A total of 30 cases in the planning area have been patented to the State of Wyoming to satisfy state indemnity selections, comprising approximately 288,438 acres. Since the publication of the existing RMP, three state school grants have been patented, comprising 31,360 acres.

Airport Grants and Leases

The Airport and Airways Improvement Act of September 3, 1982, provides for the conveyance or lease of lands to public agencies for airport and airway purposes. To date, the BFO has not conveyed or leased any public land for airport and airway purposes.

Trespassing and Illegal Dumping

Trespass actions are those uses of public land that occur or are ongoing without specific authorization, or that exceed the established thresholds of an authorization or of casual use. When trespass actions go undetected or are ignored once identified, there is no incentive to cease, and no deterrent to further trespass actions. Trespass actions can cause unmitigated damage to public lands and natural resources.

Trespass is an increasing problem in the planning area. Some of the types of known illegal activities include, but are not limited to, indiscriminate dumping of trash, debris and household wastes, farming/irrigation of public land, corrals, fences, and construction of roads and other utility related features. Currently, there are approximately 43 identified cases of unauthorized use, occupancy and development.

LAND TENURE ADJUSTMENTS

The land-ownership pattern in the planning area is mostly large areas of intermixed private and state lands surrounding smaller areas of scattered public lands. In addition to these scattered public land parcels, there are multiple areas containing large blocks of public land surrounding scattered parcels of private and state lands. Scattered parcels of public land can be difficult to manage as part of the public land system. The small size of the scattered parcels and their isolation from other parcels of public land make them of marginal utility to the public. Lack of legal public access also diminishes their public utility.

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 species of management concern, 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.

Since the issuance of the current RMP in 1985, the BFO has processed 24 land exchange cases, involving approximately 69,000 acres, under the authority provided in Section 206 of FLPMA. At the time of this report, there was one such exchange pending. Additionally, there have been 18 USFS exchange cases, involving approximately 54,000 acres, not identified under Section 206 of FLPMA.

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 of 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 recreational opportunities and acquire crucial wildlife habitats. The Land and Water

Conservation Fund and the Federal Land Transaction Facilitation Act of July 25, 2000, provide funding for the acquisition of lands.

Acquiring access easements across non-federal lands for roads and trails provides for legal public access to "landlocked" public lands. The BFO manages a total of 92 easements, including acquired easements in the Poison Creek, Billy Creek, Dry Creek Petrified Tree and Outlaw Cave areas. These acquired easements are significant because of the access they provide across private lands and the rangeland improvements that have occurred.

Donations, Condemnations and Grants

BLM occasionally receives gifts or donations of lands or interests in land where an entity elects not to receive the market value for the interests being conveyed. There are no recent or pending donations within the BFO.

Acquisition by condemnation is extremely rare, mostly because of the negative public perception of taking private property for public use. Condemnation has not been used by BLM for any acquisition in the planning area.

Section 4 of the General Allotment Act and the Carey Act also provide for the land patents to members of the public. No applications for patents under the General Allotment Act, know as Indian Allotments, have ever been received by the BFO. Patents under the Carey Act were mostly issued during 1900-1910 and there are no documented patents issued by the BFO.

Desert Land Entries were designed by Congress to encourage and promote the economic development of the arid and semiarid public lands of the western United States. With the problems of finding suitable public land, limited water available for irrigation, and the high cost of development, it is extremely difficult to acquire a desert land entry today. There are currently no Desert Land Entry cases 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 which 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 listed in FLPMA. Properties identified in the 1985 RMP for potential disposal or restricted disposal are identified on Map 12 of this document. Lands identified for disposal are typically small, isolated parcels that are difficult and economically inefficient to manage. Tracts of land that are designated in the 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.

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 the sale of land.

The 2001 BFO RMP update identified 138,700 acres of public lands as less economic to manage than most public lands, and given priority for disposal through exchange, sale, or transfer to another managing agency. Since 1985, there have been 15 FLPMA land sales encompassing approximately 745 acres, including one sale of approximately one acre under the Small Tracts Act. There was also one sale completed under RS 2455 (a revised statute that sets forth provisions related to public land sales under the Isolated Tracts Act) of approximately 40 acres.

WITHDRAWALS AND CLASSIFICATIONS

Withdrawals

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
- Closes federal land from operation of all or some of the public land laws and/or mineral laws
- Dedicate federal land to a specific purpose

Table 2-37 lists existing withdrawals in the planning area. Included in the table are existing withdrawals established by the BLM to close specific sites and protect the existing resource values, as well as withdrawals transferring public land to other federal agencies to accomplish their mission goals.

Land uses can change when withdrawals are revoked. In part this is the result of opening the land to operation of the mining laws. Part of the review process for land withdrawals must include anticipation of any such land use changes. Revocation of withdrawals can result in a "land rush" if valuable locatable minerals become available. Withdrawal review has not been completed on withdrawals under BLM's control and could be done as part of the RMP revision.

Classifications

Land classification is a process required by law for determining the suitability of public lands for certain types of disposal or lease, or 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. There are currently no classification cases in the planning area.

Table 2-37. Existing Withdrawals in the Buffalo Planning Area

Name	Acres	Segregates/Withdraws from		
		Disposal	Leasables	Locatables
Other Management Areas				
Amsden Creek Winter Game Range (WGFD)	3,500	All	480	480
Resource Protection				
Stock Drive	149, 906	All	All	All
Tie Hack Campground	21	All	All	All
Federal Power Act, Power Site	2,996	All	All	All
Middle Fork Recreation	11,000	All	All	All
Buffalo Housing Authority (HUD)	5.5	All	All	All
Burgess Visitor Information Site	77	All	All	All
BLM Miscellaneous	1,200	All	All	All
Veteran's Administration	60	All	All	All
Other Federal Agency Withdrawals				
Forest Service (Recreation)	9,636	All	All	All
Forest Service (National Forest)	13,179	All	All	All
Department of Defense	3,739	All	All	All

Trends

LAND USE AUTHORIZATIONS

Lease, Permits and Easements

Currently, there is a significant demand for rights-of-way across public lands for oil and gas development. This activity is in direct response to national energy development goals. This effort is expected to continue over the next several years. Solar and wind-energy development has not yet impacted the Buffalo Resource Area. If/when solar and wind energy begins in this area, the need for ongoing authorizations could extend well into the future.

Wyoming has considerable water issues. The current oil and gas development activities are producing significant amounts of water. Many wells produce water for long periods of time without realizing mineral or gas production. As a result, the continued stress of diminishing water supplies is becoming a significant problem.

Recreation and Public Purposes Act Leases and Conveyances

Generally, the public is in demand for recreational uses on public lands. This trend is expected to continue into the foreseeable future.

Airport Grants and Leases

There are currently no airport grants or leases within the planning area. Future interest is not likely. However, future forecasts anticipate population growth in Wyoming due to the variety of

energy development and significant recreational opportunities. To prevent a revision to the RMP in the future, there should be enough language to allow for airport grants and leases.

Trespassing and Illegal Dumping

Trespass and illegal dumping is an ongoing problem on public lands. Generally, energy development operators/developers work with realty staff to resolve these issues. This trend is expected to continue into the foreseeable future.

LAND TENURE ADJUSTMENTS

Exchanges

The BFO has been minimally involved in land exchanges since 1985. Exchanges are needed to improve management capabilities. The RMP revision needs to provide language to pursue opportunities for better surface management by allowing exchanges on a case by case basis.

Purchases

The BFO has been minimally involved in land purchases since 1985. Purchases may resolve current management issues. The RMP revision needs to provide language to pursue acquisition opportunities for better surface management by allowing these purchases on a case by case basis.

Donations and Condemnations

There haven't been any donations to the BLM in the last 30 years, although a few opportunities may present themselves in the future. There is not likely to be any condemnations.

Land Sales

In recent years, the general public is showing a great deal of interest in public land sales. However, the limited accomplishment in terms of actual land sales and the time consuming, expensive, and cumbersome processes make sales impractical in most cases. This trend is likely to continue into the foreseeable future.

WITHDRAWALS AND CLASSIFICATIONS

Withdrawals

Occasionally, the BFO withdraws public lands to protect some natural resources or provide for some special public interest. This occasional trend is expected to continue into the foreseeable future.

Classifications

The BFO rarely classifies lands, but may occasionally do so in the future.

Forecasts

LAND USE AUTHORIZATIONS

Lease, Permits and Easements

The State of Wyoming is proactive in the area of film permitting in an attempt to increase tourism and awareness of Wyoming's landscape (Wyoming Business Council 2007). As a result, there is a potential for filming to occur in the planning area.

BLM actions to grant easements across public lands are expected to occur in the planning area in the future. Fortification Creek is surrounded by private land owners with very limited access.

Recreation and Public Purposes Act Leases and Conveyances

More R&PP applications are expected. These would likely be recreation related developments, so public benefits would be immediately realized once the facilities were developed.

Airport Grants and Leases

Little activity is likely as no future needs have been identified.

Trespassing and Illegal Dumping

Trespassing on public lands in the planning area is expected to continue. Several unauthorized uses were informally identified in 2008, and the number is expected to increase substantially in the wake of projected intense oil and gas development activities in the area. Allowing trespass to continue unabated would diminish the public lands and their resources, detract from accomplishing priority work, foster an attitude that trespass will be tolerated, and deny the public receipt of fair market value for use of the public lands.

Illegal dumping of household waste will be a continuing issue. Most all facilities on public land are usually in compliance with the terms and conditions of the authorization.

LAND TENURE ADJUSTMENTS

Exchanges

Due to the significant amount of time required to process exchanges, coupled with the high demand for rights-of-way across public lands for energy development, few are likely to be processed over the next several years. However, this is a significant issue in the planning area and opportunities to improve land tenure through the exchange process should be considered on a case by case basis.

Purchases

Acquisitions would continue indefinitely to improve management opportunities, to enhance

recreation opportunities, to improve access, and to further resource preservation. Acquiring high resource value land through purchase using Land and Water Conservation Fund Act (LWCF) funds is a viable option. However, eligibility for LWCF funding will limit the potential candidates.

Only very high priority exchanges and acquisitions will be possible. Furthermore, the current land use plan contains a maintenance action that establishes criteria for evaluating acquisitions and disposals. These criteria will be revaluated and likely modified in the RMP revision.

Purchases or exchanges to improve access to public lands are likely for several areas. Improved access is also important for public land special interest areas. For example, the Fortification Creek area is a large block of public land with wildlife, watershed, recreation, cultural, and scenic values. Private property surrounds the Fortification Creek WSA; therefore, public access is not legal without landowner permission.

Donations, Condemnations and Grants

Few disposal actions through Desert Land Entries, Indian Allotments, Carey Act Applications, or State Indemnity Selections are likely.

Land Sales

While sales may be made to meet community expansion needs, and some other sales will be made as demand dictates, no appreciable sale activity is likely. The primary communities in the planning area have not identified major expansion needs to be met through BLM land sales. The pool of lands identified for disposal will remain mostly intact, though it can be drawn upon to accomplish acquisition goals and objectives.

While retaining these lands in public ownership avoids any possible adverse impact from disposal, they remain as a management liability in the sense that most are difficult and uneconomic to manage. The potential for trespass is great and can result in substantial management costs to abate and mitigate. In most instances, these lands provide little or no utility to the public. This is the result of limited or lack of legal access, and the average sizes of the parcels are too small to afford a viable recreation or outdoor experience.

WITHDRAWALS AND CLASSIFICATIONS

Withdrawals

Other than the specific areas previously discussed, few new land withdrawals for resource purposes are anticipated as the effort to establish the withdrawal is often much greater than the value of protection received where there is low potential for mineral location. Under the current RMP, withdrawals for surface and/or minerals are considered on a case-by-case basis.

Classifications

New land classifications would be tied in with specific authorizations such as R&PPs or Desert Land Entries. Like withdrawal review, classification review would remove encumbrances and segregation on some land areas.

Key Features

Key features include: Powder River Breaks, Recluse, Spotted Horse, Durham Ranch. In addition, the following elements are key features:

- Highway 59 to Hilight Road includes numerous hills with significant amounts of scoria
- North Sheridan County has significant amounts of coal sediment that adversely affect multiple use opportunities on public lands
- Kaycee area, including Tisdale Mountain has significant amounts of Bentonite, which limits development opportunities
- Fortification Creek management includes significant resources that must be protected from development but currently has limited access through private land
- Pumpkin Buttes a significant visual resource management feature
- Improved riparian corridors are needed in the following areas: north of Interstate Highway 90 along the Powder River; Tongue River; Crazy Woman Canyon
- Corridors: Because of the overall fractionated ownership patterns in the BFO, there are no major right of way corridors. Improvement of land ownership into more manageable blocks and corridors would be required before the BFO could reasonably address primary right of way corridor development in the future

Currently, under best management practices, rights-of-way holders are encouraged to use existing disturbed corridors, as well as coordinate with other authorized users for construction, maintenance and reclamation activities. Furthermore, overhead powerlines would best occur along county roads or other primary (heavily used) roads. Site specific power needs would then be served by installing underground powerlines to those individual sites. This would alleviate some of the impacts on visual resources, as well as some of the impacts on raptors.

2.6.3 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. The BLM's general policy is to encourage the development of renewable energy in acceptable areas. Executive Order 13212 instructs the BLM "to expedite projects that will increase the production, transmission, or conservation of energy."

2.6.3.1 Resource Characterization

Current Condition

Currently, there are no renewable energy activities occurring in the planning area and no applications for wind or solar projects have been received.

The BFO boasts an average of 252 sunny days per year. This creates excellent solar energy potential within the resource area (Wyoming Business Council 2008).

The wind-energy potential for the planning area was classified as moderate according the BLM 2005 Wind EIS. Recent wind energy potential studies identify the southeastern region of the planning area as having fair to moderate potential, with a few scattered areas throughout the planning area considered as fair (DOE 1986, BLM 2005c, DOE 2006).

Trends

No applications for wind or solar energy projects have been received for lands in the planning area.

Forecasts

The 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 U.S.

At this time, renewable energy development within the planning area is limited; however, potential for increased renewable energy development exists. After careful consideration of existing laws, existing management practices, and the condition of renewable energy sources in this area, it is evident that the planning area possesses resources that would provide substantial opportunities for sustainable energy development, including renewable energy. There is a potential for development under new technologies, including wind and solar energy. Existing infrastructure related to oil and gas development could possibly be utilized in the future for these renewable energy sources (Windpowermaps.org 2008; DOE and BLM 2009).

The growing demand for renewable energy sources, coupled with a moderate level of wind energy and solar development potential in the planning area, justifies further analysis and corridor identification.

Key Features

There are four key features associated with wind energy.

1. The southeastern region of the resource area is considered to have fair to moderate wind-energy development potential. This area should be the primary consideration for wind-energy development applications.
2. he Pumpkin Buttes are also located in this area. As a result, visual resource management associated with wind energy must be considered.
3. Key features associated with solar energy: The resource area provides approximately 252 sunny days a year, making public lands a key source for future solar energy development.
4. Because of the overall fractionated ownership patterns in the BFO, there are no major right of way corridors. Improvement of land ownership into more manageable blocks and corridors would be required before the BFO could reasonably address primary rights-of-way corridor development in the future.

2.6.4 Rights-of-Way and Corridors

The ROW program consists of the evaluation, authorization and management of ROWs for a variety of uses on public land. A ROW grant is an authorization to use portions of public land for specific facilities, utilities, or transportation, for a specified period of time. ROWs are removed and reclaimed upon termination of the grant.

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 demand for legal access to private homes and ranches using ROW grants.

2.6.4.1 Resource Characterization

Current Condition

The primary issued ROWs include site facilities, reservoirs, oil and gas, water, electric and road corridors. The number of communication site ROWs continues to grow. Currently, there is a substantial demand for ROWs across public lands for oil and gas development. This activity is in direct response to national energy development goals. This effort is expected to continue over the next several years. Authorizations are anticipated to continue and may increase if

renewable energy development is proposed within the planning area. Increasing populations and continued mineral development require utility ROWs to support those infrastructures. Also, changing telecommunications technology is increasing proposals for communication sites and fiber optic routes. Access roads and utilities associated with development of private lands have become increasingly important as well.

There are currently approximately 1,567 authorized ROWs (see Table 2-38) in the planning area, issued under a variety of laws and administered according to the conditions specified in the ROW grants. Since 2001, the BFO has been processing increasing numbers of ROWs (currently averaging nearly 200 per year over the last few years) for oil and gas development applications. The BFO can process an average of 160 applications annually at current staffing levels; this number is considered sustainable in terms of staff resources, other realty actions and land compatibility.

Table 2-38. Existing ROW in the Buffalo Field Office

Existing Authorization	Number of Sites	Acres*
Roads**	532	15,404
Pipelines/sites (mostly oil and gas related)	417	4,285
Powerlines/sites	407	2,600
Telephone/fiber optic cables	55	173
Water facility ditches and reservoirs	103	938
Communication Sites: Concentration area south Middle Butte of the Pumpkin Buttes	24	17
Forest Service easements/grants	14	3,289
Other	15	130
Total	1,567	26,837

Source: BLM 2008e

*ROW miles were not calculated because there are significant numbers of existing supplemental uses within the grant information. LR2000 totals do not reflect these supplemental uses and therefore, would not be accurate. As a result, the acres were calculated to provide an accurate calculation of actual surface disturbances.

**Includes RR & stations; Fed. Hwy and material sites under Sec. 317

Existing designated ROW corridors are the preferred location for future ROW grants. These routes or areas are located primarily along existing highways, major pipelines and powerlines, oil fields, and communication sites. Concentrating new ROW grants along existing corridors works well when the source and terminus are located nearby, or when land along the route is predominantly federally administered. Due to the large blocks of public land and the various locations requested for the applications received, it is not always possible to concentrate new grants into designated corridors. Generally, most existing ROW concentration areas and corridors have the capacity for more projects and there are few route “bottlenecks.”

The corridors and ROW concentration areas in the planning area are generally considered to be adequate and compatible with the land resource. Most linear ROWs get vegetation

reestablished on them over time; unwanted roads associated with a project in some areas are a problem and need to be addressed. Additionally, older powerlines have generally been modified to protect raptors over the years; it is unclear if all lines meet current standards.

Trends

Historically, most ROWs on BLM-administered lands in the planning area have involved oil and gas development, electrical transmission, irrigation ditches and communications. Since fiscal year 1985, the BFO has processed more than 1,800 ROWs across nearly 23,000 acres of public land. The 2001 RMP update identified 850 ROWs issued since 1985; a span of 6 years. The remaining grants, 950, were processed after 2001.

Forecasts

Generally, most existing ROW concentration areas and corridors have the capacity for more projects. 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). Utility development on public land near subdivisions/rural ranchettes is expected to be an increasingly sensitive issue as development continues.

It is reasonable to expect energy development to continue into the foreseeable future in the planning area. The proliferation of ROWs and corridors will likely create a substantial impact across the landscape. Limiting the number of development corridors and/or requiring shared corridor use could help reduce the overall disturbance on the landscape.

The rate of land restoration required as existing authorizations currently in use are no longer needed is projected to increase in the future. This projection relies on evidence of the substantial surface disturbance and number of authorizations issued over the last several years.

Unauthorized roads and other improvements, most of these uses were not analyzed in NEPA documents. These improvements will often result in undesirable environmental impacts. Unauthorized uses are expected to increase substantially and will need to be addressed in the RMP revision.

Key Features

The BFO resource area includes varying topographical features with scattered ownership patterns. Topography varies from relatively level terrain to steep slopes and deep ravines. Also,

many of the soils are considered highly erosive. Furthermore, scattered surface ownership patterns create the need for various ROW authorizations that affect public, as well as private lands. As a result, public and private land management opportunities require continuous coordination and communication across ownership boundaries. Current management attempts to combine (corridor) disturbances in order to limit total disturbance and protect other resource values.

2.6.5 Transportation and Access

Travel management planning is the proactive management of public access in compliance with travel-related regulations and according to the best land use management principles. It involves:

1. A comprehensive approach that considers various aspects of road and trail system planning and management, natural resource management; road and trail design and maintenance; and recreation and non-recreation uses of roads and trails;
2. Route inventory and evaluation, innovative partnerships, user education, mapping, monitoring, signing, field presence, and law enforcement; and
3. All resource aspects (recreational, traditional, casual, agricultural, industrial, educational, and cultural) and accompanying modes and conditions of travel on the public lands, including motorized, mechanized, and nonmotorized/mechanized uses (Graves et al 2006).

Implementing travel management has been a high priority for the BLM. Travel and transportation decisions include allowable types of travel (over land, water, and snow, and fly-in) as well as modes and conditions of travel on public lands. Pivotal to the BLM's strategy for managing public lands is maintaining and improving upon the BLM's transportation system, which includes roads, bridges, trails, and related facilities, in a manner that enhances accessibility, connectivity, and safety, while at the same time addressing public needs, preserving ecological functions, and fostering economic development (BLM 2001c).

A well-functioning transportation system is essential for resource harvesting, energy production, and recreational activities that take place on BLM lands. In addition to allowing the BLM to achieve its agency goals – sustaining the health, diversity, and economic vitality of our public lands – transportation enables ongoing contributions to the regional and national economies.

Travel Management Designations

The BLM must designate all public lands as Open, Closed, or Limited for OHV use. Area and trail designations are completed during the RMP planning process and are limited to the following three management categories:

> **Open:** Areas used for intensive OHV use where there are no compelling resource needs, user conflicts, or public safety issues to warrant limiting cross-country travel. Areas where all types of vehicle use are permitted at all times anywhere in the area.
>
> **Limited:** Areas or trails where the BLM restricts OHV use in order to meet specific resource management objectives. These limitations may include: limiting the time, number or types of vehicles, limiting the time or season of use, permitted, licensed use only, limiting to existing roads and trails, and limiting use to designated roads and trails. The BLM may place other limitations, as necessary, to protect other resources, particularly in areas that motorized OHV enthusiasts use intensely or where they participate in competitive events.
>
> **Closed:** Areas where the BLM enforces a closure to all vehicular use when it is necessary to protect resources, ensure visitor safety, or reduce conflicts, including units in the National Wilderness Preservation System. Access by means other than motor vehicles is generally allowed (i.e., foot, horseback, bicycle).

Travel Management Areas

In BLM-administered areas where there are unique circumstances (i.e., high levels of controversy or complex resource considerations) Travel Management Areas (TMA) may be delineated to address particular concerns and prescribe specific management actions. TMAs are delineated areas where a rational approach has been taken to classify the area as open, closed, or limited. Roads, trails, ways, and other routes have been identified and/or designated to provide for public access and travel across the planning area.

All designated travel routes within TMAs should have a clearly identified and documented need and purpose, as well as clearly defined activity types, modes of travel, and seasons or timeframes for allowable access or other limitations. TMAs are usually identified where travel and transportation management (either motorized or nonmotorized) requires particular focus or increased intensity of management. While OHV area designations are land use plan allocations, TMA's are planning tool delineations (BLM 2006).

2.6.5.1 Resource Characterization

Current Condition

Road Network

The planning area is crossed by several primary and secondary highways that connect communities, as well as a series of county roads that provide the general public access to remote locations within the planning area. The planning area is served by two interstate highways: Interstate 90 and Interstate 25. Interstate 90 is a popular route for residents to access Sheridan, Wyoming, Billings, Montana and other points in Montana to the north; as well as Gillette, Wyoming, Rapid City, South Dakota, and other points to the east. Interstate 25 is a popular route to reach Casper and Cheyenne, Wyoming, Denver, Colorado, and all points in between (Johnson County 2005).

US Highway 16 is the principal east-west two-lane highway that serves as the southern route across the Bighorn Mountains. It is a very popular route for tourists and other visitors to reach Yellowstone and Grand Teton National Park.

Wyoming State Highway 192 runs east to west between Kaycee and Sussex. Other less traveled state roads in Johnson County include Barnum Road, Mayoworth Road, Story Road, Wyoming Highway 387, Trabing Road, and Tipperary Road.

The county road system is made up of 566 miles of paved and unpaved roadway. All county roads are designated as stock driveways. The transportation infrastructure, traffic volume, and accident rates within the planning area are relatively low due to the county's small population.

The BFO currently maintains 16.5 miles of roadways within the planning area. However, the much larger network of unimproved, two-track and industrial roads are not included in this figure. Approximately 7,135 miles of new improved and 10,619 miles of two-track roads are being developed with CBNG facilities on both public and private lands according to the 2003 Powder River Basin-Final EIS. Many of these roads have not been built or maintained to the BLM standards. In an effort to minimize the footprint, lower than standard roads have been previously permitted. However, as the topography has become more rugged and precipitation has increased, these roads have become a safety and resource concern. It is uncertain at this time what the potential is for these roads to be kept and maintained to provide public access to public lands.

Airports

Table 2-39 identifies airports near the planning area.

Table 2-39. Commercial Airports that Service the Planning Area

Airport	Location	Approximate Mileage from Buffalo, WY
Campbell County Airport	Gillette, Wyoming	75
Sheridan County Airport	Sheridan, Wyoming	38
Natrona County International Airport	Casper, Wyoming	122
Billings Logan International Airport	Billings, Montana	169
Rapid City International Airport	Rapid City, South Dakota	220
Denver International Airport	Denver, Colorado	404

Trails

Approximately 97 percent (774,184 acres) of the planning area is designated as limited to existing or designated roads and trails (Map 13). Although there are approximately 800,000 acres of BLM-administered land in the planning area, road access is only available to about 400,000 acres. This designation was created to allow OHV use without increasing the number of acres disturbed. Recreational users cannot travel off roads and trails except during the performance of "necessary tasks," such as for game retrieval.

Since the implementation of this prescription, OHV use in the planning area has increased dramatically. Each year new trails are being created, especially during the hunting season. Table 2-40 identifies the acreages for OHV use in the planning area.

Table 2-40. OHV Designations in the Buffalo Planning Area, Wyoming

Designation	Acreage
Open Areas: Vehicle travel is permitted both on and off roads if the vehicle is operated responsibly in a manner unlikely to cause significant undue damage to the environment.	20,386
Closed Areas: Travel by vehicles, including snowmobiles, is prohibited.	3,650
Limited Areas A: Use is limited to existing roads and vehicle routes in existence as of 1985.	566,184
Limited Areas B: use is limited to designated roads and vehicle routes within these areas. (Until signs are posted, vehicle travel is limited to existing roads and vehicle routes.)	170,982
Limited Areas C: Vehicle travel is closed to all motor vehicles including snowmobiles from December 1 to April 15.	37,646
Total acreage	**798,848**

Source: BLM 1985

Closed Areas

Areas closed to all OHV use include 40 acres in the Dry Creek Petrified Tree EEA; 572 acres in the Cantonment Reno; and 3,038 acres in the Middle Fork Canyon. These areas have special resource concerns and were closed to OHVs as a protective measure. It has proven an effective way to protect resources from unnecessary degradation.

Travel Management and Off-Highway Vehicles

Most popular OHV usage is four-wheel-drive, sport utility vehicles, and all-terrain vehicles (ATVs). Access for nonmotorized recreation activities includes fishing, hiking, mountain bicycling, horseback riding and camping.

Typical recreational OHV activities within the planning area include exploring, mountain biking , ATV and motorcycle trail riding, and hunting (Table 2-41). In addition, OHV use provides access for hunters and nonmotorized recreational purposes such as fishing, hiking, mountain biking, horseback riding, and primitive camping opportunities. People with disabilities may be allowed to travel on OHVs in otherwise closed areas on a case-by-case basis with a permit from the WGFD along with authorization from the authorized officer (BLM 2008f). OHVs are used for a variety of purposes including livestock management, survey work, and recreation. The current RMP identified several possible OHV areas, but these have not been implemented on the ground.

Table 2-41. 2008 Motorized and Nonmotorized Activities and Number of Participants in the Buffalo Planning Area, Wyoming

Motorized Activities	Number of Participants
Driving for pleasure	3,318
Hunting – Big Game (use of 4-wd/ATVs)	16,760
OHV – ATV	8,186
OHV – Cars/Trucks/SUVs	6,232
OHV – Motorcycle	43
Nonmotorized Activities Requiring Vehicle Access	**Number of Participants**
Mountain bicycling	951
Fishing	4,313
Hiking/Walking/Running	18,170
Horseback Riding	1,772
Hunting – Other	36
Hunting – Upland Bird	1,333
Other Motor Land Sport/Event	900
Picnicking	4,865
Camping	4,671

Source: BLM 2008f

Non-recreational OHV use of the planning area includes agricultural management, energy development, and land management activities. OHVs are also used for noncommercial collection of decorative rocks, native plant materials, and firewood collection. Employees of government agencies, ranchers, timber companies, 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. The BLM uses OHVs for range

inspections, vegetation treatments, surveying, mapping, inventories, monitoring, fire suppression, project construction, and maintenance.

Trends

Prominent among the travel management issues the BLM faces is the complex challenge in managing motorized activities on the public lands. The combined effect of population increases in the west, growth in the use of OHVs in the planning area over the last ten years, and technological advances has generated increased: (1) social conflicts and resource impacts on the public lands related to motorized recreation and (2) the impact on other recreation activities and resource uses. Indiscriminate use of OHVs continues to increase, creating unauthorized pioneered trails. These trails can scar landscapes, dissect vital wildlife habitats, increase the degradation of cultural and paleontological resources, and cause increased erosion to fragile soils. The environmental impacts of OHV use are becoming apparent in the planning area, most notably in the Weston Hills Recreation Area and on BLM-administered lands near the town of Kaycee. Certain environments are more susceptible to OHV damage, including crucial winter ranges, bald eagle roosts, wildlife breeding areas, riparian habitats, and areas with steep slopes or sensitive soils.

Current OHV management allows off-road and trail travel for motorized use to perform necessary tasks and for casual use, which includes activities such as retrieving big game kills, livestock management, and energy-related exploration. Impacts related to necessary tasks and casual use are increased soil erosion, habitat fragmentation, route proliferation, visual degradation, and degradation of the OHV and recreational settings. Routes created by necessary tasks and casual use are adopted by OHV users and are perceived as existing routes. This trend creates an increase in roads and trails.

Forecasts

Upward trends in OHV use are expected to continue. Environmental impacts over the next twenty years should parallel impacts accrued since the enactment of the RMPs. OHV class designations on BLM-administered lands focus on balancing recreational opportunities with environmental protection and meeting national goals and objectives. In areas where vehicle use is limited to existing roads and trails, there can be a problem with routes which are newly created. The next visitors who come along see the route and use it, thinking it is an existing route and open for use. This generates new, unplanned routes.

While sustainable levels of OHV use have not been determined by the BFO, it is reasonable to expect impacts to accumulate over time as new roads and trails develop. Dispersal of OHV use is directly related to the size and percentage of federal parcels in a given area and the ease of public access. Popular areas with high concentrations of OHV use will be heavily impacted by

unregulated use. Adverse impacts would include increased soil erosion, habitat fragmentation, stream sedimentation, physical damage to vegetation, and damage to vegetative communities due to the spread of invasive plant species. Environments that are more susceptible to OHV damage include crucial winter ranges, wildlife breeding areas, riparian habitats and areas with steep slopes and/or sensitive soils.

Key Features

The road network within the planning area is comprised of a series of county roads, BLM-maintained roads, two-track trails, and snowmobile trails. The maintenance and use of these travel routes has become an integral part of public land management, as these roads are used for both recreational and non-recreational purposes. The BLM manages approximately 240 miles of trail in the BFO. Motorized off-road travel to perform necessary tasks and casual use, which includes activities such as retrieving big game kills, livestock management, and energy related exploration is currently allowed.

2.6.6 Recreation

Federal lands within the planning area provide a broad spectrum of outdoor opportunities that afford visitors the freedom of recreational choice with minimal regulatory constraints. Recreational opportunities are offered to the public on all BLM-administered lands within the planning area where legal access exists. The BLM provides opportunities for outdoor recreation and nature-based tourism using the concept of multiple-use management. The public values natural landscapes, the freedom to choose a particular activity to participate in, the opportunity to test skills in a sport, time spent with family and friends, and the opportunity for discovery. Recreational activities occurring on public lands are multi-faceted and generally considered to be non-consumptive.

Recreation is an important program in the BLM; it is one of the U.S. DOI's four primary missions. The objectives of the BLM's outdoor recreation program are to: (1) provide a broad spectrum of resource-dependent recreational opportunities to meet the needs and demands of visitors to public lands; (2) foster agency-wide efforts to improve service to the visiting public; (3) maintain high-quality recreation facilities to meet public needs and enhance the image of the agency; and (4) improve public understanding and support of the BLM by effectively communicating the agency's multiple-use management programs to the recreation visitor.

2.6.6.1 Resource Characterization

Current Conditions

On a regional basis, the Wyoming Travel Industry Impact Report of 2006 concluded 7.3 million overnights resulting in $2.5 billion in direct travel-generated expenditures and that 98 percent

of visitors came to Wyoming for pleasure compared to only 2 percent for business purposes. Travel and tourism resulted in $103 million in state and local tax revenues and $624 million in earnings for Wyoming residents (Wyoming Travel and Tourism Industry 2006).

Recreation on public lands also provides economic benefits. Recreation service providers (hotels, outfitters, equipment manufacturers and dealers, restaurants) depend on public lands, in part, for their livelihood. A recent study (Sonoran Institute 2006) showed that annual expenditures from hunting and fishing in Wyoming exceeded $335 million and that hunters spent 74 percent of their hunting days (960,000 days) on public lands.

The approximately 800,000 acres of BLM-administered surface in the planning area receive roughly 31,400 visits per year (BLM 2008f). The Wyoming residents make up the majority of recreational users of BLM-administered surface. The towns of Sheridan, Buffalo, Gillette, Wright, and Kaycee all have public lands bordering them that are used as "backyard" recreation areas by local residents. Visitors from outside of Wyoming come to the planning area from all over the United States and from international locations. Visitors to the planning area come because of the central location (with Yellowstone National Park and the Bighorn National Forest to the west, Montana to the north, the Black Hills to the east, and Colorado to the south) and the historic and cultural resources. The summer months of June through September receive the heaviest use.

Recreation Management

The BFO recreation program has responsibility for developed recreation sites ranging from minor improvements to trailheads, primitive campground and day-use areas.

The BLM signs public and private land boundaries, interprets resources and provides regulatory and informational kiosks in high use areas. Detailed information is available to the public via informational pamphlets, land ownership maps and online websites.

The majority of complaints received include illegal posting or otherwise restricting public access to federal lands, trespass onto private lands, vandalism to vegetation and soils and illegal dumping. Additionally, the BLM has received complaints involving unpermitted outfitters and guides and the careless discharge of weapons near infrastructure associated with various developments. All complaints are handled on a case-by-case basis

Undeveloped/Dispersed Recreation

Dispersed recreation occurs throughout the planning area over a wide range of ecosystem types. Occurring in combination with other resource activities, dispersed recreation includes but is not limited to sight-seeing, touring, backpacking, horseback riding, geo-caching, hiking, OHV use, photography, wildlife viewing, fishing, boating, other water related activities, hunting,

and camping. BLM-administered lands in the planning area provide a broad spectrum of outdoor opportunities affording visitors the freedom of recreational choice with minimal regulatory constraints. Monitoring and enforcement of dispersed recreation is limited, especially in areas with a small percentage of public lands and/or limited access.

Hunting, fishing, target shooting, and vehicle touring are among the most common recreational activities on public lands managed by the BFO. All BLM-administered lands allow for hunting and target shooting unless posted otherwise. Restrictions on gun use include a prohibition on shooting within ¼ mile of developed sites and roadways. During hunting season, there is an increase in use of motorized vehicles throughout the planning area. Casual-use vehicle touring is generally done in conjunction with hunting, fishing, rock hounding, equestrian use, camping, or hiking. Touring is to some degree inseparable from the subject of destination recreation and, to a certain extent, from the subject of access where roads are common; current use levels are unknown.

By definition, dispersed recreation is made up of small events distributed over large areas. Impacts such as minor disturbances to soil and vegetation, are negligible and the environment tends to recovery quickly. However, long-term cumulative impacts do occur in association with dispersed recreational activities. They are normally, but not exclusively linked to heavily used areas and can include soil compaction and/or erosion, invasive plant species dispersal, the creation of unauthorized two-tracks and trails as well as the purposeful vandalism of natural and cultural resources. Over time, recreational activities can adversely impact sensitive soils, wildlife habitat, riparian areas and important cultural and historical sites.

Special Recreation Management Areas and Extensive Recreation Management Areas

Special Recreation Management Areas (SRMAs) are identified during the resource management planning process and were traditionally areas that had higher recreation use, required extra recreation investment, or needed more intensive recreation management. As of 2005, SRMAs must have a distinct, primary recreation-tourism market (destination, community, or undeveloped) as well as a corresponding and distinguishing recreation management strategy. The 1985 Buffalo RMP and the 2001 RMP updates did not designate any SRMAs. There are six areas equivalent to SRMAs in the Planning Area (Table 2-42 and Map 14):

Table 2-42. Special Recreation Management Area Equivalent Areas in the Planning Area

Recreation Management Area	Market and Type of Recreation
Burnt Hollow*	Undeveloped or Developed Nonmotorized, dispersed recreation including camping, mountain bicycling, environmental education, hiking, horseback riding, big game hunting & other hunting, picnicking, viewing – scenery/landscapes, and wildlife viewing
Dry Creek Petrified Tree Environmental Education Area	Developed Nonmotorized recreation, dispersed recreation including camping, mountain bicycling, hiking, big game hunting, other motor land sport/event, picnicking, viewing – cultural sites, viewing – interpretive exhibit, and viewing - other
Middle Fork Canyon of the Powder River	Undeveloped or Developed Motorized, dispersed recreation including camping, freshwater fishing, hiking, big game hunting, and OHV (ATV, 4 WD)
Outlaw Cave Campground*	Developed Nonmotorized, dispersed recreation including camping, freshwater fishing, hiking, horseback riding, picnicking, and viewing - other
Welch Management Area*	Undeveloped or Developed Nonmotorized, dispersed recreation including camping, mountain bicycling, freshwater fishing, hiking, horseback riding, big game hunting, upland bird hunting, picnicking, viewing – other, and viewing - wildlife
Weston Hills Recreation Area (managed with USFS)	Undeveloped or Developed Motorized, dispersed recreation including mountain bicycling, hiking, horseback riding, big game hunting, and OHV (ATV, 4 WD)

*These areas were not identified as a Recreation Areas or where management objectives would be applied; however, under the current management situation, they are considered high use areas or where the BFO monitors activities.

Two areas in the planning area were designated as Recreation Areas:

Weston Hills Recreation Area—Parts of this area are managed as undeveloped and developed recreation areas. Weston Hills is open to motorized use and common activities include mountain bicycling, camping, target shooting, hiking, horseback riding, big game hunting, and OHV use (ATV, 4-wheel drive).

Mosier Gulch Recreation Area—This area is managed as a developed recreation area. Mosier Gulch is open to motorized use and common activities include fishing, hiking, mountain biking, picnicking, and wildlife viewing.

Anything not delineated as a SRMA is an Extensive Recreation Management Area (ERMA), an area where recreation is unstructured and does not require intensive management or significant investments in trails or facilities. Management within all ERMAs is focused on custodial implementation actions that address visitor health and safety, user conflicts, resource protection issues, and maintaining appropriate activity participation. Recognition of singularly dominant, activity-based recreation demand of and by itself (e.g., heavy OHV use and river

rafting), however great, generally constitutes insufficient rationale for the identification of new SRMAs.

National Back Country Byways

The Buffalo Field Office currently does not have any designated Back Country Byways. Please see the Special Designations section for general information on National Back Country Byways.

Off-Highway Vehicles

Please see the Transportation and Access section for the discussion of OHV use in the planning area.

Special Recreation Permits

The BFO issues an assortment of Special Recreation Permits (SRPs) for a range of activities, including commercial use, competitive use, filming, special area use, and organized group activities and event use. The BFO currently manages 51 SRPs with the majority of those for commercial outfitting and guide service. SRPs are required for specific recreational uses of the public lands and related waters. They are issued as a means to manage visitor use, protect natural and cultural resources, and provide a mechanism to accommodate commercial recreational use.

Trends

Recreation Management

Management practices change over time, as social priorities shift and new scientific knowledge enhances our ability to responsibly manage differing land uses. Over the past twenty years, a major shift has occurred in the way management agencies view outdoor recreation. Public lands have always provided recreation opportunities. However, outdoor recreation is now recognized as an important land use providing social and economical benefits on national, regional, and local levels.

Undeveloped/Dispersed Recreation

Outdoor recreation is more frequently being considered the dominant use on many public lands.

Special Recreation Management Areas

Growing public demand warrants continued identification and development of SRMAS.

Special Recreation Permits

Growing public demand for the services provided by commercial, competitive and organized activities on public lands is anticipated. Applications for special recreation permits are becoming diversified relative to historic use applications.

Forecasts

Recreation Management

Continuation of the current management situation would result in impacts similar to those seen since the enactment of the existing RMP. Impact levels are expected to increase paralleling recreation use trends. Minor changes to the RMP would increase management's ability to appropriately mitigate recreation impacts in natural environment areas. Allowing dispersed recreation with minimal constraints would continue to be appropriate for newly written management plans. However, management prescriptions need to be more proactive allowing for innovative strategies as they relate to heavily affected areas and OHV use.

Undeveloped/Dispersed Recreation

Public demand for open space preservation will likely continue to be high. Development of trails and installation of visitor facilities may become necessary to manage public use and meet demands for recreational opportunities in the area.

Special Recreation Management Areas

Unless carefully planned and managed, these changes to existing setting will create more demand for public open space recreation opportunities and could potentially lead to more user conflict and resource damage. Through the creation of special recreation management areas control and protection of conflicts and resources damage can be accomplished.

Special Recreation Permits

Public demand for commercial, competitive, and organized events will likely continue to increase. An increase in applications is anticipated.

Key Features

Several features of particular, or key, importance to recreation on BLM-administered lands in the planning area are listed below. These key areas will be used to shape management allocations and recreation management decisions during the planning process.

Elevations change throughout the planning area. The elevations in the **Weston Hills** Recreation Area range from 3,800 feet to over 4,500 feet. The lower elevations are grasslands with some juniper, while the upper elevations are ponderosa pine-covered hills and steep drainages

interspersed with meadows and scoria outcrops. From the Weston Hills Recreation Area you can see in the distance the Big Horn Mountains to the west and Devil's Tower to the east. The area is 15 miles north of Gillette, WY and accessible via State Highway 59 north. There are 5.9 miles of improved resource roads into the SRMA with two parking areas. One parking area is unimproved the other is improved with an outdoor toilet that is accessible by people with physical disabilities. The area is open to motorized and nonmotorized recreation opportunities including mountain bicycling, hiking, horseback riding, big game hunting, and OHV (ATV, 4 WD). Approximately ten miles of primitive roads and OHV trails exist with use restricted to marked routes only. Another 6.4 miles of trails exist that are open to nonmotorized use. No discharge of firearms, overnight camping or open fires are allowed within the developed parking area.

Hole-in-the-Wall

This area offers a colorful and scenic red sandstone escarpment know as the Red Wall that is rich in legend of outlaw activity in the late 1800s, most notably Butch Cassidy and the Wild Bunch Gang. The area is accessible by State Highway 190 and the Barnum Road and lies approximately 16 miles southwest of Kaycee, WY. The area is open to motorized dispersed recreation including driving for pleasure along Johnson County roads. The Hole–in-the-Wall SRMA is comprised of a trailhead with 2.5 miles of trail open to nonmotorized use.

Middle Fork of the Powder River & Outlaw Cave Recreation Areas

These areas are spectacularly scenic parts of the old west rich with legend of outlaw activity in the late 1800s. The Middle Fork area is a very diverse, ranging in elevation from 5,000 to 8,000 feet with numerous steep incised canyons, a red sandstone escarpment known as the Red Wall, and open grassland parks interspersed with ponderosa pine, Douglas-fir, and limber pine forests. The wildlife found here are just as diverse: elk, mule deer, pronghorn, mountain lions, eagles, among other small mammals and rodents. There is a "blue ribbon" trout stream containing brown and rainbow trout in the Middle Fork of the Powder River. The SRMA includes the Ed O. Taylor Wildlife Habitat area managed by the WGFD.

The Outlaw Cave SRMA lies within the Middle Fork Recreation area and has 0.5 miles of access road to an undeveloped campground. A hiking trail from the campground accesses the Middle Fork of the Powder River. There are other access points to the Middle Fork canyon along the Middle Fork road. The area also contains archeological sites dating back to the prehistoric period: stone circles, quarry sites, rock art and curious petro-glyphs.

The Middle Fork area lies approximately 16 miles southwest of Kaycee, WY and is accessible by State Highway 190 and Barnum Road. Multiple named roads provide approximately 50 miles of access routes to the area including Barnum Mountain Road, Outlaw Cave Road, South Slope Road, Bachus Pasture Road, Buffalo Creek Road, Hazelton Road and Shirly Road. Another 18

miles of primitive access roads exist within the SRMA however vehicle and OHV use is allowed on marked trails only. The area is open to motorized and nonmotorized recreation opportunities camping, freshwater fishing, cycling, hiking, big game hunting, and OHV (ATV, 4 WD). There are no developed parking areas or camp grounds.

Dry Creek Petrified Tree Environmental Education Area

This area offers 60 million year old remnants of petrified trees in red sage hills and sagebrush country. The area was a jungle-like swamp with towering Metasequoia trees. The area is closed to motorized use offering dispersed recreation including camping, hiking, and picnicking.

The area is accessed via Johnson County's Tipperary Road approximately ten miles east of Buffalo, WY. The SRMA provides a developed parking area with an outdoor toilet accessible to people with physical disabilities. The area has 0.66 miles of interpretive trails and an interpretive and educational sign identifying the SRMA and its unique values is posted on site. Overnight camping, open fires and discharge of firearms are not allowed within the developed parking area. There is no vehicle or OHV use within the SRMA beyond the parking area. Vehicle access into the area is allowed for livestock operations on existing primitive resource roads which are open to nonmotorized use by the general public. The area is open to nonmotorized recreation opportunities including cycling, hiking as well as small and big-game hunting.

Mosier Gulch

The area is accessed from State Highway 16 West approximately three miles west of Buffalo, WY. Approximately 0.5 miles of improved resource road provides access into the SRMA's two developed parking areas and four picnic sites with tables. Two undeveloped parking areas also exist. An outdoor toilet is available accessible to people with physical disabilities as well as a hand pumping water well. An interpretive sign that identifies the SRMA and its facilities is posted on site. No overnight camping, open fires or discharge of fire arms are allowed within the parking or picnic areas. The area is not open to motorized use beyond the improved access road. The area is open to nonmotorized recreation opportunities including cycling, freshwater fishing, hiking and small and big game hunting.

Welch Ranch

The area offers nonmotorized dispersed recreation including camping, mountain bicycling, freshwater fishing, hiking, horseback riding, big game hunting, upland bird hunting, picnicking, viewing – other, and viewing – wildlife.

The Welch Management Area, located in north-central Sheridan County, Wyoming, comprises approximately 1,740 acres. The Welch area is located in the Powder River Basin, a part of the

Northern Great Plains which includes most of northeastern Wyoming and a portion of southeastern Montana. The Big Horn Mountains are within sight of the Welch lands to the west. The following narrative is from the P&M Exchange EIS completed in 2004.

The Welch property occupies a portion of the Tongue River valley floor and the adjacent dissected uplands between Ash Creek and Hidden Water Creek, both tributaries of the Tongue River. Approximately 1.5 miles of the Tongue River runs through the eastern portion of the Welch lands. The river and riparian area lie within an alluvial valley floor.

The upland areas on the property contain sagebrush/grasslands intermixed with skunkbush sumac and ponderosa pine and juniper stands. Several intermittent draws contain green ash, chokecherry and hawthorne shrubs. A large portion of the upland woodlands was burned in a July, 2001.

Common wildlife present on the Welch lands include pronghorn, mule deer, white-tailed deer, coyote, fox, sage-grouse, sharp-tail grouse, turkey, grey partridge, pheasant, waterfowl, golden eagle, red-tailed hawk, turkey vulture, and numerous non-game birds and mammals. Other species observed or known to frequent the area include bald eagle, cormorant, blue heron, mountain lion, and bobcat.

The Tongue River along this stretch is a transition zone between cold-water and warm-water fish species and contains small mouth bass, sauger, walleye, catfish, brown trout, stonecat, and numerous non-game species. The Welch area is rich in cultural values.

The Welch lands can be accessed from Sheridan via Wyoming State Highway 338. Highway 338 borders the area for approximately 0.33 miles providing public access. A developed parking area exists at the junction of Highway 338 and the Tongue River with an interpretive sign identifying the area. Several unimproved primitive roads totaling 6.1 miles serve the livestock operations on the property both from Highway 338 and from the Ash Creek Road located just north of the property. No motorized use is allowed within the SRMA by the general public. Overnight camping, open fires and discharge of firearms are not allowed within the developed parking area. The area is open to nonmotorized recreation opportunities including cycling, freshwater fishing, hiking and small and big game hunting.

Burnt Hollow Management Area (BHMA)

This area offers a varied topography from rolling sagebrush-grasslands to steep precipitous drainages, scoria buttes and clayey outcrops with juniper and ponderosa pine uplands. Several intermittent drainages contain plains cottonwood and junipers. Springs and small wetlands are scattered throughout the BHMA. Livestock grazing, wildlife habitat, and limited mineral development are the historic land uses. The few existing two-track roads within the BHMA were created for mineral exploration and/or livestock management. Approximately 6.1 miles

primitive resource roads are used for livestock operations and are open to the public for nonmotorized use. The area offers nonmotorized dispersed recreation including mountain bicycling, environmental education, hiking, horseback riding, small and big game hunting, picnicking, viewing – scenery/landscapes, and wildlife viewing.

The area is accessible via State Highway 59 15 miles north of Gillette, WY. Approximately 2.4 miles of the SRMA border Highway 59 providing public access. Two developed parking area exist along this route with interpretive signs that identify the site. Another undeveloped parking area exists on state owned land at the northeast end of the SRMA off the Cow Creek Road which also allows for public access to the area along 1.9 miles of boundary with the SRMA. Firearm discharge is allowed for hunting purposes only, no recreational target shooting.

2.6.7 Wilderness Characteristics

The current planning area contains three WSA's that may possess wilderness characteristics and are managed as WSA'S or wilderness areas until or unless congress approves or releases these areas (see the Special Designations section). The planning area may also contain other areas that possess wilderness characteristics; however, the BLM is precluded from establishing any new WSA's or modifying any existing WSA's during the planning process based on past legal settlements (Washington Office Instruction Memorandum No. 2003-275). Nevertheless, the BLM may consider, under Section 201 of FLPMA, information on wilderness characteristics when preparing land use plans. Lands with wilderness characteristics may be managed to protect and/or preserve some or all of those characteristics. Decisions concerning those lands will be part of the final land use plan.

In February 2004, the BLM received a document entitled "Wilderness at Risk-The Citizens' Wilderness Proposal for Wyoming BLM Lands" (Updated Version) submitted by the Wyoming Wilderness Association (2/13/04) known at the Citizens' Wilderness Proposal (Wyoming Wilderness Coalition 1994). The cover letter of this Citizens' Wilderness Proposal states: "Please accept this document and enclosed maps as official comments for the Buffalo, Casper, Cody Resource Districts in their Resource Management Plan revisions." (Howell 2004). The proposal requests additional acres surrounding each of the three existing WSAs be added to the designation. The Citizens' Wilderness Proposal was originally submitted to the BLM in 1994 and updated in 2004.

- **Gardner Mountain WSA:** The proposal requests that an additional 12,362 acres be added to the existing WSA.
- **North Fork of the Powder River WSA:** The proposal requests that an additional 6,677 acres be added to the existing WSA.
- **Fortification Creek WSA:** The proposal requests that an additional 11,330 acres be added to the existing WSA.

For each of the above requests, the Citizens' Wilderness Proposal presents a Summary, Highlights, Location and Access, Wilderness Qualities, Resource Analysis, and Boundary Rationale and Management Recommendations section. In summary, the Citizens' Wilderness Proposal recommends additional acres in the Gardner Mountain area because of its "impressive historical legacy and terrific wildlife habitat;" additional acres in the North Fork of the Powder River area for its "unsurpassed delicate beauty, impressive environment, and outstanding fishery;" and additional acres in the Fortification Creek area for its "unique topography and truly western scenery" (Wyoming Wilderness Coalition 1994).

While BLM is precluded from adding additional acres or modifying current WSA's, areas that might contain wilderness characteristics will be analyzed for such and management decisions will be structures to preserve and/or protect some or all of those characteristics. The authority to do so is found under Section 201 of FLPMA, not under the Wilderness Act of 1964.

2.6.7.1 Resource Characterization

Current Condition

The BLM did not recommend any of these three WSAs for Wilderness in the 1985 RMP. The WSAs are managed in accordance with the interim management guidelines until Congress acts upon the BLM's recommendations.

Trends

Current trend information on areas with wilderness characteristics is one of a shrinking resource. The current planning area has seen an increasing trend of multiple uses with an emphasis on mineral extraction, agricultural use, and recreation opportunities. Regionally, the interest in areas with wilderness characteristics is increasing with recreationists. Recreationists will continue to seek out areas with wilderness characteristics because of values such as primitive and unconfined recreation opportunities and outstanding opportunities for solitude. Additional acreage to be managed for its wilderness characteristics will require inventory and careful consideration in the development of management alternatives.

Forecasts

BLM will not propose additional Wilderness or WSAs in accordance with BLM policy; however, BLM will re-evaluate the WSAs, the Citizens' Wilderness Proposal , and the entire planning area to determine appropriate management actions. These actions could also include areas managed for primitive nonmotorized activities and preservation of biodiversity.

Key Features

Wilderness characteristics include, but are not limited to, naturalness, solitude, primitive and unconfined recreation, special features, diversity, manageability, and other features of the land associated with the concept of wilderness. Additional acres would be analyzed for

characteristics such as naturalness, solitude, primitive and unconfined recreation, special features, manageability, and diversity in the national wilderness system.

2.6.8 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, yaks, and bison) within the planning area. All public land grazing in the planning area is governed under Section 15 of the Taylor Grazing Act which concerns issuing grazing leases on public lands outside the original grazing district boundaries that were established by the Taylor Grazing Act of 1934. Base property is land, owned or controlled by a BLM lessee, which may serve as a base for a livestock operation. The land must have the capability to produce crops or forage that can be used to support the livestock authorized for a specified period of time. The base property supporting a section 15 grazing lease must adjoin the leased public lands unless no applicant owns adjoining lands. In most cases, the base property for a section 15 lease adjoins, surrounds, or is intermingled with the leased public lands. The amount of forage required by one animal unit for one month is called an animal unit month (AUM).

2.6.8.1 Resource Characterization

Current Condition

Animal Unit Month Allocations

The BFO manages livestock grazing on 782,102 acres. This acreage incorporates 427 grazing leases (Table 2-43), authorizing approximately 106,078 AUMs of livestock forage in 477 grazing allotments. The public lands in the planning area are used by 400 livestock operators. These lands are located in Johnson, Campbell and Sheridan Counties with the majority of the public lands being located in Johnson County. The BFO also administers grazing use for public lands located within the boundaries of adjacent BLM Field Offices through cooperative management agreements.

Table 2-43. Summary of Livestock Kind Authorizations in the Buffalo Planning Area

Livestock Type	Number of Leases
Cattle Only	362
Sheep Only	18
Cattle and Sheep	24
Horse Only	5
Bison Only	2
Yak Only	1
Cattle and Horse	11
Cattle, Sheep and Horse	4
Total	427

Source: BLM 2008e

Livestock grazing on allotments is authorized during various times during the year dependent on management objectives. Grazing periods vary with elevation and/or geographical change, resource needs, and user preference. The higher elevation allotments are generally grazed during summer and/or fall. The lower elevation areas may be grazed during any season. The majority of the allotments in the planning area are operating with prescribed use levels that provide for plant recovery to enhance rangeland health. When rangelands are not meeting resource objectives, changes in grazing management are implemented.

Two major stock driveway systems, the Kaycee (28.5 miles) and Hazelton Road (51.2 miles), are still actively used. These two stock driveways include segments of other trails, which for administrative purposes are considered part of the main stock driveway. For the most part, the stock driveways are fenced lanes.

The BLM recognizes that AUM production on its rangelands can only be sustained with proper management of livestock grazing activities. To evaluate rangeland health and keep AUM production sustainable, the BLM utilizes the *Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for Public Lands Administered by the Bureau of Land Management in the State of Wyoming* (BLM 1998). In 1985 all allotments were placed in categories established by BLM range management policies. These categories included: "I" (Improve), "M" (Maintenance), and "C" (Custodial). The BLM uses this classification to categorize allotments according to the greatest potential for resource improvement and the greatest economic return for applied management. Factors used in the categorization process include public land acreage, estimated range condition and trend, resource conflict or concerns, existing grazing systems, range suitability, production potential, wildlife habitat values, land patterns and acreages, and range improvement needs. Allotments containing larger acreage tracts of public land and the lowest potential were placed in the "I" and "M" categories and allotments containing smaller acreage tracts of public land were placed in the "C" category. Priority was given to the "I" category allotments followed by the "M" category allotments and then the "C" category allotments. Appendix B lists each allotment in the planning area with current allotment categorization, AUMs, season of use, type of management, active preference, suspended use and kind of livestock. Map 15 shows how the planning area has been categorized.

Improvement projects and grazing systems, which have become known as BMPs, have been used in rangeland management since the early 1970s. Management efforts have occurred singly or cooperatively amongst livestock lessees and state and federal agencies. The goal of such efforts is to allow sustainable livestock use to continue on public lands while maintaining healthy watersheds and providing habitat for a variety of wildlife species.

In the planning area, a total of 18 allotments are currently being operated under allotment management plans (AMP) or management agreements. These allotments encompass approximately 123,247 acres of public land in the planning area (Table 2-44).

Table 2-44. Activity Plans—Allotment Management Plans, and Management Agreements

Allotment Number	Allotment Name	Type of Plan	Public Acres
22213	Tongue River	AMP	1,767
22214	Schooner Ranch	AMP	12,482
32014	North Windmill	AMP	2,074
02275	Remington Creek	AMP	2,676
02310	Little Willow	AMP	6,080
02344	Dry Vee	Agreement	4442
02371	Slope/Mountain/Stubbs Draw/Poker Creek	AMP	16,540
02380	Wormwood Ranch/Beaver Creek	AMP	12,917
02390	Olmstead	AMP	832
02426	Crooked Creek	AMP	20,367
02430	Powder River	AMP	4,526
02438	T.W.	AMP	1,840
02476	Gardner Mountain (South)	AMP	1,622
12033	Red Fork	AMP	10,000
12139	Falxa	AMP	14,759
12162	Fence Creek	AMP	4,820
22106	Wagonhammer	AMP	3,881
TOTAL			123,247

Rangeland Health/Productivity

Starting in 1998, the BLM started assessing grazing allotments in accordance with the *Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for Public Lands Administered by the Bureau of Land Management in the State of Wyoming* (BLM 1998) as per the change in 1995 to the 43 CFR 4100 grazing regulations. Management decisions and actions are made in accordance with the Wyoming Standards for Healthy Rangelands. These standards are used to allow sustainable livestock grazing to continue while protecting watersheds, riparian and upland ecosystems, and wildlife habitat.

Standards address the health, productivity, and sustainability of the BLM-administered public rangelands and represent the minimum acceptable conditions for the public rangelands. The standards apply to all resource uses on public lands. Their application will be determined as resource-specific guidelines are developed. Standards are synonymous with goals and are observed on a landscape scale. They describe healthy rangelands rather than important rangeland by-products. The achievement of a standard is determined by observing, measuring, and monitoring appropriate indicators. An indicator is a component of a system whose

characteristics (e.g., presence, absence, quantity, and distribution) can be observed, measured, or monitored based on sound scientific principles.

At the end of the 2008 fiscal year, rangeland health evaluations had been completed on 125 allotments containing 588,581 acres of public land. It was determined that one or more rangeland health standards were not being met in three allotments, for a total of 9,601 acres. Only a portion of those acres within the allotment did not meet rangeland health standards. Appendix B identifies specific allotments that have been assessed as to meeting standards and if progress is being made to achieve standards not met.

Range improvement projects are implemented to assist in achieving management goals. Those developed prior to the 1960s were financed by the grazing lessees. Later, the BLM contributed money toward projects and in some cases completely financed them. There are numerous old projects on public lands that may have never been authorized by the BLM. These primarily consist of reservoirs and fences. In recent years BLM has sought and participated in cost shared projects with other agencies and private organizations to achieve mutual goals on public and private lands.

The BFO uses set criteria for prioritizing new projects for funding. Highest priority is given to reconstruction of existing projects and new projects needed to implement rangeland health guidelines. Criteria used to rank other projects include: implementation of activity plans; cooperatively funded projects; allotment category (I, stock driveway, M, and C); number of allotments benefited; project cost; number of AUMs of forage authorized within an allotment; and wildlife habitat enhancement. Current BLM policy is to assign all maintenance responsibilities to the benefiting user, usually the grazing lessee.

Prior to 1997, an average of six to ten range improvement projects were completed annually. Since 1998, an average of four to six range improvement projects have been completed annually. These projects consist primarily of fences, stock water pipelines, spring developments, water wells, and vegetative treatments (Table 2-45).

Table 2-45. Range Improvement Projects Implemented in the Buffalo Planning Area, Wyoming

Type of Project	Number Projects Projected	Projects Completed Since 1998
Fences (miles)	3.3	2.9
Reservoirs (number)	1	0
Springs (number)	2	<1
Wells (number)	3	1
Pipelines (number)	5	2

Source: BLM 2008j

Trends

AUM Allocations

The Missouri River Basin studies, conducted by the BLM between 1949 and 1954, provided base data on vegetative types, AUMs, and in some cases range condition. The grazing preference for all leases administered by the BFO are based on these studies unless more current information is available. Information pertaining to the BFO is found in the individual studies for two drainage basins: Powder River and Tongue River. A large portion of the public land was resurveyed in 1968.

The number of AUMs authorized each year has gradually increased as range specialists have developing working relationships with lessees and improving livestock management (Table 2-46).

Rangeland Health/Productivity

Approximately ten percent of the public land grazing allotments in the planning area are assessed annually. Where livestock grazing has been identified as contributing to an allotment not meeting the rangeland health standards, allotment specific guidelines or BMPs are being implemented to improve rangeland condition. The goal is to continue sustainable livestock use on public lands while maintaining healthy watersheds and providing habitat for wildlife.

Forecasts

Livestock grazing will continue in the planning area in response to public demand. Most livestock operators in the planning area depend on the forage public lands grazing provide. A predicted increase in development of mineral resources in the planning area will increase the presence of energy development related infrastructure and machinery (e.g., roads, pipelines, well pads processing facilities and a variety of vehicular traffic). Construction of new facilities and related infrastructure necessary to extract mineral resources will require removal of existing vegetation. Further indirect loss of available forage may occur as increased infrastructure and traffic constrain livestock movements. As reclamation practices are applied to the public lands, adjustments in livestock numbers and locations may be affected to assure the success of those applications.

Evaluation of rangeland health will continue. Focus will be on an allotment-level basis. Emphasis will change somewhat from doing only high priority allotments to looking at all public lands, especially those with potential greater sage-grouse habitat and habitat for other species as risk. Adjustments in grazing use would still be done at the allotment level.

Table 2-46. AUMs Authorized in the Planning Area

Year	Campbell County	Johnson County	Sheridan County	Field Office Total
1989	34,096	52,862	5,103	94,050
1990	34,505	55,024	5,359	96,878
1991	33,234	59,281	4,796	99,302
1992	32,860	61,078	5,145	101,075
1993	34,170	60,733	5,292	102,188
1994	35,075	66,601	5,601	109,271
1995	35,698	58,825	5,423	101,941
1996	36,368	59,865	5,107	103,336
1997	37,118	66,041	5,448	110,604
1998	35,454	68,230	4,908	110,590
1999	34,558	61,912	5,727	104,196
2000	36,288	64,756	5,290	108,334
2001	32,229	59,472	4,985	98,687
2002	34,365	55,740	4,722	96,829
2003	33,216	58,487	5,274	98,980
2004	33,446	56,802	5,071	97,323
2005	34,751	49,864	5,677	92,297
2006	34,511	48,638	6,148	91,303
2007	35,382	49,811	6,444	93,644
2008	38,597	53,066	5,848	99,519
Average	34,796	58,354	5,368	98,518

Other impacts on livestock grazing come from ongoing evaluations of grazing management, management for wildlife habitat, Threatened and Endangered species, the presence of cultural resources, recreation activities, fire management, WSAs, soil and watershed protection, invasive species, land sales and exchanges, ROWs, air and atmospheric values (air quality) protection, and hazardous materials control.

Key Features

Key features for livestock grazing include I and M category allotments and greater sage-grouse focus areas.

2.7 Special Designations

ACECs, Scenic or National Back Country Byways, Wild and Scenic Rivers (WSRs), and WSAs are discussed within this section. Areas managed under special designations are regulated, congressionally mandated, and designed to protect or preserve certain qualities or uses.

2.7.1 Areas of Critical Environmental Concern

An ACEC is defined in FLPMA, Public Law 94-579, Section 103(a) as an area within the public lands where special management attention is required to protect and prevent irreparable damage to important historical, cultural, and scenic values, fish and wildlife and other natural systems or processes, and to protect life and safety from natural hazards. The BLM prepared regulations for implementing the ACEC provisions of FLPMA. These regulations are found at 43 CFR 1610.7-2(b).

2.7.1.1 Resource Characterization

Current Condition

There are no designated ACECs within the planning area.

Potential Areas for Consideration as ACECs

Six areas were identified by the public during the Powder River Basin EIS as potential ACECs within the planning area (Map 16). All six of these nominated ACECs were reviewed and evaluated for meeting relevance and importance criteria. Of the six, five were determined to meet relevance and/or importance criteria. Current management was determined to be sufficient to protect these potential ACECs until an official designation is made. These potential areas will be evaluated during the current RMP revision process.

2.7.2 Scenic or Back Country Byways

National Back Country Byway Program

The BLM began a Back Country Byway program in 1989 to focus on enhancing recreational opportunities. A national Scenic Byway System was created two years later under Section 1047 of the Intermodal Surface Transportation Efficiency Act of 1991. This act recognized the BLM Back country and Scenic Byways as a component of the national scenic byway system (Section 1032, eligible projects). The objectives of the byway program include 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 multiuse 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 system in a way that is uniquely suited to national public lands managed by the BLM.

2.7.2.1 Resource Characterization

Current Condition

There are no designated scenic or Back country byways in the planning area.

2.7.3 Wild and Scenic Rivers

The National Wild and Scenic River System is a system of nationally designated rivers and their immediate environments that have outstanding scenic, recreational, geologic, fish and wildlife, historic, cultural, and other similar values and are preserved in a free-flowing condition. WSR designations are an administrative special designation in the RMP. The BLM must assess all eligible river segments and determine which are suitable or non-suitable per Section 5(d)(1) of the Wild and Scenic Rivers Act of 1968.

The system consists of three types of rivers:

> *Recreation*—rivers or sections of rivers that are readily accessible by road or railroad and that may have some development along their shorelines and may have undergone some impoundments or diversion in the past.
>
> *Scenic*—rivers or sections of rivers free of impoundments with shorelines or watersheds still largely undeveloped but accessible in places by roads.
>
> *Wild*—rivers or sections of rivers free of impoundments and generally inaccessible except by trails, with watersheds or shorelines essentially primitive and waters unpolluted.

The BLM is responsible for evaluating all rivers located on BLM-administered land to determine if they are appropriate for addition to the National Wild and Scenic River System and, as appropriate, making recommendations for legislative actions to accomplish such additions.

The WSR study process is composed of two main components: the eligibility phase and the suitability phase. The eligibility phase includes identifying eligible rivers and stream segments, and assigning a tentative classification (Wild, Scenic, or Recreational). If, upon completion of

the eligibility phase, any river or stream segments are found to be eligible for inclusion in the National Wild and Scenic Rivers System, a suitability study will be conducted. River or stream segments must be found eligible and suitable to be considered for designation in the National Wild and Scenic Rivers System, and only congress or the Secretary of Interior can designate segments.

A WSR Final Review Report was completed for BLM Wyoming in 2003 which assessed suitability of eligible waterways. The WSR management prescription is to be developed as part of the completed RMP decisions and will be the "interim management direction" for these areas until congress decides whether or not to include suitable waterway segments in the WSR system.

2.7.3.1 Resource Characterization

Current Condition

Four waterways were determined to be eligible for WSR designation: Beartrap Creek, Middle Fork Powder River, North Fork Powder River, and Powder River (Cantonment Reno). However, only the Middle Fork Powder River was determined to be suitable for WSR designation (Table 2-47).

Table 2-47. Middle Fork Powder River Wild and Scenic River Characteristics

Suitable for WSR Status (miles)	9.5
Total Length (miles)	3,040
Classification	Wild
Current Management	Multiple use
Mineral Potential Leasable	Low
Mineral Potential Locatable	Withdrawn from mineral entry

2.7.4 Wilderness Study Areas

In 1964, Congress passed the Wilderness Act, thereby establishing a national system of lands for the purpose of preserving a representative sample of ecosystems in a natural condition for the benefit of future generations. Until 1976, most land considered for, and designated as, wilderness was managed by the National Park Service and USFS. With the passage of FLPMA in 1976, congress directed the BLM to inventory, study, and recommend which public lands under its administration should be designated wilderness. To be designated as wilderness, an area has to have the following characteristics:

Size – road-less areas of at least 5,000 acres of public lands or of a manageable size.

Naturalness – generally appears to have been impacted primarily by the forces of nature.

Opportunities – provides outstanding opportunities for solitude or primitive and unconfined types of recreation.

WSAs also often have special qualities, such as ecological, geological, educational, historical, scientific, and scenic values. WSAs are areas determined to meet wilderness eligibility requirements but for which congress has not acted on the managing agency's recommendation. They are managed in accordance to interim management guidelines to maintain the wilderness characteristics until congress acts. There are no congressionally designated wilderness areas within the planning area; however there are three WSAs within the planning area.

A Wyoming Statewide Wilderness Study Report was completed in 1991 by the BLM (BLM 1991b). In this study, the BLM described all WSAs in Wyoming and provided a recommendation for each. Each WSA was either recommended or not recommended for designation as wilderness. Regardless of the BLM's recommendation, the BLM must manage each area as a WSA until Congress designates these areas as wilderness or releases them for other uses. All WSAs included in the 1991 report must continue to be managed as WSAs and must be addressed as WSAs in RMP revisions.

2.7.4.1 Resource Characterization

Current Condition

There are three WSAs managed by the BLM in the planning area: Gardner Mountain, North Fork of Powder River, and Fortification Creek (Table 2-48 and Map 16).

Table 2-48. Wilderness Study Areas in the Planning Area

Wilderness Study Area	WSA Number	Acreage
Gardner Mountain	WY-060-201	6,377
North Fork of Powder River	WY-060-202	10,019
Fortification Creek	WY-060-204	12,417

Gardner Mountain WSA (WY-060-201)

The Gardner Mountain WSA, which encompasses 6,377 acres with no state or private in holdings, is located in Johnson County 40 miles southwest of Buffalo. The area is characterized by the rugged terrain of the southern Big Horn Mountains and dominated by ponderosa pine, Douglas-fir, limber pine, scattered mountain mahogany, and meadows. Deep, steep walled canyons of Beartrap Creek and the North Fork of the Red Fork of the Powder River are the dominant perennial water sources. The area provides winter habitat for elk and mule deer and other wildlife resources include mountain lions, black bears, turkeys, blue grouse, golden

eagles, red tailed hawks, among others. Solitude, excellent fishing, wildlife recreation, historic landscapes, and naturalness are some of the wilderness opportunities within this WSA.

North Fork of Powder River WSA (WY-060-202)

The North Fork of the Powder River WSA, which encompasses 10,019 acres with no state or private in holdings, is located in Johnson County 30 miles southwest of Buffalo. The area is dominated by two deep, rugged and scenic canyons: Pass Creek and the North Fork of the Powder River. Vegetation in the steep terrain is dominated by ponderosa pine, Douglas-fir, and limber pine while mixed with open native grass covered areas. The area provides winter range for elk, a pronghorn migration route, black bear habitat, and a variety of other species and raptors. Solitude, excellent fishing (Class III and Class II), primitive and unconfined recreation, and naturalness are some of the wilderness opportunities within this WSA.

Fortification Creek WSA (WY-060-204)

The Fortification Creek WSA, which encompasses 12,417 acres of public lands and one state owned in holding of 640 acres, is located 36 miles northeast of Buffalo in northeastern Johnson County and northwestern Campbell County. The area is representative of the Sagebrush Steppe ecosystem/Great Plains Shortgrass Prairie province. This ecosystem is not found in any designated wilderness. The landscape is steeply sloping, highly dissected, and gullied terrain. The main drainages are Bull Creek, Little Bull Creek, and Deer Creek. Vegetation consists of juniper, sagebrush, and grasses. Most of the WSA is considered crucial yearlong range for elk which have used the area for winter range because of available forage and cover. Solitude, primitive and unconfined recreation, naturalness and unique landscapes are some of the wilderness opportunities within this WSA.

Recommendation for Wilderness Designation

The BLM is required by congress to manage WSAs to preserve the wilderness characteristics under the non-impairment standard until congress designates the lands under wilderness review as wilderness, or releases the lands to uses other than wilderness. BLM performs inventories of these areas and makes recommendations regarding the areas and acreages that it recommends for designation as wilderness. These recommendations are based on factors such as the manageability of the area, how well it meets the characteristic of wilderness, conflicts/potential for conflicts with other users and uses, and other relevant factors. Table 2-49 shows the current acreages for WSA's in the planning area and the BLM's recommendations for the number of acreages that should be designated as wilderness.

Table 2-49. Current Acreages for Wilderness Study Areas in the Buffalo Planning Area and BLM-Recommended Acreages for Wilderness Areas

Lands Managed as Wilderness	Wilderness Study Areas (acres)	BLM Recommended Wilderness (acres)
Gardner Mountain	6,377	0
North Fork of Powder River	10,019	0
Fortification Creek	12,417	0
Total	28,813	0

The above BLM recommendations were incorporated in the 1985 Buffalo RMP. As of 12/31/2008 congress has not acted on this recommendation. The BLM is still required, however, to manage the WSA's under the non-impairment standard until the congress either designates the lands as wilderness or releases the lands to uses other than wilderness.

2.8 Socioeconomic Resources

2.8.1 Social Conditions

The custom, culture, and history of the area affect the social conditions within the planning area, which includes the towns, cities and rural areas. While it is recognized that BLM does not manage social conditions directly, BLM's management actions can impact social conditions in the planning area and nearby communities. Therefore, the purpose of this section is to provide a summary of demographic information in conjunction with additional topics that will be available to be used to address the affected social conditions in the planning process, including public services and custom and culture.

2.8.1.1 Resource Characterization

Current Condition

This section presents information on existing conditions in the planning area based on the profiles that comprise the AMS, supplemented by additional data for a few key areas of interest. Data are provided at the county level and the level of incorporated towns and cities; most government demographic data is provided at the county level and at the level of incorporated towns and cities.

The summary focuses on the three counties of the planning area. Although there are some relatively direct economic linkages with counties outside the planning area (as discussed in detail in the economic conditions section), with a potentially significant portion of labor and services for the CBNG development in the planning area coming from counties outside the planning area, at this stage of analysis BLM believes the major impacts on social conditions are likely to be focused within the three counties of the planning area. Future analysis, to be conducted later in the RMP and EIS process, will consider the potential for impacts on social conditions outside the three counties of the planning area. Future analysis will also incorporate data on social conditions from sources other than the profiles that comprise the AMS.

In 2005 the most populous county in the planning area was Campbell County, with over 37,000 residents. Sheridan County had about 27,000 residents, and Johnson County had nearly 8,000. The most populous cities in the planning area, in order of decreasing size, were Gillette (Campbell County), Sheridan (Sheridan County), and Buffalo (Johnson County). Table 2-53, in the Trends section below, shows population for all of the towns in the planning area in 1990 and 2000.

Table 2-50 shows information about the population distribution by various age groups in year 2000. The median age was higher in Johnson and Sheridan Counties than the state or national average, but was lower in Campbell County. Johnson and Sheridan Counties also had a lower

proportion of residents in the lower age categories (under age 20 and aged 20-39) compared to the state or nation, while Campbell County had a higher proportion of residents in both lower age categories. The opposite is true of residents in higher age categories (age 40-54, 55-64, and 65 and over).

Table 2-50. Age Distribution by County, 2000

Area	Median Age	Percent of People by Age Category				
		Under 20	20-39	40-54	55-64	65 and Over
Campbell County	32.2	34%	28%	27%	6%	5%
Johnson County	43.0	27%	19%	24%	12%	18%
Sheridan County	40.6	27%	22%	25%	10%	16%
Wyoming	36.2	29%	29%	21%	9%	12%
United States	37.3	29%	26%	24%	9%	12%

Sources: Headwaters Economics 2007g, 2007h, 2007i; U.S. Census Bureau 2000

Table 2-51 provides a summary of educational attainment in each county in year 2000. Compared to the United States, people in the counties in the planning area tend to be more likely to have a high school diploma, but less likely to have a four-year college degree. Johnson County has the highest percentage of high school graduates, while Sheridan has the highest percentage of four-year college graduates. Among the four counties, Campbell County has the lowest percentage of four-year college graduates.

Table 2-51. Educational Attainment in 2000

Area	Percent of people age 25 and over:	
	With a high school diploma	With a four-year college degree
Campbell County	88.3%	15.7%
Johnson County	90.1%	22.2%
Sheridan County	88.4%	22.4%
Wyoming	87.9%	21.9%
United States	80.4%	24.4%

Sources: Headwaters Economics 2007g, 2007h, 2007i; U.S. Census Bureau 2000

Other topics of interest related to social conditions include historical custom and culture, discussion of groups of people interested in using the land and resources in different ways, physical infrastructure such as roads and utilities, services such as law enforcement and medical care, and others. Social conditions are also integrally linked to economic conditions and have some overlap with environmental justice, which addresses conditions and impacts for people of color and low-income people in particular. However, the profiles that comprise the AMS focus on data provided by the federal government, and offer information on a smaller subset of topics. These other topics will be addressed further during the remainder of the RMP and EIS process.

Future analysis, to be conducted later in the RMP and EIS process, will consider social conditions at finer geographic resolution as well as additional data from sources other than the profiles that comprise the AMS. Information that may be incorporated later in the process includes:

- Historical custom and culture, which describes how different groups of people use the land and resources in different ways
- The availability and current use of physical infrastructure such as roads and utilities;
- The availability and current use of services such as law enforcement, primary and secondary public schools, and medical care; and
- Forecasted data on social conditions, where available.

Trends

Table 2-52 shows changes in population for each county between 1970 and 2005. Campbell was the fastest-growing county, nearly tripling its population since 1970. Sheridan grew by about 50 percent in the same period, which was a pace comparable to the state and the United States Johnson County grew by about 40 percent, a rate just below the national population growth rate for the same period.

Table 2-52. Population Change by County, 1970-2005

Area	Population in 1970	Population in 2005	Change 1970-2005	Average Annual Change 1970-2005
Campbell County	13,049	37,420	187%	3.1%
Johnson County	5,611	7,785	39%	0.9%
Sheridan County	17,865	27,341	53%	1.2%
Wyoming	333,795	506,541	52%	1.2%
United States	203,798,722	295,895,897	45%	1.1%

Sources: Headwaters Economics 2007g, 2007h, 2007i; BEA 2008

Table 2-53 shows population for individual towns in the planning area. Most of the towns in the planning area grew between 1990 and 2000 with a small town (Dayton) having the fastest growth. The three largest cities in the planning area were the second, third, and fourth fastest-growing towns (Buffalo, Sheridan, and Gillette, in that order). Two towns, Clearmont and Kaycee, lost population between 1990 and 2000.

The profiles that comprise the AMS for economics provide additional information about demographic trends. The affected environment chapter of the RMP and EIS will consider additional information about trends from the profiles and additional data sources.

Table 2-53. Population of Towns in 1990 and 2000

Town	Population in 2000	Population in 1990	Change 1990-2000	Average Annual Change 1990-2000
Arvada	33	n/a[1]	n/a[1]	n/a[1]
Big Horn	198	n/a[1]	n/a[1]	n/a[1]
Buffalo	3,900	3,302	18%	1.7%
Clearmont	115	119	-3%	-0.3%
Dayton	678	565	20%	1.8%
Gillette	19,646	17,635	11%	1.1%
Kaycee	249	256	-3%	-0.3%
Parkman	137	n/a[1]	n/a[1]	n/a[1]
Ranchester	701	676	4%	0.4%
Sheridan	15,804	13,900	14%	1.3%
Story	887	n/a[1]	n/a[1]	n/a[1]
Wright	1,347	1,236	9%	0.9%

Sources: U.S. Census Bureau 2000; U.S. Census Bureau 1990

[1]Data are not available for 1990.

Forecasts

The profiles that comprise the AMS for social conditions do not provide information about forecasted future conditions.

2.8.2 Economic Conditions

Economic conditions relate to the analysis of 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 decision-making 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 could be impacted by the BLM management actions.

Economic conditions within individual communities in the planning area are integrally linked to those of other communities, both within the planning area and outside of it. For instance, businesses in some cities outside the planning area, such as Billings and Casper, provide services as well as labor to CBNG developers in locations within the planning area. Similarly, some of the people who recreate in the Big Horn Mountains and other areas come from outside the planning area. Thus, economic conditions outside the planning area indirectly affect the economy within the planning area, and BLM's management actions within the planning area can affect economic conditions outside the planning area. Because of these

linkages, and due to the relative importance of the CBNG development within economy of the larger region outside the field office area, the AMS for economic conditions considers areas outside the planning area when addressing some elements of the analysis. Thus, this summary presents data elements for three nearby counties (Natrona County in Wyoming, and Big Horn and Yellowstone counties in Montana). This results in the inclusion of the counties in which Billings and Casper are located, as well as the county in Montana (Big Horn) that lies between Billings and Sheridan.

2.8.2.1 Resource Characterization

Current Condition

Measurements that describe economic conditions include the parameters that affect the financial well-being of individuals and households as well as those related to the fiscal management of incorporated towns and counties. Individual and household economic conditions can be measured in terms of employment and unemployment (e.g., unemployment rate, employment and earnings by economic sector, and earnings per job); by household income and housing value measures (e.g., median household income, median house value); and by other measures (e.g., percentage of income derived from dividends, interest, and rent; ratio of rich to poor households). The fiscal conditions that affect the management of incorporated towns and counties tend to be related to the financial health of citizens and businesses, since property tax, sales and use tax, and taxes on mineral production (in Wyoming) are the main contributors to government revenues.

This section presents information on existing conditions in the planning area based on the profiles that comprise the AMS, supplemented by additional data for a few key areas of interest. The focus is on county-level statistics because nearly all government economic data is tabulated at the county level (or larger) and almost none is provided at the level of incorporated towns and cities.

Future analysis, to be conducted later in the RMP and EIS process, will consider economic conditions at finer geographic resolution as well as additional data from sources other than the profiles that comprise the AMS. Information to be incorporated later in the process may include changes in the relative cost of living over time; the availability of rental housing; local and county government expenditures; data on mineral production (in physical and dollar terms) within the counties in the planning area; the specific role of public lands in oil and gas production, mining, livestock grazing, recreation, and other economic activities within the planning area; additional data on livestock grazing such as fees for grazing on federal, state, and private lands; and data on local, state, and federal tax revenues that accrue from the various activities that take place on BLM-administered lands within the planning area. Other economic data may also be presented and considered depending on specific concerns raised by BLM staff,

decision-makers, and stakeholders throughout the planning process. Future data collection efforts will consider a wide range of sources, including more detailed consideration of the AMS profiles as well as other published data sources.

Table 2-54 shows average income per capita for each of the counties in the planning area, along with the median value for all counties in the United States (i.e., the point at which half the counties in the United States have a higher per capita income and half have a lower per capita income). The table shows that in year 2005, all three counties had a higher per capita income than the median value for United States counties. Average earnings per job were higher than the United States median for Campbell and Sheridan Counties – substantially higher in Campbell County – and lower in Johnson County. In 1999, median household income (the point at which half the households in the county had a higher income and half had a lower income) was highest in Campbell County; Johnson and Sheridan Counties had comparable values.

Table 2-54 Average and Median Income; Average Earnings Per Job

Area	Per Capita Income (2005)	Average Earnings Per Job (2005)	Median Household Income (1999)
Campbell County	$37,318	$51,638	$49,536
Johnson County	$34,192	$28,082	$34,012
Sheridan County	$38,999	$32,679	$34,538
Median of United States counties[1]	$26,371	$30,269	n/a

Source: Headwaters Economics 2007g, 2007h, 2007i

[1]Represents the median for all counties in the United States (not the median value for the United States as a whole).

Table 2-55 presents personal income and earnings by sector for the three counties of the planning area as well as the three counties outside the planning area for which there is a relatively direct economic linkage as discussed in the introduction to this section. The top three rows of Table 2-55 show total personal income; the percent of total income derived from dividends, interest, and rent; and earnings by place of work (which includes wages, salaries, and proprietors' income), in 2006. This portion of the table shows that within the planning area counties, Campbell County had the highest total income and the highest income by place of work (note that income by place of work in Campbell County exceeds personal income because there is a net positive in migration of employees and income by place of work is tabulated for all people employed in the county whereas personal income is tabulated only for people who reside in the county; also see Table 2-60 below). Natrona and Yellowstone Counties had higher personal income and higher work-related income, which is consistent with their status as relatively populous and economically developed areas proximate to the planning area. It is this status, along with other factors, that causes them to contribute some services and labor to the CBNG fields in the planning area.

The main portion of Table 2-55 shows the percentage of work-related earnings by industry sector in 2006 (the most recent year for which data are available). Mining, construction, and government are the largest contributors to earnings by place of work in all three counties; mining was the largest contributor in Campbell County, contributing nearly 45 percent of earnings. It is important to note that government revenues, and therefore earnings from government employment depend on tax revenues from basic sectors; in other words, a reduction in economic activity of sectors such as mining, manufacturing, construction, trade, or services would likely result in reduced earnings from people working in the government sector. But it should be noted that this principle is likely to apply more for local government employees than federal or even state employees, since federal and state governments have a broader tax base than local governments.

Among the three counties included in Table 2-54 but outside the planning area, mining represents an important contributor to earnings. For example, in Natrona and Big Horn Counties, mining contributes on the order of one-quarter of the earnings in both counties. This would be consistent with the suggestion that labor and services from these counties may contribute to serving the CBNG fields in the planning area, as well as other mining activities that are outside the BFO planning area. By contrast, the importance of the mining sector in Yellowstone County is relatively less by comparison, which increases the diversification of their economy with the possible exception of health care and social assistance. (Although a sizable portion of earnings in Yellowstone County come from government, the proportion is lower for than for the United States as a whole.)

It is also important to note that U.S. Bureau of Economic Analysis (BEA) does not disclose data for some sectors, where there are three or fewer employers in a sector in a given geographic area, for confidentiality reasons. In Table 2-55, these nondisclosures affect available information on agricultural services and forestry and fishing activities in Campbell and Natrona Counties, as well as available information on several other sectors, as indicated in the table notes.

Table 2-55. Personal Income and Earnings by Place of Work, 2006

Item / Sector	Campbell County (WY)	Johnson County (WY)	Sheridan County (WY)	Natrona County (WY)	Big Horn County (MT)	Yellowstone County (MT)	Wyoming	United States
Total personal income ($ millions)	$1,637	$282	$1,222	$3,102	$260	$4,837	$20,846	$10,968,393
Dividends, interest, and rent as a proportion of total personal income	11%	28%	34%	17%	12%	18%	23%	17%
Earnings by place of work ($ millions)[1]	$1,719	$173	$683	$2,490	$208	$3,855	$15,221	$8,432,719
Percent of total earnings by place of work (by sector)								
Farming, fishing, logging, and related activities[2]	n/a[3]	2%	1%	n/a[3]	1%	1%	1%	1%
Mining	44%	18%	11%	27%	22%	4%	19%	1%
Utilities	1%	1%	1%	n/a[3]	n/a[3]	1%	2%	1%
Construction	11%	15%	9%	6%	5%	7%	9%	7%
Manufacturing	3%	1%	2%	5%	0%	8%	5%	12%
Wholesale trade	6%	1%	2%	8%	1%	8%	4%	5%
Retail trade	4%	6%	8%	6%	3%	8%	6%	6%
Transportation and warehousing	5%	3%	7%	n/a[3]	n/a[3]	5%	5%	3%
Information	0%	1%	1%	1%	0%	2%	1%	4%
Finance and insurance	1%	5%	3%	3%	2%	5%	3%	8%
Real estate and rental and leasing	1%	3%	2%	4%	0%	3%	3%	2%
Professional and technical services	3%	4%	7%	4%	2%	n/a[3]	5%	10%
Management of companies and enterprises	1%	n/a[3]	n/a[3]	0%	0%	n/a[3]	1%	2%
Administrative and waste services	2%	n/a[3]	n/a[3]	2%	0%	4%	2%	4%
Educational services	0%	n/a[3]	0%	0%	n/a[3]	0%	0%	1%
Health care and social assistance	3%	n/a[3]	9%	10%	n/a[3]	16%	6%	9%
Arts, entertainment, and recreation	0%	3%	1%	1%	1%	1%	1%	1%
Accommodation and food services	2%	4%	4%	2%	2%	3%	4%	3%
Other services, except public administration	n/a[3]	3%	3%	3%	2%	3%	3%	3%
Government and government enterprises	11%	26%	25%	12%	49%	13%	22%	16%
Categories for which data were not disclosed	3%	4%	2%	4%	8%	8%	0%	0%

Source: BEA 2008 n/a = Not available

[1]Earnings by place of work differs from total personal income by the exclusion of dividends, interest, and rent, as well as adjustments to account for net transfer payments (e.g., unemployment benefits and Social Security taxes and payments) and the residential adjustment (see Table 2-59 for details).

[2]"Related activities" includes agricultural services (e.g., custom tillage), fishing, and logging. However, note that earnings data for related activities were not disclosed (see note 3) for the counties of Campbell or Natrona.

[3]Data were not disclosed due to confidentiality reasons (BEA does not report data when there are three or fewer employers in a sector). The line item "Categories for which data were not disclosed" shows the total income attributable to these categories for each county.

Table 2-56. Employment by Sector, 2006

Sector	Campbell County (WY)	Johnson County (WY)	Sheridan County (WY)	Natrona County (WY)	Big Horn County (MT)	Yellowstone County (MT)	Wyoming	United States
Farming and related activities[1]	2%	10%	5%	1%	15%	2%	4%	2%
Mining	27%	7%	4%	10%	9%	1%	8%	0%
Utilities	1%	0%	0%	n/a[2]	n/a[2]	0%	1%	0%
Construction	11%	12%	10%	8%	4%	7%	9%	6%
Manufacturing	2%	2%	3%	4%	0%	4%	3%	8%
Wholesale trade	5%	2%	2%	5%	1%	6%	2%	4%
Retail Trade	9%	9%	12%	12%	7%	13%	11%	11%
Transportation and warehousing	5%	3%	4%	n/a[2]	n/a[2]	4%	4%	3%
Information	1%	1%	1%	1%	1%	2%	1%	2%
Finance and insurance	2%	4%	4%	4%	2%	4%	3%	5%
Real estate and rental and leasing	2%	5%	5%	5%	1%	4%	4%	4%
Professional and technical services	3%	5%	6%	5%	2%	n/a[2]	4%	7%
Management of companies and enterprises	1%	n/a[2]	n/a[2]	0%	0%	n/a[2]	0%	1%
Administrative and waste services	3%	n/a[2]	n/a[2]	4%	1%	7%	3%	6%
Educational services	0%	n/a[2]	1%	1%	n/a[2]	1%	1%	2%
Health care and social assistance	3%	n/a[2]	10%	11%	n/a[2]	13%	7%	10%
Arts, entertainment, and recreation	1%	2%	2%	2%	3%	3%	2%	2%
Accommodation and food services	6%	9%	8%	7%	5%	8%	9%	7%
Other services, except public administration	n/a[2]	5%	6%	6%	4%	6%	5%	6%
Government and government enterprises	13%	17%	16%	11%	36%	9%	18%	13%
Categories for which data were not disclosed	5%	7%	3%	3%	9%	7%	0%	0%
Total employment (number of jobs)	**30,362**	**5,785**	**19,688**	**52,464**	**6,449**	**101,054**	**376,249**	**178,332,900**

Source: BEA 2008

n/a = Not available.

[1]"Related activities" includes agricultural services (e.g., custom tillage), fishing, and logging. However, note that employment data for related activities were not disclosed (see note 2) for the counties of Campbell or Natrona.

[2]Data were not disclosed due to confidentiality reasons (BEA does not report data when there are three or fewer employers in a sector). The line item "Categories for which data were not disclosed" shows the total employment attributable to these categories for each county.

Table 2-56 summarizes sector-level employment data, using the same sectors as Table 2-55. The breakout in Table 2-56 is comparable to that in Table 2-55, with substantial portions of employment derived from mining (especially in Campbell County, and also in Natrona and Big Horn (Montana) Counties), construction, and government. However, the differences between Table 2-55 and Table 2-56 highlight the divergence in earnings per job in different sectors. For example, whereas mining contributes 44 percent of earnings in Campbell County, it contributes proportionally fewer jobs (27 percent), which illustrate the relatively high wages per job in the mining sector in that county. Similarly, accommodation and food services accounts for nine percent of jobs in Johnson County and eight percent of jobs in Sheridan County, but contributes just four percent of earnings in each of those counties. This divergence indicates that wages per job in this sector are relatively low, either because of lower wages per hour or because the jobs are more likely to be seasonal or part-time.

Like Table 2-55, Table 2-56 has some sectors for which BEA does not disclose data for confidentiality reasons. Like Table 2-55, in Table 2-56 these nondisclosures affect available information on agricultural services and forestry and fishing activities in Campbell and Natrona Counties, as well as available information on several other sectors (all of which are indicated in the table notes).

Table 2-57 provides additional detailed information about the farm sector income for year 2005. It should be noted that although supplemental data was collected to fill out Table 2-55 and Table 2-56 in order to provide the most up to date information available, the information provided in this document generally uses the profiles that constitute the AMS and the "most up to date" data are for year 2005. As the table shows, net income was positive only in Campbell County, which also had the largest proportion of gross income made up of government payments. The proportion of gross income from livestock exceeds that from crops in all three counties.

Natrona, Big Horn, and Yellowstone Counties are not included in Table 2-57 (or subsequent tables in this section) because the primary issue with respect to these counties is their contribution to oil and gas services and labor.

Table 2-57. Farm Income in 2005

Farm Income (2005 $ thousands)	Campbell County	Johnson County	Sheridan County
Gross income	$60,041	$39,348	$42,628
Percent of Income from Livestock	64.2%	68.6%	76.3%
Percent of Income from Crops	1.7%	3.0%	7.9%
Percent of Income from Other Sources[1]	9.8%	12.2%	6.3%
Percent of Income from Government Payments	24.3%	16.3%	9.5%
Net income	$5,933	-$5,403	-$9,040
Net income including inventory change	$11,723	-$1,278	-$3,828

Source: Headwaters Economics 2007g, 2007h, 2007i

[1]Includes the value of home consumption and other farm related income components, such as machine hire and custom work income and income from forest products. This category also includes royalty payments from oil and gas producers to farmers when oil/gas development occurs on farm lands (Kennedy 2008).

Table 2-58 shows unemployment rates in 2006, which is the latest year for which data are available from the profiles that comprise the AMS. The table shows that unemployment for all three counties in the planning area was lower than the United States and lower than or equal to the statewide rate. Seasonal variation is lowest in Campbell County.

Table 2-58. Unemployment Rate in 2006

Area	Unemployment Rate, 2006 (annual average)	Seasonal Variability in Unemployment in 2006[1]
Campbell County	2.1%	0.9%
Johnson County	3.1%	1.4%
Sheridan County	3.2%	1.6%
Wyoming	3.2%	n/a
United States	4.6%	n/a

Source: Headwaters Economics 2007g, 2007h, 2007i

[1]Measured as the difference in percentage points between the highest and the lowest monthly unemployment rate.

Moving away from employment and unemployment statistics, Table 2-59 shows the median housing value as well as several measures of housing affordability. In 1999, the median housing value was less in all counties than in the United States overall, and was lowest in Sheridan County and highest in Johnson County. Housing was generally affordable in all three counties, but housing has become slightly less affordable in Johnson and Sheridan Counties between 1990 and 2000. Although the affordability index in Campbell County was essentially identical to the median for all United States counties in 2000, housing became more affordable there between 1990 and 2000. Note that these data are the latest available from sources that have been collected at this time, but are over eight years old. With the recent CBNG boom in the planning area, a priority data collection effort for the RMP and EIS process will be to gather more recent data on housing affordability in Campbell County and elsewhere in the planning area.

Table 2-59. Median Housing Value and Housing Affordability

	Median Housing Value (1999)	Percent of median income needed to buy median house (in 2000)[1]	Affordability Index (2000)[2]	Change in Affordability Index, 1990-2000[3]
Campbell County	$102,900	13%	185	2.8%
Johnson County	$115,500	19%	130	-14.8%
Sheridan County	$102,100	17%	148	-3.9%
Median of United States counties[4]	n/a	n/a	186	10.3%
Median within United States[5]	$119,600	n/a	n/a	n/a

Source: Headwaters Economics 2007g, 2007h, 2007i; U.S. Census Bureau 2000

[1]Measures the percentage of income that a family earning the median household income would spend on the mortgage on a home with the median value, assuming a 20 percent down payment and an interest rate of 8.03 percent.

[2]A comparative measure of the affordability of housing; values over 100 indicate that the median family can afford the median-valued house.

[3]Measures the percentage change in the affordability index from 1990 to 2000. Positive values indicate that housing has become more affordable over that time period; negative values indicate housing has become less affordable.

[4]Represents the median for all counties in the United States (not the median value for the United States as a whole).

[5]Represents the median for all housing units within the United States

Table 2-60 shows information on some additional economic variables of interest. The ratio of relatively low-income households to relatively high-income households, which provides an indication of the proportion of high income households, which is lower in all three counties, indicating there are relatively fewer households in the planning area earning less than $30,000 per year compared to the same statistic for the United States The index of employment specialization is highest in Campbell County, reflecting primarily the relative concentration in the mining industry that was also seen in Table 2-56 above. The index of employment specialization is higher in all three counties than the median for United States counties, which indicates that employment in all three of the counties is relatively concentrated in a small number of industry sectors. This lack of diversification can mean that boom and bust cycles that affect particular industries can have a particularly acute effect within the planning area. Finally, the net residential adjustment shows the degree to which commuting across county borders affects earnings by place of work. Johnson and Sheridan Counties had a positive residential adjustment in 2005, indicating that more people commute out of these counties to work (the counties are “bedroom communities”). Campbell County had a negative residential adjustment that is relatively large in magnitude, indicating that many people commute into the county to work (accounting for approximately 10 percent of the total payroll within the county).

Table 2-60. Poor-Rich Ratio, Employment Specialization, and Residential Adjustment

Area	Poor- Rich Ratio (1999)[1]	Employment Specialization Index (2005)[2]	Net Residential Adjustment (2005)[3]
Campbell County	3.0	640	-10.0%
Johnson County	7.6	369	2.8%
Sheridan County	6.2	185	3.9%
Median of United States counties[4]	9.0	155	n/a

Source: Headwaters Economics 2007g, 2007h, 2007i

[1]Measures the ratio of households with income less than $30,000 to those with income exceeding $100,000 (in year 1999). For instance, a ratio of 10 indicates there are ten households with income less than $30,000 for every household with income over $100,000.

[2]A relative measure of the diversity of the employment base of a county compared to the employment base of the United States as a whole. A lower index indicates a more diverse employment base; a higher index indicates greater specialization (employment is more concentrated in a few economic sectors).

[3]A positive residential adjustment indicates that more people commute out of the county to work, while a negative adjustment indicates that more people commute into the county to work. The numeric value is the net proportion of total personal income that is earned across county lines.

[4]Represents the median for all counties in the United States (not the median value for the United States as a whole).

Trends

The profiles that comprise the AMS for economics provide a substantial amount of information about trends, but the focus in this summary is generally about current conditions. The profiles that comprise the AMS have some limitations; for example, they show the proportion of earnings and employment by sector from 1970-2000, and in 2001 and 2005, but do not show trend information for 2001-2006 continuously. The affected environment section of the EIS will provide additional information about trends in sector-level earnings.

Table 2-59 above provides some information about trends with respect to housing affordability. Two other trends of likely interest are those with respect to net farm income (page 21 of each of the Headwaters Economics profiles) and year-over-year changes in real personal income (page 24 of each of the Headwaters Economics profiles). The AMS profiles show that net farm income was positive for all three counties through the early 1990s, but has been negative almost every year since in Sheridan and Johnson Counties (although from about 2003 to 2006 the magnitude of the deficit has decreased, meaning the average farm is closer to breaking even). In Campbell County, net farm income has fluctuated substantially in recent years but has been positive since about 2003 (Headwaters Economics 2007g, 2007h, 2007i).

Year-over-year changes in real (inflation-adjusted) personal income show that the economies of each of the counties do not fully follow state and national business cycles. Some of the peaks are higher and some of the valleys lower depending on the specific area and time period. To consider one case study, in the most recent recession in 2001-2002, Campbell and Johnson Counties showed increasing income when growth in the national economy was slowing down,

while the slowdown in income in Sheridan County occurred during about the same time period as in the national economy. Campbell County suffered a relatively large drop in income (about the same as for the national economy) in the year or so immediately following, which suggests that the 2001-2002 recession hit Campbell County slightly later than it hit the country as a whole. In Johnson County the economy grew while the national economy shrank and shrank while the national economy grew, a countercyclical pattern. In Sheridan County the rise and fall in economic growth occurred at about the same times as for the national economy, but the magnitude of the rise and fall was lower than that for the national economy (i.e., the swing was dampened in both directions relative to the national trend) (Headwaters Economics 2007g, 2007h, 2007i).

Forecasts

The profiles that comprise the AMS for economics do not provide information about forecasted future conditions.

2.8.3 Health and Safety

The BLM's Hazard Management and Resource Restoration Program addresses a variety of hazards on public surfaces to reduce risks to visitors and employees. Hazards can be grouped into three categories: naturally occurring geological hazards (erosion, downslope movements, tectonic movements), manmade geological hazards (mine shafts, adits, abandoned equipments and structures), or hazardous materials (explosives and munitions, spills from pipelines, tankers, and storage tanks). Activities directed toward health and safety concerns in the planning area primarily encompass these three main hazard groups.

2.8.3.1 Resource Characterization

Current Condition

Naturally-occurring Geologic Hazards

Potential naturally occurring geological hazards include active fault or seismic zones; areas prone to landslides; subsidence due to coal fires; over-pressured subsurface oil, gas or groundwater zones; and shrinking and swelling clay soils. In the planning area, several naturally-occurring geologic hazards are present. These include down slope movements such as slumps, landslides and rock falls, coal fires, and potential seismic zones. Slumping occurs primarily near the base of the Bighorn Mountains in Sheridan County and, to a lesser extent, in the Fortification Creek area of Campbell County. Favorable conditions for slumping exist due to soil types, underlying bedrock, and the amount of annual moisture in the planning area. Rock falls are primarily restricted to the relatively steep slopes and vertical cliffs of the Bighorn Mountains. Coal fires can occur throughout the planning area where coal beds are exposed or near the ground surface, igniting by way of prairie fires, lightning, or spontaneous combustion.

Spontaneous combustion has also occurred in active and inactive surface and underground mines.

Naturally occurring geologic hazards are generally identified and forecast through the earthquake and landslide hazards programs of the USGS. The Wyoming Geological Survey's Surficial Processes/Geological Hazards Section is dedicated to the study and publication of information about geologic hazards within the state. A great amount of information about the location of faults, earthquake likelihood, recorded seismic events, and other natural hazards is available at the websites of both the Wyoming and the USGS.

Manmade Geologic Hazards

Manmade hazards are caused by the abandonment and deterioration of old or new associated surface/subsurface mineral development activity. Extreme physical hazards are common at abandoned mine lands (AMLs), and for visitors, 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. Pits, shafts, or trenches are sometimes left open and unmarked. Highwalls may have been left behind when the stripping ratio of a surface mine became cost prohibitive to continue mining. Entrances to underground mines, such as adits, drifts, and shafts may have been left open after depletion of the mineral deposit. Piles of mine wastes may have been left on location with steep slide slopes or embankments. Mine waste piles can contain acid-forming minerals, or minerals that increase the total dissolved solids content of natural waters.

Hazardous Materials

The BLM has the responsibility and the authority under federal law to clean-up hazardous waste (including oils spills from pipelines, illegal dumping of solid wastes, unexploded ordnance) on public land that poses a substantial threat to the public and/or the environment. The BLM is faced with increasing incidents of contamination of public lands as a result of expanding urban areas, increased recreational use, and the increased demand for resources on public land.

Hazardous waste problems with the planning area can result from activities conducted by industry, the public, and by illegal dumping of commercial or household waste. There are no known approved hazardous waste dumps or repositories within the planning area.

Oil and Gas Operations: CBNG drilling companies and associated service industries are users of hazardous materials within the planning area. Hazardous materials commonly used in CBNG development include ammonia, gasoline, diesel fuel, motor oil, greases and lubricants, solvents to clean equipment, heat transfer fluids (such as antifreeze), paint, sand, fertilizers, and herbicides. Pesticides and larvicides are also used to control mosquitoes near infiltration

reservoirs and drainages. Additional hazardous materials that are used for CBNG development include sodium hydroxide and buffers, acids for well stimulation, surfactants (soap-like materials to remove CO_2 during gas processing), inert gases (not toxic, flammable, or explosive), and welding and cutting materials.

Typical wastes generated by oil and gas development include produced water, oilfield production fluids (drilling muds and used fracturing fluids), crude oil and condensate, and soils contaminated with relatively low concentrations of petroleum products.

Natural Gas Pipelines: Natural gas pipelines pose a health and safety risk associated with potential leaks or ruptures. Hazardous materials associated with natural gas pipelines include fuels and other chemicals used at compressor stations; chemicals associated with pipeline construction and maintenance; and benzene and hexane from natural gas condensates.

Illegal Dumps: The remoteness of lands within the planning area creates an opportunity for illegal dumping of hazardous materials and solid waste. Illegal dumping may include petroleum products, household wastes, paints, batteries, antifreeze, old appliances, and industrial wastes.

Trends

Naturally Occurring Geological Hazards

Naturally occurring geological hazards have been occurring for millions of years; some events don't occur more often than once per million years. Collection of data about previous naturally occurring geological hazards would be of little value because of the inaccuracy of trying to forecast future geologic events based on the past.

Manmade Geological Hazards

In 1999, the BLM and the Wyoming DEQ, AML 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.

Hazardous Materials

Increased awareness on the part of employees and the public has led to an increase in the reporting of hazmat incidents. This awareness has lead to the cleanup up of old dump sites and abandoned facilities.

Forecasts

Naturally Occurring Geological Hazards

Seismic activity, or an earthquake, is usually associated with a fault. There is a low potential for earthquake activity in the planning area, though seismic activity has occurred in the past.

Manmade Geological Hazards

The Wyoming DEQ, AML Division works closely with federal land management agencies, private land owners, and the general public to assure that the views of all interested parties are considered in the reclamation process. AML funds will be used to identify and reclaim AML sites and to construct public works projects in communities impacted by mining. Only through public involvement, inter-office, and interagency coordination will the hazards posed by AML sites within the planning area be identified, characterized, prioritized, and finally remediated through reclamation.

AML locations that are confirmed through onsite inspections by the Wyoming DEQ, AML Division contractors that are un-reclaimed and abandoned will be characterized and prioritized for reclamation. DEQ coordination regarding AML sites will be required to mitigate AML sites within the planning area. The BLM should take measures to abate unauthorized removal of solid minerals that may result in abandoned mine sites. All surface and underground mining operations should be properly reclaimed to mitigate adverse impacts to the environment.

Hazardous Materials

As the demand for oil, gas, and minerals increase, so does the potential for hazardous material spills. Although industrial operations are regulated to minimize any potential spills, accidents can never be completely eliminated. Increased recreational activities on BLM lands will put visitors at a greater risk of encountering a variety of hazards: chemical and physical hazards left over from past industrial operations; illegal waste dumping; and illegal drug manufacturing wastes. Although the workload may increase, the Hazard Management and Resource Restoration program will manage and respond to foreseeable hazards on BLM lands in the same manner as existing management. The program will continue to emphasis protection of public health, safety, and the environment; and compliance with all laws, policies, and regulations.

2.8.4 Environmental Justice

Environmental justice pertains to the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including racial, ethnic, or socio-economic group, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and Tribal programs and policies (BLM 2005a).

BLM does not manage environmental justice resources; rather, it manages public lands and the resources and uses that occur on them. However, BLM does incorporate environmental justice into its planning process both as part of the environmental analysis and in making sure minority and low-income populations have a meaningful role in the decision-making process.

2.8.4.1 Resource Characterization

Current Condition

In considering environmental justice, it is important to recognize that some low-income and minority populations may be transitory users of public lands and thus not associated with a particular geographic area. However, this section focuses on residential demographics since these are the data available in the profiles that comprise the AMS.

This summary focuses on the three counties of the planning area. However, there are some relatively direct economic linkages with counties outside the planning area (as discussed in detail in the economic conditions section), with a potentially significant portion of labor and services for the CBNG development in the planning area coming from counties outside the planning area. Thus, management actions within the planning area could affect communities outside the planning area, including, potentially, environmental justice conditions in these communities. From an environmental justice perspective, one of the questions to be resolved in the analysis is to what degree management actions in the planning area could affect economic conditions for Native Americans residing on the Crow Indian Reservation in Big Horn County, Montana, just to the north of the planning area. BLM will explore the potential for impacts on these populations due to management actions within the planning area and, depending on its findings with respect to the potential economic impacts, may present additional data on existing conditions relative to the low-income and racial/ethnic minority populations living in Big Horn County, Montana, and other areas potentially affected by BLM management actions within the planning area.

Table 2-61 shows the percent of minority and low-income populations (where low-income is defined as persons with income below the poverty threshold) in the three counties in the

planning area, compared to the United States and Wyoming. As the table shows, all three counties had a lower proportion of racial/ethnic minorities than the state or United States average in 2000 and in 1990. All three counties also had a lower proportion of people in poverty than either the state or the United States (Although the table does not show decimals, Sheridan County had 10.7 percent of its population in poverty and Wyoming had 11.4 percent in poverty in year 2000.) Johnson County had a higher proportion of people in poverty than the state in 1990, but a lower proportion than the United States (the rate in 1990 was 12.9 percent in Johnson County and 13.1 percent in the United States).

Table 2-61. Minority and Low-Income Populations in 1990 and 2000 (Counties)

County	Percent Minority Population in 2000	Percent Minority Population in 1990	Percent in Poverty in 2000	Percent in Poverty in 1990
Campbell	6%	4%	8%	8%
Johnson	4%	2%	10%	13%
Sheridan	5%	3%	11%	10%
Wyoming	11%	9%	11%	12%
United States	31%	24%	12%	13%

Sources: U.S. Census Bureau 2000; U.S. Census Bureau 1990

Similar to Table 2-61, Table 2-62 shows the percent of minority and low-income populations within incorporated towns within the planning area. As the table shows, most of the towns in the planning area had a lower percent minority than the state, and all were lower than the United States, in 2000 and in 1990. Those with the highest percentages of minority residents in year 2000 were Arvada and Ranchester (both towns are in Sheridan County).

In terms of poverty, however, several towns had a higher proportion of people in poverty than the United States or the state in both 1990 and 2000. In the year 2000, the poverty rate was about 20 percent in Clearmont, and 15 percent or higher in Kaycee, Ranchester, and Story.

Table 2-62. Minority and Low-Income Populations in 1990 and 2000 (Towns)

Town	Percent Minority Population in 2000	Percent Minority Population in 1990	Percent in Poverty in 2000	Percent in Poverty in 1990
Arvada	15%	n/a[1]	12%	n/a[1]
Big Horn	2%	n/a[1]	1%	n/a[1]
Buffalo	5%	2%	10%	11%
Clearmont	6%	6%	20%	10%
Dayton	6%	2%	7%	17%
Gillette	7%	5%	8%	10%
Kaycee	2%	1%	15%	8%
Parkman	5%	n/a[1]	9%	n/a[1]
Ranchester	12%	6%	17%	19%
Sheridan	6%	4%	11%	11%
Story	2%	n/a[1]	15%	n/a[1]
Wright	4%	5%	6%	2%
Wyoming	11%	9%	11%	12%
United States	31%	24%	12%	13%

[1] Data are not available for 1990

Sources: U.S. Census Bureau 2000; U.S. Census Bureau 1990.

Trends

Table 2-61, above, shows recent trends in the percentage of minority and low-income populations in the four counties in the planning area, and Table 2-62 shows the same information for towns in the planning area. Table 2-61 shows that the percentage of minority residents declined in all three counties between 1990 and 2000. The percentage of people in poverty declined in Sheridan County, stayed roughly the same in Campbell County, and increased in Johnson County.

Table 2-62 shows that the percentage of minority residents fell in most towns (increased in only one town, Wright) from 1990 to 2000. The percentage of people in poverty declined in most towns in the planning area, with the largest decreases in terms of percentage points being in Clearmont and Kaycee. The largest increase in poverty in terms of percentage point changes was in Dayton (up by ten percentage points), but poverty also increased in Buffalo, Gillette, and Ranchester.

Forecasts

The profiles that comprise the AMS for environmental justice do not provide information about forecasted future conditions. The most important drivers that affect the proportion of people in poverty are economic conditions, including the diversity of the economy and its resilience in periods of economic downturn, the availability of jobs available to people with a wide range of skills and education levels, and the cost of housing, food, and services. Identifying the

determinants that affect the decisions of people of color to move into or out of the planning area is beyond the scope of this analysis.

2.8.5 Tribal Treaty Rights

A treaty is a formal agreement between the government of the United States and a Native American Tribe or Tribes that cedes land or reserves rights to the tribe(s). Executive Order 13084, Consultation with Indian Tribal Governments, and Executive Order 13007, Indian Sacred Sites, provide the framework for involving Native American Tribes in the BLM planning process. Additional guidance is provided under BLM Manual 8120 (Tribal Consultation).

BLM land use plans must address the protection of any treaty rights within the planning area. The Wind River Reservation is the only reservation in Wyoming and is over 50 miles from the planning area. There are several reservations in states bordering Wyoming with tribes that historically had treaty rights in the Powder River Basin. Tribes may retain certain rights that were not specifically ceded when treaties were abrogated.

3.0 CURRENT MANAGEMENT

This chapter describes management direction from the existing plans and Updates by program (and later becomes the basis for the No Action Alternative). Without revision to the existing plan, this management direction would continue unchanged into the future.

3.1 Relevant Resource Management Plans and Amendments

Table 3-1 identifies the relevant plans and updates in the Buffalo planning area.

Table 3-1. Relevant Plans and Updates

Document Title	Year
Buffalo Resource Area RMP	October 1985
Buffalo RMP Plan Update	April 2001

3.2 Management Decisions

Management decisions for resources in the Buffalo planning area were issued in the 1985 Buffalo RMP and 2001 Buffalo Plan Update. These management decisions are provided in the tables below. The decisions are included verbatim from the original documents. If a decision references a table, figure, or appendix, it is referencing the original document from which the decision was pulled.

Each management decision has been assigned a planning decision number, which is a unique identifier assigned to each decision. Management decisions from the 1985 Buffalo RMP are assigned a number beginning with BFO; decisions from the 2001 Buffalo Plan Update are assigned a number beginning with PAM. These numbers carry over into chapter 4, which allows for comparison between the current decisions in this chapter and the analysis of management opportunities. A discussion of the status of each decision is also included.

3.2.1 Physical Resources

3.2.1.1 Air Quality

Table 3-2. Air Quality: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
PAM-001	Buffalo RMP Update (2001)	Any BLM-initiated actions or authorizations that result in air quality or visibility deterioration are conditioned to avoid violating Wyoming and national air quality standards.	This has been implemented. BLM is mandated to follow provisions of the Clean Air Act.
PAM-002	Buffalo RMP Update (2001)	Dust control measures are required to be taken to increase visibility and reduce particulate impacts for all construction and other surface-disturbing activities.	This has been implemented. Dust control measures are one of a list of BMP's (Best Management Practices) implemented in order to reduce air quality impacts from federal actions. Dust control measures are not implemented 100 percent of the time, but on a more arbitrary basis. Visibility in the Powder River Basin (PRB) is degraded during dry periods due to dust in the air.
PAM-003	Buffalo RMP Update (2001)	Air quality permits are obtained from the WDEQ before any prescribed fires are set on public land.	Fully implemented/continuing.

3.2.1.2 Geologic Resources

Table 3-3. Geologic Resources: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
N/A	N/A	No management decisions issued relating to geologic resources.	N/A

3.2.1.3 Soil

Table 3-4. Soil: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
BFO-033	Buffalo RMP (1985)	SWAM-1: Prohibit surface disturbance or occupancy within areas of severe erosion hazard from March 1 through June 15 unless the prohibition is waived by the authorized officer.	Timing limitation has not been implemented, and is not generally effective. A controlled surface use stipulation would be more effective.
BFO-035	Buffalo RMP (1985)	SWAM-3: Prohibit surface disturbance or occupancy on slopes of more than 25 percent (see map 12) unless the prohibition is waived by the authorized officer.	Implementation has not been consistent. BLM needs to define when it can be waived. Slope limitation has not been implemented as intended, and is routinely not followed.
PAM-048	Buffalo RMP Update (2001)	ORV travel will be prohibited on wet soils and on slopes greater than 25 percent if damage to vegetation, soils, or water quality would result.	Damage to soils will occur in these situations. BLM should require a No Surface Occupancy (NSO) due to erosion potential and water quality issues and should separate slope and wet soils into two separate decisions. Potentially damaging ORV travel often occurs on steep slopes during pre-construction onsites. Generally, wet conditions are avoided, but there have been exceptions. For example, an onsite started in the morning when the ground is frozen may continue into the afternoon after thawing has occurred.
PAM-074	Buffalo RMP Update (2001)	Timber harvest activities will be limited to slopes of 45 percent or less to protect the water quality and to keep soil from eroding.	Implemented.
PAM-075	Buffalo RMP Update (2001)	Surface occupancy and disturbance will not be allowed on slopes of 25 percent or more (281,100 acres).	Implementation has not been consistent. This should require approved mitigation measures and be related to soil erosion features. Slope limitation has not been implemented as intended, and is routinely not followed. Surface occupancy and disturbance has been allowed on slopes in excess of 25 percent; engineering designs are submitted for these areas.

Table 3-4. Soil: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
PAM-076	Buffalo RMP Update (2001)	ORV travel will be prohibited on wet soils and on slopes greater than 25 percent if unnecessary damage to vegetation, soils, or water quality would result. Roads and trails will be closed and reclaimed if they are heavily eroded, washed out, or if access roads in better condition are available. Head seepages on all spring developments on BLM-administered public lands will be fenced.	Implementation has not been consistent.
PAM-077	Buffalo RMP Update (2001)	No surface disturbance or occupancy will be allowed in areas of severe erosion from March 1 until June 15. As they are needed, conservation practices and state of Wyoming best management practices will be applied to surface-disturbing activities.	Implementation has not been consistent. Areas of severe erosion potential need a Controlled Surface Use, or NSO and BMPs to be the most effective. Not implemented, seasonal soil restriction.

3.2.1.4 Water

Table 3-5. Water: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
BFO-034	Buffalo RMP (1985)	SWAM-2: Prohibit surface disturbance within 500 feet of any spring, reservoir, water well, or perennial stream unless the prohibition is waived by the authorized officer.	Implementation has not been consistent, and has been very site and disturbance specific.
BFO-036	Buffalo RMP (1985)	SWAM-4: Fence the head seepage areas of all spring developments on public surface.	Implementation has not been consistent.
PAM-087	Buffalo RMP Update (2001)	The rights to water-related projects on public lands will be filed with the Wyoming state engineer's office in order to obtain valid water rights.	Implementation has been inconsistent. The goal is to inventory and file permits for all related infrastructure.

3.2.2 Mineral and Energy Resources

3.2.2.1 Locatable

Table 3-6. Locatable: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
BFO-028	Buffalo RMP (1985)	MM-9: BLM-administered locatable minerals will remain subject to the provisions of the 1872 Mining law except in areas that are now withdrawn from mineral location.	This management decision was implemented and is still adequate.
PAM-028	Buffalo RMP Update (2001)	Unless formally withdrawn from mineral location, all lands in the resource area, including federally administered surface/minerals and split-estate, are open to exploration, location, and development of locatable minerals on valid mining claims.	This management decision was implemented and is still adequate.

3.2.2.2 Leasable – Coal

Table 3-7. Leasable – Coal: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
BFO-020	Buffalo RMP (1985)	MM-1: Federal coal lands in central Campbell County and in north central Sheridan County are the priority areas available for consideration for coal leasing.	This management decision is being implemented under the decertified PRB coal production region decision of 1989.
BFO-021	Buffalo RMP (1985)	MM-2: Delineated coal tracts are available for consideration for competitive leasing in one coal lease sale beginning with a possible second round Powder River lease sale.	These were considered in 1984. The EIS was not finalized, and the regional sale was cancelled.
BFO-022	Buffalo RMP (1985)	MM-3: Federal coal land available to be considered for lease modifications, emergency leases, and exchanges includes the uncommitted coal land determined to be acceptable for coal development and leasing consideration both within the priority areas for competitive leasing (as described in MM-1, above) and outside the priority areas for competitive leasing.	This management decision is being implemented under the decertified PRB coal production region decision of 1989.

Table 3-7. Leasable – Coal: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
BFO-023	Buffalo RMP (1985)	MM-4: On coal leases for which mining and reclamation plans have been approved, authorize oil and gas drilling and production only where such activities would not conflict with coal mining. In cases where conflicts cannot be resolved, oil and gas drilling and production will be deferred.	Oil and gas lease offers are reviewed and conditioned (prior to offer) with the so called "coal stipulation" when the oil and gas lease would be on coal leases or leases by application.
PAM-022	Buffalo RMP Update (2001)	All federal coal lands (federal mineral estate for coal retained by the federal government) are open to study and exploration.	This management decision is being implemented under the coal exploration license program and regulations.
PAM-023	Buffalo RMP Update (2001)	Areas that pass these screens are available for further consideration for competitive coal leasing.	This management decision is being implemented under the decertified PRB coal production region decision of 1989.
PAM-024	Buffalo RMP Update (2001)	Federal coal lands available for consideration for competitive coal leasing are open for lease by application (LBA), lease modifications, emergency leases, and exchanges. This includes uncommitted coal land determined to be acceptable for coal development and leasing consideration within the priority areas for competitive leasing. Coal lands outside the priority leasing areas which are applied for must pass the coal screening process before they will be considered for leasing.	This management decision is being implemented under the decertified PRB coal production region decision of 1989.
PAM-025	Buffalo RMP Update (2001)	Coal leasing in producing oil and gas fields would be deferred unless or until coal development would not interfere with the economic recovery of the oil and gas resources. This would be determined on a case-by-case basis.	This management decision is being implemented under the decertified PRB coal production region decision of 1989. Oil and gas field conflicts are resolved on a case-by-case basis.
PAM-026	Buffalo RMP Update (2001)	Any exploration drilling conducted to gather data concerning unleased federal coal, strata above the coal, hydrology of the coal, and surrounding strata requires an exploration license. Drilling water monitor wells in areas of unleased federal coal requires an incidental exploration license.	This management decision is being implemented under the coal exploration license program and regulations.
PAM-027	Buffalo RMP Update (2001)	The right to mine federal coal is conveyed by a coal lease.	Ongoing implementation.

3.2.2.3 Leasable – Oil and Gas

Table 3-8. Leasable – Oil and Gas: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
BFO-024	Buffalo RMP (1985)	MM-5: Defer coal leasing in producing oil and gas fields unless or until coal development will not interfere with the economic recovery of the oil and gas resource, as determined case by case by the BLM.	Ongoing implementation.
BFO-026	Buffalo RMP (1985)	MM-7: Continue to lease and allow development of federal oil and gas in the Buffalo Resource Area.	Leasing continued until 2004, when a Tenth Circuit Court of Appeals ruling prohibited the leasing of federal minerals in coal-bearing areas until the RMP is revised. Leasing continues in non-coal-bearing areas.
PAM-017	Buffalo RMP Update (2001)	Continue to lease and allow development of federal oil and gas in the Buffalo Field Office Area.	Leasing continued until 2004, when a Tenth Circuit Court of Appeals ruling prohibited the leasing of federal minerals in coal-bearing areas until the RMP is revised. Leasing continues in non-coal-bearing areas.
PAM-019	Buffalo RMP Update (2001)	About 1,300 acres of federal oil and gas estate are not available for leasing because the acreage is within a city or town, and 44,000 acres are unavailable due to coal mining activities. Any oil and gas lease offer tracts that conflict with coal mining are pulled out of the offer.	Implemented. Mineral estate within incorporated cities and towns is not leased. Federal mineral estate in coal-bearing areas is prohibited by a Tenth Circuit Court of Appeals ruling until the RMP is revised.
PAM-020	Buffalo RMP Update (2001)	Surface occupancy or use will be restricted or prohibited on this lease (oil and gas lease) owing to conflicts with ongoing coal activities. Prior to surface use, an acceptable plan of mitigation of anticipated impacts must be negotiated between the oil and gas and the coal lessees and approved by the authorized officer. This stipulation may affect development, operations and maintenance of facilities.	Implemented. Section 1836 of the Energy Policy Act of 2005 required the Secretary of the Interior to implement a policy to resolve federal coal and federal/non-federal coalbed natural gas (CBNG) development conflicts. BLM Instruction Memorandum (IM) 2003-253, Policy and Guidance on Conflicts between CBNG and Surface Coal Mine Development in the Powder River Basin, established the BLM's policy.
PAM-021	Buffalo RMP Update (2001)	About 25,000 acres of federal oil and gas estate is available for leasing with the condition that no oil and gas activity occur on the surface (no surface occupancy-NSO) due to federal and state highways.	This decision has not been implemented. This provision was included in the 2001 RMP update, which was issued as a clarification of the 1985 RMP. No ROD was signed on this update.

3.2.2.4 Leasable – Other Solid Leasables

Table 3-9. Leasable – Other Solid Leasables: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
PAM-015	Buffalo RMP Update (2001)	BLM will provide for the efficient use of the mineral resources.	Ongoing implementation.
PAM-016	Buffalo RMP Update (2001)	In either category, the mineral owners are entitled access to their minerals to explore for and develop them and to prudently use an area of the land surface and surface resources that are directly necessary to those exploration and development activities.	Ongoing implementation.
PAM-031	Buffalo RMP Update (2001)	Geothermal resources are available for leasing in areas that are open to oil and gas leasing. Areas closed to oil and gas leasing are also closed to geothermal leasing. We consider leasing other minerals (phosphates or sodium) on a case-by-case basis.	Ongoing implementation.

3.2.2.5 Salable

Table 3-10. Salable: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
BFO-027	Buffalo RMP (1985)	MM-8: The entire resource area is available for mineral material sales initiated either by the BLM or by application. This does not include sites designated by the BLM for free use by city, county, and state entities.	This management decision was implemented and is still adequate.

3.2.3 Fire and Fuels Management

3.2.3.1 Unplanned/Wildland Fire

Table 3-11. Unplanned/Wildland Fire: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
BFO-003	Buffalo RMP (1985)	FM-1: Conduct full fire suppression in class III and IV value-at-risk areas (see map 4).	Partially implemented.
BFO-004	Buffalo RMP (1985)	FM-2: Conduct limited fire suppression on public land in value-at-risk class I and class" areas and where fire control is very difficult or extremely hazardous to firefighting personnel (see map 4).	Partially implemented.
PAM-007	Buffalo RMP Update (2001)	Unwanted wildland fires will be suppressed, the use of some types of suppression equipment will be restricted in some areas, and fire and suppression damage will be rehabilitated.	Partially implemented.
PAM-008	Maintenance Action (2004)	Priority will be given to suppressing fires in or threatening higher value resources (commercial timber areas, Developed recreation sites, and areas of wildland/urban interface) and keeping fires from spreading onto private, state, or other federal lands.	This management decision was formally changed in 2004.
PAM-010	Buffalo RMP Update (2001)	Aerial retardant use will be restricted to keep retardant out of water sources.	Fully implemented.
PAM-061	Buffalo RMP Update (2001)	South Big Horns. All wildfires in the area are aggressively attacked and suppressed. However, heavy equipment may not be used to construct fire lines except to protect life and state or private property.	Partially implemented.

3.2.3.2 Planned/Prescribed Fire

Table 3-12. Planned/Prescribed Fire: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
BFO-005	Buffalo RMP (1985)	FM-3: Conduct prescribed burns.	Fully implemented/ongoing implementation.
PAM-012	Buffalo RMP Update (2001)	Prescribed burns will be used as a tool to reach management objectives planned for areas in conjunction with such things as range and wildlife habitat management projects.	Fully implemented/ongoing implementation.
PAM-082	Buffalo RMP Update (2001)	Prescribed burns will be conducted to support vegetation and wildlife habitat objectives.	Fully implemented/ongoing implementation.

3.2.3.3 Stabilization and Rehabilitation

Table 3-13. Stabilization and Rehabilitation: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
PAM-011	Buffalo RMP Update (2001)	Fire lines which are constructed by heavy equipment, or on steep slopes, will be rehabilitated to prevent or control erosion. Rehabilitation includes, but is not limited to, water barring and reseeding.	Fully implemented/ongoing Implementation.

3.2.4 Biological Resources

3.2.4.1 Vegetation – Forests and Woodlands

Table 3-14. Vegetation – Forests and Woodlands: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
PAM-081	Buffalo RMP Update (2001)	Vegetation treatments, including timber harvest and sagebrush spraying or burning, will be designed to meet overall resource management objectives and will be consistent with the policy to protect or improve biodiversity and water quality.	This management decision has been and continues to be consistent with the Buffalo Field Office (BFO) land management objectives. The management decision is currently being implemented as opportunities are available.

3.2.4.2 Vegetation – Grassland and Shrubland Communities

Table 3-15. Vegetation – Grassland and Shrubland Communities: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
PAM-083	Buffalo RMP Update (2001)	Livestock grazing strategies on vegetative treatment areas generally include rest the first year following treatments and deferment of livestock grazing the second year.	This management decision has been and will continue to be a management practice.

3.2.4.3 Vegetation – Riparian/Wetland Resources

Table 3-16. Vegetation – Riparian/Wetland Resources: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
PAM-092	Buffalo RMP Update (2001)	Riparian areas and wetlands in less than proper functioning condition will be improved. The goal is to either create, improve, or maintain existing riparian and wetland areas for waterfowl such as ducks, geese, and shorebirds; warm- and cold-water fish; and other wildlife species that depend on these areas for their health and well being.	Ongoing implementation.
PAM-093	Buffalo RMP Update (2001)	Any study exclosures or other special exclosures such as riparian and wetland sites on springs and streams are closed to livestock grazing. Surface disturbance is not allowed within 500 feet of surface water including springs, reservoirs, water wells, and perennial streams (about 19,000 acres).	Partially implemented.

3.2.4.4 Invasive Species and Pest Management

Table 3-17. Invasive Species and Pest Management: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
BFO-012	Buffalo RMP (1985)	GM-1: Control noxious weeds on public surface lands.	Ongoing implementation.
PAM-084	Buffalo RMP Update (2001)	In cooperation with county weed and pest districts, cooperative integrated weed control programs are being implemented on public land in conjunction with control work on adjoining deeded and state lands.	Ongoing implementation.
PAM-099	Buffalo RMP Update (2001)	BLM cooperates with APHIS to control grasshoppers and Mormon crickets on public lands in conjunction with the control efforts initiated on adjoining nonfederal lands.	Ongoing implementation on an as-needed basis.

3.2.4.5 Fish and Wildlife Resources – Fish

Table 3-18. Fish and Wildlife Resources – Fish: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
PAM-088	Buffalo RMP Update (2001)	Big game and fisheries management levels identified in the WGFD's 1990-1995 strategic plan are supported by the BLM (WGFD 1990). BLM cooperates with the WGFD in introducing or reintroducing native and acceptable nonnative wildlife and fish within the planning area where potential habitat exists.	Ongoing implementation.
PAM-090	Buffalo RMP Update (2001)	Reservoirs and riparian areas are sometimes maintained to improve or enhance potential fisheries. Designing reservoirs to enhance fisheries where potential exists will be encouraged.	Ongoing implementation.

3.2.4.6 Fish and Wildlife Resources – Wildlife

Table 3-19. Fish and Wildlife Resources – Wildlife: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
BFO-038	Buffalo RMP (1985)	WHM-1: Prohibit surface disturbance and occupancy in the Ed O. Taylor, Kerns, Bud Love, and Amsden Creek winter ranges for big game unless the prohibition is waived by the authorized officer.	Ongoing implementation.
BFO-039	Buffalo RMP (1985)	WHM-2: Prohibit surface disturbance in crucial elk winter range between November 15 and April 30. In addition, prohibit surface occupancy in elk calving areas. The decision may be waived by the authorized officer.	Ongoing implementation.
BFO-040	Buffalo RMP (1985)	WHM-3: Prohibit surface disturbance and occupancy within 250 yards of sharp-tailed grouse dancing grounds at any time. Prohibit surface disturbance within an additional 1/2-mile radius of sharp-tailed grouse dancing grounds from April 1 through May 30 (see map 14) unless the prohibition is waived by the authorized officer.	Ongoing implementation.
BFO-042	Buffalo RMP (1985)	WHM-5: Prohibit surface disturbance or occupancy within a biologic buffer zone around active nests of raptor species of high federal interest unless the prohibition is waived by the authorized officer.	Ongoing implementation.
BFO-043	Buffalo RMP (1985)	WHM-6: Develop habitat management plans (HMPs) to improve and protect wildlife habitat in the following priority areas: South Big Horns HMP (1985), including a portion or all of the Gardner Mountain and North Fork WSAs; wetlands and aquatic HMP (1986); and Powder River Breaks HMP (1987).	Implemented.
BFO-045	Buffalo RMP (1985)	WHM-8: Allow animal damage control on BLM-administered lands when the need for control is demonstrated.	Ongoing implementation.
PAM-045	Buffalo RMP Update (2001)	Fences will be constructed to maintain wildlife mobility in important habitat areas. Fences on public land that are hindering natural movement of wildlife will be modified to conform with BLM standards.	Ongoing implementation
PAM-057	Buffalo RMP Update (2001)	South Big Horns. BLM's goal regarding wildlife values in the south Big Horns are to provide sufficient forage, cover, and water in helping to support the WGFD's big game population objectives.	Ongoing implementation.

Table 3-19. Fish and Wildlife Resources – Wildlife: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
PAM-066	Buffalo RMP Update (2001)	Fork Creek Area. No surface occupancy is allowed in elk calving areas (5,700 acres), and a seasonal timing restriction is applied to elk wintering areas (26,000 acres). It is a requirement that all oil and gas production be piped out of crucial elk winter range and that necessary precautions are taken to protect the highly erosive soils in the area.	Ongoing implementation.
PAM-089	Buffalo RMP Update (2001)	Constructing islands in reservoirs, improving riparian vegetation by planting and grazing management, and installing nesting structures to improve waterfowl production and security areas near reservoirs will be encouraged.	Ongoing implementation.
PAM-091	Buffalo RMP Update (2001)	No surface disturbance and occupancy is allowed on the WGFD's four big game ranges unless waived by the authorized officer (table 5). The BLM-administered public lands in the Ed Taylor and Amsden Creek game ranges have been withdrawn for locatable minerals.	Ongoing implementation.
PAM-094	Buffalo RMP Update (2001)	Timber harvest activities are not allowed in areas where critical elk habitat occurs or where hiding cover is insufficient to meet the minimum needs of this species (about 8,000 acres).	Ongoing implementation.
PAM-095	Buffalo RMP Update (2001)	Surface disturbance or disruptive activity is not allowed in crucial elk winter range (11,045 acres) between November 15 and April 30, and in elk calving areas (5,700 acres) from May 1 to June 30, when necessary.	Ongoing implementation.
PAM-096	Buffalo RMP Update (2001)	Management decisions: Surface occupancy or disturbance is not allowed on approximately 6,000 acres in the study area to protect important raptor, sharp-tail grouse, and sage-grouse habitat. An additional 430,700 acres may be restricted from surface-disturbing activities during the breeding and nesting period (February 1 to July 31). Buffers are established with radii from 250 yards to ½ mile for sharp-tailed grouse dancing grounds from April 1 through May 30. The buffers for sage-grouse strutting grounds (leks) vary from ¼ mile radius to 1 ¾ miles from March 1 to June 15. The field office manager can approve exceptions, modification, or waivers to this restriction.	Ongoing implementation.
PAM-098	Buffalo RMP Update (2001)	No animal damage control is allowed on BLM-administered public lands unless a need for control is determined.	Ongoing implementation.

3.2.4.7 Special Status Species – Plants

Table 3-20. Special Status Species – Plants: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
PAM-080	Buffalo RMP Update (2001)	BLM will protect known populations of rare or sensitive plants as required under the same laws as for Threatened and Endangered animals.	Ongoing implementation.

3.2.4.8 Special Status Species – Fish

Table 3-21. Special Status Species – Fish: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
N/A	N/A	No management decisions issued for Special Status Species – Fish. However, all management decisions relating to fish species, and many management actions relating to water quality, riparian and wetland resources, livestock grazing, fire and fuels management, locatable mineral resources, and management of invasive species, would also apply to or have an impact on special status fish species.	N/A

3.2.4.9 Special Status Species – Wildlife

Table 3-22. Special Status Species – Wildlife: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
BFO-041	Buffalo RMP (1985)	WHM-4: Prohibit surface disturbance and occupancy within a 1/4-mile radius of the center of sage-grouse strutting grounds with no exceptions. Prohibit surface disturbance within an additional 1 3/4-mile radius from March 1 to June 15 (see map 14) unless the prohibition is waived by the authorized officer.	Ongoing implementation.
BFO-044	Buffalo RMP (1985)	WHM-7: Prohibit surface disturbance or occupancy within 1/2 mile of communal winter roosts for bald eagles from November 1 through March 30 (see map 14). When biologic buffer zones around roosts have been delineated, prohibit surface disturbance within these zones from November 1 through March 30. The prohibition can be waived by the authorized officer.	Ongoing implementation.
PAM-079	Buffalo RMP Update (2001)	Surface disturbance or occupancy will not be allowed within ½ mile of communal winter roosts for bald eagles from November 1 through March 30. Documented nest sites, roosts, cottonwood trees, and other potential critical habitats related to hunting and concentration areas for bald eagles will also be protected.	Ongoing implementation.
PAM-097	Buffalo RMP Update (2001)	Surface disturbance or occupancy is not allowed within ½ mile of communal winter roosts for bald eagles from November 1 through March 30. Surface disturbance will not be allowed around "biologic" buffer zones delineated for eagle roosts from November 1 through March 30.	Ongoing implementation.
PAM-100	Buffalo RMP Update (2001)	Rodents like prairie dogs will be controlled by APHIS on BLM-administered public lands.	This decision has not been Implemented.

3.2.5 Heritage and Visual Resources

3.2.5.1 Cultural Resources

Table 3-23. Cultural Resources: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
BFO-001	Buffalo RMP (1985)	CRM-1: Develop cultural resource management plans (CRMPs) for Cantonment Reno, Dull Knife Battlefield, and the Outlaw Cave Archeological District. In addition, develop CRMPs for other federally owned sites as they are nominated to the National Register of Historic Places.	Management decision completed in 1985.
BFO-002	Buffalo RMP (1985)	CRM-2: Class III (intensive) cultural resource inventories will be required before surface-disturbing activities are permitted in the areas listed below. ▪ Gardner Mountain (Ts 43-45N, Rs 83-85W) ▪ Fortification Creek (Ts 51-53N, Rs 75-77W) ▪ Middle Fork (Ts 41-43N, Rs 83-85W) ▪ Pumpkin Buttes (Ts 51-53N, Rs 75-77W) ▪ Rochelle Hills (Ts 45-47N, Rs 59-70W) ▪ All BLM-administered lands within ½ mile of the Powder River	Implemented throughout the planning area.
PAM-004	Buffalo RMP Update (2001)	Using the land for scientific purposes such as archeological collections is authorized through a permit system.	Implemented.
PAM-005	Buffalo RMP Update (2001)	Site-specific inventories for cultural resources are required before any surface-disturbing activities can begin. Adverse effects on significant resources are mitigated, or the resources themselves are avoided. Sites listed on, or eligible for, the National Register of Historic Places (NRHP) are protected.	Implemented.
PAM-006	Buffalo RMP Update (2001)	Rock art, as well as prehistoric and historic archaeological sites and districts associated with specific time periods or cultures, are managed for scientific, public, and sociocultural use. General areas are managed for research emphasizing interpretation of the environments in which prehistoric man lived. Specific sites or areas are preserved for future study and use. Cultural resource interpretive sites, such as rock art and historic trails, are developed or will be developed, providing such public benefits as scenic overlooks, signs, and walking trails.	Implemented.

Table 3-23. Cultural Resources: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
PAM-058	Buffalo RMP Update (2001)	South Big Horns. In the Outlaw Cave area and the Dull Knife Battlefield site, management goals are to protect and preserve the cultural and archeological information, to provide for interpretation, and to nominate all significant sites to the National Register. Ideally, the objective for managing these sites is to do it within a multiple-use context.	Status uncertain.
PAM-070	Buffalo RMP Update (2001)	Cantonment Reno Area. The area is a no surface occupancy area for mineral development.	Implemented.
PAM-071	Buffalo RMP Update (2001)	Bozeman Trail and Crazy Woman Battle Site. No surface occupancy stipulations will be applied to mineral leases where potentially eligible or significant segments exist (within ¼ mile or visual horizon, whichever is closer, from the Bozeman Trail; map 7).	There has been inconsistent implementation, NSO for Bozeman Trail.

3.2.5.2 Paleontological Resources

Table 3-24. Paleontological Resources: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
PAM-050	Buffalo RMP Update (2001)	Using the land for scientific purposes such as paleontological exploration is authorized through a permit system.	Implemented.
PAM-051	Buffalo RMP Update (2001)	Fossils are part of the surface estate.	Implemented.
PAM-052	Buffalo RMP Update (2001)	A paleontological collecting permit is required before collecting any fossil vertebrates, significant fossil invertebrates, and plants on BLM-administered public lands.	Implemented.
PAM-053	Buffalo RMP Update (2001)	Collection of invertebrate fossils and petrified wood are allowed, except significant invertebrate paleontological resources are evaluated on a case-by-case basis.	Implemented.

3.2.5.3 Visual Resources

Table 3-25. Visual Resources: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
BFO-030	Buffalo RMP (1985)	RVRM-2: Prohibit surface disturbance or occupancy on public lands in the Red Wall/Hole-in-the-Wall area, within Middle Fork Canyon and within 1/2 mile of the canyon rims, and on the Dry Creek Petrified Tree environmental education site unless the prohibition is waived by the authorized officer.	Implemented.
BFO-031	Buffalo RMP (1985)	RVRM-3: Prohibit surface disturbance or occupancy within 200 feet of the edge of state and federal highways unless the prohibition is waived by the authorized officer.	This has been implemented but is not consistently reviewed. Disturbance for oil and gas roads and pipelines has been allowed.
PAM-086	Buffalo RMP Update (2001)	Visual resources are managed in accordance with objectives for visual resource management (VRM) classes that have been assigned to the planning area (map 8). No activity or occupancy is allowed within 200 feet of the edge of state and federal highways. Facilities or structures such as power lines, oil wells, and storage tanks are required to be screened, painted, and designed to blend with the surrounding landscape except where safety indicates otherwise. Any facilities or structures proposed in or near WSAs will be designed so as not to impair wilderness suitability.	Inconsistent implementation.

3.2.6 Land Resources

3.2.6.1 Forest Products

Table 3-26. Forest Products: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
BFO-007	Buffalo RMP (1985)	FOM-2: Implement forest thinning and planting projects. Thinning and planting projects have been identified for initiation in the following areas: **Sawmill Creek**, T45N, R85W, Sections 3 and 4 **Fisher Springs**, T44N, R85W, Sections 7 and 8 **Woosley Cabin**, T45N, R85W, Sections 4 and 5 **Willow Creek**, T45N, R84W, Section 22 **Rome Hill**, T46N, R85W, Section 6 **Upper North Fork**, T47N, R85W, Section 17 **Horn and Bull Creek**, T47N, R83W, Sections 7,18,19,31, and 32; T46N, R83W, Sections 5,6,7, and 20; T46N, R84W, Section 12 **Mosier Gulch**, T50N, R83W, Sections 2 and 3 **Baldwin Creek**, T44N, R85W, Sections 7 and 8 **Laramandy Draw**, T45N, R85W, Section 1 **Pass Creek**, T46N, R85W, Section 22 Planting Projects **Willow Creek**, T45N, R84W, Section 22 **Lost Creek**, T46N, R85W, Sections 9,10, and 15 **Poison Creek**, T48N, R83W, Section 32 **Sawmill Creek**, T45N, R85W, Sections 9 and 10	Ongoing implementation.
BFO-008	Buffalo RMP (1985)	FOM-3: Allow the sale of minor forest products (posts, poles, and fuelwood) from woodlands and/or noncommercial forestlands throughout the resource area.	Ongoing implementation.

Table 3-26. Forest Products: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
BFO-009	Buffalo RMP (1985)	FOM-4: Offer for sale from commercial forestlands over the next ten years approximately 9 MMBF of sawtimber in the 11 timber harvest areas listed below. In addition, offer for sale over the next ten years approximately 1 MMBF of minor green forest products from commercial forestlands. The sawtimber will be offered as follows: **Gardner Mountain** area (not in WSA), 1 MMBF (300 acres) **Baldwin Creek**, 1 MMBF (200 acres) **Poison Creek**, 1 MMBF (200 acres) **Horn**, 2 MMBF (300 acres) **Red Springs Reservoir**, 250 MBF (400 acres) **Arndt**, 1 MMBF (200 acres) **Lost Creek**, 250 thousand board feet (MBF) (50 acres) **Upper North Fork Reentry**, 500 MBF (50 acres) **Lower Beartrap**, 1 MMBF (200 acres) **Billy Creek**, 500 MBF (125 acres) **Lower "H" Hill**, 500 MBF (125 acres)	Ongoing implementation.

Table 3-26. Forest Products: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
BFO-010	Buffalo RMP (1985)	FOM-5: Acquire easements across private and state lands where access is needed for timber harvest and other forest management purposes. Areas where easement needs are currently known are listed below. **Poison Creek**, T48N, R84W, Sections 27, 28, 34, 35, and 36; T48N, R83W, Section 31 **The "Horn"**, T47N, R83W, Section 31; T48N, R84W, Sections 32 and 33; T47N, R84W, Sections 3, 4, 10, 14, 15, 23, 25, 26, and 36; T46N, R84W, Sections 1 and 2; T46N, R83W, Sections 4, 5, 6, 9, 20, 28, 29 and 33 **Bull Creek**, T47N, R84W, Sections 13,14,15,24,25 and 26; T47N, R83W, Sections 16,17,19,20,29 and 30 **Red Springs Reservoir,** T45N, R84W, Section 6; T46N, R84W, Sections 31 and 32 **Pack Saddle Canyon**, T45N, R84W, Section 6; T46N, R84W, Sections 32 and 33 **Arndt**, T45N, R84W, Sections 17, 18 and 19; T45N, R85W, Section 12 **Gardner Mountain**, T44N, R84W, Sections 2 and 3 **Lost Creek**, T46N, R85W, Section 15 **Lower Beartrap**, T45N, R85W, Sections 2, 11, 14, 23 and 36; T44N, R85W, Section 2 **Billy Creek**, T48N, R83W, Sections 7,12,17 and 18 **Upper North Fork and Goldmine**, T47N, R85W, Sections 9,10 and 20 **Dull Knife**, T44N, R83W, Sections 17, 20, 21, 27 and 28 **The "Castle"**, T45N, R85W, Sections 32 and 33 **Cash Canyon**, T45N, R84W, Sections 8, 9 and 10 **Hammond Spring**, T46N, R84W, Sections 7, 8,17, and 21; T46N, R85W, Sections 11,12 and 14	Ongoing implementation.
BFO-011	Buffalo RMP (1985)	FOM-6: Suspend or adjust livestock grazing on commercial forestlands if grazing is impairing the productive capacity of the forestland.	Implemented.
PAM-013	Buffalo RMP Update (2001)	Management decisions: Timber harvest is allowed at 10-year harvest levels not to exceed 10 million board feet (mmbf). Forest products are sold by permit as requested. Easements are acquired across private and state land where access is needed for timber harvest and other forest management purposes.	Ongoing implementation.

Table 3-26. Forest Products: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
PAM-014	Buffalo RMP Update (2001)	Individual clear-cuts are not allowed to exceed 20 acres. Harvested areas are planted if they have not regenerated within 5 years. Regeneration areas are often fenced to prevent livestock from damaging seedlings. Timber harvests are prohibited within 200 feet of surface water. Timber harvest is limited to commercial forestlands with slopes less than 45 percent (also see appendix B).	Ongoing implementation.
PAM-059	Buffalo RMP Update (2001)	South Big Horns. BLM's public forestlands management objective is to harvest timber in diseased old-growth and overstocked stands to enhance growing conditions and to assist the local economy through timber harvest and milling.	This management decision is no longer implemented. The BFO currently follows guidance in the Healthy Forest Resource Act.
PAM-085	Buffalo RMP Update (2001)	Trees will be planted on timber harvest areas that fail to regenerate naturally to minimum stocking levels within five years after completing harvest and rehabilitation activities. Precommercial tree thinning will be initiated on overstocked releasable seedling and sapling size stands.	Ongoing implementation.

3.2.6.2 Lands and Realty

Table 3-27. Lands and Realty: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
BFO-016	Buffalo RMP (1985)	LR-1: Locate transmission and transportation facilities within the corridor areas.	This decision has not been implemented.
BFO-017	Buffalo RMP (1985)	LR-2: Locate communication sites and utilities in the Pumpkin Buttes area only on South Middle Butte until that butte has been fully utilized as a communication site unless the decision is waived by the authorized officer. Communication sites will not be authorized on North Middle Butte unless it becomes absolutely necessary to use that butte for the line-of-sight needs (such as for microwave transmission).	Implemented.

Table 3-27. Lands and Realty: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
BFO-018	Buffalo RMP (1985)	LR-3: Prohibit surface disturbance or occupancy in the recreation and public purpose (R&PP) areas unless the prohibition is waived by the authorized officer. This decision will not apply to recreation and public purpose projects in the R&PP applicant's plan of development.	Ongoing implementation.
BFO-019	Buffalo RMP (1985)	LR-4: Public lands shown on map 7A are available for further consideration for sale or exchange. The possible sale or exchange of lands in producing oil and gas fields (known geologic structures-KGSs), high interest coal areas, and designated mineral material sites will be considered case by case.	Inconsistent implementation.
PAM-037	Buffalo RMP Update (2001)	R&PP applications will be considered for recreation purposes. Uses that are not compatible with each R&PP will not be allowed.	Ongoing implementation.
PAM-038	Buffalo RMP Update (2001)	Withdrawals for surface and/or minerals will be considered on a case-by-case basis.	Ongoing implementation.
PAM-039	Buffalo RMP Update (2001)	Approximately 138,700 acres of public lands that are more difficult or less economic to manage than most BLM-administered public lands have priority consideration for exchange, public sale, or transfer of jurisdiction to another agency (map 5).	Inconsistent implementation.
PAM-040	Buffalo RMP Update (2001)	Priority is given to acquiring public land in areas adjacent to major blocks of public land, especially in areas of high recreational potential like the south Big Horn Mountains.	Inconsistent implementation.
PAM-041	Buffalo RMP Update (2001)	Any lands known to be contaminated with hazardous substances are not acquired (appendix F).	Implemented.
PAM-042	Buffalo RMP Update (2001)	Easements that will provide access to better blocks of public lands for recreation and administrative purposes will continue to be pursued.	Inconsistent implementation.

3.2.6.3 Renewable Energy

Table 3-28. Renewable Energy: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
N/A	N/A	No management decisions issued relating to renewable energy.	N/A

3.2.6.4 Rights-of-Way and Corridors

Table 3-29. Rights-of-Way and Corridors: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
PAM-034	Buffalo RMP Update (2001)	Long-term occupancy of the public lands for roads, power lines, pipelines, communication sites, and irrigation ditches is authorized by granting a ROW. ROWs are to be removed and reclaimed upon termination of the grant.	Implemented.
PAM-035	Buffalo RMP Update (2001)	Transmission lines and transportation facilities are located to the extent feasible within identified corridor areas. Communication sites are not authorized on North Middle Butte unless it becomes absolutely necessary to use that butte for the line of-sight needs (such as microwave transmission). The remainder of the planning area is open for rights-of-way development.	Implemented.
PAM-036	Buffalo RMP Update (2001)	Public lands having agricultural potential and water are considered for disposal by sale, exchange, or desert land entry.	Ongoing implementation.

3.2.6.5 Transportation and Access

Table 3-30. Transportation and Access: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
BFO-029	Buffalo RMP (1985)	RVRM-1: Public lands in Campbell and Sheridan counties are designated for off-road vehicle (ORV) use as shown on table 2-5 on page 26 of the proposed RMP/final EIS.	Implementation not consistent.
PAM-047	Buffalo RMP Update (2001)	Using motorized off-highway vehicles requires no fee and no permit, but their use is restricted depending on whether the area has been designated closed, limited, or open. Until on-the-ground signing has occurred, OHV use in all areas designated as limited or limited to designated roads and trails will be limited to existing roads and vehicle routes.	Implemented.
PAM-049	Buffalo RMP Update (2001)	On areas designated as limited to "designated" roads and trails, ORV travel will be restricted to marked roads. Until actual roads and trails are marked on the ground travel will be restricted to existing roads and trails. Over-the-snow vehicles will be subject to the same requirements and limitations as all other vehicles.	Inconsistent implementation.
PAM-060	Buffalo RMP Update (2001)	South Big Horns. In the south Big Horns area, priority is given to land exchanges which can provide access to large blocks of BLM-administered public lands, to lands with unique resources, or to lands with riparian/wetland values. Private or state lands with high scenic value near well-blocked BLM-administered public lands are also considered very desirable for exchange.	Partially implemented.
PAM-062	Buffalo RMP Update (2001)	South Big Horns. In the Middle Fork of the Powder River area, additional trails created by hunters and fishermen will be closed in consultation with adjacent landowners (private, state, and WGFD).	Ongoing implementation.
PAM-067	Buffalo RMP Update (2001)	Weston Hills Recreation Area. Off-highway vehicle use is limited to designated (marked with white arrows) roads. In additions an existing (and marked) foot, horse, and mountain bike loop is open to ATV use (motorized vehicles 50 inches wide or less). The loop trail will be closed to motorized vehicles from September 15 through October 20.	Implemented.
PAM-073	Buffalo RMP Update (2001)	BLM will continue to maintain 16.5 miles of road every year (Bar C, Billy Creek, Muir, Petrified Tree, and Weston West) and will continue to maintain existing recreation facilities and roads at the same level.	Implemented.

3.2.6.6 Recreation

Table 3-31. Recreation: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
PAM-054	Buffalo RMP Update (2001)	Casual use of the BLM-administered public land for hiking, bicycling, hunting, fishing, and similar uses are allowed without charge. Camping is limited to 14 days at any one spot.	Ongoing implementation.
PAM-055	Buffalo RMP Update (2001)	Special recreation permits (SRPs) are issued for commercial competitive and large-scale nonprofit organized recreational events on a case-by-case basis.	Implemented.
PAM-056	Buffalo RMP Update (2001)	South Big Horns. BLM's major goal in the south Big Horns area is to protect those values mentioned above while maintaining compatible multiple use activities.	Implemented.
PAM-064	Buffalo RMP Update (2001)	Dry Creek Petrified Tree Environmental Education Area. Preserve the Dry Creek area near its natural state, prevent or slow down deterioration of the petrified trees, and inform the visitor about the area.	Ongoing implementation.
PAM-065	Buffalo RMP Update (2001)	Dry Creek Petrified Tree Environmental Education Area. An outhouse is planned for the area if use justifies, and a way to protect the largest deteriorating petrified tree will be identified. Surface disturbance or occupancy is prohibited within ½ mile of the site unless waived by the authorized officer.	The outhouse and mitigation plan is in place at the Petrified Tree Environmental Education Area.
PAM-068	Buffalo RMP Update (2001)	Mosier Gulch Recreation Area. The objective of the MOU is to jointly develop and manage recreational facilities on lands administered by all three agencies in the greater Mosier Gulch area.	Implemented, but no MOU has been signed.
PAM-069	Buffalo RMP Update (2001)	Mosier Gulch Recreation Area. Oil and gas leasing and development is not allowed in the area.	Implemented.
PAM-072	Buffalo RMP Update (2001)	Bozeman Trail and Crazy Woman Battle Site. Any plans for interpretation and development of related sites along the Bozeman Trail will generally follow the state sponsored plan, Promoting Historical and Cultural Resources Along the Bozeman Trail (McDermott Associates 1989).	An interpretive plan was written for sections of Bozeman Trail and the Crazy Woman Battle Site. Turnouts with interpretive signs for the above sites and Cantonment Reno were placed on Trabing, Nine Mile, and Lower Sussex Roads. Visitor use numbers at the turnouts is unclear, and many of the turnouts may be falling into disrepair.

3.2.6.7 Wilderness Characteristics

Table 3-32. Wilderness Characteristics: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
N/A	N/A	No management decisions issued relating to wilderness characteristics.	N/A

3.2.6.8 Livestock Grazing

Table 3-33. Livestock Grazing: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
BFO-006	Buffalo RMP (1985)	FOM-1: Suspend or adjust livestock grazing use in areas where timber harvest has occurred, whenever grazing would impair forest regeneration.	Ongoing implementation.
BFO-013	Buffalo RMP (1985)	GM-2: Manage "M" category allotments as described below. Continue the current authorized livestock use on 98 "M" allotments at 43,573 AUMs. Allow development of range improvements. Establish resource monitoring studies as necessary to detect undesirable changes in the current satisfactory resource conditions.	Ongoing implementation.
BFO-014	Buffalo RMP (1985)	GM-3: Manage "I" category allotments as described below. Conduct baseline inventories. Develop, implement, and monitor AMPs. After range condition class has been upgraded to "good" on allotments now rated "poor" to "fair," allocate the increased available forage first to wildlife to meet the population objectives of the Wyoming Game and Fish Department (WGFD). Any of the increased forage not needed for wildlife will be available to be licensed for livestock use.	Ongoing implementation.
BFO-015	Buffalo RMP (1985)	GM-4: Manage "C" category allotments as described below. Continue current authorized livestock use. Assign low priority to funding of range improvement projects.	Ongoing implementation.

Table 3-33. Livestock Grazing: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
PAM-043	Buffalo RMP Update (2001)	Livestock grazing is not authorized on about 4,000 acres of public land located in the canyons and slopes of the southern Big Horn Mountains because of the rough terrain and steep slopes. Livestock grazing is allowed on all public lands in the resource area except on about 6,000 acres (1 percent) where it has been determined to be incompatible with other resource uses or values.	Implemented.
PAM-044	Buffalo RMP Update (2001)	Any permanent increases in the amount of forage produced are considered for wildlife and watershed protection before additional livestock use is authorized.	Replaced in 1997 with "Rangelands are capable of sustaining viable populations and a diversity of native plant and animal species appropriate to the habitat. Habitats that support or could support Threatened species, Endangered species, species of special concern, or sensitive species will be maintained." Ongoing implementation.
PAM-046	Buffalo RMP Update (2001)	Reservoirs, wells, troughs and pipelines will be constructed to provide water in dry areas and to disperse grazing use. The grazing lessee or other cooperator will be required to maintain water in all troughs located on public land during the frost-free period (April through October) for wildlife.	Ongoing Implementation.

3.2.7 Special Designations

3.2.7.1 Areas of Critical Environmental Concern (ACECs)

Table 3-34. Areas of Critical Environmental Concern: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
N/A	N/A	No management decisions issued relating to ACECs.	N/A

3.2.7.2 Scenic or Back Country Byways

Table 3-35. Scenic or Back Country Byways: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
N/A	N/A	No management decisions issued relating to scenic or back country byways.	N/A

3.2.7.3 Wild and Scenic Rivers

Table 3-36. Wild and Scenic Rivers: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
PAM-101	Buffalo RMP Update (2001)	The BLM has determined that the BLM-administered public lands along the review segment of the Middle Fork of the Powder River (map 9) meet the WSR suitability factors and should be managed to maintain or enhance their outstandingly remarkable values for any possible future consideration for inclusion in the WSR system.	Implemented.

3.2.7.4 Wilderness Study Areas

Table 3-37. Wilderness Study Areas: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
BFO-025	Buffalo RMP (1985)	MM-6: If Congress decides not to designate the WSAs as wilderness, lease for oil and gas development 6,423 acres in the Gardner Mountain WSA, 10,089 acres in the North Fork WSA, and 12,419 acres in the Fortification Creek WSA with the terms and conditions shown on the Oil and Gas/Watershed and Oil and Gas/Wildlife maps for each WSA.	This decision has not been implemented.
BFO-032	Buffalo RMP (1985)	RVRM-4: Provide access to the Gardner Mountain and North Fork WSAs by existing roadbed and new construction.	This decision has not been implemented.
BFO-037	Buffalo RMP (1985)	WM-1: Recommend all three WSAs for nondesignation as wilderness.	Implemented.
PAM-009	Buffalo RMP Update (2001)	Heavy equipment (dozers) will be restricted from being used for wildfire suppression in the WSAs, the Middle Fork Powder River management area, and areas of known cultural values (for example, ruts of the Bozeman Trail).	Partially implemented.
PAM-018	Buffalo RMP Update (2001)	Until Congress decides to designate or not designate the three WSAs in the resource area- Gardner Mountain (about 6,400 acres), North Fork (10,000 acres), and Fortification Creek (12,400 acres) as wilderness, about 28,800 acres are not available for oil and gas leasing. If Congress decides not to designate them as wilderness, they would be available for oil and gas leasing and development.	Implemented.
PAM-029	Buffalo RMP Update (2001)	The Amsden Creek winter game range (480 acres) and Middle Fork Canyon (about 11,000 acres) have been withdrawn from mineral location. Locatable mineral activities are restricted in Fortification Creek, Gardener Mountain, and North Fork WSAs (about 28,931 acres).	Implemented.
PAM-030	Buffalo RMP Update (2001)	The majority of lands in the resource area, including federally administered surface/minerals and split-estate, are available for mineral material exploration and development. Mineral materials activities are prohibited in the Fortification Creek, Gardener Mountain, and North Fork WSAs (about 28,931 acres).	Implemented.
PAM-063	Buffalo RMP Update (2001)	Foot/Horse Trail to North Fork WSA. A decision in the 1985 RMP stated that access to the North Fork WSA will be provided by constructing a foot and horseback trail.	This decision has not been implemented.

3.2.8 Socioeconomic Resources

3.2.8.1 Social Conditions

Table 3-38. Social Conditions: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
N/A	N/A	No management decisions issued relating to social conditions.	N/A

3.2.8.2 Economic Conditions

Table 3-39. Economic Conditions: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
N/A	N/A	No management decisions issued relating to economic conditions.	N/A

3.2.8.3 Health and Safety

Table 3-40. Health and Safety: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
PAM-032	Buffalo RMP Update (2001)	For any authorized activities involving hazardous materials or their use, precautions will be required to be taken to guard against releases into the environment.	Implemented via Conditions of Approval for authorized activities.
PAM-033	Buffalo RMP Update (2001)	Parties responsible for contamination will be liable for cleanup and resource damage costs, as prescribed by law.	Implemented.

3.2.8.4 Environmental Justice

Table 3-41. Environmental Justice: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
N/A	N/A	No management decisions issued relating to Environmental Justice.	N/A

3.2.8.5 Tribal Treaty Rights

Table 3-42. Tribal Treaty Rights: Current Decisions

Planning Decision Number	Decision Source	Current Management Decision	Status
N/A	N/A	No management decisions issued relating to Tribal Treaty Rights.	N/A

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4.0 MANAGEMENT OPPORTUNITIES

This chapter analyzes the ability of current management direction to achieve desired conditions and address resources and demands for use of the resources. It describes resource management activities that may or may not, under current management, be meeting the goals specified in the Buffalo RMP. This chapter serves a starting point for alternative formulation by identifying management opportunities for consideration during the alternative development process.

4.1 Desired Conditions and Ability to Address Resource Demands

Management decisions for resources in the Buffalo planning area were originally issued in the 1985 Buffalo RMP. These management decisions are included in the tables below. Each management decision has been assigned a planning decision number, which is a unique identifier assigned to each decision. Management decisions from the 1985 Buffalo RMP are assigned a number beginning with BFO; decisions from the 2001 Buffalo RMP Plan Update are assigned a number beginning with PAM. The decisions are included verbatim from the original documents. If a decision references a table, figure, or appendix, it is referencing the original document from which the decision was pulled.

The tables below analyze the ability of current management decisions to achieve desired conditions and address resource demands. The tables include an analysis of each management decision, which are carried forward from chapter 3 and can be cross-referenced using the planning decision number, including a discussion of the responsiveness of the management decision relative to current issues; a discussion of the rationale of whether or not the decisions are responsive; and a discussion of options that have been identified for changing management if the decision is determined to be unresponsive to current issues.

4.1.1 Physical Resources

4.1.1.1 Air Quality

Table 4-1. Air Quality: Management Opportunities

Planning Decision Number	Current Management Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
PAM-001	Any BLM-initiated actions or authorizations that result in air quality or visibility deterioration are conditioned to avoid violating Wyoming and national air quality standards.	Yes	Dust control measures are one of a list of BMP's (Best Management Practices) implemented in order to reduce air quality impacts from federal actions.	BLM will minimize, within the scope of its authority, any emissions that may add to atmospheric deposition, cause violations of air quality standards, or degrade visibility. (Rawlins) Minimize or prevent air quality degradation through-out the planning area by applying mitigation measures on a project-by-project basis. (Dillon) BLM will follow specific guidance (EPA and Wyoming Department of Environment Quality [DEQ]) for the application of air quality protection measures. (Rawlins) Manage air quality to meet the Wyoming Standards and Guidelines for Healthy Rangelands. (Rawlins)
PAM-002	Dust control measures are required to be taken to increase visibility and reduce particulate impacts for all construction and other surface-disturbing activities.	Yes	There is a continued need to reduce visual impacts of development.	Develop performance-based goal, such as in Powder River Basin (PRB) Record of Decision (ROD): 50 percent control efficiency (pg A-39).

Table 4-1. Air Quality: Management Opportunities

Planning Decision Number	Current Management Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
PAM-003	Air quality permits are obtained from the WDEQ before any prescribed fires are set on public land.	Yes	New Wyoming DEQ Smoke Management Rules were adopted in 2005, replacing the "smoke permit" requirements. Additional potential decisions.	Amend decision to require compliance with the air quality and smoke management rules promulgated by Wyoming DEQ. BLM will manage prescribed burns to comply with Wyoming DEQ-Air Quality Division (AQD) smoke management rules and regulations. (Rawlins) Develop burn plans for all prescribed burn treatments that include incident and cumulative air quality considerations. (Dillon)

4.1.1.2 Geologic Resources

Table 4-2. Geologic Resources: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
N/A	No management decisions issued relating to geologic resources.	N/A	N/A	N/A

4.1.1.3 Soil

Table 4-3. Soil: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
BFO-033	SWAM-1: Prohibit surface disturbance or occupancy within areas of severe erosion hazard from March 1 through June 15 unless the prohibition is waived by the authorized officer.	No	This decision has not been implemented consistently.	Limit to linear features of a maximum size (5 acres?). Surface disturbance and occupancy will be prohibited within areas of severe erosion hazard unless individual site plans … (BFO-35).
BFO-035	SWAM-3: Prohibit surface disturbance or occupancy on slopes of more than 25 percent (see map 12) unless the prohibition is waived by the authorized officer.	No	This decision has not been implemented consistently.	Limit the amount of disturbance (width and length). Limit to linear features of a maximum size (5 acres?). Surface disturbance or development on slopes greater than 25 percent is prohibited, unless individual site plans that meet the following requirements are submitted to and approved by the authorized officer: engineered drawings for construction, site drainage design, and final rehabilitation contours with a written rationale describing how the proposed controls will prevent slope failure and erosion, while maintaining viable topsoil for final reclamation. This plan will also include a timeline identifying the actions that will be applied during the construction, production, and rehabilitation phases of the plan so appropriate monitoring protocols can be developed by the BLM to ensure that the plan is meeting the objectives. (Casper)

Table 4-3. Soil: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
PAM-048	ORV travel will be prohibited on wet soils and on slopes greater than 25 percent if damage to vegetation, soils, or water quality would result.	No	Not enforced.	Limit recreational use to designated routes, except for a few potential 'open' areas. Implement seasonal restrictions where necessary.
PAM-074	Timber harvest activities will be limited to slopes of 45 percent or less to protect the water quality and to keep soil from eroding.	No	Improve timber harvest operations.	Slope limitations should be dependent on the erosiveness of the soils. Allow for technology to be utilized appropriately.
PAM-075	Surface occupancy and disturbance will not be allowed on slopes of 25 percent or more (281,100 acres).	No	This management decision is redundant with BFO-035.	This decision is redundant with BFO-035. Carry BFO-035 forward and eliminate this decision.
PAM-076	ORV travel will be prohibited on wet soils and on slopes greater than 25 percent if unnecessary damage to vegetation, soils, or water quality would result. Roads and trails will be closed and reclaimed if they are heavily eroded, washed out, or if access roads in better condition are available. Head seepages on all spring developments on BLM-administered public lands will be fenced.	No	This decision has not been implemented consistently.	Limit recreational use to designated routes, except for a few potential 'open' areas. Implement seasonal restrictions where necessary. Roads and trails will be closed and reclaimed if they are heavily eroded, washed out, or if access roads in better condition are available. This decision should be broken down into two decisions.
PAM-077	No surface disturbance or occupancy will be allowed in areas of severe erosion from March 1 until June 15. As they are needed, conservation practices and state of Wyoming best management practices will be applied to surface-disturbing activities.	No	This management decision is redundant with BFO-035. This decision is difficult to apply seasonally.	This decision is redundant with BFO-035. Carry BFO-035 forward and eliminate this decision. This decision should be permanent, not seasonal.

4.1.1.4 Water

Table 4-4. Water: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
BFO-034	SWAM-2: Prohibit surface disturbance within 500 feet of any spring, reservoir, water well, or perennial stream unless the prohibition is waived by the authorized officer.	Yes	This decision has not been implemented consistently.	A surface disturbance buffer of 500 feet is overly restrictive in some situations.
BFO-036	SWAM-4: Fence the head seepage areas of all spring developments on public surface.	Yes	Concerns were raised about using the word "all." The decision should allow for exceptions.	Change wording to "Fence the head seepage areas of spring developments on public surface in accordance with project objectives."
PAM-087	The rights to water-related projects on public lands will be filed with the Wyoming state engineer's office in order to obtain valid water rights.	Yes	This decision is required by state law.	There are no options for change.

4.1.2 Mineral and Energy Resources

4.1.2.1 Locatable

Table 4-5. Locatable: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
BFO-028	MM-9: BLM-administered locatable minerals will remain subject to the provisions of the 1872 Mining law except in areas that are now withdrawn from mineral location.	Yes	This decision is required by the Mining Law of 1872. This is non-discretionary unless superseded by another law.	There are no options for change.
PAM-028	Unless formally withdrawn from mineral location, all lands in the resource area, including federally administered surface/minerals and split-estate, are open to exploration, location, and development of locatable minerals on valid mining claims.	Yes	This decision should remain the same. Not all management goals and objectives can be applied to all actions.	There are no options for change. Replace the word "valid" with "active" mining claims.

4.1.2.2 Leasable - Coal

Table 4-6. Leasable – Coal: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
BFO-020	MM-1: Federal coal lands in central Campbell County and in north central Sheridan County are the priority areas available for consideration for coal leasing.	Yes	See regional and national demand discussion in Chapter 2.	There is no need to change the decision. Leasing is discretionary and subject to pre lease NEPA review and a public hearing.
BFO-021	MM-2: Delineated coal tracts are available for consideration for competitive leasing in one coal lease sale beginning with a possible second round Powder River lease sale.	No	These were considered in 1984. The EIS was not finalized, and the regional sale was cancelled.	None.
BFO-022	MM-3: Federal coal land available to be considered for lease modifications, emergency leases, and exchanges includes the uncommitted coal land determined to be acceptable for coal development and leasing consideration both within the priority areas for competitive leasing (as described in MM-1, above) and outside the priority areas for competitive leasing.	Yes	This decision is the redundant with BFO-020. Is coal compatible with other resource objectives outside priority areas? Screening process?	No change needed. Priority areas have already been screened and are, therefore, compatible with other resource objectives. Coal is compatible with other resource objectives outside priority areas because prior to leasing outside the priority areas, coal screening is required. The screening process leads to areas suitable for leasing (meets objectives) or unsuitable for leasing (does not meet objectives).
BFO-023	MM-4: On coal leases for which mining and reclamation plans have been approved, authorize oil and gas drilling and production only where such activities would not conflict with coal mining. In cases where conflicts cannot be resolved, oil and gas drilling and production will be deferred.	Yes	The coal lease stipulation ("coal stip") is placed on new oil and gas lease parcel offers, which are on the same lands as existing coal leases and lease applications. This stipulation provides a mechanism for regulating oil and gas development where it will interfere with coal development, with a view to facilitating multiple mineral developments.	The alternative of placing this stipulation on all oil and gas lease parcels within the high coal development potential area (delineated as the first coal screening step) should be addressed as part of alternative formulation.

Table 4-6. Leasable – Coal: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
PAM-022	All federal coal lands (federal mineral estate for coal retained by the federal government) are open to study and exploration.	Yes	Because of the similarity between coal exploration drilling and drilling operations for coal bed natural gas (CBNG), all lands should be open to coal exploration under the same multiple use limits as oil and gas. Coal exploration, unlike CBNG drilling, will not lead to longer-term occupancy, because coal exploration holes are drilled and abandoned in one to three days, with no possibility of a "production phase." Is coal compatible with other resource objectives outside priority areas? Screening process?	Change decision as necessary to protect other resource values. No change needed. Priority areas have already been screened and are, therefore, compatible with other resource objectives. Coal is compatible with other resource objectives outside priority areas because prior to leasing outside the priority areas, coal screening is required. The screening process leads to areas suitable for leasing (meets objectives) or unsuitable for leasing (does not meet objectives).
PAM-023	Areas that pass these screens are available for further consideration for competitive coal leasing.	Yes	This decision is the redundant with BFO-020.	No need to change. Leasing is discretionary and subject to NEPA review and a public hearing pre lease.

Table 4-6. Leasable – Coal: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
PAM-024	Federal coal lands available for consideration for competitive coal leasing are open for lease by application (LBA), lease modifications, emergency leases, and exchanges. This includes uncommitted coal land determined to be acceptable for coal development and leasing consideration within the priority areas for competitive leasing. Coal lands outside the priority leasing areas which are applied for must pass the coal screening process before they will be considered for leasing.	Yes	There is no need to screen additional lands beyond those already subject to the four coal screens. Lands have been identified that would most likely meet reserve demand into the future, and those presently available are sufficient to meet leasing demand through 2020and beyond . In the event there is leasing interest in lands beyond those already screened, beyond the current delineated high potential development area, BLM can easily provide a mechanism for screening additional lands as needed as part of application processing under cost recovery.	There is no need to change the decision. Leasing is discretionary and subject to NEPA review and a public hearing pre lease.
PAM-025	Coal leasing in producing oil and gas fields would be deferred unless or until coal development would not interfere with the economic recovery of the oil and gas resources. This would be determined on a case-by-case basis.	Yes	This decision will continue to be implemented under the decertified PRB coal production region decision of 1989, with oil and gas field conflicts resolved on a case-by-case basis.	There is no need to change the decision.
PAM-026	Any exploration drilling conducted to gather data concerning unleased federal coal, strata above the coal, hydrology of the coal, and surrounding strata requires an exploration license. Drilling water monitor wells in areas of unleased federal coal requires an incidental exploration license.	Yes	This decision will continue to be implemented under the coal exploration license program and regulations.	Change decision as necessary to protect other resource values.
PAM-027	The right to mine federal coal is conveyed by a coal lease.	Yes	Wyoming DEQ and the Office of Surface Mining recognize this as a fact for their regulatory programs.	There is no need to change the decision.

4.1.2.3 Leasable - Oil and Gas

Table 4-7. Leasable – Oil and Gas: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
BFO-024	MM-5: Defer coal leasing in producing oil and gas fields unless or until coal development will not interfere with the economic recovery of the oil and gas resource, as determined case by case by the BLM.	Yes	None.	Optimize the recovery of both resources to secure the maximum return to the public in revenue and energy production.
BFO-026	MM-7: Continue to lease and allow development of federal oil and gas in the Buffalo Resource Area.	Yes	Resume leasing in coal-bearing areas.	Evaluate leasing, and resume leasing where appropriate.
PAM-017	Continue to lease and allow development of federal oil and gas in the Buffalo Field Office Area.	Yes	Resume leasing in coal-bearing areas.	Evaluate leasing, and resume leasing where appropriate.
PAM-019	About 1,300 acres of federal oil and gas estate are not available for leasing because the acreage is within a city or town, and 44,000 acres are unavailable due to coal mining activities. Any oil and gas lease offer tracts that conflict with coal mining are pulled out of the offer.	Yes	None.	Optimize the recovery of both resources to secure the maximum return to the public in revenue and energy production.
PAM-020	Surface occupancy or use will be restricted or prohibited on this lease (oil and gas lease) owing to conflicts with ongoing coal activities. Prior to surface use, an acceptable plan of mitigation of anticipated impacts must be negotiated between the oil and gas and the coal lessees and approved by the authorized officer. This stipulation may affect development, operations and maintenance of facilities.	Yes	None.	Optimize the recovery of both resources to secure the maximum return to the public in revenue and energy production.
PAM-021	About 25,000 acres of federal oil and gas estate is available for leasing with the condition that no oil and gas activity occur on the surface (no surface occupancy-NSO) due to federal and state highways.	Yes	No buffer zone has been identified.	This decision is no longer needed, because it is included in the standard lease notice number one.

4.1.2.4 Leasable - Other Solid Leasables

Table 4-8. Leasable – Other Solid Leasables: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
PAM-015	BLM will provide for the efficient use of the mineral resources.	No	What does 'efficient use' mean?	Determine where in the planning area is appropriate for mineral development and where it is not.
PAM-016	In either category, the mineral owners are entitled access to their minerals to explore for and develop them and to prudently use an area of the land surface and surface resources that are directly necessary to those exploration and development activities.	Yes	None.	There is no need to change the decision.
PAM-031	Geothermal resources are available for leasing in areas that are open to oil and gas leasing. Areas closed to oil and gas leasing are also closed to geothermal leasing. We consider leasing other minerals (phosphates or sodium) on a case-by-case basis.	Yes	None.	Determine where in the planning area is appropriate for physical developments and where it is not.

4.1.2.5 Salable

Table 4-9. Salable: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
BFO-027	MM-8: The entire resource area is available for mineral material sales initiated either by the BLM or by application. This does not include sites designated by the BLM for free use by city, county, and state entities.	Yes	The original planning decision applies with no changes. The entire planning area has scattered deposits of mineral materials. A GIS map has been developed to reflect the current disposals in the planning area.	Determine where in planning area is appropriate for physical developments and where it is not.

4.1.3 Fire and Fuels Management

4.1.3.1 Unplanned/Wildland Fire

Table 4-10. Unplanned/Wildland Fire: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
BFO-003	FM-1: Conduct full fire suppression in class III and IV value-at-risk areas (see map 4).	Partially	Most initial fire suppression attack in the planning area is initiated by county cooperators applying full suppression tactics regardless of land ownership. Fires on public land that escape initial attack suppression efforts have been addressed something other than full suppression in only one or two instances since 1985.	Apply Appropriate Management Response to all areas outside special management areas and Wilderness Study Areas (WSA)'s where site-specific activity plans dictate fire management protocols. Coordinate BLM fire planning decisions with the County Fire Districts and Dispatch Centers.
BFO-004	FM-2: Conduct limited fire suppression on public land in value-at-risk class I and class" areas and where fire control is very difficult or extremely hazardous to firefighting personnel (see map 4).	Partially	Fire behavior and resistance to suppression is influenced by fuel and environmental conditions as well as topography. Consequently, any fire can potentially be benign or extremely hazardous depending on the current fuel and environmental conditions.	Identify areas that have terrain and/or access conditions that increase fire resistance to control and/or present hazardous conditions for fire personnel. Consider the hazardous terrain and limited access in developing the Appropriate Management Response.
PAM-007	Unwanted wildland fires will be suppressed, the use of some types of suppression equipment will be restricted in some areas, and fire and suppression damage will be rehabilitated.	Yes	None.	None.
PAM-008	Priority will be given to suppressing fires in or threatening higher value resources (commercial timber areas, Developed recreation sites, and areas of wildland/urban interface) and keeping fires from spreading onto private, state, or other federal lands	Yes	None.	None.
PAM-010	Aerial retardant use will be restricted to keep retardant out of water sources.	Yes	The decision reduces the potential for contamination of surface water with chemical fire retardants or other contaminants in the slurry.	None.

Table 4-10. Unplanned/Wildland Fire: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
PAM-061	South Big Horns. All wildfires in the area are aggressively attacked and suppressed. However, heavy equipment may not be used to construct fire lines except to protect life and state or private property.	No	Since there are intermingled state and private lands throughout the South Bighorns area, the decision essentially lifts any restrictions on heavy equipment use. However, most South Bighorn fires do not lend themselves to heavy equipment use; aggressive attack is usually limited to aerial, engines, and hand crews.	Apply Appropriate Management Response with consideration of public and firefighter safety, values at risk, current and expected fire behavior, and guidance from site-specific activity plans.

4.1.3.2 Planned/Prescribed Fire

Table 4-11. Planned/Prescribed Fire: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
BFO-005	FM-3: Conduct prescribed burns.	Yes	The decision allows for application of prescribed fire anywhere in the planning area (subject to appropriate planning and NEPA review).	Consider identifying sites within the planning area where prescribed fire should not be used (i.e., do not use prescribed fire to reduce sagebrush vegetation within the designated Sage Grouse Focus Areas).
PAM-012	Prescribed burns will be used as a tool to reach management objectives planned for areas in conjunction with such things as range and wildlife habitat management projects.	Yes	None.	None.
PAM-082	Prescribed burns will be conducted to support vegetation and wildlife habitat objectives.	Yes	This decision is redundant with PAM-012.	Consider replacing “wildlife habitat objectives” with wildland fuels and forest management objectives.

4.1.3.3 Stabilization and Rehabilitation

Table 4-12. Stabilization and Rehabilitation: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
PAM-011	Firelines which are constructed by heavy equipment, or on steep slopes, will be rehabilitated to prevent or control erosion. Rehabilitation includes, but is not limited to, water barring and reseeding.	Yes	None.	None.

4.1.4 Biological Resources

4.1.4.1 Vegetation – Forests and Woodlands

Table 4-13. Vegetation – Forests and Woodlands: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
PAM-081	Vegetation treatments, including timber harvesting and sagebrush spraying or burning, will be designed to meet overall resource management objectives and will be consistent with the policy to protect or improve biodiversity and water quality.	Yes	Caution should be taken if cheatgrass regeneration may become a problem; burning is questionable.	This management decision should be split into two management decisions for grasslands/shrublands and forests/woodlands.

4.1.4.2 Vegetation – Grassland and Shrubland Communities

Table 4-14. Vegetation – Grassland and Shrubland Communities: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
PAM-083	Livestock grazing strategies on vegetative treatment areas generally include rest the first year following treatments and deferment of livestock grazing the second year.	No	Rest and deferment can be difficult to accommodate. Deferment allows the vegetation to have two growing seasons without grazing so that plants are able to establish themselves and produce a healthy root system prior to grazing.	Revise decision in terms of desired outcomes instead of prescriptive measures. Drought may prolong the necessary rest period.

4.1.4.3 Vegetation – Riparian/Wetland Resources

Table 4-15. Vegetation – Riparian/Wetland Resources: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
PAM-092	Riparian areas and wetlands in less than proper functioning condition will be improved. The goal is to either create, improve, or maintain existing riparian and wetland areas for waterfowl such as ducks, geese, and shorebirds; warm- and cold-water fish; and other wildlife species that depend on these areas for their health and well being.	Yes	Standards and Guidelines for Rangeland Health address this issue. These would probably only be addressed if in conjunction with Standard and Guidelines for Rangeland Health, Standard #2, or in the development of an allotment management plan where improvement of riparian health was a goal.	Standards for Rangeland Health assessments continue in the planning area. Standard #2 includes proper functioning condition (PFC); Changes must be implemented if the system is not achieving PFC for livestock-related reasons. Riparian/wetlands constitute a very small portion of the public lands, but are critical. More effort should be implemented to enhance these systems in the future.
PAM-093	Any study exclosures or other special exclosures such as riparian and wetland sites on springs and streams are closed to livestock grazing. Surface disturbance is not allowed within 500 feet of surface water including springs, reservoirs, water wells, and perennial streams (about 19,000 acres).	No	This decision is a combination of two unrelated decisions. A few exclosures for this purpose do exist, but maintenance of exclosures is difficult due to downed timber and remote locations. This should continue to be encouraged, and more resources should be put toward this effort for all the reasons listed above.	Separate the decision into two decisions, of which the surface disturbance decision would be a duplicate and could be deleted.

4.1.4.4 Invasive Species and Pest Management

Table 4-16. Invasive Species and Pest Management: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
BFO-012	GM-1: Control noxious weeds on public surface lands.	Yes	This decision is too generic, and noxious weed control may not be achievable. Control of noxious weed has been and will continue to be a priority. Control efforts will continue based on, but not limited to: treating existing and new infestations as well as existing and new areas of soil disturbance, especially those areas impacted by CBNG; federal program funding; rangeland health assessments; drought conditions; and annual precipitation. Additional resources are needed to address the current and new infestations. CBNG development with all its associated soil disturbing activities, vehicular travel, access to remote areas, water transportation and disposal methods, and reclamation success or lack of, has exponentially increased the potential for noxious and invasive species to increase in population size, locations, size of infestation, number of infestations, locality, species diversity, ability to transport to new sites, and the cost of control.	Actively manage invasive species to meet management goals and objectives. Re-establish perennial vegetation in a timely manner (define) to rehabilitate disturbed areas (Dillon). Use native species for rehabilitation and reclamation unless site-specific evaluations indicated than nonnative species are needed to ensure success or rapid vegetation establishment (Dillon). Treatment of cheatgrass communities needs to be considered. BFO resource specialists acknowledge that populations and sizes of infestations are increasing. The threat to native plant communities and habitats as well as the wildfire potential is increasing.

Table 4-16. Invasive Species and Pest Management: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
PAM-084	In cooperation with county weed and pest districts, cooperative integrated weed control programs are being implemented on public land in conjunction with control work on adjoining deeded and state lands.	Yes	With the public land pattern in northeast Wyoming, treatments are planned in coordination with the counties to combine control efforts, maximize the results, and minimize treatment costs.	Develop an Integrated Weed Management Plan and establish Weed Management Areas to provide a strategy tool for the prevention and control of existing and new species and infestations.
PAM-099	BLM cooperates with APHIS to control grasshoppers and Mormon crickets on public lands in conjunction with the control efforts initiated on adjoining nonfederal lands.	Yes	The USDA Animal and Plant Health Inspection Service (APHIS) currently leads on grasshopper and Mormon cricket treatments.	The latest copy BFO has of the agreement for APHIS to take the lead on these projects is covered under: BLM MOU WO-220-2003-03 APHIS PPQ MOU #03-8100-0870-MU.

4.1.4.5 Fish and Wildlife Resources – Fish

Table 4-17. Fish and Wildlife Resources – Fish: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
PAM-088	Big game and fisheries management levels identified in the WGFD's 1990-1995 strategic plan are supported by the BLM (WGFD 1990). BLM cooperates with the WGFD in introducing or reintroducing native and acceptable nonnative wildlife and fish within the planning area where potential habitat exists.	Yes	BLM recreational areas have been used for such introductions or reintroductions. Update 'strategic plan' with 'current WGFD strategic plan.'	The decision should be updated and incorporated again. Include the most recent MOU between WGFD and BLM. Prioritize native fish. Incorporate Aquatics Task Group monitoring roles from the EIS to encompass entire planning area.
PAM-090	Reservoirs and riparian areas are sometimes maintained to improve or enhance potential fisheries. Designing reservoirs to enhance fisheries where potential exists will be encouraged.	Yes	Although this is occurring, care should be taken to ensure that reservoir design minimizes the opportunity for mosquito larvae propagation.	Develop/change planning decisions for reservoirs and riparian areas separately. The decision should be changed to include direction for designing facilities that discourage the spread of West Nile virus. Take care not to introduce/promote unwanted nonnative fisheries. Determine existing recreation options to determine need.

4.1.4.6 Fish and Wildlife Resources – Wildlife

Table 4-18. Fish and Wildlife Resources – Wildlife: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
BFO-038	WHM-1: Prohibit surface disturbance and occupancy in the Ed O. Taylor, Kerns, Bud Love, and Amsden Creek winter ranges for big game unless the prohibition is waived by the authorized officer.	Yes	None.	None.

Table 4-18. Fish and Wildlife Resources – Wildlife: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
BFO-039	WHM-2: Prohibit surface disturbance in crucial elk winter range between November 15 and April 30. In addition, prohibit surface occupancy in elk calving areas. The decision may be waived by the authorized officer.	No	Elk calving NSO changed to a timing limitation in the 2001 BFO RMP update (pg 38). Re-evaluate the decision, particularly for Fortification Creek, where the entire range is within the proposed CBNG field, and a timing limitation is not sufficient. Elk habitat is currently protected in this area compared to the remainder of the state.	Apply RMP update direction to entire elk range. Focus on disruptive activities and/or surface occupancy/disturbance. Increase protection to meet goals and objectives. See road density/security habitat standards.
BFO-040	WHM-3: Prohibit surface disturbance and occupancy within 250 yards of sharp-tailed grouse dancing grounds at any time. Prohibit surface disturbance within an additional 1/2-mile radius of sharp-tailed grouse dancing grounds from April 1 through May 30 (see map 14) unless the prohibition is waived by the authorized officer.	No	Not enough information has been gathered on sharp-tailed grouse impacts. Measures are likely ineffective as sage-grouse management has been determined. This was changed in 1990 from NSO to a Controlled Surface Use (CSU).	Develop accurate baseline information. Address impacts to limiting factors for this species. Increase protection to meet goals and objectives. Increase CSU buffer and timing based on habitat, not a set distance.
BFO-042	WHM-5: Prohibit surface disturbance or occupancy within a biologic buffer zone around active nests of raptor species of high federal interest unless the prohibition is waived by the authorized officer.	No	A generic ½-mile timing limitation is ineffective without a CSU/NSO component. This was changed in 2001 from NSO to a timing limitation stipulation.	Set species-specific protections. Adopt U.S. Fish and Wildlife Service (USFWS) recommendations for buffer zones. Add a CSU/NSO component.
BFO-043	WHM-6: Develop habitat management plans (HMPs) to improve and protect wildlife habitat in the following priority areas: South Big Horns HMP (1985), including a portion or all of the Gardner Mountain and North Fork WSAs; wetlands and aquatic HMP (1986); and Powder River Breaks HMP (1987).	Yes	Habitat Management Plans (HMPs) need to be reviewed and updated as necessary.	Add several other large blocks (i.e., recreation areas) of BLM surface areas to this WHM.

Table 4-18. Fish and Wildlife Resources – Wildlife: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
BFO-045	WHM-8: Allow animal damage control on BLM-administered lands when the need for control is demonstrated.	Yes	Decision status is unknown. Coordinate with APHIS.	If demonstrated in accordance with BLM goals and objectives.
PAM-045	Fences will be constructed to maintain wildlife mobility in important habitat areas. Fences on public land that are hindering natural movement of wildlife will be modified to conform with BLM standards.	Yes	BFO still has fences on BLM surface that do not meet these standards.	Add requirement to inventory, and indentify fences in addition to those in the original decision. Identify big game movements in order to prioritize.
PAM-057	South Big Horns. BLM's goal regarding wildlife values in the south Big Horns are to provide sufficient forage, cover, and water in helping to support the WGFD's big game population objectives.	Yes	Lack of access prohibits meeting the goals and objectives of this decision.	Look at this direction for more of the planning area. Ensure BFO is meeting goals and objectives of all HMPs.
PAM-066	Fortification Creek Area. No surface occupancy is allowed in elk calving areas (5,700 acres), and a seasonal timing restriction is applied to elk wintering areas (26,000 acres). It is a requirement that all oil and gas production be piped out of crucial elk winter range and that necessary precautions are taken to protect the highly erosive soils in the area.	No	See the 2001 RMP update. The timing limitation not sufficient for Fortification Creek. Fortification Creek elk calving NSO changed to a timing limitation in the 2001 RMP update (pg. 38). Production piped out applied to conventional oil and gas only. The RMP update addressing location of facilities.	Principles from the RMP update should be expanded to the entire elk range.
PAM-089	Constructing islands in reservoirs, improving riparian vegetation by planting and grazing management, and installing nesting structures to improve waterfowl production and security areas near reservoirs will be encouraged.	No	The adequacy of this decision is unknown. Islands are often ineffective at improving waterfowl production.	Adjust decision to adequately reflect goals and objectives/concerns for all species.

Table 4-18. Fish and Wildlife Resources – Wildlife: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
PAM-091	No surface disturbance and occupancy is allowed on the WGFD's four big game ranges unless waived by the authorized officer (table 5). The BLM-administered public lands in the Ed Taylor and Amsden Creek game ranges have been withdrawn for locatable minerals.	Yes	None.	None.
PAM-094	Timber harvest activities are not allowed in areas where critical elk habitat occurs or where hiding cover is insufficient to meet the minimum needs of this species (about 8,000 acres).	No	Is critical habitat defined?	BLM should have standards for security cover. Include standards for creation of designated habitats. This decision is confusing, and may need to change wording.
PAM-095	Surface disturbance or disruptive activity is not allowed in crucial elk winter range (11,045 acres) between November 15 and April 30, and in elk calving areas (5,700 acres) from May 1 to June 30, when necessary.	No	Timing limitations may be appropriate to Big Horns and Rochelle Hills herds, but not Fortification Creek herd.	Add security habitat/road density standard.
PAM-096	Management decisions: Surface occupancy or disturbance is not allowed on approximately 6,000 acres in the study area to protect important raptor, sharp-tail grouse, and sage-grouse habitat. An additional 430,700 acres may be restricted from surface-disturbing activities during the breeding and nesting period (February 1 to July 31). Buffers are established with radii from 250 yards to ½ mile for sharp-tailed grouse dancing grounds from April 1 through May 30. The buffers for sage-grouse strutting grounds (leks) vary from ¼ mile radius to 1 ¾ miles from March 1 to June 15. The field office manager can approve exceptions, modification, or waivers to this restriction.	No	Decision is redundant with specific decisions for raptors, sharp-tail, and sage-grouse.	Remove this entire decision and develop separately.
PAM-098	No animal damage control is allowed on BLM-administered public lands unless a need for control is determined.	No	This is a livestock grazing-related decision, not a wildlife decision. Duplicate decision with BFO-045.	Remove this decision.

4.1.4.7 Special Status Species – Plants

Table 4-19. Special Status Species – Plants: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
PAM-080	BLM will protect known populations of rare or sensitive plants as required under the same laws as for Threatened and Endangered animals.	Yes	Plant protection under the Endangered Species Act (ESA) is different than T&E animals. Rare and sensitive plants not managed under ESA.	BLM will protect known populations of rare or sensitive plants in accordance with BLM sensitive species policy and/or other appropriate guidance, such as ESA, if listed.

4.1.4.8 Special Status Species – Fish

Table 4-20. Special Status Species – Fish: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
N/A	No management decisions issued for Special Status Species – Fish.	No	Management for Special Status Species – Fish should be considered for those activities authorized by the BLM that might adversely affect species downstream of the planning area.	Create a management strategy that would consider the effects to the entire Upper Missouri ecoregion. Consider all special status fish species. Incorporate Aquatics Task Group monitoring roles from the EIS to encompass the entire planning area.

4.1.4.9 Special Status Species – Wildlife

Table 4-21. Special Status Species – Wildlife: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
BFO-041	WHM-4: Prohibit surface disturbance and occupancy within a 1/4-mile radius of the center of sage-grouse strutting grounds with no exceptions. Prohibit surface disturbance within an additional 1 3/4-mile radius from March 1 to June 15 (see map 14) unless the prohibition is waived by the authorized officer.	No	The best available science indicates these measures are not adequate for protection of this species.	Look at all seasonal habitats. Apply most recent science-based recommendations. Adopt WGFD recommendations for oil and gas development. Increase protection to meet goals and objectives.
BFO-044	WHM-7: Prohibit surface disturbance or occupancy within 1/2 mile of communal winter roosts for bald eagles from November 1 through March 30 (see map 14). When biologic buffer zones around roosts have been delineated, prohibit surface disturbance within these zones from November 1 through March 30. The prohibition can be waived by the authorized officer.	No	Communal roosts are insufficient to protect eagles. See the PRB ROD (pA-35 #9) as well as a one-mile limitation and a 2007 consultation reinitiating Biological Opinion and a ½-mile no disturbance zone.	Update to current protections (2007) Biological Assessment. Add NSO for perennial floodplains combined with a timing limitation (1 mile) for nests and consistent use areas and/or areas of bald eagle concentration with no options for exceptions to timing limitations.
PAM-079	Surface disturbance or occupancy will not be allowed within ½ mile of communal winter roosts for bald eagles from November 1 through March 30. Documented nest sites, roosts, cottonwood trees, and other potential critical habitats related to hunting and concentration areas for bald eagles will also be protected.	No	Communal roosts are insufficient to protect eagles. See the PRB ROD (pA-35 #9) as well as a one-mile limitation and a 2007 consultation reinitiating Biological Opinion and a ½-mile no disturbance zone.	Update to current protections (2007) Biological Assessment. Add NSO for perennial floodplains combined with a timing limitation (1 mile) for nests and consistent use areas and/or areas of bald eagle concentration with no options for exceptions to timing limitations.
PAM-097	Surface disturbance or occupancy is not allowed within ½ mile of communal winter roosts for bald eagles from November 1 through March 30. Surface disturbance will not be allowed around "biologic" buffer zones delineated for eagle roosts from November 1 through March 30.	No	See the Biological Assessment. Duplicate decision with BFO-044.	Remove this decision.

Table 4-21. Special Status Species – Wildlife: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
PAM-100	Rodents like prairie dogs will be controlled by APHIS on BLM-administered public lands.	No	Prairie dogs are a sensitive species. BFO does not want to allow chemical control on public surface.	Remove this decision.

4.1.5 Heritage and Visual Resources

4.1.5.1 Cultural Resources

Table 4-22. Cultural Resources: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
BFO-001	CRM-1: Develop cultural resource management plans (CRMPs) for Cantonment Reno, Dull Knife Battlefield, and the Outlaw Cave Archeological District. In addition, develop CRMPs for other federally owned sites as they are nominated to the National Register of Historic Places.	No	Cantonment Reno CRMP: It does not appear that all of the decisions in the CRMP were followed. Although plans were made for test excavations and investigations over several years, it does not appear that they were undertaken. It is unclear if road access was restricted. The area around the site has been leased for minerals, but has not been developed. It is unclear if an interpretive slide show was created. It does not appear that there has been any access by special groups to the site negotiated by BFO. Dull Knife Battlefield CRMP: It does not appear that any of the decisions in this CRMP were followed. Outlaw Cave Archeological District CRMP: It does not appear that all of the decisions in the CRMP were followed. Some of the archeological sites within the district have been recorded, although the district has not been nominated for the National Register of Historic Places (NRHP). There are no special vehicle restrictions in	Many of the decisions in the CRPMP's were not implemented. There is an opportunity to write new up–to-date CRMP's with goals that are achievable.

Table 4-22. Cultural Resources: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
			place inside the district. One interpretive sign, a visitor register, and a parking area were constructed near a rock art site. It does not appear that a mitigation plan was written. There are occasional patrols of the area by the BLM law enforcement ranger, but there has not been regular site monitoring by BFO archeological staff. It is unclear if an interpretive slide show was created, but an interpretive brochure was made.	
BFO-002	CRM-2: Class III (intensive) cultural resource inventories will be required before surface-disturbing activities are permitted in the areas listed below. Gardner Mountain (Ts 43-45N, Rs 83-85W) Fortification Creek (Ts 51-53N, Rs 75-77W) Middle Fork (Ts 41-43N, Rs 83-85W) Pumpkin Buttes (Ts 51-53N, Rs 75-77W) Rochelle Hills (Ts 45-47N, Rs 59-70W) All BLM-administered lands within 1/2 mile of the Powder River	No	BFO currently requires a class III inventory throughout the field office for any federal undertaking resulting in surface disturbance as outlined in the protocol agreement with the Wyoming State Historic Preservation Office.	Apply the decision across the entire planning area.
PAM-004	Using the land for scientific purposes such as archeological collections is authorized through a permit system.	No	This decision is an affirmation of The BLM policy stated in the 8150 Manual), rather than a decision.	Formulate site-specific management decisions.

Table 4-22. Cultural Resources: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
PAM-005	Site-specific inventories for cultural resources are required before any surface-disturbing activities can begin. Adverse effects on significant resources are mitigated, or the resources themselves are avoided. Sites listed on, or eligible for, the National Register of Historic Places (NRHP) are protected.	No	This is an affirmation of the BLM's responsibility under the National Historic Preservation Act. Site-specific inventories are generally required for all federal undertakings. It is unclear why a distinction between "significant resources" and "sites listed on, or eligible for, the NRHP" is made, since they are in actuality same thing. Avoidance of sites listed on, or eligible for listing on, the NRHP is BLM policy, although mitigation can also be considered by the decision maker.	Formulate site-specific management decisions.
PAM-006	Rock art, as well as prehistoric and historic archaeological sites and districts associated with specific time periods or cultures, are managed for scientific, public, and sociocultural use. General areas are managed for research emphasizing interpretation of the environments in which prehistoric man lived. Specific sites or areas are preserved for future study and use. Cultural resource interpretive sites, such as rock art and historic trails, are developed or will be developed, providing such public benefits as scenic overlooks, signs, and walking trails.	No	This decision describes use allocations (as defined in Manual 8130) for certain cultural resource categories. Although site types and specific uses are mentioned, management of specific sites is not described.	Formulate site-specific management decisions.

Table 4-22. Cultural Resources: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
PAM-058	South Big Horns. In the Outlaw Cave area and the Dull Knife Battlefield site, management goals are to protect and preserve the cultural and archeological information, to provide for interpretation, and to nominate all significant sites to the National Register. Ideally, the objective for managing these sites is to do it within a multiple-use context.	No	It is unclear if the management goals of protection and preservation in this decision have been met due to inadequate site monitoring. One interpretive sign was placed at a site in the area before the 2001 RMP update, but no further interpretive projects were completed. None of the sites in the area have been nominated to the NRHP. The stated objective of the decision is consistent with the basic mandate of the BLM as outlined in the Federal Land Policy and Management Act (FLPMA). Dull knife is not public surface.	The decision should be reworded to incorporate a plan for monitoring and measurable goals.
PAM-070	Cantonment Reno Area. The area is a no surface occupancy area for mineral development.	Yes	None.	None.
PAM-071	Bozeman Trail and Crazy Woman Battle Site. No surface occupancy stipulations will be applied to mineral leases where potentially eligible or significant segments exist (within ¼ mile or visual horizon, whichever is closer, from the Bozeman Trail; map 7).	Yes	Is a ¼-mile buffer sufficient?	Evaluate expansion of the ¼-mile buffer.

4.1.5.2 Paleontological Resources

Table 4-23. Paleontological Resources: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
PAM-050	Using the land for scientific purposes such as paleontological exploration is authorized through a permit system.	N/A	This is a statement of long-standing BLM policy, not a management decision for the RMP update. See FLPMA Sec. 302 and BLM Manual 8270.09. Also, not all "scientific purposes" require a permit.	N/A
PAM-051	Fossils are part of the surface estate.	N/A	This is a statement of long-standing BLM policy, not a management decision for the RMP update. See BLM Manual 8270.09H.	N/A
PAM-052	A paleontological collecting permit is required before collecting any fossil vertebrates, significant fossil invertebrates, and plants on BLM-administered public lands.	N/A	This is a statement of long-standing BLM policy, not a management decision for the RMP update. See BLM Manual 8270.09.	N/A
PAM-053	Collection of invertebrate fossils and petrified wood are allowed, except significant invertebrate paleontological resources are evaluated on a case-by-case basis.	No	Collection of invertebrate and plant fossils and petrified wood is allowed by existing regulation. However, some areas may merit closure based on significance of fossils. This would be done at the BFO level. This is an existing regulation, not a management decision for the RMP. See 43 CFR 8365.1-5 and 43 CFR 3622. Fossil plants can be collected as well, based on administrative extension of 43 CFR 8365 in the BLM Manual 8270.02. No case-by-case evaluations (also BLM policy) have been done to date, leaving all areas open for hobby collection.	Identification and enforcement of closures to protect significant fossils from hobby collection may be done if merited. Existing policy allows most areas to remain open by default.

4.1.5.3 Visual Resources

Table 4-24. Visual Resources: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
BFO-030	RVRM-2: Prohibit surface disturbance or occupancy on public lands in the Red Wall/Hole-in-the-Wall area, within Middle Fork Canyon and within 1/2 mile of the canyon rims, and on the Dry Creek Petrified Tree environmental education site unless the prohibition is waived by the authorized officer.	Yes	These continue to be popular recreation areas.	This management action should be incorporated in the revised RMP.
BFO-031	RVRM-3: Prohibit surface disturbance or occupancy within 200 feet of the edge of state and federal highways unless the prohibition is waived by the authorized officer.	Yes	The need to protect visual resources along highways still exists. 200 feet is an insufficient buffer for visual resource protection.	This decision should be reviewed. If incorporated again, visual resources should be monitored more closely. Possibly revise the decision based on class rating. Potentially set a larger buffer for VRM Class II and III areas than the buffer for Class IV.
PAM-086	Visual resources are managed in accordance with objectives for visual resource management (VRM) classes that have been assigned to the planning area (map 8). No activity or occupancy is allowed within 200 feet of the edge of state and federal highways. Facilities or structures such as power lines, oil wells, and storage tanks are required to be screened, painted, and designed to blend with the surrounding landscape except where safety indicates otherwise. Any facilities or structures proposed in or near WSAs will be designed so as not to impair wilderness suitability.	Yes	This decision has been partially implemented. Exceptions are frequently allowed for oil and gas development without waivers by the authorized officer. There is a continued need to reduce visual impacts from development. Evaluate whether a 200-foot buffer is sufficient. The decision is current and active for the WSA component.	This decision should be reviewed for possible change in VRM classes. Enforcement of VRM class management objectives should be implemented.

4.1.6 Land Resources

4.1.6.1 Forest Products

Table 4-25. Forest Products: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
BFO-007	FOM-2: Implement forest thinning and planting projects. Thinning and planting projects have been identified for initiation in the following areas: **Sawmill Creek**, T45N, R85W, Sections 3 and 4 **Fisher Springs**, T44N, R85W, Sections 7 and 8 **Woosley Cabin**, T45N, R85W, Sections 4 and 5 **Willow Creek**, T45N, R84W, Section 22 **Rome Hill**, T46N, R85W, Section 6 **Upper North Fork**, T47N, R85W, Section 17 **Horn and Bull Creek**, T47N, R83W, Sections 7,18,19,31, and 32; T46N, R83W, Sections 5,6,7, and 20; T46N, R84W, Section 12 **Mosier Gulch**, T50N, R83W, Sections 2 and 3 **Baldwin Creek**, T44N, R85W, Sections 7 and 8 **Laramandy Draw**, T45N, R85W, Section 1 **Pass Creek**, T46N, R85W, Section 22 Planting Projects **Willow Creek**, T45N, R84W, Section 22 **Lost Creek**, T46N, R85W, Sections 9,10, and 15 **Poison Creek**, T48N, R83W, Section 32 **Sawmill Creek**, T45N, R85W, Sections 9 and 10	No	Larger forest management areas have been identified and inventoried. The RMP will not list individual stands and units.	Forest Management Areas Healthy forest initiative and fuels reduction projects include: Billy Creek The Horn Bear Trap Meadow Gold Mine Red Fork Gardner Mountain Isolated parcels
BFO-008	FOM-3: Allow the sale of minor forest products (posts, poles, and fuelwood) from woodlands and/or noncommercial forestlands throughout the resource area.	No	"Throughout the resource area" is likely too broad. Instead, identify forest product areas.	Identify areas where the sale of minor forest products is prohibited, including: WSAs, campgrounds, and riparian areas.

Table 4-25. Forest Products: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
BFO-009	FOM-4: Offer for sale from commercial forestlands over the next ten years approximately 9 MMBF of sawtimber in the 11 timber harvest areas listed below. In addition, offer for sale over the next ten years approximately 1 MMBF of minor green forest products from commercial forestlands. The sawtimber will be offered as follows: **Gardner Mountain** area (not in WSA), 1 MMBF (300 acres) **Baldwin Creek**, 1 MMBF (200 acres) **Poison Creek**, 1 MMBF (200 acres) **Horn**, 2 MMBF (300 acres) **Red Springs Reservoir**, 250 MBF (400 acres) **Arndt**, 1 MMBF (200 acres) **Lost Creek**, 250 thousand board feet (MBF) (50 acres) **Upper North Fork Reentry**, 500 MBF (50 acres) **Lower Beartrap**, 1 MMBF (200 acres) **Billy Creek**, 500 MBF (125 acres) **Lower "H" Hill**, 500 MBF (125 acres)	Yes	Offer for sale various forest products in the six management areas and scattered woodlands, over the next 10 years to accomplish salvage removals, pest removals, and to create forest resiliency.	Forest Management Areas. This decision is redundant of BFO-007. Update the decision for current conditions.

Table 4-25. Forest Products: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
BFO-010	FOM-5: Acquire easements across private and state lands where access is needed for timber harvest and other forest management purposes. Areas where easement needs are currently known are listed below. **Poison Creek**, T48N, R84W, Sections 27, 28, 34, 35, and 36; T48N, R83W, Section 31 **The "Horn"**, T47N, R83W, Section 31; T48N, R84W, Sections 32 and 33; T47N, R84W, Sections 3, 4, 10, 14, 15, 23, 25, 26, and 36; T46N, R84W, Sections 1 and 2; T46N, R83W, Sections 4, 5, 6, 9, 20, 28, 29 and 33 **Bull Creek**, T47N, R84W, Sections 13,14,15,24,25 and 26; T47N, R83W, Sections 16,17,19,20,29 and 30 **Red Springs Reservoir,** T45N, R84W, Section 6; T46N, R84W, Sections 31 and 32 **Pack Saddle Canyon**, T45N, R84W, Section 6; T46N, R84W, Sections 32 and 33 **Arndt**, T45N, R84W, Sections 17, 18 and 19; T45N, R85W, Section 12 **Gardner Mountain**, T44N, R84W, Sections 2 and 3 **Lost Creek**, T46N, R85W, Section 15 **Lower Beartrap**, T45N, R85W, Sections 2, 11, 14, 23 and 36; T44N, R85W, Section 2 **Billy Creek**, T48N, R83W, Sections 7,12,17 and 18 **Upper North Fork and Goldmine**, T47N, R85W, Sections 9,10 and 20 **Dull Knife**, T44N, R83W, Sections 17, 20, 21, 27 and 28 **The "Castle"**, T45N, R85W, Sections 32 and 33 **Cash Canyon**, T45N, R84W, Sections 8, 9 and 10 **Hammond Spring**, T46N, R84W, Sections 7, 8,17, and 21; T46N, R85W, Sections 11,12 and 14	No	Conditioning sale so that access is the purchaser's responsibility is a good way to address easements. Also cooperative timber harvest involving private and/or state lands with BLM. Acquire easements if necessary and if partnering is not an option.	Forests Management areas are the same as in BFO-007. Other options for access are available in addition to easements.

Table 4-25. Forest Products: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
BFO-011	FOM-6: Suspend or adjust livestock grazing on commercial forestlands if grazing is impairing the productive capacity of the forestland.	Yes	Livestock grazing is impairing regeneration after fire and harvest and/or impairing productive capacity of forest and ecosystem.	Refine the decision to include regeneration.
PAM-013	Management decisions: Timber harvest is allowed at 10-year harvest levels not to exceed 10 million board feet (mmbf). Forest products are sold by permit as requested. Easements are acquired across private and state land where access is needed for timber harvest and other forest management purposes.	No	Approaching easements in a different manner.	Partner with agencies, contractors, industry, and others to gain access. Update the decision for current conditions.
PAM-014	Individual clear-cuts are not allowed to exceed 20 acres. Harvested areas are planted if they have not regenerated within 5 years. Regeneration areas are often fenced to prevent livestock from damaging seedlings. Timber harvest areas are prohibited within 200 feet of surface water. Timber harvest is limited to commercial forestlands with slopes less than 45 percent (also see appendix B).	No	None.	Don’t limit group select cuts to 20 acres. Develop limits based on forest type.
PAM-059	South Big Horns. BLM's public forestlands management objective is to harvest timber in diseased old-growth and overstocked stands to enhance growing conditions and to assist the local economy through timber harvest and milling.	No	None.	This decision is no longer implemented. The BFO currently follows guidance in the Healthy Forest Resource Act.
PAM-085	Trees will be planted on timber harvest areas that fail to regenerate naturally to minimum stocking levels within five years after completing harvest and rehabilitation activities. Precommercial tree thinning will be initiated on overstocked releasable seedling and sapling size stands.	Yes	Site-specific objectives are not stated.	Planting will be dependent on forest management objectives.

4.1.6.2 Lands and Realty

Table 4-26. Lands and Realty: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
BFO-016	LR-1: Locate transmission and transportation facilities within the corridor areas.	Yes	Most proposals are not within any pre-determined corridor. Long-term planning is necessary for mid-stream infrastructure, such as electric, gas, etc. Scattered public land surface has not improved since the 1985 RMP. The location of transmission lines and transportation facilities continue as current authorizations attempt to apply new disturbance to existing corridors. However, this is not always feasible.	Define corridors.
BFO-017	LR-2: Locate communication sites and utilities in the Pumpkin Buttes area only on South Middle Butte until that butte has been fully utilized as a communication site unless the decision is waived by the authorized officer. Communication sites will not be authorized on North Middle Butte unless it becomes absolutely necessary to use that butte for the line-of-sight needs (such as for microwave transmission).	Yes	Maximizing use of the one site is good. Native Americans have concerns about potential expansion of communication sites and utilities onto other buttes.	None.
BFO-018	LR-3: Prohibit surface disturbance or occupancy in the recreation and public purpose (R&PP) areas unless the prohibition is waived by the authorized officer. This decision will not apply to recreation and public purpose projects in the R&PP applicant's plan of development.	Yes	None.	None.

Table 4-26. Lands and Realty: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
BFO-019	LR-4: Public lands shown on map 7A are available for further consideration for sale or exchange. The possible sale or exchange of lands in producing oil and gas fields (known geologic structures-KGSs), high interest coal areas, and designated mineral material sites will be considered case by case.	Yes	The criteria need to be updated and refined.	The disposal map should be refined with documented criteria for disposal.
PAM-037	R&PP applications will be considered for recreation purposes. Uses that are not compatible with each R&PP will not be allowed.	Yes	None.	None.
PAM-038	Withdrawals for surface and/or minerals will be considered on a case-by-case basis.	Yes	None.	None.
PAM-039	Approximately 138,700 acres of public lands that are more difficult or less economic to manage than most BLM-administered public lands have priority consideration for exchange, public sale, or transfer of jurisdiction to another agency (map 5).	Yes	The criteria need to be updated and refined. Management needs to consider exchanges to improve land tenure. Little effort has been put into exchanges because of the high demand for energy development authorizations.	Combine this decision with BFO-019.
PAM-040	Priority is given to acquiring public land in areas adjacent to major blocks of public land, especially in areas of high recreational potential like the south Big Horn Mountains.	Yes	Management needs to consider exchanges to improve land tenure. Little effort has been put into exchanges because of the high demand for energy development authorizations.	None.
PAM-041	Any lands known to be contaminated with hazardous substances are not acquired (Appendix F).	Yes	None.	None.
PAM-042	Easements that will provide access to better blocks of public lands for recreation and administrative purposes will continue to be pursued.	Yes	None.	None.

4.1.6.3 Renewable Energy

Table 4-27. Renewable Energy: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
N/A	No management decisions issued relating to renewable energy.	No	Renewable energy is a foreseeable activity, including geothermal, solar, and wind.	None identified.

4.1.6.4 Rights-of-Way and Corridors

Table 4-28. Rights-of-Way and Corridors: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
PAM-034	Long-term occupancy of the public lands for roads, power lines, pipelines, communication sites, and irrigation ditches is authorized by granting a ROW. ROW facilities are to be removed and reclaimed upon termination of the grant.	Yes	None.	None.
PAM-035	Transmission lines and transportation facilities are located to the extent feasible within identified corridor areas. Communication sites are not authorized on North Middle Butte unless it becomes absolutely necessary to use that butte for the line of-sight needs (such as microwave transmission). The remainder of the planning area is open for ROW development.	Yes	This decision is a compilation of duplicate decisions.	Remove the communication sites portion of the decision.
PAM-036	Public lands having agricultural potential and water are considered for disposal by sale, exchange, or desert land entry.	Yes	OK for consideration. Lands with water are likely to have multiple resource values which should remain with BLM, including wildlife, recreation, etc.	None.

4.1.6.5 Transportation and Access

Table 4-29. Transportation and Access: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
BFO-029	RVRM-1: Public lands in Campbell and Sheridan counties are designated for off-road vehicle (ORV) use as shown on table 2-5 on page 26 of the proposed RMP/final EIS.	Yes	There is continued demand for ORV areas on public land. The map will be revised. This was implemented in Campbell County but has not been implemented in Sheridan County. Land has been designated by the State of Wyoming for ORV use in Sheridan County.	This decision should be reviewed for all three counties and possibly increased. Monitoring and enforcement should be implemented.
PAM-047	Using motorized off-highway vehicles requires no fee and no permit, but their use is restricted depending on whether the area has been designated closed, limited, or open. Until on-the-ground signing has occurred, off-highway vehicle (OHV) use in all areas designated as limited or limited to designated roads and trails will be limited to existing roads and vehicle routes.	Yes	A state permit for OHVs is now required. Limit OHV use to existing roads until official designation and signing.	BLM may consider charging fees for OHV use under the Federal Lands Recreation Enhancement Act.
PAM-049	On areas designated as limited to "designated" roads and trails, ORV travel will be restricted to marked roads. Until actual roads and trails are marked on the ground travel will be restricted to existing roads and trails. Over-the-snow vehicles will be subject to the same requirements and limitations as all other vehicles.	Yes	Address unauthorized use and the ability for law enforcement compliance.	Review current Wyoming guidance for off-road usage to perform necessary tasks.

Table 4-29. Transportation and Access: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
PAM-060	South Big Horns. In the south Big Horns area, priority is given to land exchanges which can provide access to large blocks of BLM-administered public lands, to lands with unique resources, or to lands with riparian/wetland values. Private or state lands with high scenic value near well-blocked BLM-administered public lands are also considered very desirable for exchange.	Yes	This is still a high priority for BFO but can only be implemented as opportunities arise with landowners on the South Big Horns. Currently, realty staff is dedicated to ongoing CBNG development, so land tenure is not a priority given current office workload and staff assignments/commitments. As CBNG development slows in the predicted 3-5 years, workload priorities and commitments could shift to land tenure.	Identify other high priority areas in the planning area; do not limit priority areas to the South Big Horns.
PAM-062	South Big Horns. In the Middle Fork of the Powder River area, additional trails created by hunters and fishermen will be closed in consultation with adjacent landowners (private, state, and WGFD).	Yes	This direction could apply to the entire planning area.	There is need for ongoing monitoring.
PAM-067	Weston Hills Recreation Area. Off-highway vehicle use is limited to designated (marked with white arrows) roads. In additions an existing (and marked) foot, horse, and mountain bike loop is open to ATV use (motorized vehicles 50 inches wide or less). The loop trail will be closed to motorized vehicles from September 15 through October 20.	No	Seasonal closure may not be enforced. Work with the Forest Service (USFS) on an implementation plan.	Be consistent with USFS decisions. Monitoring and law enforcement is needed for non-compliance. Revisit seasonal closure.
PAM-073	BLM will continue to maintain 16.5 miles of road every year (Bar C, Billy Creek, Muir, Petrified Tree, and Weston West) and will continue to maintain existing recreation facilities and roads at the same level.	Yes	Clarify these locations.	Revisit the mileage and areas.

4.1.6.6 Recreation

Table 4-30. Recreation: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
PAM-054	Casual use of the BLM-administered public land for hiking, bicycling, hunting, fishing, and similar uses are allowed without charge. Camping is limited to 14 days at any one spot.	No	Demands created by a transient workforce are placing high demand on available camping space.	Dispersed camping is generally allowed on public lands in Wyoming for no more than a period of 14 days within any period of 28 consecutive days. The 14-day limit may be reached either through a number of separate visits or through 14 days of continuous overnight occupation during the 28-day period. After this time period, you must relocate to another site at least 25 miles away. The purpose of this is to prevent damage to sensitive resources caused by continual use of any particular area.
PAM-055	Special recreation permits (SRPs) are issued for commercial competitive and large-scale nonprofit organized recreational events on a case-by-case basis.	Yes	Is large-scale defined? Regulations changed in 2006.	Remove “large-scale nonprofit” from decision. Add “commercial, complete, organized, special area, and vendor.”
PAM-056	South Big Horns. BLM's major goal in the south Big Horns area is to protect those values mentioned above while maintaining compatible multiple use activities.	Yes	Fuels reduction has been implemented and is ongoing.	List values in the decision.
PAM-064	Dry Creek Petrified Tree Environmental Education Area. Preserve the Dry Creek area near its natural state, prevent or slow down deterioration of the petrified trees, and inform the visitor about the area.	Yes	Implemented.	Revisit the Dry Creek Plan.

Table 4-30. Recreation: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
PAM-065	Dry Creek Petrified Tree Environmental Education Area. An outhouse is planned for the area if use justifies, and a way to protect the largest deteriorating petrified tree will be identified. Surface disturbance or occupancy is prohibited within ½ mile of the site unless waived by the authorized officer.	Yes	All decisions have been implemented.	None.
PAM-068	Mosier Gulch Recreation Area. The objective of the MOU is to jointly develop and manage recreational facilities on lands administered by all three agencies in the greater Mosier Gulch area.	No	None.	Pursue the MOU. If the MOU does exist, it needs to be modified to address current public demands.
PAM-069	Mosier Gulch Recreation Area. Oil and gas leasing and development are not allowed in the area.	Yes	None.	None.
PAM-072	Bozeman Trail and Crazy Woman Battle Site. Any plans for interpretation and development of related sites along the Bozeman Trail will generally follow the state sponsored plan, Promoting Historical and Cultural Resources Along the Bozeman Trail (McDermott Associates 1989).	Yes	An interpretive plan was written for sections of Bozeman Trail and the Crazy Woman Battle Site. Turnouts with interpretive signs for the above sites as well as for Cantonment Reno were placed on Trabing, Nine Mile, and Lower Sussex Roads. Visitor use numbers at the turnouts is unclear, and many of the turnouts may be falling into disrepair.	Revise the decision to include a monitoring and maintenance plan of the existing facilities.

4.1.6.7 Wilderness Characteristics

Table 4-31. Wilderness Characteristics: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
N/A	No management decisions issued relating to wilderness characteristics.	No	WO IM No. 2003-275 (Consideration of Wilderness Characteristics in Land Use Plans) provides specific guidance for areas that may contain wilderness characteristics. In summary, BLM will not designate or recommend any new WSAs through the land use process. However, BLM can consider wilderness characteristics for lands under the authority of Section 201 of FLPMA. Lands may be managed to protect and/or preserve some or all of those characteristics. The Wyoming Wilderness Association through the Citizens Wilderness Proposal recommends that the BLM analyze specific areas surrounding each of the three existing WSAs. While BLM cannot consider them for WSA designation, it can consider and analyze them for the characteristics they may possess. Wilderness type resources are becoming increasingly scarce.	The BLM should consider and analyze those areas contained in the Citizen's Proposal for Wilderness Characteristics. Based on that analysis, the impacted environment and management alternatives can be included in the land use plan. The BLM has the authority and direction to do so, and it is highly recommended that these areas are analyzed while developing the impacted environment and various management alternatives. Re-evaluate WSA recommendations and other areas with primitive characteristics to manage as such.

4.1.6.8 Livestock Grazing

Table 4-32. Livestock Grazing: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
BFO-006	FOM-1: Suspend or adjust livestock grazing use in areas where timber harvest has occurred, whenever grazing would impair forest regeneration.	Yes	Livestock may feed on young tree shoots, hampering or restricting regeneration. Livestock use would only be adjusted on a temporary basis and only if the acreage was large enough to impact the carrying capacity of that allotment and therefore reduce the grazing preference significantly. In most cases, which are rare, a fence is built to keep livestock from accessing the harvest area until regenerations has occurred. Implementation has occurred, but the occurrence of these situations usually covers a small acreage and on average occurs once every 5 years, depending on price of timber.	Suspending grazing use is not necessary since most regeneration should occur in 5-10 years. Instead, livestock use reductions may be adjusted. It would take a large amount of harvested acreage to trigger an adjustment to the grazing use.

Table 4-32. Livestock Grazing: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
BFO-013	GM-2: Manage "M" category allotments as described below. Continue the current authorized livestock use on 98 "M" allotments at 43,573 AUMs. Allow development of range improvements. Establish resource monitoring studies as necessary to detect undesirable changes in the current satisfactory resource conditions.	Yes	"M" category allotments have large enough quantities of public land to justify time and money resource allocations. The majority of monitoring that has occurred on the 'M' category allotments has been Level II and Rangeland Health Assessments. "M" category allotments should not be held to a specific number (for example, 98 allotments) since this number can/will fluctuate as allotments are divided into smaller units and the status changes with the new units. A divided "M" allotment usually equates to two or three new "C" allotments. Range improvements are encouraged and cost share is feasible depending on the local resources and management objectives. Undesirable changes in resource condition should be detected during Level II and Rangeland Health assessments and when guidelines are implemented.	Manage to remain within Wyoming healthy range standards and guidelines. Land tenure should be a high priority in order to adjust land ownership to produce larger tracts of public land for applying management and expending resources. Large expanses of cheatgrass should be analyzed for treatment potential and cost/benefits.

Table 4-32. Livestock Grazing: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
BFO-014	GM-3: Manage "I" category allotments as described below. Conduct baseline inventories. Develop, implement, and monitor AMPs. After range condition class has been upgraded to "good" on allotments now rated "poor" to "fair," allocate the increased available forage first to wildlife to meet the population objectives of the Wyoming Game and Fish Department (WGFD). Any of the increased forage not needed for wildlife will be available to be licensed for livestock use.	Yes	This decision was replaced with the Standards for Healthy Rangeland in January 1998. Category “I” allotments contain the largest acreages of public land on an allotment basis. These units remain a priority for developing management plans and providing resources to implement the plans. Wildlife goals/objectives are a part of the AMP development and implementation.	Manage to achieve Wyoming healthy range standards and guidelines. Category “I” allotments will continue to be the highest priority for implementation of AMPs. AMP goals/objectives need to include livestock management, wildlife habitat, T&E presence/potential habitat, noxious/invasive management, and management of other pertinent resources as they apply. Land tenure should be a high priority in order to adjust land ownership to produce larger tracts of public land for applying management and expending resources. Large expanses of cheatgrass should be analyzed for treatment potential and cost/benefits.
BFO-015	GM-4: Manage "C" category allotments as described below. Continue current authorized livestock use. Assign low priority to funding of range improvement projects.	Yes	Category “C” category allotments contain very small public land acreages, are often isolated, and usually have no public access. Current category “C” allotments are costly to administer with little benefits to the public. They are isolated, inaccessible to the public, too small to warrant expenditure of personnel and resources, and cost more to administer than what the grazing fee provides.	In addition, category “C” allotments will be a low priority for Rangeland Health assessments and will be completed based on workload priorities, resource values, and management objectives. Land tenure should be a very high priority in order to adjust land ownership to produce larger tracts of public land for applying management and expending resources.

Table 4-32. Livestock Grazing: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
PAM-043	Livestock grazing is not authorized on about 4,000 acres of public land located in the canyons and slopes of the southern Big Horn Mountains because of the rough terrain and steep slopes. Livestock grazing is allowed on all public lands in the resource area except on about 6,000 acres (one percent) where it has been determined to be incompatible with other resource uses or values.	Yes	Re-evaluate any areas not currently leased or when leases expire if not sought by another applicant. Certain areas have high resource values that may be adversely impacted by grazing livestock.	Additional areas may be considered depending on resource values and management objectives.
PAM-044	Any permanent increases in the amount of forage produced are considered for wildlife and watershed protection before additional livestock use is authorized.	No	Other resources management objectives should be considered when distributing forage allocations.	T&E habitat should be added to this list. Plants and soil have extraordinary capacity to remove and store atmospheric carbon, diminishing greenhouse gases. Plants permanently remove carbon from the atmosphere unless the soil is broken through cultivation or mined for fossil fuels. Grasslands in North America have an enormous capacity to store atmospheric carbon and mitigate the adverse impacts of greenhouse gasses.
PAM-046	Reservoirs, wells, troughs and pipelines will be constructed to provide water in dry areas and to disperse grazing use. The grazing lessee or other cooperator will be required to maintain water in all troughs located on public land during the frost-free period (April through October) for wildlife.	Yes	These are major tools for accomplishing management of livestock and wildlife. Water should remain in tanks for wildlife, small mammals, and birds during the heat of the summer months.	Include wildlife escape ramp requirements (See PRB EIS). Terminology should be changed from “all troughs located on public land” to “those troughs needed to maintain or achieve management objectives”. Add, “Trough(s) will be equipped to allow escape by small mammals and birds.” Decision should be separated into two management decisions.

4.1.7 Special Designations

4.1.7.1 Areas of Critical Environmental Concern

Table 4-33. Areas of Critical Environmental Concern: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
N/A	No management decisions issued relating to ACECs and Other Management Areas.	N/A	None.	Decisions will be made on proposed ACECs. Other ACECs may be proposed during revision.

4.1.7.2 Scenic or Back Country Byways

Table 4-34. Scenic or Back Country Byways: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
N/A	No management decisions issued relating to scenic or back country byways.	N/A	None.	Evaluate Hazelton Road in conjunction with Casper and Worland field offices and cooperators (counties).

4.1.7.3 Wild and Scenic Rivers

Table 4-35. Wild and Scenic Rivers: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
PAM-101	The BLM has determined that the BLM-administered public lands along the review segment of the Middle Fork of the Powder River (map 9) meet the WSR suitability factors and should be managed to maintain or enhance their outstandingly remarkable values for any possible future consideration for inclusion in the WSR system.	Yes	A formal designation of WSR can only be completed by Congress. The process is lengthy and time consuming. Therefore, it is suggested that the decision to manage the area as if it were designated be continued. The same management strategy is also employed in the Wilderness program with successful results. An interim management plan is in place.	None.

4.1.7.4 Wilderness Study Areas

Table 4-36. Wilderness Study Areas: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
BFO-025	MM-6: If Congress decides not to designate the WSAs as wilderness, lease for oil and gas development 6,423 acres in the Gardner Mountain WSA, 10,089 acres in the North Fork WSA, and 12,419 acres in the Fortification Creek WSA with the terms and conditions shown on the Oil and Gas/Watershed and Oil and Gas/Wildlife maps for each WSA.	Yes	Congress has not made a final decision on the WSA areas. It is not anticipated that this will occur in the near future. Therefore, the interim management for WSA's is adequate. The philosophy of the policy is to manage the WSA's as if they were designated.	Reevaluate options for managing the wilderness characteristics.

Table 4-36. Wilderness Study Areas: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
BFO-032	RVRM-4: Provide access to the Gardner Mountain and North Fork WSAs by existing roadbed and new construction.	Yes	The original rationale for this decision was to provide safe and legal access to the WSA for use by the public. Recreation pressures have been increasing over the last 20 years. It is recommended that use documentation be gathered and analyzed to determine that the management decision remain responsive to the public expectation. For Gardner Mountain WSA: In April 2001 the following was updated: The trail route to Gardner Mountain WSA begins at Ice Cave along Mayoworth Slope Road and ends at Dull Knife Pass Overlook (7miles). A cooperative agreement with the State of Wyoming is in place which allows access across state lands (pg. 27). For North Fork WSA: In April 2001 the following was updated: A decision in the 1985 RMP stated that access to the North fork WSA will be provided by constructing a foot and horseback trail. To date, access across private lands (1/4 mile) has not been obtained. Therefore, no trail exists (pg. 27). An access road to North Fork WSA has not been constructed.	None.

Table 4-36. Wilderness Study Areas: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
BFO-037	WM-1: Recommend all three WSAs for nondesignation as wilderness.	No	In 1991 and updated in 2004, the Wyoming Wilderness Association produced a document entitled "Wilderness At Risk: Citizens' Wilderness Proposal for Wyoming BLM Lands". This document disagrees with the original recommendation for nondesignation and requests that additional acreage be added to each of the three WSA's. This proposal will need a thorough evaluation requiring new inventory and new recommendations in order to respond to this proposal. During the evaluation of the citizens' proposal, it is highly recommended that a current status report be conducted for the current acreage of the WSA's. Once completed, a better informed overall management recommendation can then be made. Until Congress releases the WSAs from further consideration they will continue to be managed as if they were designated.	Until Congress releases the WSA's from further wilderness considerations they will continue to be managed as if they were designated. The Wyoming Wilderness Association has asked BLM to consider more acreage for these WSA's, and it is incumbent upon BLM to analyze these areas and make a decision. If these additional acres are suitable for wilderness, then appropriate management actions and their impacts will be documented in the plan update.

Table 4-36. Wilderness Study Areas: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
PAM-009	Heavy equipment (dozers) will be restricted from being used for wildfire suppression in the WSAs, the Middle Fork Powder River management area, and areas of known cultural values (for example, ruts of the Bozeman Trail).	Yes	Heavy equipment use has been excluded from use on fires in the Gardner Mountain and North Fork WSAs, and limited (restricted to existing trails on the perimeter of the WSA unit) for one fire occurring in the Fortification Creek WSA. Extensive and unrestricted use of heavy equipment occurred on only one fire in the Middle Fork Management Area. No heavy equipment use for fire suppression has occurred on Bozeman Trail cultural sites.	The decision should be expanded to include all special designation areas listed in Table 2-25.
PAM-018	Until Congress decides to designate or not designate the three WSAs in the resource area- Gardner Mountain (about 6,400 acres), North Fork (10,000 acres), and Fortification Creek (12,400 acres) as wilderness, about 28,800 acres are not available for oil and gas leasing. If Congress decides not to designate them as wilderness, they would be available for oil and gas leasing and development.	Yes	Congress has not made a final decision on the WSA areas. It is not anticipated that this will occur in the near future. Therefore, the interim management for WSA's is adequate. The philosophy of the policy is to manage the WSA's as if they were designated.	Reevaluate the recommendations and possibly manage as primitive areas. Do not open the areas for leasing.
PAM-029	The Amsden Creek winter game range (480 acres) and Middle Fork Canyon (about 11,000 acres) have been withdrawn from mineral location. Locatable mineral activities are restricted in Fortification Creek, Gardener Mountain, and North Fork WSAs (about 28,931 acres).	Yes	Congress has not made a final decision on the WSA areas. It is not anticipated that this will occur in the near future. Therefore, the interim management for WSA's is adequate. The philosophy of the policy is to manage the WSA's as if they were designated.	None.

Table 4-36. Wilderness Study Areas: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
PAM-030	The majority of lands in the resource area, including federally administered surface/minerals and split-estate, are available for mineral material exploration and development. Mineral materials activities are prohibited in the Fortification Creek, Gardener Mountain, and North Fork WSAs (about 28,931 acres).	No	Congress has not made a final decision on the WSA areas. It is not anticipated that this will occur in the near future. Therefore, the interim management for WSA's is adequate. The philosophy of the policy is to manage the WSA's as if they were designated.	Evaluate the entire planning area for designation as "open to resource development" or "closed to resource development."
PAM-063	Foot/Horse Trail to North Fork WSA. A decision in the 1985 RMP stated that access to the North Fork WSA will be provided by constructing a foot and horseback trail.	Yes	The current trend of increased interest of wilderness recreation opportunities on BLM lands is expected to continue. Continuing to pursue foot/horse access to this WSA will meet the public demand for more access.	None.

4.1.8 Socioeconomic Resources

4.1.8.1 Social Conditions

Table 4-37. Social Conditions: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
N/A	No management decisions issued relating to social conditions.	N/A	None.	The management decisions need to take into consideration the social impact associated with the goals and objectives that are designed to meet management objectives.

4.1.8.2 Economic Conditions

Table 4-38. Economic Conditions: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
N/A	No management decisions issued relating to economic conditions.	N/A	None.	The management decisions need to take into consideration the economic impact associated with the goals and objectives that are designed to meet management objectives.

4.1.8.3 Health and Safety

Table 4-39. Health and Safety: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
PAM-032	For any authorized activities involving hazardous materials or their use, precautions will be required to be taken to guard against releases into the environment.	Yes	BMPs and Conditions of Approval are in place.	None.
PAM-033	Parties responsible for contamination will be liable for cleanup and resource damage costs, as prescribed by law.	Yes	The BLM is mandated by law to clean up contaminations.	None.

4.1.8.4 Environmental Justice

Table 4-40. Environmental Justice: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
N/A	No management decisions issued relating to Environmental Justice.	N/A	None.	The management decisions need to take into consideration the Environmental Justice requirements as it relates to the goals and objectives that are designed to meet management objectives.

4.1.8.5 Tribal Treaty Rights

Table 4-41. Tribal Treaty Rights: Management Opportunities

Planning Decision Number	Planning Decision	Is Decision Responsive to Current Issues?	Remarks (rationale)	Options for Change
N/A	No management decisions issued relating to Tribal Treaty Rights.	N/A	N/A	N/A

4.2 Areas of Relative Ecological Importance

Areas of relative ecological importance are places recognized as important to managing the health, diversity, and productivity of the public lands in either the planning area or the broader, eco-region. Identifying areas of relative ecological importance within the planning area is an important step in the RMP revision process. It facilitates an understanding of tradeoffs when establishing land use allocations and management requirements and is fundamental to developing a range of alternatives in the RMP and EIS. Focusing on these areas will help to guide the planning process through the identification of management opportunities for the maintenance or rehabilitation of areas important to the overall health of public lands in the Buffalo planning area.

Resource specialists in Buffalo field office are currently developing potential areas of relative ecological importance for use in development of the Draft RMP and EIS. As such, they are not included in this Summary of the AMS, but will be available for review at a later date.

5.0 CONSISTENCY/COORDINATION WITH OTHER PLANS

5.1 Local, Tribal, State, and Federal Management Plans

According to guidance found in the Federal Land Policy and Management Act (FLPMA) (43 Code of Federal Regulations [CFR] 1610), the Bureau of Land Management (BLM) Resource Management Plans (RMPs) must be consistent, to the extent practical, with officially approved or adopted resource-related plans of other Tribal, federal, state, and local governments so long as the plans are compatible. BLM RMPs must also be consistent with the purposes, policies, and programs of FLPMA and other federal laws and regulations related to public lands. If these other entities do not have officially approved or adopted resource-related plans, the BLM RMPs must, to the extent practical, be consistent with those entities' officially approved and adopted resource-related policies and programs. This consistency will be accomplished so long as BLM RMPs incorporate the policies, programs, and provisions of public land laws and regulations. Table 5-1 outlines the applicable local, state, and federal management plans that pertain to the Buffalo planning area and the resource areas that will require coordination with those plans. There are no applicable tribal plans which will require coordination with the RMP revision.

Table 5-1. Applicable Local, State, and Federal Management Plans

Resource Plans	**Physical Resources**	Air Quality	Geology	Soil	Water	**Mineral and Energy Resources**	**Fire and Fuels Management**	**Biological Resources**	**Heritage and Visual Resources**	Cultural Resources	Paleontological Resources	Visual Resources	**Land Resources**	Forest Products	Lands and Realty	Renewable Energy	Rights-of-Way and Corridors	Transportation and Access	Recreation	Wilderness Characteristics	Livestock Grazing	**Special Designations**	ACECs	Scenic or Back Country Byways	Wild and Scenic Rivers	Wilderness Study Areas	**Socioeconomic Resources**	Social Conditions	Economic Conditions	Health and Safety	Environmental Justice	Tribal Treaty Rights
COUNTY PLANS																																
Campbell County Land Use Plan		X	X	X	X	X	X	X				X		X			X		X		X							X	X			
Johnson County Land Use Plan			X		X	X		X						X					X		X							X	X			
Sheridan County Land Use Plan					X	X	X	X		X		X		X			X	X	X									X	X			
CONSERVATION DISTRICTS																																
Campbell County Conservation District 2004		X			X			X												X	X											
Lake DeSmet Conservation District				X	X			X													X											
Sheridan County Conservation District			X	X	X			X													X											
Powder River Conservation District				X	X			X				X		X							X							X	X			
WATERSHED PLANS																																
Donkey/ Stonepile Creek Watershed Plan 2006				X	X																											
Little Powder River Watershed Plan 2006					X	X		X													X											

Table 5-1. Applicable Local, State, and Federal Management Plans

Resource Plans	**Physical Resources**	Air Quality	Geology	Soil	Water	**Mineral and Energy Resources**	**Fire and Fuels Management**	**Biological Resources**	**Heritage and Visual Resources**	Cultural Resources	Paleontological Resources	Visual Resources	**Land Resources**	Forest Products	Lands and Realty	Renewable Energy	Rights-of-Way and Corridors	Transportation and Access	Recreation	Wilderness Characteristics	Livestock Grazing	**Special Designations**	ACECs	Scenic or Back Country Byways	Wild and Scenic Rivers	Wilderness Study Areas	**Socioeconomic Resources**	Social Conditions	Economic Conditions	Health and Safety	Environmental Justice	Tribal Treaty Rights
Gillette Fishing Lake Watershed Plan 2005					X																											
Powder River Watersheds Water Quality Management Plan			X	X	X	X		X						X							X											
STATE AGENCY PLANS																																
Wyoming Department of Agriculture Strategic Plan 2008																					X											
Wyoming Game and Fish Department Strategic Habitat Plan								X						X					X		X											
Wyoming Game and Fish Department Greater Sage-Grouse Conservation Plan				X	X	X		X						X					X		X											
Wyoming State Water Plan Powder/Tongue River Basins 2002			X		X		X												X													

Table 5-1. Applicable Local, State, and Federal Management Plans

Resource Plans	**Physical Resources**	Air Quality	Geology	Soil	Water	**Mineral and Energy Resources**	**Fire and Fuels Management**	**Biological Resources**	**Heritage and Visual Resources**	Cultural Resources	Paleontological Resources	Visual Resources	**Land Resources**	Forest Products	Lands and Realty	Renewable Energy	Rights-of-Way and Corridors	Transportation and Access	Recreation	Wilderness Characteristics	Livestock Grazing	**Special Designations**	ACECs	Scenic or Back Country Byways	Wild and Scenic Rivers	Wilderness Study Areas	**Socioeconomic Resources**	Social Conditions	Economic Conditions	Health and Safety	Environmental Justice	Tribal Treaty Rights
Wyoming State Water Plan Northeast River Basins 2002			x		X	X		X						X					X													
Wyoming Statewide Comprehensive Outdoor Recreation Plan 2003																		X	X													
Wyoming Statewide Trails Plan 2004																		X	X							X						
Wyoming SHPO Comprehensive Statewide Historic Preservation Plan 2007-2013										X	X	X																				
FEDERAL AGENCY PLANS																																
Bighorn National Forest Plan			X	X	X	X	X	X		X		X		X				X	X	X	X											
Medicine Bow National Forest Revised Land and RMP								X				X		X					X	X					X							
Routt National Forest Land and RMP		X		X	X	X	X	X		X		X		X	X		X		X	X					X				X			

Table 5-1. Applicable Local, State, and Federal Management Plans

Resource Plans	**Physical Resources**	Air Quality	Geology	Soil	Water	**Mineral and Energy Resources**	**Fire and Fuels Management**	**Biological Resources**	**Heritage and Visual Resources**	Cultural Resources	Paleontological Resources	Visual Resources	**Land Resources**	Forest Products	Lands and Realty	Renewable Energy	Rights-of-Way and Corridors	Transportation and Access	Recreation	Wilderness Characteristics	Livestock Grazing	**Special Designations**	ACECs	Scenic or Back Country Byways	Wild and Scenic Rivers	Wilderness Study Areas	**Socioeconomic Resources**	Social Conditions	Economic Conditions	Health and Safety	Environmental Justice	Tribal Treaty Rights
Thunder Basin National Grassland Land and RMP		X			X	X	X	X						X				X	X		X	X			X			X	X		X	
U.S. Fish and Wildlife Service Wyoming Plan					X			X						X																		
U.S. EPA Region 8 Wyoming State Implementation Plans		X										X																				
FIRE MANAGEMENT PLANS																																
U.S. Forest Service National Fire Plan				X			X	X																								

ACECs Areas of Critical Environmental Concern
EPA Environmental Protection Agency
RMP Resource Management Plan
SHPO State Historic Preservation Office
U.S. United States

5.2 Cooperating Agencies

The BLM plans to collaborate with other federal, state, and local agencies and governmental entities throughout the RMP process. Coordination was initiated at the inception of the project through the identification of potential cooperating agencies. The following agencies and tribes were invited to participate in the RMP revision process as cooperating agencies:

Counties

- Campbell County Commission
- Johnson County Commission
- Sheridan County Commission
- Crook County Commission

Conservation Districts

- Campbell County Conservation District
- Lake DeSmet Conservation District
- Powder River Conservation District

Wyoming State Agencies

- Department of Agriculture
- Department of Environmental Quality
- Department of Revenue
- Department of Transportation
- Game and Fish Department
- Office of State Lands and Investments
- Office of the Governor
- Oil and Gas Conservation Commission
- State Historic Preservation Office
- State Engineer's Office
- State Forestry Division
- State Geological Survey
- State Parks and Cultural Resources
- State Trails Program
- Water Development Commission

Federal Agencies

- United States Department of the Interior – Office of Surface Mining
- United States Environmental Protection Agency (EPA), Region 8
- United States Fish and Wildlife Service

- United States Forest Service – Medicine Bow-Routt National Forest, Thunder Basin National Grasslands
- United States Forest Service – Bighorn National Forest
- United States Nuclear Regulatory Commission

Tribes

- Cheyenne River Sioux
- Crow
- Eastern Shoshone
- Ft. Peck/Assiniboine/Sioux
- Northern Arapahoe
- Northern Cheyenne
- Oglala Sioux
- Three Affiliated Tribes
- Federal Congressional Offices
- United States Senator Michael Enzi's Office
- United States Senator John Barrasso's Office
- United States Representative Cynthia Lummis' Office

A cooperating agency training workshop was held on October 22-23, 2008. Topics discussed during this workshop included:

- Definition of cooperating agency status
- Socioeconomic analysis workshop
- Details of the BLM planning process and cooperating agency roles
- Cooperating agency responsibilities during process, pre-decision
- Decision stage
- Post decision roles and responsibilities of cooperating agencies

Additional opportunities for cooperation with other agencies will be sought throughout the RMP and Environmental Impact Statement development process. Project phases where state and local governments, other federal agencies, and tribal government involvement could prove to be most critical to ensure consistency include scoping, alternatives development, impacts analysis, and public and agency comment periods.

6.0 SPECIFIC MANDATES AND AUTHORITY

6.1 Mandates and Authorities Pertaining to All Resources

6.1.1 Federal Laws and Statutes

Federal Law or Statute	Year
American Indian Religious Freedom Act of 1978, as amended, 42 U.S.C. 1996 et seq.	1978
Antiquities Act of 1906, as amended, 16 U.S.C. 431-433.	1906
Archeological Resources Protection Act of 1978, as amended, 42 U.S.C 1996 et seq.	1978
Clean Air Act of 1990, as amended, 42 U.S.C. 7418 et seq.	1990
Clean Water Act of 1987, as amended, 33 U.S.C. 1251 et seq.	1987
Endangered Species Act (ESA) of 1973, as amended, 16 U.S.C. 1531 et seq.	1973
Energy Policy and Conservation Act Reauthorization of 2000, as amended, P.L. 106-469.	2000
Energy Policy and Conservation Act Report (P.L. 109–58)	2005
Executive Order 11988 (Floodplain Management)	1977
Executive Order 11990 (Protection of Wetlands)	1977
Executive Order 12144 (Environmental Effects Abroad of Major Federal Actions)	1979
Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations)	1994
Executive Order 13007 (Indian Sacred Sites)	1996
Executive Order 13045 (Protection of Children from Environmental Health Risks and Safety Risks	1997
Executive Order 13084 (Consultation and Coordination with Indian Tribal Governments)	1998
Executive Order 13112 (Invasive Species)	1999
Executive Order 13186 (Migratory Birds)	2001
Executive Order 13212 (Actions to Expedite Energy Related Projects)	2003
Executive Orders 11644 and 11989 (Off-Road Vehicles)	1972, 1977
Federal Agriculture Improvement and Reform Act of 1996 P.L. 104-127 (Repealed Colorado River Basin Salinity Control Act)	1996
Federal Coal Leasing Amendments Act of 1976, as amended, 30 U.S.C. 201 (a)(3)(A)(i).	1976
Federal Land Policy and Management Act of 1976 (FLPMA), as amended, 43 U.S.C. 1701 et seq.	1976
Federal Water Pollution Control Act, as amended, 33 U.S.C. 1323 et seq.	1948
General Mining Law of 1872, as amended, 30 U.S.C. 21 et seq.	1872
Healthy Forest Restoration Act of 2003 P.L. 108-148	2003
Materials Act of 1947 and 1955	1947, 1955
Migratory Bird Conservation Act of 1979, as amended, 16 U.S.C. 715 et seq.	1979
Mineral Leasing Act of 1920, as amended, 30 U.S.C. 181 et seq.	1920
Mining and Mineral Policy Act of 1970, as amended, 30 U.S.C. 21(a).	1970
National Environmental Policy Act of 1969 (NEPA), as amended, 42 U.S.C. 4321 et seq.	1969
National Historic Preservation Act (NHPA), as amended, 16 U.S.C. 470 et seq.	1966
Native American Graves Protection and Repatriation Act of 1990, as amended, 25 U.S.C. 3001 et seq.	1990
Onshore Oil and Gas Leasing Reform Act of 1987, 30 U.S.C. 181 et seq.	1987
Public Rangelands Improvement Act of 1978, 43 U.S.C. 1901.	1978

Federal Law or Statute	Year
Recreation and Public Purposes Act of 1926, as amended, 43 U.S.C. 869 et seq.	1926
Safe Drinking Water Act, as amended, 42 U.S.C. 201 et seq.	1977
Secretarial Order 3175 (incorporated into the Departmental Manual at 512 DM 2)	
Secretarial Order 3206 (American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act)	1997
Surface Mining Control and Reclamation Act of 1977, 30 U.S.C. 1201 et seq.	1977
Taylor Grazing Act of 1934, as amended, 43 U.S.C. 315 et seq.	1934
Wild and Free-Roaming Horse and Burro Act, as amended, 16 U.S.C. 1331-1340.	1971
Wild and Scenic Rivers Act, as amended, 16 U.S.C. 1271 et seq.	1968
Wilderness Act, as amended, 16 U.S.C. 1131 et seq.	1964

6.1.2 Regulations and Policies

BLM Directive		Year
BLM Manual 1220 Appendix 3a	Subject Function Codes (alpha)	2003
BLM Manual 1220 Appendix 3n	Subject Function Codes (numeric)	2003
BLM Manual 1221	Directives	1989
BLM Manual 1601	Land Use Planning	2005
BLM Manual 1613	Areas of Critical Environmental Concern	1988
BLM Manual 1790	National Environmental Policy Act	2008
BLM Manual 3031	Energy and Mineral Resource Assessment	1985
BLM Manual 3060	Mineral Reports Preparation and Review	1994
BLM Manual 3600	Mineral Material Disposal	2002
BLM Manual 4180	Rangeland Health Standards	2001
BLM Manual 4700	Wild Free-Roaming Horse and Burro Management	
BLM Manual 4710	Wild Horse and Burro Management Considerations	1988
BLM Manual 5000	Forest Management - Public Domain	2006
BLM Manual 6840	Special Status Species Management	2001
BLM Manual 8120	Protecting Cultural Resources	2004
BLM Manual 8160	Native American Coordination and Consultation	1990
BLM Manual 8270	Paleontological Resource Management	1998
BLM Manual 8300	Recreation Management	
BLM Manual 9400	Visual Resource Management	2008
BLM Manual 8431	Visual Resource Contrast Rating	1986
BLM Manual 8351	Wild and Scenic Rivers – Policy and Program Direction for Identification, Evaluation, and Management	1993
BLM Manual 9211	Fire Planning	2006

BLM Directive		Year
BLM Handbook H-1283-1	Data Administration and Management	1969
BLM Handbook 1553-1	Publication Standards	
BLM Handbook H-1601-1	Land Use Planning	2001
BLM Handbook H-1624-1	Planning for Fluid Mineral Resources	1990
BLM Handbook H-1790-1	National Environmental Policy Act	2008
BLM Handbook H-3070-1	Economic Evaluation of Coal Properties	
BLM Handbook H-3070-2	Economic Evaluation of Oil and Gas Properties	
BLM Handbook H-3203-1	Leasing Terms	
BLM Handbook H-3600-l	Mineral Materials Disposal	2002
BLM Handbook H-4120-1	Grazing Management	1984
BLM Handbook H-4180-1	Rangeland Health Standards	2001
BLM Handbook H-6310-1	Wilderness Inventory and Study Procedures (Rescinded October 2003)	2001
BLM Handbook H-8160-1	General Procedural Guidance for Native American Consultation	1994
BLM Handbook H-8410-1	Visual Resource Inventory	1986
BLM Handbook H-8270-1	General Procedural Guidance for Paleontology Resource Management -- 1998	1998
BLM Handbook H-921 1-1	Fire Management Activity Planning	1987
BLM Handbook H-9214-1	Prescribed Fire Management	1998
WO IB 1998-135	Visual Resource Management (VRM) Policy Restatement	1998
WO IM 1998-164	Visual Resource Management (VRM) Policy Restatement	1998
WO IM 2000-022	Compliance with NEPA - Addressing Alternatives for Livestock Grazing Permit Renewals	2000
WO IM 2000-022 Change 1	Compliance with NEPA - Addressing Alternatives for Livestock Grazing Permit Renewals	2000
WO IM 2000-034	Documentation of NEPA adequacy for Oil and Gas Leasing and Other Similar Actions	2000
WO IM 2000-162	Land Use Plan Evaluations - Interim Guidance	2001
WO IM 2001-022	Planning Guidance for National Monuments and NCAs	2001
WO IM 2001-030	Military Activities On and Over Public Lands	2001
WO IM 200 1-030 Change 1	Supplemental Guidance - Military Activities On and Over Public Lands	2001
WO IM 2001-038	Development/Approval of Preparation Plans for New Planning Starts	2001
WO IM 2001-038 Change 1	Development/Approval of Preparation Plans for New Planning Starts	2001

BLM Directive		Year
WO IM 2001-062	Documentation of Land Use Plan Conformance and NEPA Adequacy	2001
WO IM 2001-079	Transmittal of 4180 Rangeland Health Standards Manual Section and Handbook and Guidance for Conducting Watershed-Based Land Health Assessments	2001
WO IM 2001-107	Establishing Advisory Councils/Committees for National Conservation Areas (NCAs) and National Monuments	2001
WO IM 2001-146	Oil and Gas Lease Implementation Actions During Resource Management Planning	2001
WO IM 2001-151	Compliance with the National Environmental Policy Act (NEPA) and Endangered Species Act (ESA) for Hazardous Fire Fuels Reduction Projects under the National Fire Plan	2001
WO IM 2001-158	Consultation with the National Marine Fisheries Service on Federal Actions Adversely Affecting Designated Essential Fish Habitat	2001
WO IM 2001-179	Guidance on Preparing Federal Register Notices	2001
WO IM 2001-191	Processing of Applications for Permit to Drill (APD), Site-Specific Permits and Issuing New Leases During Resource Management Plan Development	2001
WO IM 2001-202	Interim Guidance for Data Management in Land Use Planning	2001
WO IM 2001-226	Ten Year Land Use Planning Schedule	2001
WO IM 2002-008	Interim Management Policy for Bureau of Land Management National Monuments and National Conservation Areas	2002
WO IM 2002-034	Land Use Planning and Fire Management Planning	2002
WO IM 2002-041	Expediting Appeals Resolution in OHA when NEPA Challenges are the Cause of the Appeal	2002
WO IM 2002-053	Preparation of a Statement of Adverse Energy Impact	2002
WO IM 2002-080	Use of Comment Content Analysis contractors	2002
WO IM 2002-081	Time Sensitive Plans, National Planning Support Team and Action Plan for Time Sensitive Plans	2002
WO IM 2002-082	Guidance for Developing the No Action Alternative for National Conservation Area, National Monument and Cooperative Management and Protection Area Resource Management Plans	2002
WO IM 2002-095	Gather Policy & Selective Removal Criteria for Wild Horses	2002
WO IM 2003-096	Guidelines for Gather Approvals	2002
WO IM 2002-100	Review Requirements for Land Use Planning Efforts	2002
WO IM 2002-108 Change 2	Process for Tracking Litigation Costs in BLM	2002
WO IM 2002-143	Competitive Sale of Public Lands	2002
WO IM 2002-149	Cooperating Agency Arrangements During NEPA Decision making and Land Use Planning	2002
WO IM 2002-161	Federal Register Notice Publication Policy	2002
WO IM 2002-164	Guidance to Address Environmental Justice in LUPs and Related NEPA Documents	2002
WO IM 2002-167	Social and Economic Analysis for Land Use Planning	2002
WO IM 2002-196	Right of Way Management - Land Use Planning	2002
WO IM 2002-203	CEQ Data Call Concerning Cooperating Agency Status	2002
WO IM 2002-209	Federal Register Notice Review Policy	2002
WO IM 2002-216	Federal Register Notice Instructions	2002
WO IM 2002-256	Plan Schedule Changes	2002
WO IB 2002-054	IT in Support of Land Use Planning Project	2002
WO IB 2002-056	Recon-mended Formats for Land Use Plans, Records of Decision, and Their Supporting Environmental Impact Statements	2002
WO IB 2002-101	Cultural Resource Considerations in Resource Management Plans	2002
WO IB 2002-103	Evaluation of the Use of Contracting to Develop Land Use Plans	2002

BLM Directive		Year
WO IB 2002-130	Availability of the New Internal Planning and National Environmental Policy Act (NEPA) Library Website	2002
OFA IB 2002-058	Biomass Utilization	2002
WO IM 2003-020	Interim Wind Energy Policy	2003
OFA IM 2003-038	Interim Guidance for Completion of Fire Management Plan Revisions Using the Interagency Template	2003
WO IM 2003-054	Identification of State Data Steward for Land Use Planning Boundaries	2003
WO IM 2003-070	Clarify Policy and Procedures for the Resolution of Protests to Land Use Plans	2003
WO IM 2003-070 Change 1	Protest Procedures and Privacy Issues	2003
WO IM 2003-137	Integration of the EPCA Inventory Results into Land Use Planning and Energy Use Authorizations	2003
WO IM 2003-152	Application for Permit to Drill - Process Improvements #1 Comprehensive Strategies	2003
WO IM 2003-169	Use of the Economic Profile System in Planning and Collaboration	2003
WO IM 2003-195	Rescission of the National Level Policy Guidance on Wilderness Review and Land Use Planning	2003
WO IM 2003-221	Categorical Exclusions for Hazardous Fuels Treatments and Post-Fire Rehabilitation Projects	2003
WO IM 2003-22 1 Change 1	Categorical Exclusions for Hazardous Fuels Treatments and Post-Fire Rehabilitation Projects	2003
WO IM 2003-222	Council on Environmental Quality (CEQ) Data Call concerning Cooperating Agency Status	2003
WO IM 2003-232	Full force and Effect (FFE) Decision Authority for Wildland Fire Management Decisions	2003
WO IM 2003-233	Integration of the Energy Policy and Conservation Act (EPCA) Inventory Results into the Land Use Planning Process	2003
WO IM 2003-234	Integration of the EPCA Inventory Results into oil and Gas Exploration and Development Use Authorizations	2003
WO IM 2003-238	Guidance for Data Management in Land Use Planning	2003
WO IM 2003-274	BLM Implementation of the Settlement of Utah v. Norton Regarding Wilderness Study	2003
WO IM 2003-275	Consideration of Wilderness Characteristics in Land Use Plans (Excluding Alaska)	2003
WO IB 2003-020	Minimum content for RMP Scoping Reports	2003
WO IB 2003-058	Preparing to Prepare a Land Use Plan	2003
WO IB 2003-074	Sample filing Plan for Land Use Planning Records	2003
WO IB 2003-078	DOI Memoranda in Effect	2003
WO IB 2003-113	The Manager's Role in the Land Use Planning Process	2003
WO IM 2004-005	Clarification of OHV Designations and Travel management in the BLM Land Use Planning Process	2004
WO IM 2004-007	Land Use Plan and Implementation Plan Guidance for Wildland Fire Management	2004
WO IM 2004-052	Assessing Tribal and Cultural Considerations as Required in IM-2003-233, Integration of the Energy Policy and Conservation Act (EPCA) Inventory Results into the Land Use Planning Process	2004
WO IM 2004-065	Additional Information Regarding Use of the Categorical Exclusions for Hazardous Fuels Treatments and Post-Fire Rehabilitation Projects	2004
WO IM 2004-079	Land Use Plan Decisions, Implementation Decisions, and Administrative Remedies	2004
WO IM 2004-089	Policy for Reasonably Foreseeable Development (RFD) Scenario for Oil and Gas	2004
WO IM 2004-096	Federal Register Notice of Availability for Records of Decision	2004
WO IM 2004-105	Cooperating Agency: Proposed Planning Rules Change	2004

BLM Directive		Year
WO IM 2004-110	Fluid Mineral Leasing and Related Planning and National Environmental Policy Act (NEPA) Processes	2004
WO IM 2004-138	Gather Plan and Environmental Assessment Review and Content Requirements for Fertility Control	2004
WO IM 2004-148	Federal Register Notice; Solicitor's Edits	2004
WO IB 2004-018	Transmittal of Final Evaluation Report on the Use of Contracting to Develop Land Use Plans	2004
WO IB 2004-046	Memorandum of Understanding, Science in Support of Land Use Planning	2004
WO IB 2004-053	Wind Energy Development Programmatic EIS	2004
WO IB 2004-087	New Department of Interior Environmental Statement Memoranda	2004
OFA IB 2004-011	Fire Management Plan Federal Fire Policy and National Environmental Policy Act Documentation Request	2004
WO IM 2005-003	Cultural Resources and Tribal Consultation for Fluid Minerals Leasing	2005
WO IM 2005-007	Addressing Mail to the Bureau of Land Management (BLM) Washington Office (WO)	2005
WO IM 2005-0 15	Publications/Exhibits/Informational/Promotional Items Policy and Process	2005
WO IM 2005-024	National Sage-Grouse Habitat Conservation Strategy BLM National Sage-grouse Habitat Conservation Strategy Guidance for Addressing Sagebrush Habitat Conservation in Land Use Plans Guidance for the Management of Sagebrush Plant Communities for Sage-grouse Conservation	2005
WO IM 2005-037	Cost Recovery Fee Schedule for the Public Cost Recovery Fee Schedule	2005
WO IM 2005-079	Departmental Copying Policy Departmental Copying Policy DTAPR 2004-06	2005
WO IM 2005-056	Plan Schedule Changes	2005
WO IM 2005-058	New Cooperating Agency Reporting Procedures/Requirements for EIS's and EA's	2005
WO IM 2005-069	Interim Offsite Compensatory Mitigation for Oil, Gas, Geothermal and Energy Rights-of-Way Authorizations	2005
WO IM 2005-071	Guidance for Implementation of the Tribal Forest Protection Act, Pub. L.108-278 Tribal Forest Protection Act, P.L. 108-278	2005
WO IM 2005-088	Energy and Mineral Assessment	2005
WO IM 2005-089	Military Base Closures 2005	2005
WO IM 2005-110	Meeting Healthy Forests Restoration Act Old-Growth Management and National Historic Preservation Act Requirements	2005
WO IM 2005-119	Use of Federal Funds to Mitigate Wildfire Risks to Communities	2005
WO IM 2005-156	BLM Bureau-wide Publications Standards	2005
WO IM 2005-165	BLM ADR and FACA Policy FACA Guidebook FACA Summary Brochure	2005
WO IM 2005-237	Desk guide to Cooperating Agency Relationships 516 DM2.5 (Revised June 2005) Directors Letter to Federal, State and Local Governments Directors Letter to Tribal Governments	2005

BLM Directive		Year
WO IM 2005-247	National Environmental Policy Act (NEPA) Compliance for Oil, Gas, and Geothermal Development Developing a Reasonable Range of Alternatives in Oil, Gas, and Geothermal Exploration and Developing EISs Use of Section 390 Categorical Exclusions for Oil and Gas Development Use of Multiple Well EAs or EISs for Oil and Gas Development Use of DNAs Section 390 Categorical Exclusion Tracking Log	2005
WO IM 2005-249	Federal Register Notice Templates for Land Use Plans Model NOI Model NOA for Drafts Model NOA for Finals	2005
WO IB 2005-0 15	Strategy for Issuing Right-of-Way Authorizations for "Earthscope" Facilities	2005
WO IB 2005-032	Statements of Work for Land Use Planning SOW Template	2005
WO IB 2005-038	Suggestions for Cooperating Agencies Desk Guide	2005
WO IB 2005-043	Land Use Planning Budget Strategy Work Session	2005
WO IB 2005-076	Review of the Draft Cooperating Agency Desk Guide	2005
WO IB 2005-078	Economic Profile System (EPS) Workshops Task Order Request	2005
WO IB 2005-113	10 Year Planning Schedule Updates Instructions for Updating the 10-year Planning Schedule	2005
WO IB 2005-118	Guide to Agreements	2005
WO IB 2005-126	Distribution of A Desk Guide to Cooperating Agency Relationships	2005
WO IB 2005-138	Meeting Staffing and Skill Needs Associated with Planning and NEPA Projects Decision Tree	2005
WO IB 2005-140	Council on Environmental Quality (CEQ) Guidance on Cumulative Effects Analysis Guidance on Consideration of Past Actions in Cumulative Effects Analysis	2005
WO IB 2005-159	Public Comment Periods for Planning and Environmental Documents	2005
WO-IB 2005-163	Resource Management Plan Contracting Survey BLM RMP Contracting Survey Report	2005
WO IM 2006-011	National Environmental Policy Act (NEPA) Third Party Contracting Procedures Example of an MOU (14 pp)	2006
WO IM 2006-071	Process Improvement for Oil, Gas, Geothermal, Geophysical, and Related Rights-of-Way Approvals APD and NEPA Process Improvement Strategies	2006
WO IM 2006-083	Implementation of Section 368 of the Energy Policy Act of 2005 (EPA) - Priority Corridor PETS Draft Corridor Criteria - Alternative Development and Selection	2006
WO IM 2006-097	Revision of Bureau Form 1842-1, Information on Taking Appeals to the Board of Land Appeals	2006
WO IM 2006-112	Minimum Qualifications for Socio-Economic Contractors	2006
WO IM 2006-114	State Wildlife Action Plans	2006
WO IM 2006-146	National Spatial Data Layer for Areas of Critical Environmental Concern (ACEC)	2006
WO IM 2006-148	Environmental Management System Policy	2006
WO IM 2006-150	Recreation and Cultural Interest Area Symbols	2006
WO IM 2006-170	Environmental Management System - Pilot Implementation and Strategy Plan Development	2006
WO IM 2006-173	Implementation of Roads and Trails Terminology Report 1- Highlights Report — Asset Management Program 2- Roads and Trails Terminology Report	2006

BLM Directive		Year
WO IM 2006-180	Congressional Relations	2006
WO IM 2006-197	BLM Energy and Non-Energy Mineral Policy	2006
WO IM 2006-204	Consideration of Large Fire Suppression Costs at All Planning Levels	2006
WO IM 2006-2 14	Establishment of Geospatial Standards for Land Use Planning Boundaries 1- Geospatial Land Use Planning Boundary Standards 2- Geospatial Land Use Planning Boundary Standards Template	2006
WO IM 2006-216	Wind Energy Development Policy	2006
WO IM 2006-219	Implementing Executive Order 13392: Improving Agency Disclosure of Information	2006
WO IM 2006-225	Standardized Guidance on Compiling a Decision File and an Administrative Record 1 — Standardized Guidance on Compiling a Decision File and an Administrative Record	2006
WO IB 2006-052	Review of the Bureau of Land Management's Draft 516 DM Chapter 11	2006
WO IB 2006-089	Review of Draft BLM National Environmental Policy Act Handbook 1- Draft BLM NEPA Handbook 2- Reviewer Guide for Draft Handbook 3 -Comment Sheet for Draft Handbook	2006
WO IM 2007-025	Request for Compilation of Data for Cooperating Agency Report Regarding Environmental Impact Statements (EISs) and Environmental Assessments (EAs) 1 — CA — Report to the Council on Environmental Quality 2 — Report to the National Office on NEPA Compliance Efforts (imp) 3 — CA — Frequently Asked Questions and Answers	2007
WO IM 2007-033	Resource management Plan Schedule and Budget Accountability 1 - Group Recommendations for Plan Development, Resource Management Plan Budget Strategy Meeting, June 14-15, 2005	2007
WO IM 2007-041	Federal Lands Hunting, Fishing and Shooting Sports Roundtable Memorandum of Understanding 1- MOU — Federal Lands Hunting, Fishing and Shooting Sports Roundtable	2007
WO IM 2007-057	Guidance for Preparatory Staff Briefings for the WO and Briefings for the Office of the Director for Preliminary RMPs/EISs 1 — Information Memorandum, Pinedale Resource Management Plan (RMP) Revision 2 — Prebriefing/Briefing Presentation Outline for Preliminary Planning Documents 3 — Casper Draft RMP/EIS.pdf file	2007
WO IM 2 007-092	Guidance of Preparing Federal Register Notices 1 - Briefing Paper Requirement 2 - Example Briefing Papers	2007
WO IM 2007-097	Solar Energy Development Policy 1-Solar Energy Systems	2007
WO IM 2007-112	Obtaining Regional or Field Solicitor Participation and Review of RMPs and Supporting EISs	2007
WO IM 2007-167	Guidance on Submitting Federal Register Notices	2007
WO IM 2007-176	Temporary Route Definition	2007
WO IM 2007-20 1	Consultation Requirements with the National Oceanic and Atmospheric Administration (NOAA) Fisheries on Essential Fish Habitat under the Magnuson-Stevens Fishery Conservation and Management Act	2007
WO IM 2007-208	The Bureau of Land Management (BLM) Revised Chapter 11, Part 516 of the Department Manual 1 — Revised Chapter 11, Part 516 of the Departmental Manual (12 pp) 2 — Chapter four of NEPA Handbook, Categorical Exclusions (6 pp) 3 — Program specific guidance for use of CXs (3 pp)	2007
WO IB 2007-022	Geospatial and Resource Management Tools Training 2007	2007
WO IB 2007-029	Comments Requested: Revision of the Desk Guide to Cooperating Agency Relationships 1 — Optional Comment Form (1 p)	2007
WO IB 2007-045	Permanent Field Positions for PMFs	2007

BLM Directive		Year
WO IB 2007-048	Rotations for PMFs	2007
WO IB 2007-060	Service First MOU between BLM, NPS, USFWS, and USDA Forest Service 1 - Transmittal Memorandum (2 pp) 2 - Memorandum of Understanding (6 pp) 3 - Service First (2 pp)	2007
WO IB 2007-073	Energy Policy Act Section 390 Categorical Exclusions 1 - Energy Policy Act of 2005 Section 390 Categorical Exclusions (4 pp)	2007
WO IB 2007-083	Field Rotations for PMFs	2007
WO IB 2007-092	Telephone Survey: BLM Social Science Assessment	2007
WO IB 2007-107	Update on Bald Eagle Protection Requirements Under Applicable Laws and Regulations Post Endangered Species Act (ESA) Delisting	2007
WO IB 2007-108	Format for Submitting Planning Documents for Washington Office (WO) Review	2007
WO IM 2008-006	Implementation of Executive Order 13443, Facilitation of Hunting Heritage and Wildlife Conservation 1- Executive Order 13443, Facilitation of Hunting Heritage and Wildlife Conservation (2 pp)	2008
WO IM 2008-009	Potential Fossil Yield Classification (PFYC) System for Paleontological Resources on Public Lands	2008
WO IM 2009-011	Assessment and Mitigation of Potential Impacts to Paleontological Resources	2009
CEQ Guidance	40 CFR 1500-1508 Forty Most Asked Questions Transboundary Impacts Environmental Justice Considering Cumulative Effects Executive Orders Federal Register Document Drafting Handbook Plain Language Tools	
EPA Guidance	EPA EIS Rating Criteria How to File an EIS Considering Cumulative Effects in EPA Review Environmental Justice Final Guidance Air Pollution Emission Factors AP-42 Volume 1, Fifth Edition	

ACEC	Area of Critical Environmental Concern
ADR	Alternative Dispute Resolution
APD	Application for Permit to Drill
BLM	Bureau of Land Management
CEQ	Council of Environmental Quality
DNA	Documentation of NEPA Adequacy
DOI	Department of the Interior
FACA	Federal Advisory Committee Act
FFE	Full Force and Effect
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EPCA	Energy Policy and Conservation Act
EPS	Economic Profile System
ESA	Endangered Species Act
IM	Instruction Memorandum
LUP	Land Use Plan
MOU	Memorandum of Understanding
NCA	National Conservation Area
NEPA	National Environmental Policy Act
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPS	National Park Service
OHA	Office of Hearings and Appeals
OHV	Off-Highway Vehicle
PMF	Presidential Management Fellow
PFYC	Potential Fossil Yield Classification
RFD	Reasonably Foreseeable Development
RMP	Resource Management Plan
SOW	Statement of Work
USFWS	U.S. Fish and Wildlife Service
WO	Washington Office

6.1.3 Applicable Wyoming State Laws and Regulations

Wyoming State Laws and Regulations
Wyoming State Engineer's Office Statutes, Rules and Regulations
State of Wyoming Occupational Health and Safety Rules & Regulations
State of Wyoming Oil & Gas Conservation Commission Rules & Regulations
Wyoming Department of Environmental Quality Rules & Regulations
Wyoming Forestry Best Management Practices, Water Quality Protection Guidelines
Wyoming Guidelines for Managing Sagebrush Communities with Emphasis on Fire Management
Silviculture Best Management Practices, Wyoming Non-point Source Management Plan

6.1.4 Memoranda and Agreements

Memoranda and Agreements	Year	Description
Agreement between the Wyoming State Office of the BLM and the Wyoming Dept. of Environmental Quality (WDEQ), entitled "Abandoned Mine Land Reclamation Agreement"	1999	Provides for the cooperative effort between the two agencies and for a long-term relationship to efficiently and economically plan and share responsibilities to ensure effective abandoned mine land reclamation on public lands in Wyoming. This agreement may be superseded or amended in the near future, as section IV indicates a termination date of no later than December 31, 2004, which has past.
Memorandum of Agreement (MOA) between BLM, USFWS, and USDA Forest Service		MOA between the BLM, the USFWS, and the USDA Forest Service to improve the efficiency and effectiveness of plan-level Section 7 consultation processes under the ESA.
Memorandum of Understanding (MOU) between BLM and WGFD		MOU between the BLM, Wyoming Game and Fish Department through the Powder River Basin Interagency Working Group. A forum for government agencies to address and discuss issues of common concern to all parties involved in permitting and monitoring of Coal Bed Natural Gas (CBNG) development.
MOU No. WY 19		Between the United States Department Of Interior Bureau Of Land Management and the Wyoming Department of Environmental Quality Land Quality Division for Management Of Surface Mining and Exploration for Locatable Minerals On Public Lands, May 29, 2002 - Supplement to Memorandum to the General Statewide Memorandum of Understanding (MOU), between the Governor of Wyoming and the United States, by and through the State Director, Bureau Of Land Management, United States, Department of the Interior 1990. This document was updated in November, 2003.
Programmatic Agreement Among BLM, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers	1997	Regarding the Manner in which BLM will meet its Responsibilities Under the National Historic Preservation Act (1997).
State Protocol Agreement Between the Wyoming BLM State Director and the Wyoming State Historic Preservation Officer	2006	Describes the manner in which the Wyoming SHPO and the Wyoming BLM will interact and cooperator under the national Programmatic Agreement.

BLM Bureau of Land Management
CBNG Coalbed natural gas
ESA Endangered Species Act
MOA Memorandum of Agreement
MOU Memorandum of Understanding
USDA U.S. Department of Agriculture
USFWS U.S. Fish and Wildlife Service
WDEQ Wyoming Department of Environmental Quality
WGFD Wyoming Game and Fish Department

7.0 SUMMARY OF SCOPING REPORT

The purpose of the public scoping process is to identify issues and planning criteria that should be considered in the Buffalo Resource Management Plan (RMP) and Environmental Impact Statement (EIS) and to initiate public participation in the planning process. During the scoping process, the Bureau of Land Management (BLM) solicits comments from relevant agencies and the public, organizes and analyzes all of the comments received, and then distills the comments to identify the issues, which are called planning issues or important issues that need to be addressed during the planning process.

Scoping for the Buffalo RMP Revision Project took place from November 14, 2008 to January 5, 2009. During the week of December 1, 2008, the BLM hosted scoping meetings in five locations across the planning area. Scoping meetings were held in Wright, Buffalo, Gillette, Sheridan, and Kaycee. In addition to members of the BLM interdisciplinary team, approximately 129 people attended the scoping meetings.

The BLM received a total of 95 unique written comment documents and 101 form letters during the scoping period. Comments were delivered in person, submitted via email, or mailed to the field offices. The most commonly used method of comment submission was e-mail. From these 95 unique written comment documents, the BLM bracketed approximately 710 unique individual comments related to RMP planning issues; written comment documents often contained more than one unique comment.

Unique scoping comments were compiled and evaluated to identify issue categories, broad resource topics used to consolidate comments on like topics. These issue categories were then used to group individual comments, and these grouped comments were then used to develop discreet planning issue statements. The 12 issue categories and individual comments counts were: Air Quality and Climate Change (43), Water Quality and Wetlands/Riparian Areas (52), Mineral and Energy Resources (143), Biological Resources: Vegetation, Fish, Wildlife, and Special Status Species (156), Invasive Species and Pest Management (13), Cultural and Paleontological Resources and Tribal Concerns (22), Lands and Realty and Rights-Of-Way (42), Transportation and Access (69), Recreation (21), Livestock Grazing (43), Special Designations (82), Socioeconomic Resources (24).

One or more planning issue statements were developed for each of the 12 planning issue categories, for a total of 18 issue statements (written in the form of questions). These planning issue statements summarize the issues and concerns raised by the public during the scoping process. Adjustments to the planning issues will continue to be made as needed during the planning process as the BLM receives additional input from the public and cooperators. The 18 planning issue statements are identified below for each of the planning issue categories.

Air Quality and Climate Change

- How can the BLM manage activities occurring on public lands to ensure they do not contribute to air quality-related impacts to human health or resource values?

- How should the BLM incorporate climate change into its land management practices?

Water Quality and Wetlands/Riparian Areas

- How should the BLM manage the use and development of public lands to ensure surface and groundwater resources are available and of sufficient quality for public, wildlife, and other uses?
- How can BLM-administered lands be managed to protect wetland and riparian areas?

Mineral and Energy Resources

- Which areas should be open to mineral and energy development and how will the BLM address issues related to split-estate lands?
- What management and leasing actions are needed for mineral and energy developments to protect natural, biological, and cultural resources?

Biological Resources: Vegetation, Fish, Wildlife, and Special Status Species

- What management actions or development actions are needed to protect, improve, or restore terrestrial and aquatic habitats for fish, wildlife, and special status species (including greater sage-grouse)?
- How can the BLM manage forests resources to protect ecosystem health and preserve multiple use?

Invasive Species and Pest Management

- What development stipulations and management actions are appropriate to control and prevent the spread of noxious weeds, pests, and invasive species?

Cultural and Paleontological Resources and Tribal Concerns

- How can the BLM protect paleontological resources, cultural and heritage sites, and traditional cultural properties?
- How can the BLM effectively involve Native Americans in the RMP revision and BLM decision making?

Lands and Realty and Rights-Of-Way

- How can land tenure and management adjustments be used for access and development, while also protecting natural, biological, and cultural resource values?
- Which areas should be available for renewable energy development and how should this development be managed to protect other resource values and uses?

Transportation and Access

- How should travel, including off-highway vehicle (OHV) use be managed for recreational and commercial access, while also protecting natural, biological, and cultural resources?

Recreation

- How should the BLM manage recreation on public lands to provide a full spectrum of recreational opportunities, while ensuring public safety and the protection of resources values?

Livestock Grazing

- How should the BLM manage livestock grazing and related development on public lands to ensure the protection of natural, biological, and cultural resources while maintaining grazing-dependent socioeconomic and heritage values?

Special Designations

- What areas contain sensitive resources requiring special management and what, if any, special designations are appropriate to protect them?

Socioeconomic Resources

- How can the BLM protect natural, biological, and cultural resources while managing BLM-administered lands to support local economies and traditions tied to these lands?

Additional information about the scoping process, summaries of the scoping comments received, and reproductions of the comment documents in their entirety can be viewed in the Final Scoping Report for the Buffalo RMP revision, available at http://www.blm.gov/wy/st/en/programs/Planning/rmps/buffalo.html.

8.0 LIST OF PREPARERS

Name	Education	Title	Role	Years of Experience
Bureau of Land Management Interdisciplinary Team				
Duane Spencer	B.S. Petroleum Engineering, University of Wyoming, 1984	Field Office Manager	Management and Oversight	25
Paul Beels	B.S. Wildlife Management, Humboldt State University, 1975	Associate Field Office Manager	Management and Oversight	33
Brian Cox	B.S. Wildlife Biology, University of Montana, 1989 M.S. Rangeland Ecology, Texas A&M, 1991	Assistant Field Office Manager (Resources)	Management and Oversight	22
Linda Slone	A.S. Paralegal/Natural Science and Math, Casper College, 1994	Project Manager	Planning Coordination and Consistency	30
Ken Peacock	M.S. University of Wyoming	State Office Planning Lead	Planning Coordination and Consistency (Backup)	17
Thomas Bills	B.S. State University of New York College of Environmental Science and Forestry, 1986	Planning & Environmental Coordinator	Technical Coordinator	22
Diane Adams	B.S. Forest Resource Management, University of Idaho, 1981	GIS Specialist	GIS Coordinator/ Visual Resources	10
Kerry Aggen	B.S. Geological Engineering, 1995 M.S. Geochemistry, 2007	Geologist	Geologic Resources/ Other Solid Leasable Minerals/ Locatable Minerals/Salable Minerals	1
Cindy Allen	B.A. Counseling B.S. Forestry, Mississippi State University, 1983	Forester	Vegetation – Forests and Woodlands, Forest Products	20
Roy Allen	B.S. Chemistry M.S. & Ph.D. Economics	Economist	Social Conditions/ Economic Conditions/ Environmental Justice	32
Jude Carino	B.A. Anthropology, 1978 M.A. Anthropology 1981	National Landscape Conservation System Coordinator, Outdoor Recreation Planner	Wild & Scenic Rivers/ Wilderness Study Areas	26
Lesley Collins	B.A. Journalism, University of Northern Colorado,1997	Public Affairs Specialist	Public Affairs	9

Name	Education	Title	Role	Years of Experience
Buck Damone	B.S. Sociology, Montana State University, 1994	Archeologist	Areas of Critical Environmental Concern (Cantonment Reno/Hole-in-the-Wall/ Pumpkin Buttes)/ Historic Trails/ Cultural Resources	16
Chris Durham	B.S. Wildlife Biology, University of Alaska-Fairbanks, 1998	Supervisory Natural Resource Specialist	Fish/Wildlife/ Special Status Species (Plants/Fish/Wildlife)	10
Al Elser	Ph.D., Chemistry (concentration: geochemistry), Georgia State University, 2004	Petroleum Geologist	Leasable Oil and Gas (RFD)	6
Jay Esperance	B.S. Resource Management, California State University: Sacramento, 1971	Fire Management Officer	Unplanned and Wildland Fire/ Planned and Prescribed Fire	31
Courtney Frost	B.A. Biology and Environmental Conservation, University of Colorado, 1993	Wildlife Biologist	Fish/Wildlife/ Special Status Species (Plants/Fish/Wildlife)	13
Janelle Gonzales	B.S. Rangeland Science, North Dakota State University, 1982	Rangeland Management Specialist	Livestock Grazing and Rehabilitation/Vegetation (Grassland and Shrubland Communities/Riparian and Wetland Communities)/ Invasive Species and Pest Control	26
Stacy Gunderson	M.S. Geological Engineering, South Dakota School of Mines and Technology, 2006	Civil Engineer	Travel Management	3
Steve Hannan	B.S. Wildlife Management, Texas Tech, 1974 M.S. Rangeland Science, Colorado State University, 1975	Natural Resource Specialist (Fuels)	Fire and Fuels Management	33
Dale Hanson	B.S. Wildlife Management, New Mexico State University, 1976 M.S. Geological Sciences, University of Oregon, 2000	Regional Paleontologist	Areas of Critical Environmental Concern (Dry Creek Petrified Tree)/ Paleontological Resources	31
Ken Henke	B.S. Wildlife Biology, Arizona State University, 1980	Natural Resource Specialist	Health and Safety (Hazardous Materials)	26

Name	Education	Title	Role	Years of Experience
Melanie Hunter	B.S. Natural Resource Management, Colorado State University		Leasable Oil and Gas (Surface Use)/Health and Safety (Airports)	4
Arnie Irwin	B.S. Soils, North Dakota State University	Soil Scientist	Soil Resources	25
Mike Karbs	B.S. Colorado School of Mines M.S. University of Wisconsin, Madison	Mineral Engineer	Leasable Coal	33
Pat Karbs	Casper College	Writer-Editor	Writer-Editor	27
Jenny Morton	B.S. Natural Resources, The Ohio State University, 2001	Wildlife Biologist	Fish/Wildlife/ Special Status Species (Plants/Fish/Wildlife)	7
Jerry Queen	B.A. Earth Science, Chadron State College	Geologist	Geologic Resources/ Other Solid Leasable Minerals/ Locatable Minerals/Salable Minerals	25
Christine Sadler	B.A. Business Management/ Administration, St. Leo University, 2001 1 year graduate school Environmental Policy/Natural Resource Management Certified General Appraiser, 2006 Lands and Realty Academy, 2003	Realty Specialist	Lands and Realty/ Renewable Energy/Rights-of-way and Corridors	2
Lesly Smith	B.A. Journalism, Louisiana Tech University, 1973	Recreation and Travel Management Lead (Outdoor Recreation Planner)	Transportation and Access/ Recreation	16
Dean Stilwell	B.S. Geology, University of Nebraska, 1976 M.S. Geology, University of Nebraska, 1978	Geologist	Leasable Oil and Gas (RFD)	31
Jim Verplancke	B.A. Fish and Wildlife Management, University of Wyoming, 1995	Natural Resource Specialist	Recreation and Travel Management	4

Name	Education	Title	Role	Years of Experience
Chris Williams	B.S. Geology, University of Alabama M.S. Earth Resources, Colorado State University	Hydrologist	Water Resources	24
Mike Worden	B.S. Petroleum Engineering, University of Alaska Fairbanks	Supervisory Petroleum Engineer	Leasable Oil and Gas (Engineering)	6
John Zachariassen	B.S. Biology, Carleton University, 1981 M.S. Soils, 1985, University of Nebraska-Lincoln Ph.D. Biogeochemistry/ Atmospheric-Bios Interactions, Colorado State University, 1992	Air Quality Specialist	Air Quality	11
Consultant				
ICF International – Interdisciplinary Team				

9.0 GLOSSARY

Archaeology: A method of the discovery, study and reconstruction of past human cultures from material remains such as artifacts and sites.

Archeological site: A place which holds evidence of past human activity.

Archaic: Ancient, old, or surviving from an earlier people. Archaic can also mean relating to an earlier time.

Area of Critical Environmental Concern (ACEC): An area within the public lands designated for special management attention 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. According to 43 CFR 1601.0-5a, "The identification of...[an] ACEC shall not, of itself, change or prevent change of the management or use of public lands."

Areas Administratively Unavailable to Leasing: BLM H-1601-1 - Land Use Planning, Appendix C.4 uses the term areas closed to oil and gas leasing. Areas administratively unavailable or closed to oil and gas leasing are areas where it has been determined that other land uses or resource values cannot be adequately protected with even the most restrictive oil and gas leasing stipulations; appropriate protection can be ensured only by making the areas administratively unavailable to oil and gas leasing for the life of the plan. Lands currently under lease would remain leased for the life of the leases. After expiration of these leases, no lands would be available for lease.

Allotment: An area of land where one or more livestock operators graze their livestock. Allotments are Bureau of Land Management (BLM) lands, but may also include other federally managed, state-owned, and private lands. An allotment may include one or more separate pastures. Livestock numbers and periods of use are specified for each allotment. Allotments are classified by the following:

Category I – Improve Existing Resource Conditions

Category M – Maintain Existing Resource Conditions

Category C – Custodial Management.

Analysis Area: Any lands, regardless of jurisdiction, for which the BLM synthesizes, analyzes, and interprets data for information that relates to planning for BLM-administered lands.

Animal Unit Month (AUM): A standardized measurement of the amount of forage necessary for the sustenance of one cow unit or its equivalent for 1 month (approximately 800 pounds of forage).

Arroyo: A deep gully from the Spanish work riachuelo meaning stream, brook, small river or the dry bed of a waterway in the Southwestern part of the United States.

Arroyo traps: A dead end arroyo that was deep and broad enough to trap bison. Hunters drove a group of bison into one. When the stampeding bison reached the dead end, hunters armed with spears slaughtered the struggling animals.

Artifact: Any object made, modified or used by humans, usually but not necessarily portable.

Atlatl: A spear thrower that extended the range of a thrown spear. Using it caused the spear to go faster and farther than when it was thrown without an atlatl.

Basin: An extent of land where water from rain or snow melt drains downhill into a body of water, such as a river, lake, reservoir, estuary, wetland, sea or ocean. The basin includes both the streams and rivers that convey the water as well as the land surfaces from which water drains into those channels, and is separated from adjacent basins by a drainage divide.

Big Game Crucial Winter Range: Winter habitat on which a wildlife species depends for survival. Because of severe weather conditions or other limiting factors, no alternative habitat would be available.

Borrow Material: A term used in conjunction with construction. The term refers to unprocessed material excavated from a borrow pit for use as fill at another location.

Bow and arrow: A bow is a weapon for shooting arrows. It is made of a flexible material, often wood, that is bent by a string that is fastened to each end. An arrow is a straight slender stick that has a projectile point at one end and feathers on the other.

Carbon Dioxide Flood: A carbon dioxide flood is an enhanced oil recovery technique that injects fluid into the reservoir. When carbon dioxide is injected, it mixes with the oil and the two compounds dissolve into one another. The injected CO_2 acts as a solvent to overcome forces that trap oil in tiny rock pores and helps sweep the immobile oil left behind after the effectiveness of water injection decreases, resulting in increased oil production (EnCana 2005).

Cheatgrass: Cheatgrass is an annual grass that forms tufts up to 2 feet tall. The leaves and sheaths are covered in short, soft hairs. The flowers occur as drooping, open, terminal clusters that can have a greenish, red, or purple hue. Flowering occurs in the early summer. These annual plants will germinate in fall or spring (fall is more common), and senescence usually occurs in summer. Cheatgrass invades rangelands, pastures, prairies, and other open areas. Cheatgrass has the potential to completely alter the ecosystems it invades. It can completely replace native vegetation and change fire regimes and is most problematic in areas of the western United States with lower precipitation levels.

Class I Wells: Injection wells that are

(1) Wells used by generators of hazardous waste or owners or operators of hazardous waste management facilities to inject hazardous waste beneath the lowermost formation containing, within ¼ mile of the wellbore, an underground source of drinking water.
(2) Other industrial and municipal disposal wells that inject fluid beneath the lowermost formation containing, within ¼ mile of the wellbore, an underground source of drinking water.
(3) Radioactive waste disposal wells that inject fluid below the lowermost formation containing an underground source of drinking water within ¼ mile of the wellbore.

Class II Wells: Injection wells

(1) That are brought to the surface in connection with natural gas storage operations, or conventional oil or natural gas production, and may be commingled with wastewaters from gas plants, which are an integral part of production operations, unless those waters are classified as a hazardous waste at the time of injection.
(2) For enhanced recovery of oil or natural gas.
(3) For storage of hydrocarbons that are liquid at standard temperature and pressure.

Clinker: Clinker forms from the natural burning of coal beds within in an outcrop. It consists of baked (melted) and fused rocks that are commonly red or red-brown in color.

Closed: Generally denotes that an area is not available for a particular use or uses; refer to specific definitions found in law, regulations, or policy guidance for application to individual programs.

Clovis point: Spear point made by early Paleo-Indians; characterized by a short, shallow channel on one or both faces; larger than a Folsom point.

Commodity: An economic good, such as a product of agriculture or mining.

Communal hunt: A hunt in which all the group's able people joined. It may involve a number of groups and employ a technique that could kill many animals, such as bison (or buffalo) jump.

Communication Site Management Plan: A plan that provides for effective administration of a communications site. The site plan defines the principles and technical standards adopted in the site designation. The site plan provides direction for the day-to-day operations of the site in connection with the lease. The site plan shall delineate the types of uses that are appropriate at this site and the technical and administrative requirements for management of the site. The site plan should reflect the complexity of the current situation and the anticipated demand for the site.

Comprehensive Weed Management Plan: A plan for controlling invasive plant species that incorporates integrated weed management techniques and accounts for pertinent considerations, such as management actions and allocations affecting weeds.

Contrast: opposition or unlikeness of different forms, lines, colors, or texture in a landscape.

Controlled Surface Use (CSU): Surface occupancy or use will be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts. Identified resource values require special operational constraints that may modify the lease rights. CSU is used for operating guidance, not as a substitute for the no surface occupancy or timing limitation stipulations.

Cordage: Plant fibers twisted into cord, rope, or yarn.

Cultural Resource Inventory Levels: A three-tiered process for discovering, recording, and evaluating cultural resources.

> *Class I* - A review of existing literature and oral informant data combined with an analysis of a specific geographic region (e.g., an area of potential effect, drainage basin, resource area, etc.).
>
> *Class II* - A sampling survey usually aimed at developing and testing a predictive model of cultural resource distribution.
>
> *Class III* - An on-the-ground survey to discover, record, and evaluate cultural resources within a specific geographic area (e.g., usually an area of potential effect for a proposed undertaking).

dB (decibel): A unit of measurement of the loudness or strength of a signal. One decibel is considered the smallest difference in sound level that the human ear can discern. Decibels are a relative measurement derived from two signal levels: a reference input level and an observed output level. A decibel is the logarithm of the ratio of the two levels. One Bel is when the output signal is 10x that of the input and one decibel is $1/10^{th}$ of a Bel.

Culture: The customs, beliefs, and ways of life of a group of people.

Cultivate: To raise crops; to water, loosen the soil, and weed around growing plants.

Cultivation: The process of preparing the land and caring for growing crops.

Dendrochronology: The study of tree-ring dating. The science of dating events and weather patterns in former times by studying growth rings in trees. One can determine the age of a tree by counting its rings.

Designated Roads and Trails: Specific roads and trails on which some type of motorized vehicle use is allowed either seasonally or year-long.

Desired Plant Community (DPC): Of the several plant communities that may occupy a site, the DPC is the community that has been identified through a management plan to best meet the plan's objectives for the site. At a minimum, it must protect the site.

Diet: What people and living organisms eat is their diet. A diet is a combination of foods and liquids that provide the necessary nutrients for the body.

Digging stick: A pointed, wooden stick used to dig and pry edible roots from the ground.

Domestication: The process of taming or making usable for humans.

Drive line: Long lines of stone piles that marked a path used to channel the bison in the proper direction during a hunt. The drive lines caused the animals to move toward a jump-off or corral location.

Dung: Animal manure. Solid waste material passed from the bowels of animals. Scientists study dung to learn what animals and humans ate in the past.

Ecological Site: A kind of land with a specific potential natural community and specific physical site characteristics, differing from other kinds of land in that the site has the ability to produce distinctive kinds and amounts of vegetation and to respond to management. Ecological sites are defined and described with information about soil, species composition, and annual production.

Endangered Species: Any species that is in danger of extinction throughout all or a significant portion of its range.

Enhancement: A management action designed to improve visual quality.

Environment: The conditions around an area that affect it. These include geography, soil, climate, plants, and animals.

Ephemeral Stream: A stream that flows only in direct response to precipitation, and whose channel is at all times above the water table. Confusion over the distinction between intermittent and ephemeral streams may be minimized by applying Meinzer's suggestion that the term "ephemeral" be arbitrarily restricted to streams that do not flow continuously for at least 30 days (Prichard et al. 1998). Ephemeral streams support riparian areas when streamside vegetation reflects the presence of permanent subsurface water.

Epidemic: An outbreak of a pest or disease in a high proportion of the individuals of a population in a geographic area. For example, outbreaks of bark beetles causing mortality in a large portion of pine trees in a forest.

Evidence: Data which are used to prove a point, or which clearly indicate a situation.

Excavation (cultural resources): Carefully removing layers of dirt or sediment to find objects or features made by people from long ago.

Exceedance: An event in which measurements of ambient air quality are above the national ambient air quality standard (NAAQS) or Wyoming Department of Environmental Quality (DEQ) standard set for a particular pollutant. For example, an annual average nitrogen dioxide value of 110 $\mu g/m^3$ is an exceedance of both the NAAQS and Wyoming DEQ annual average standard for nitrogen dioxide of 100 $\mu g/m^3$.

Exclusion Areas: Areas with sensitive resource values where rights-of-way and 302 permits, leases, and easements would not be authorized.

Extensive Recreation Management Areas (ERMA): These are areas where dispersed recreation is encouraged and where visitors have a freedom of recreational choice with minimal regulatory constraint.

Extinct: No longer existing or active; died out.

Extinction: Bring to an end, wiping out, or destruction.

Federal Mineral Estate: Federal mineral estate is where the federal government retains any form of mineral ownership, including coal, oil and gas, potassium, sodium, or any combination of the above.

Fire Management Plan: Identifies appropriate strategies to achieve resource objectives. Identifies fire policy, objectives, and prescribed actions; may include maps, charts, tables, and statistical data.

Fire Regime Condition Class: A classification of the amount of departure from the natural fire regime. The departure results in changes to one or more of the following ecological components: vegetation characteristics (e.g., species composition, structural stages, stand age, canopy closure, and mosaic pattern), fuel composition, fire frequency, severity, and pattern, and other associated disturbance (e.g., insect and disease mortality, grazing, and drought). The three condition classes are listed below:

(a) **Condition Class 1**

- The historic disturbance regime is largely intact and functioning (e.g., has not missed a fire return interval)
- Potential intensity and severity of fire within historic range
- Effects of disease and insects within historic range
- Hydrologic functions within normal historic range
- Vegetation composition and structure resilient to disturbances
- Nonnative species currently not present or to a limited extent
- Low risk of loss for key ecosystem components

(b) **Condition Class 2**

- Moderate alterations to historic disturbance regime evident (e.g., missed one or more fire return intervals)
- Effects of disease and insects pose an increased risk of loss of key community components
- Riparian areas and associated hydrologic function show measurable signs of adverse departure from historic conditions
- Vegetation composition and structure shifted toward conditions less resilient to disturbances
- Populations of nonnative species may have increased, increasing the risk of further increases following disturbance

(c) **Condition Class 3**

- Historic disturbance regime significantly altered; historic disturbance processes and impacts may be precluded (e.g., missed several fire return intervals)
- Effects of disturbance (fire, insects, and disease) may cause significantly or complete loss of key community components
- Hydrologic functions may be adversely altered; high potential for increased sedimentation and reduced streamflows
- Invasive species may be common and in some cases the dominant species on the landscape; disturbance will likely increase both the dominance and geographic extent of these invasive species
- Highly altered vegetation composition and structure predisposes community to disturbance events outside the range of historic availability; disturbance may have effects not observed or measured before

Fire Return Interval: The number of years between two successive fire events at a specific site or area.

Flaring/Venting: The controlled burning (flare) or release (vent) of natural gas that cannot be processed for sale or use because of technical or economic reasons.

Floodplain Connectivity: Maintenance of lateral, longitudinal, and vertical pathways for biological and hydrological processes in the floodplain. Examples of failures to maintain connectivity could include culverts or levees that restrict flow in the floodplain and that focus overbank flow into the channel.

Flushing Livestock: Flushing livestock is the holding of livestock in an invasive plant species seed-free area where they are fed an invasive species seed-free ration for 72 hours, thus flushing invasive species seed from the animals' digestive systems.

Folsom Point: A spear or atlatl dart point made by later Paleo-Indians. Characterized by a long, shallow channel on one or both faces; smaller than a Clovis point.

Foothill: A low hill near the base of a mountain or range of mountains.

Foreground-Middle Ground Zone: An area that can be seen from a travel route for a distance of 3 miles (foreground) to 5 miles (middle ground) where management activities might be viewed. A distance from 5 to 15 miles is called the *Background Zone* and the area beyond 15 miles is called the *Seldom-Seen Zone.*

Fossil: The remains or traces of an organism preserved by natural processes in the earth's crust. This would include plants and animals, their tracks, burrows, and other imprints, and are considered a nonrenewable resource. It does not include minerals such as coal, oil and gas, and tar sands.

Geologic Resources: Resources associated with the scientific study of the Earth, including its composition, structure, physical properties, and history. Geologic resources commonly include the study of minerals (**mineralogy**) and rocks (**petrology**); the structure of the Earth (**structural geology**) and volcanic phenomena (**volcanology**); and landforms and the processes that produce them (**geomorphology** and **glaciology**).

Glacier: A large mass of ice that moves slowly down a slope or valley.

Goal: A broad statement of a desired outcome. Goals are usually not quantifiable and may not have established timeframes for achievement.

Guzzler: A water development for wildlife.

HABS/HAER: The Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER) is an integral component of the federal government's commitment to historic preservation. The program documents important architectural, engineering and industrial sites throughout the United States and its territories. A complete set of HABS/HAER documentation, consisting of measured drawings, large-format photographs, and written history plays a key role in accomplishing the mission of creating an archive of American architecture and engineering and in better understanding what historic resources tell us about America's diverse ethnic and cultural heritage. To insure that such evidence is not lost to future generations, the HABS/HAER Collections are archived at the Library of Congress, where they are made available to the public.

Heavy Equipment Use: This phrase is used in fire management and is relative to limiting fire suppression tactics. In this context it refers to not using dozers, skidders, or graders in areas where important resource values are in need of protection. Fire engines and water tenders used during suppression activities would be allowed.

Held by Production: Leases that become productive and do not terminate until all wells on the lease have ceased production.

Historic: Referring to the time after written records or after the Europeans first came and wrote about the people and events in America.

History: The study of past events and times through use of written and recorded sources. In some cases, oral sources may also be available.

House Pit: A small dwelling that had a shallow excavated floor and a roof of poles covered with branches or hides.

Hunter-gatherers: People who depend on wild animals and plants for food to survive.

Impact Analysis for Planning (IMPLAN 2000) Model: IMPLAN is a regional economic model that provides a mathematical accounting of the flow of money, goods, and services through a region's economy. The model provides estimates of how a specific economic activity translates into jobs and income for the region. It includes the "ripple effect" (also called the "multiplier effect") of changes in economic sectors that may not be directly impacted by management actions, but are linked to industries that are directly impacted. In IMPLAN, these ripple effects are termed indirect impacts (for changes in industries that sell inputs to the industries that are directly affected) and induced impacts (for changes in household spending as household income increases or decreases due to the changes in production).

Indicator: An indicator is a component of a system whose characteristics (for example, presence, absence, quantity, and distribution) can be observed, measured, or monitored based on sound scientific principles. An indicator can be evaluated at a site- or species-specific level. Monitoring of an indicator must be able to show change within timeframes acceptable to management and be capable of showing how the health of the ecosystem is changing in response to specific management actions. Selection of the appropriate indicators to be observed, measured, or monitored in a particular allotment is a critical aspect of early communication among the interests involved on-the-ground. The most useful indicators are those for which change or trend can be easily quantified and for which agreement as to the significance of the indicator is broad based.

Integrated Weed Management: The use of all appropriate weed control measures, including fire, as well as mechanical, chemical, biological, and cultural techniques, in an organized and coordinated manner on a site-specific basis.

Intermittent Stream: A stream that flows only at certain times of the year when it receives water from springs or from some surface source such as melting snow in mountainous areas. Confusion over the distinction between intermittent and ephemeral streams may be minimized

by applying Meinzer's suggestion that the term "intermittent" be arbitrarily restricted to streams that flow continuously for periods of at least 30 days (Prichard et al. 1998).

Infestation: The inhabitation of a host by large numbers of pests, such as bark beetles on pine trees.

Invasive Species: A nonnative species whose introduction does or is likely to cause economic or environmental harm or harm to human health (EO 13112).

Karst Region: Karst topography is a landscape shaped by the dissolution of a layer or layers of soluble bedrock, usually carbonate rock such as limestone or dolomite. Due to subterranean drainage, there may be very limited surface water, even to the absence of all rivers and lakes. Many karst regions display distinctive surface features, with sinkholes or dolines being the most common. However, distinctive karst surface features may be completely absent where the soluble rock is mantled, such as by glacial debris, or confined by a superimposed non-soluble rock strata. Some karst regions include thousands of caves, even though evidence of caves that are big enough for human exploration is not a required characteristic of karst.

Landscape character: The arrangement of a particular landscape as formed by the variety and intensity of the landscape features and the four basic elements of form, line, color, and texture. These factors give the area a distinctive quality which distinguishes it from its immediate surroundings.

Land Tenure: To improve the manageability of the Bureau of Land Management (BLM) lands and improve their usefulness to the public, the BLM has numerous authorities for "repositioning" lands into a more consolidated pattern, disposing of lands, and entering into cooperative management agreements. These land-pattern improvements are completed primarily through the use of land exchanges, but also through land sales, jurisdictional transfers to other agencies, and through the use of cooperative management agreements and leases. These ownership or jurisdictional changes are referred as "Land Tenure Adjustments."

Leasable Minerals: Those minerals or materials subject to lease by the federal government under the Mineral Leasing Act of 1920. They include coal, phosphate, asphalt, sulphur, potassium, and sodium minerals; oil and gas, as well as geothermal resources.

Limited Area: Means an area restricted, at certain times, in certain areas, and/or to certain vehicle use. These restrictions may be of any type, but can generally be accommodated within the following type of categories: Number of vehicles; type of vehicles; time of season of vehicle use; permitted or licensed use only; use on existing roads and trails; use on designated roads and trails; and other restrictions.

Locatable Minerals: Minerals subject to exploration, development, and disposal by staking mining claims as authorized by the Mining Law of 1872, as amended. This includes deposits of

metallic minerals such as gold, silver, and other uncommon materials not subject to lease or sale.

Medicine Wheel: A stone structure that is shaped like a wheel with radiating spokes with a central pile of stones.

Megafauna: Large animals especially in the last Ice Age or Pleistocene. These animals are now extinct and include mammoths, mastodons, American lions, American camels, and saber-toothed cats.

Mineral Materials (Salables): Materials such as common varieties of sand, stone, gravel, pumice, pumicite, and clay that are not obtainable under the mining or leasing laws, but can be acquired under the Mineral Materials Act of 1947, as amended.

Mineral Withdrawal: A formal order that withholds federal lands and minerals from entry under the Mining Law of 1872, as amended, and closes the area to mineral location (i.e., staking mining claims) and development.

Mitigation: Lessening or avoiding adverse impacts to a resource from actions or activities of another resource.

(a) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.

(b) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.

(c) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.

(d) Compensating for the impact by replacing or providing substitute resources or environments.

Mitigation measures: methods or procedures designed to reduce or lessen the adverse impacts caused by management activities.

Multiple Use Reservoir: A human-created lake or pond with a combination of balanced uses, including, but not limited to, recreation, livestock watering, watershed health, and wildlife and fish.

Native American: The first people living in North and South America. Many groups of people today are Native Americans and have ancestors who lived on these continents for thousands of years before Columbus came. They are also called American Indian, First American, Alaska Native and Native People.

Native Species Status: Native Species Status (NSS) refers to the population status of species native to the area in which their habitats occur. The NSSs are divided into the following categories:

NSS1 **Native Species Status 1**

- Populations are greatly restricted or declining, extirpation appears possible; or ongoing 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 that are stable or increasing and not restricted in numbers and/or distribution; ongoing significant loss of habitat.

Natural Fire Regime: The general classification of the role fire would play across a landscape in the absence of modern human mechanical intervention, but including the influence of aboriginal burning (Agee 1993, Brown 1995).

Necessary Tasks (Clause): Work requiring the use of motor vehicles. Examples include using motor vehicles to repair range improvements, manage livestock, perform geophysical exploration activities and other types of leasable mineral exploration activity (other than casual use), and performing mining claim functions resulting in less than 5 acres of surface disturbance as described in 43 CFR 3809.

Nomad: A person who belongs to a group of people who have no permanent home, but wander from place to place searching for water, food, or grazing land.

Noxious Weed: Any living stage (including seeds and reproductive parts) of a parasitic or other plant of a kind that is of foreign origin, is new to or not widely prevalent in the United States, and can directly or indirectly injure crops, other useful plants, livestock, poultry, or other interests of agriculture, including irrigation, navigation, fish and wildlife resources, or the public health. In Wyoming, a noxious weed is a legal designation of plants under the Wyoming Weed and Pest Control Act.

No Surface Occupancy (NSO): The term "no surface occupancy" (NSO) is used in two ways. It is used in one way to define a NSO area where no surface-disturbing activities of any nature or for any purpose would be allowed. For example, construction or the permanent or long-term placement of structures or other facilities for any purpose would be prohibited in an NSO area.

The other way the "no surface occupancy" term is used is as a stipulation or mitigation requirement for controlling or prohibiting selected land uses or activities that would conflict with other activities, uses, or values in a given area. When used in this way, the NSO stipulation or mitigation requirement is applied to prohibit one or more specific types of land and resource development activities or surface uses in an area, while other—perhaps even similar—types of activities or uses (for other purposes) would be allowed. For example, protecting important rock art relics from destruction may require closing the area to the staking of mining claims and surface mining, off-road vehicle travel, construction or long-term placement of structures or pipelines, power lines, general purpose roads, and livestock grazing. Conversely, the construction of fences to protect the rock art from vandalism or from trampling or breakage by livestock, an access road or trail, and other visitor facilities to provide interpretation and opportunity for public enjoyment of the rock art would be allowed. Further, if there were interest in development of leasable minerals in the area, leases for oil and gas, coal, and so forth, could be issued with a "no surface occupancy" stipulation or mitigation requirement for the rock art site, which would still allow access to the leasable minerals from adjacent lands and underground.

The term "no surface occupancy" has no relationship or relevance to the presence of people in an area.

Occupied Lek: A lek that has been active during at least one strutting season within the last 10 years.

Objective: A description of a desired condition for a resource. Objectives can be quantified and measured and, where possible, have established timeframes for achievement.

Open: Generally denotes that an area is available for a particular use or uses. Refer to specific program definitions found in law, regulations, or policy guidance for application to individual programs.

Off-Highway Vehicle (OHV): Any motorized vehicle capable of, or designed for, travel on or immediately over land, water, or other natural terrain, excluding (1) any nonamphibious registered motorboat; (2) any military, fire, emergency, or law enforcement vehicle being used for emergency purposes; (3) any vehicle whose use is expressly authorized by the authorized officer, or otherwise officially approved; (4) vehicles in official use; and (5) any combat or combat support vehicle when used in times of national defense emergencies.

Off-Highway Vehicle (OHV) Management Designations: Designations apply to all off-road vehicles (ORVs) regardless of the purposes for which they are being used. Emergency vehicles are excluded. The ORV designation definitions have been developed in cooperation with representatives of the United States Forest Service, National Park Service, and the Bureau of Land Management (BLM) state and field office personnel. The BLM recognizes the differences between ORVs and over-snow vehicles in terms of use and impact. Therefore, travel by over-snow vehicles will be permitted off existing routes and in all open or limited areas (unless otherwise specifically limited or closed to over-snow vehicles) if they are operated in a responsible manner without damaging the vegetation or harming wildlife.

> **Closed:** Vehicle travel is prohibited in the area. Access by means other than motorized vehicle is permitted. This designation is used if closure to all vehicular use is necessary to protect resources, to ensure visitor safety, or to reduce conflicts.
>
> **Open:** Vehicle travel is permitted in the area (both on and off roads) if the vehicle is operated responsibly in a manner not causing, or unlikely to cause, significant undue damage to or disturbance of the soil, wildlife, wildlife habitats, improvements, cultural or vegetative resources, or other authorized uses of the public lands. These areas are used for intensive OHV use where there are no compelling resource needs, user conflicts, or public safety issues to warrant limiting cross-country travel.

Limited:

(a) Vehicle travel is permitted only on roads and vehicle routes which were in existence prior to the date of designation in the *Federal Register*. Vehicle travel off of existing vehicle routes is permitted only to accomplish necessary tasks and only if such travel does not result in resource damage. Random travel from existing vehicle routes is not allowed. Creation of new routes or extensions and/or widening of existing routes are not allowed without prior written agency approval.

(b) Vehicle travel is permitted only on roads and vehicle routes designated by the BLM. In areas where final designation has not been completed, vehicle travel is limited to existing roads and vehicle routes as described above. Designations are posted as follows:

1. Vehicle route is open to vehicular travel.
2. Vehicle route is closed to vehicular travel.

Vehicle travel is limited by number or type of vehicle. Designations are posted as follows:

1. Vehicle route limited to four-wheel drive vehicles only.
2. Vehicle route limited to motorbikes only.
3. Area is closed to over-snow vehicles.

Vehicle travel is limited to licensed or permitted use.

Vehicle travel is limited to time or season of use.

Where specialized restrictions are necessary to meet resource management objectives, other limitations also may be developed.

The BLM may place other limitations, as necessary, to protect other resources, particularly in areas that motorized OHV enthusiasts use intensely or where they participate in competitive events.

Outbreak: The infestation of a relatively small and contained grouping of trees by bark beetles.

Overgrazing: Continued heavy grazing that exceeds the recovery capacity of the forage plants and creates deterioration of the grazing lands (Valentine 1990).

Perennial Stream: A stream that flows continuously. Perennial streams generally are associated with a water table in the localities through which they flow (Prichard et al. 1998).

Paleo-Indian: The name given to the oldest known cultural group in North America.

Paleontology: The study of ancient plants and animals now known only from fossil remains.

Paleontological Locality: A geographic point or area where a fossil or associated fossils are found in a related geological context. A paleontological locality is confined to a discrete stratigraphic layer, structural feature, or physiographic area.

Pemmican: A mixture of dried meat mixed with crushed berries and fat. It was used as food on hunting trips and other journeys because it kept well without spoiling.

Pest: With the exception of vascular plants classified as invasive plant species, a pest can be any biological life form that poses a threat to human or ecological health and welfare. For the purposes of this planning effort, an "animal pest" is any vertebrate or invertebrate animal subject to control by Animal and Plant Health Inspection Service (APHIS). APHIS is currently BLM's authorized agent for controlling "animal pests." For this reason, "animal pests" will be considered a subset of Pest.

Pestle: A tool used to mash or grind substances.

Petroglyph: Pictures created on rock faces by removing a portion of the rock by pecking, abrading, incising, or scratching.

Pictograph: Picture created on a rock face by applying pigment or charcoal.

Planning Area: A geographic area for which land use and resource management plans are developed and maintained.

Pleistocene: The Ice Age(s) and period in the world's history that began about 1.6 to 2 million years ago and lasted until about 10,000 years ago. During this time, continental glaciers greatly expanded toward the mid-latitudes and far down-slope from mountainous regions.

Potential Natural Community (PNC): The biotic community that would become established if all successional sequences were completed without interference by humans under the present environmental conditions. Natural disturbances are inherent in development. PNCs can include naturalized nonnative species.

Pottery: Earthenware or clayware pots, dishes, or vases. These cups, bowls, and other dishes or objects were made from clay and hardened by heat.

Prairie Dog "Complex": Defined as a cluster of two or more prairie dog towns within 3 kilometers of each other (Clark and Stromberg 1987; Luce 2003), and bounded by either natural or artificial barriers (Whicker and Detling 1998) which effectively isolate one cluster of colonies from interacting/interchanging with another. Prairie dogs may commonly move among colonies of a cluster, and thereby foster reproductive/genetic viability, but exhibit little emigration/immigration between clusters. A cluster may include some currently unoccupied, through physically suitable (i.e., vegetation, soils, topography, etc), land immediately adjacent to occupied colonies that support other prairie dog-associated (ecosystem function), obligate or facultative species (e.g., swift fox, mountain plover, burrowing owl, etc.).

Prehistory/Prehistoric: Information about past events prior to the recording of events in writing. The period of prehistory differs around the world depending upon when written records became common in a region.

Prescribed Burning: Controlled application of fire to wildland fuels in either their natural or modified state under specified environmental conditions that allow the fire to be confined to a predetermined area and at the same time to produce the fire intensity and rate of spread required to attain planned resource management objectives.

Prescribed Fire: The introduction of fire to an area under regulated conditions for specific management purposes.

Priority Fish Species: Priority fish species are species considered to be sport fish and native species.

Potential Fossil Yield Classification: Geologic units are classified according to the Potential Fossil Yield Classification system, usually at the formation or member level, based on the relative abundance of significant fossils and their sensitivity to adverse impacts. The classification uses a ranking of 1 through 5, with Class 5 assigned to units with a very high potential for fossils. The classifications are described below.

> **Class 1 – Very Low**. Igneous or metamorphic geologic units, or other units not likely to contain recognizable fossil remains. Management concern is negligible for Class 1 units and mitigation requirements are rarely necessary.
>
> **Class 2 – Low.** Sedimentary geologic units that are not likely to contain vertebrate fossils or significant nonvertebrate fossils. Management concern is low for Class 2 units and mitigation requirements are not likely.
>
> **Class 3 – Moderate or Unknown.** Fossiliferous sedimentary geologic units where fossil content varies in significance, abundance, and predictable occurrence; or sedimentary units of unknown fossil potential. Management concern may extend across the entire range of management. Ground-disturbing activities require sufficient assessment to determine whether significant resources occur in the area of the proposed action, and whether the action could affect the paleontological resources. Pre-disturbance surveys, monitoring, or avoidance procedures may be necessary.
>
> **Class 4 – High.** Geologic units containing known occurrences of significant fossils, but these occurrences may vary in local abundance and predictability. Management concern is moderate to high, depending on the potential impacts of the proposed action and local geologic conditions. Pre-disturbance field surveys are often needed, and avoidance or onsite monitoring may often be necessary during project activities.
>
> **Class 5 – Very High.** Highly fossiliferous geologic units that consistently and predictably produce significant fossils, and that are at risk of human-caused adverse impacts or natural degradation. Class 5 areas merit a high level of management focus. Mitigation of ground-disturbing activities, including Pre-disturbance surveys, onsite monitoring, or avoidance procedures, are nearly always necessary. These units are often the focus of illegal collecting activities. Special management designations may be appropriate for protection or interpretation.

Produced Water: Groundwater removed to facilitate the extraction of minerals, such as coal, oil, or gas.

Projectile Point: The stone point attached to the end of darts, spears, and arrows. Often called "arrowheads."

Proper Grazing: Proper grazing is the practice of managing forage use by grazing animals at a sustainable level that maintains rangeland health. Proper grazing will maintain or increase plant cover, including residue, which acts to slow down or reduce runoff, increase water infiltration, and keep erosion and sedimentation at or above acceptable levels within the potential of ecological sites within a given geographic area (e.g., watershed, grazing allotment, etc.).

Rangeland: Land on which the native vegetation is predominantly grasses, grass-like plants, forbs, or shrubs suitable for grazing or browsing. This includes lands revegetated naturally or artificially when routine management of that vegetation is accomplished mainly through manipulation of grazing. Rangelands include natural grasslands, savannas, shrublands, most deserts, tundra, alpine communities, coastal marshes, and wet meadows.

Rangeland Health: The degree to which the integrity of the soil and ecological processes of rangeland ecosystems are sustained.

Range Improvement Project: A structural improvement requiring placement or construction to facilitate management or control distribution and movement of grazing or browsing animals. Such improvements may include, but are not limited to, fences, wells, troughs, reservoirs, water catchments, pipelines, and cattleguards. The project also may include a practice or treatment which improves rangeland condition and or resource production for multiple use. Nonstructural types of projects may include, but are not limited to, seeding and plant control through chemical, mechanical, and biological means or prescribed burning.

Raptor: Bird of prey with sharp talons and a strongly curved beak, such as hawks, falcons, owls, vultures, and eagles.

Recreation Management Areas: Recreation management areas are units within a planning area guiding recreation management on public lands having similar recreation related issues and concerns. There are two types of recreation management areas, extensive and special.

> **Extensive Recreation Management Areas (ERMA):** These are areas where dispersed recreation is encouraged and where visitors have a freedom of recreational choice with minimal regulatory constraint.
>
> **Special Recreation Management Areas (SRMA):** These are areas where congressionally recognized recreation values exist <u>or</u> where significant public recreation issues or

management concerns occur. Special or more intensive types of management are typically needed.

Restricted Disposal: Parcels identified for restricted disposal may be disposed of under the Recreation and Public Purposes Act, by exchange, may limit the disposal to a particular type of entity capable of preserving the resource values, or may include the use of covenants in the deed or land sale patent to ensure the resource values are protected.

Riparian: A form of wetland transition between permanently saturated wetlands and upland areas. These areas exhibit vegetation or physical characteristics reflective of permanent surface or subsurface water influence. Lands along, adjacent to, or contiguous with perennially and intermittently flowing rivers and streams, glacial potholes, and the shores of lakes and reservoirs with stable water levels are typical riparian areas. (See BLM Manual 1737.) Included are ephemeral streams that have vegetation dependent upon free water in the soil. All other ephemeral streams are excluded.

Riparian/Wetland Functionality Classification:

Functional-At-Risk (FAR): Riparian/wetland areas that are in functional condition, but an existing soil, water, or vegetation attribute makes them susceptible to degradation.

Proper Functioning Condition (PFC): A riparian or wetland area is considered to be in proper functioning condition when adequate vegetation, landform, or large woody debris is present to do the following:

- Dissipate stream energy associated with high water flows, thereby reducing erosion and improving water quality
- Filter sediment, capture bedload, and aid floodplain development
- Improve floodwater retention and groundwater recharge
- Develop root masses that stabilize stream banks against cutting action
- Develop diverse ponding and channel characteristics to provide the habitats and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses
- Support greater biodiversity

Nonfunctional: Riparian or wetland areas that clearly are not providing adequate vegetation, landform, or large woody debris to dissipate stream energy associated with high flows and thus are not reducing erosion, improving water quality, and so on, as listed above. The absence of certain physical attributes, such as a floodplain where one should be, are indicators of nonfunctioning conditions.

Unknown: Riparian or wetland areas that the Bureau of Land Management lacks sufficient information on to make any form of determination.

Rights-of-Way (ROW): A ROW grant is an authorization to use a specific piece of public land for a specific project, such as 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.

Roasting Pit: A pit dug into the ground that was used for cooking. The pit contained fire-cracked rocks, charcoal, ash, and sometimes the remains of whatever was cooked.

ROW Avoidance Areas: Areas where adverse routing factors exist. ROWs either will not be granted in these areas, or—if granted—will be subject to stringent terms and conditions. In other words, ROWs would be *restricted* (but not necessarily prohibited) in these avoidance areas.

Saleable Minerals: Common variety of minerals on public lands, such as sand and gravel, used mainly for construction. Saleable minerals are disposed of by sales to the public or free-use permits to government agencies or nonprofit organizations.

Scenic area: An area whose landscape character exhibits a high degree of variety and harmony among the basic elements which results in a pleasant landscape to view.

Scenic Quality: The relative worth of a landscape from a visual perception point of view. Scenic quality is rated as Class A (high), Class B (medium), or Class C (low).

Seasonal Ranges: The Wyoming Game and Fish Department has identified various ranges for big game species. These ranges are defined as follows:

Summer or Spring-Summer-Fall: A population or portion of a population of animals uses the documented habitats within this range annually from the end of previous winter to the onset of persistent winter conditions.

Severe Winter Relief: A documented survival range, which may or may not be considered a crucial range area as defined above. It is used to a great extent, but only in extremely severe winters. It may lack habitat characteristics that would make it attractive or capable of supporting major portions of the population during normal years, but is used by and allows at least a significant portion of the population to survive the occasional extremely severe winter.

Winter: A population or portion of a population of animals annually uses the documented suitable habitat sites within this range in substantial numbers during the winter period only.

Winter/Year-long: A population or a portion of a population of animals makes general use of the documented suitable habitat sites within this range on a year-round basis.

During the winter months there is a significant influx of additional animals into the area from other seasonal ranges.

Year-long: A population or substantial portion of a population of animals makes general use of the suitable documented habitat sites within the range on a year-round basis. On occasion, animals may leave the area under severe conditions.

Parturition Areas: Documented birthing areas commonly used by females. They include calving areas, fawning areas, and lambing grounds. These areas may be used as nurseries by some big game species.

Section 106 of National Historic Preservation Act: "The head of any Federal agency having direct or indirect jurisdiction over a proposed federal or federally assisted undertaking in any state and the head of any federal department or independent agency having authority to license any undertaking shall, prior to the approval of the expenditure of any federal funds on the undertaking or prior to the issuance of any license, as the case may be, take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register. The head of any such federal agency shall afford the Advisory Council on Historic Preservation established under Title II of this Act a reasonable opportunity to comment with regard to such undertaking" (16 U.S.C. 47 df).

Sensitive Sites or Resources: Sensitive sites or resources refer to significant cultural resources that are or may be eligible for nomination to the National Register of Historic Places.

Sensitive Species: Species designated as sensitive by the Bureau of Land Management (BLM) State Director include species that are under status review, have small or declining populations, live in unique habitats, or require special management. BLM Manual 6840 provides policy and guidance for special status species management. The BLM Wyoming Sensitive Species Policy and List are provided in a memorandum updated annually. Primary goals of the BLM Wyoming policy include maintaining vulnerable species and habitat components in functional BLM ecosystems and preventing a need for species listing under the Endangered Species Act.

Seral Stage: One of a series of plant communities that follows another in time on a specific ecological site.

Setting: Setting is the physical environment of a historic property and how the property evokes a sense of feeling and association with past events. Accordingly, setting referees to the character of the place in which the property played its historic role. It involves how, not just where, the property is situated and its relationship to surrounding features and open space. These features and their relationships should be considered not only within the exact boundaries of the property, but also between the property and its surroundings.

Shaman: A medicine man or religious leader; a person who calls upon the spirits to cure the sick and to control events (weather or hunting).

Silviculture: The art of producing and tending a forest; the application of knowledge of silvics in the treatment of a forest; the theory and practice of controlling forest establishment, composition, structure, and growth.

Significant Paleontological Resource (also Significant Fossil Resource): Any paleontological resource that is considered to be of scientific interest, including most vertebrate fossil remains and traces, and certain rare or unusual invertebrate and plant fossils. A significant paleontological resource is considered to be scientifically important because it is a rare or previously unknown species, it is of high quality and well-preserved, it preserves a previously unknown anatomical or other characteristic, provides new information about the history of life on earth, or has identified educational or recreational value.

Site: A location, place. Is a term used by archaeologists for places that prehistoric and historic people lived in or used. Sites are places where humans left things behind.

Special Recreation Management Areas (SRMA): *See Recreation Management Areas.*

Special Status Species: Special status species are species proposed for listing, officially listed as Threatened or Endangered, or are candidates for listing as Threatened or Endangered under the provisions of the Endangered species act; those listed by a state in a category such as Threatened or Endangered implying potential endangerment or extinction; and those designated by the State Director as sensitive (BLM 6840 Manual 2001).

Split-Estate: Surface land and mineral estate of a given area under different ownerships. Frequently, the surface will be privately owned and the minerals federally owned.

State-Listed Species: Species proposed for listing or listed by a state in a category implying, but not limited to, potential endangerment or extinction. Listing is either by legislation or regulation.

Stratigraphy: The science of studying layers of materials, as in rock layers in the Earth or deposits in archeological sites. Cultural remains and dirt become buried over time and, usually, the layer on the bottom is the oldest, the layer on the top is the youngest. Dirt of different layers is often colored differently.

Surface-disturbing Activities (or Surface Disturbance): The physical disturbance and movement or removal of land surface and vegetation. These activities range from the very minimal to the maximum types of surface disturbance associated with such things as off-road vehicle travel or use of mechanized, rubber-tired, or tracked equipment and vehicles; some timber cutting and forest silvicultural practices; excavation and development activities associated with use of heavy equipment for road, pipeline, power line and other types of

construction; blasting; strip, pit, and underground mining and related activities, including ancillary facility construction; oil and gas well drilling and field construction or development and related activities; range improvement project construction; and recreation site construction.

Surface Water Classes and Uses: The following water classes are a hierarchical categorization of waters according to existing and designated uses. Except for Class 1 waters, each classification is protected for its specified uses plus all the uses contained in each lower classification. Class 1 designations are based on value determinations rather than use support and are protected for all uses in existence at the time of or after designation. There are four major classes of surface water in Wyoming with various subcategories within each class (see "Wyoming Surface Water Classification List" for current listing).

(a) Class 1, Outstanding Waters. Class 1 waters are those surface waters in which no further water quality degradation by point source discharges other than from dams will be allowed. Nonpoint sources of pollution shall be controlled through implementation of appropriate best management practices. Pursuant to Section 7 of these regulations, the water quality and physical and biological integrity that existed on the water at the time of designation will be maintained and protected. In designating Class 1 waters, the Environmental Quality Council shall consider water quality, aesthetic, scenic, recreational, ecological, agricultural, botanical, zoological, municipal, industrial, historical, geological, cultural, archeological, fish and wildlife, the presence of substantial quantities of developable water, and other values of present and future benefit to the people.

(b) Class 2, Fisheries and Drinking Water. Class 2 waters are waters, other than those designated as Class 1 that are known to support fish or drinking water supplies or where those uses are attainable. Class 2 waters may be perennial, intermittent, or ephemeral and are protected for the uses indicated in each subcategory listed below. Five subcategories of Class 2 waters exist.

(c) Class 3, Aquatic Life Other than Fish. Class 3 waters are waters other than those designated as Class 1 that are intermittent, ephemeral, or isolated waters, and because of natural habitat conditions, do not support nor have the potential to support fish populations or spawning or certain perennial waters that lack the natural water quality to support fish (e.g., geothermal areas). Class 3 waters provide support for invertebrates, amphibians, or other flora and fauna that inhabit waters of the state at some stage of their life-cycles. Uses designated on Class 3 waters include aquatic life other than fish, recreation, wildlife, industry, agriculture, and scenic value. Generally, waters suitable for this classification have wetland characteristics; and such characteristics will be a primary indicator used in identifying Class 3 waters. There are four subcategories of Class 3 waters.

(d) Class 4, Agriculture, Industry, Recreation, and Wildlife. Class 4 waters are waters other than those designated as Class 1 where it has been determined that aquatic life uses are not attainable pursuant to the provisions of Section 33 of these regulations. Uses designated on Class 4 waters include recreation, wildlife, industry, agriculture and scenic value. (Source: WDEQ, Wyoming Surface Water Quality Standards)

Tanning: The process which turns animal hides into leather.

Threatened Species: Any species that is likely to become Endangered within the foreseeable future throughout all or a significant portion of its range.

Tipi: A cone-shaped tent used especially by Plains Indians usually made of skins or bark spread over a frame of poles. Also spelled tepee or teepee.

Travois: A primitive device used by Plains Indians to move things. It consisted of two long poles with a platform or netting to carry objects. Originally pulled by dogs, horses were later used to pull it.

Vegetative Diversity: The variety of vegetative types in an area, including species, the genetic differences among species and populations, the communities and ecosystems in which vegetation types occur, and the structure and seral stage of these communities. Vegetative diversity includes rare as well as common vegetative types, and typically supports a diverse array of animal species and communities.

Viewshed: Viewshed is used in Visual Resource Management to describe "…landscape that can be seen under favorable atmospheric conditions from a viewpoint (key observation point) or along a transportation corridor" (BLM 1984).

Visual Resources: The visible physical features of a landscape (topography, water, vegetation, animals, structures, and other features) that constitute the scenery of an area.

Visual Resource Management (VRM) Classes:

Class I. The objective of this class is to maintain a landscape setting that appears unaltered by humans. It is applied to wilderness areas, some natural areas, wild portions of Wild and Scenic Rivers, and other similar situations in which management activities are to be restricted.

Class II. The objective of this class is to design proposed alterations so as 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 design proposed alterations so as to partially retain the existing character of the landscape. Contrasts to the basic elements (form, line, color, and texture) caused by a management activity may be evident and begin to attract attention in the characteristic landscape; however, the changes should remain subordinate to the existing 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. Contrasts may attract attention and be a dominant feature of the landscape in terms of scale; however, changes should repeat the basic elements (form, line, color, and texture) inherent in the characteristic landscape.

Rehabilitation Area. Change is needed or change may add acceptable visual variety to an area. This class applies to areas where the naturalistic character has been disturbed to a point at which rehabilitation is needed to bring it back into character with the surrounding landscape. This class would apply to areas identified in the scenic evaluation where the quality class has been reduced because of unacceptable cultural modification. The contrast is inharmonious with the characteristic landscape. It may also be applied to areas that have the potential for enhancement; i.e., add acceptable visual variety to an area or site. It should be considered an interim or short-term classification until one of the other VRM class objectives can be reached through rehabilitation or enhancement. The desired visual resource management class should be identified.

Watershed: See "Basin" above.

Wilderness Study Area: A designation made through the land use planning process of a road-less area found to have wilderness characteristics, as described in Section 2(c) of the Wilderness Act of 1964 (from H-6310-1, Wilderness Inventory and Study Procedures).

Wildfire: Any natural fire ignition occurring on wildland that neither meets management objectives nor occurs within a prescribed fire area, thus requiring a suppression response.

Wildland Industrial Interface: The area where industrial development meets or intermingles with undeveloped wildland.

Wildland Urban Interface (WUI): Healthy Forest Recreation Act 2003: defines wildland urban interface (WUI) (section 101) as an area within or adjacent to an at risk community that has been identified by a community in its wildfire protection plan or, for areas that do not have such a plan, an area extending; 1) ½ mile from the boundary of an at risk community, or 2) 1 ½ miles when other criteria are met. (e.g., a sustained steep slope or a geographic feature aiding in creating an effective fire break or is condition class III land, or 3) is adjacent to an evacuation route.

Wildlife-Disturbing Activity: BLM-authorized activities other than routine maintenance that may cause displacement of or excessive stress to wildlife during critical life stages. Wildlife-disturbing activities include human presence, noise, and activities using motorized vehicles or equipment.

Withdrawal: Removal or withholding of public lands, by statute or Secretarial order, from operation of some or all of the public land laws. A mineral withdrawal includes public lands potentially valuable for leasable minerals, precluding the disposal of the lands except with a mineral reservation clause, unless the lands are found not to contain a valuable deposit of minerals. A mineral withdrawal is the closing of an area to mineral location and development activities.

Woodland: Forest lands which are not included in the commercial forest land allowable cut base. These lands include both commercial and noncommercial forest lands. Also included are those lands formerly defined as noncommercial forest lands and those that cannot be reforested within 15 years (now Category I and II lands).

Yellowcake: Yellowcake is the product of the uranium extraction (milling) process. Early production methods resulted in a bright yellow compound, hence the name yellowcake. The material is a mixture of uranium oxides that can vary in proportion and color from yellow to orange to dark green (blackish), depending at which temperature the material was dried (level of hydration and impurities). Higher drying temperatures produce a darker, less soluble material. Yellowcake is commonly referred to as U_3O_8 and is assayed as pounds U_3O_8 equivalent. This fine powder is packaged in drums and sent to a conversion plant that produces uranium hexafluoride as the next step in the manufacture of nuclear fuel.

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Buffalo Summary of the Analysis of the Management Situation

Appendix A

Common and Scientific Names of Plant and Wildlife Species

Table A-1. Common and Scientific Names of Plant and Wildlife Species Identified in the Summary of the Analysis of the Management Situation

Common Name	Scientific Name
Plants	
Alder	*Alnus sp.*
Alfalfa	*Medicago sativa*
Alkali grass	*Zigadenus elegans*
Alkali sacaton	*Sporobolus airoides*
Alpine poppy	*Papaver pygmaeum*
Antelope bitterbrush	*Purshia tridentata*
Aster	*Aster spp.*
Astragalus	*Astragalus spp.*
Basin big sagebrush	*Artemisia tridentata*
Basin wildrye	*Leymus cinereus*
Big bluegrass (Sandberg's bluegrass)	*Poa secunda*
Birch	*Betula sp.*
Biscuit-root	*Lomatium* spp.
Bitterbrush	*Purshia* spp.
Black henbane	*Hyoscyamus niger*
Black sagebrush	*Artemisia nova*
Blowout penstemon	*Penstemon haydenii*
Blue elderberry	*Sambucus mexicana*
Blue elderberry	*Sambucus nigra*
Blue grama	*Bouteloua gracilis*
Blue spruce	*Picea pungens*
Bluebell	*Hyacinthoides* spp.
Bluebunch wheatgrass	*Agropyron spicatum*
Bottlebrush squirreltail	*Elymus elymoides*
Box elder	*Acer negundo*
Broadleaved twayblade	*Listera convallarioides*
Buckwheat	*Polygonaceae* spp.
Buffalo grass	*Buchloe dactyloides*
Buffalobur	*Solanum rostratum*
Canada thistle	*Cirsium arvense*
cheatgrass	*Bromus tectorum*
Chokecherry	*Prunus virginiana*
Coil beaked lousewort	*Pedicularis contorta var. ctenophora*
Colombia needlegrass	*Stipa columbiana*
Columbine	*Aquilegia* spp.
Common burdock	*Arctium minus (Hill) Bernh.*
Common cocklebur	*Xanthium sp.*
Common crupina	*Crupina vulgaris*
Common mullein	*Verbascum thapsus*
Common St. Johnswort	*Hypericum perforatum*

Table A-1. Common and Scientific Names of Plant and Wildlife Species Identified in the Summary of the Analysis of the Management Situation

Common Name	Scientific Name
Common tansy	*Tanacetum vulgare*
Cottonwood	*Populus* spp.
Curl-leaf mountain mahogany	*Cercocarpus ledifolius*
Curly dock	*Rumex crispus*
Currant	*Ribes* spp.
Cusick's alkali grass	*Puccinellia cusickii*
Dalmation toadflax	*Linaria genistifolia* ssp. *dalmatica*
Diffuse knapweed	*Centaurea diffusa*
Douglas -fir	*Pseudotsuga menziesii*
Douglas rabbitbrush	*Chrysothamnus viscidiflorus*
Dwarf woolly-heads	*Psilocarphus brevissimus*
Dyer's woad	*Isatis tinctoria*
Engleman spruce	*Picea engelmannii*
Fall knotweed	*Polygonum douglasii*
False agoseris	*Agoseris glauca var. laciniata*
Field bindweed	*Convolvulus arvensis*
Field pussytoes	*Antennaria neglecta*
Four-winged saltbush	Atriplex canescens
Fragile rockbrake	*Cryptogramma stelleri*
Gardner saltbush	*Atriplex garnderi*
Globemallow	*Sphaeralcea* spp.
Greasewood	*Sarcobatus vermiculatus*
Green ash	*Fraxinus pennsylvanica*
Green needlegrass	*Stipa viridula*
Green spleenwort	*Asplenium trichomanes-ramosum)*
Grounsel	*Packera sp.*
Hairy tranquil goldenweed	*Pyrrocoma clementis var. villosa*
Hall's fescue	*Festuca hallii*
Halogeton	*Halogeton glomeratus*
Hawthorne	*Crataegus*
Hoary cress (whitetop)	*(Cardaria draba and Cardaria pubescens Desv.)*
Hood's phlox	*Phlox hoodsii*
Houndstongue	*Cynoglossum offinale*
Idaho fescue	*Festuca idahoensis*
Indian paintbrush	*Castilleja* spp.
Indian ricegrass	*Oryzopsis hynenoides*
Inland saltgrass	*Distichlis spicata*
Japanese brome	*Bromus japonicus*
Junegrass	Koelaria cristata
Juniper	*Juniperus* spp.
Kentucky bluegrass	*Poa pratensis*

Table A-1. Common and Scientific Names of Plant and Wildlife Species Identified in the Summary of the Analysis of the Management Situation

Common Name	Scientific Name
King spike fescue	*Leucopoa kingii*
Kotzebuei's grass-of-parnassus	*Parnassia kotzebuei*
Lance-leaved moonwort	*Botrychium lanceolatum var lanceolatum*
Large bur-reed	*Sparganium eurycarpum*
Large yellow lady-slipper	*Cypripedium parviflorum*
Large-leaved pondweed	*Potomogeton amplifolius*
Larkspur	*Delphinium occidentale*
Leafy spurge	*Euphorbia esula*
Leafy thistle	*Cirsium foliosum*
Limber pine	*Pinus flexilis*
Locoweed	*Astragalus* spp.
Lodgepole pine	*Pinus contorta*
Longleaf dropseed	*Sporobolus composites*
Lupine	*Lupinis* spp.
Medusahead	*Taeniatherum caput-medusae*
Milkvetch	*Astragalus* spp.
Mingan moonwort	*Botrychium minganense*
Mistletoe	*Arceuthobium spp.*
Moschatel	*Adoxa moschatellina*
Mountain big sagebrush	*Artemisia tridentate var. vaseyana*
Mountain lady-slipper	*Cypripedium montanum*
Mountain mahogany	*Cercocarpus montanus*
Musk thistle	*Carduus nutans*
Mutton bluegrass	*Poa fendleriana*
Needle-and-thread	*Stipa comata*
Northern arnica	*Arnica lanchophylla*
Northern blackberry	*Rubus acaulis*
Ox-eye daisy	*Chrysanthemum leucanthemum*
Penstemon	*Penstemon* spp.
Perennial pepperweed (giant whitetop)	*Lepidium latifolium*
Perennial sowthistle	*Sonchus arvensis*
Phlox	*Phlox* spp.
Plains prickley pear	Opuntia polyacantha
Plumeless thistle	*Carduus acanthoides*
Ponderosa pine	*Pinus ponderosa*
Porter's sagebrush	*Artemisia porteri*
Prairie junegrass	*Koeleria macrantha*
Pretty dodder	*Cuscuta indecora var. neuropetala*
Prickly pear cactus	*Opuntia* spp.
Puncturevine	*Tribulus terrestris*
Purple loosestrife	*Lythrum salicaria*

Table A-1. Common and Scientific Names of Plant and Wildlife Species Identified in the Summary of the Analysis of the Management Situation

Common Name	Scientific Name
Puzzling moonwort	*Botrychium paradoxum*
Quackgrass	*Agropyron repens*
Quaking aspen	*Populus tremuloides*
Rabbitbrush	*Chrysothamnus sp.*
Rattlesnake fern	*Botrychium virginianum*
Red sampire	*Unknown*
Rubber rabbitbrush	*Ericameria nauseosa*
Russet cotton-grass	*Eriophorum chamissonis*
Saltgrass	*Distichlis spicata*
Sand dropseed	*Sporbolus cryptandrus*
Sandberg's bluegrass (big bluegrass)	*Poa secunda*
Sandwort	*Arenaria* spp.
Sartwell's sedge	*Carex sartwellii var. sartwellii*
Scarlet globe mallow	*Sphaeralcea coccinea*
Scotch thistle	*Onopordum acanthium*
Scrubby aspen	*Populus spp.*
Sea blight	*Suaeda maritime*
Sea purslane	*Susvium verrucasum*
Serviceberry	*Amerlanchier alnifolia*
Shadscale saltbush	*Atriplex confertifolia*
Sheathed musineon	*Musineon vaginatum*
Short-leaf sedge	*Carex misandra*
Showy milkweed	*Asclepias speciosa*
Shrubby cinquefoil	*Dasiphora fruticosa*
Silver sagebrush	*Artemisia canescens*
Single-head pussytoes	*Antennaria monocephala*
Skeletonleaf bursage	*Franseria discolor*
Skunkbush sumac	*Rhus trilobata*
Slender bulrush	*Schoenoplectus heterochaetus*
Slim-pod Venus' looking glass	*Triodanis leptocarpa*
Small-flowered fame flower	*Phemeranthus parviflora*
Snowberry	*Symphoricarpos* spp.
Spiny hopsage	*Grayia spinosa*
Spotted knapweed	*Centaurea maculosa*
Subalpine fir	*Abies lasiocarpa*
Sulfur flower buckwheat	*Eriogonum umbellatum*
Tall larkspur	*Delphinium exaltatum*
Tamarisk	*Tamarix* spp.
Teal love grass	*Eragrostis hypnoides*
Threadleaf sedge	*Carex filifolia*
Threeawn	*Aristida beyrichiana*

Table A-1. Common and Scientific Names of Plant and Wildlife Species Identified in the Summary of the Analysis of the Management Situation

Common Name	Scientific Name
Three-flower rush	*Juncus triglumis var. triglumis*
Threetip sagebrush	*Artemisia tripartite*
Upward-lobe moonwort	*Botrychium ascendens*
Ute ladies'-tresses	*Spiranthes diluvialis*
Violet	*Viola* spp.
Watson goosefoot	*Chenopodium watsonii*
Western wheatgrass	*Pascopyrum smithii*
Wheatgrass	*Agropyron spp.*
White arctic whitlow-grass	*Draba fladnixensis var. pattersonii*
Wild barley	*Hordeum spp.*
Wild licorice	*Glycyrrhiaz lepidota*
Wild plum	*Prunus americana*
William's wafer-parsnip	*Cymopterus williamsii*
Willow	*Salix* spp.
Winterfat	*Krascheninnikovia lanata*
Wood's rose	*Rosa woodsii*
Woodland horsetail	*Equisetum sylvaticum*
Woolly twinpod	*Physaria lanata*
Wyoming big sagebrush	*Artemisia tridentata* var. *wyomingensis*
Yarrow	*Achillea millefolium*
Yellow sweet clover	*Melilotus indicus*
Yellow toadflax	*Linaria vulgaris*
Zephyr windflower	*Anemone narcissiflora spp.. zephyra*
Fungi	
Blitser rust	*Cronartium ribicola*
Fish	
Black bullhead	*Ameirus melas*
Brassy minnow	*Hybognathus hankinsoni*
Brook trout	*Salvelinus fontinalis*
Brown trout	*Salmo trutta*
Catfish	*Ictalurus spp.*
Channel catfish	*Ictalurus punctatus*
Common carp	*Cyprinus carpio*
Creek cub	*Semotilus atromaculatus*
Cutthroat trout	*Oncorhynchus clarki*
Fathead minnow	*Pimephales promelas*
Flathead chub	*Platygobio gracilis*
Green sunfish	*Lepomis cyanellus*
Green sunfish	*Lepomus cyanellus*
Largemouth bass	*Micropterus salmoides*
Longnose dace	*Rhinichthys cataractae*

Table A-1. Common and Scientific Names of Plant and Wildlife Species Identified in the Summary of the Analysis of the Management Situation

Common Name	Scientific Name
Longnose sucker	*Catostomus catostomus*
Mountain sucker	*Catostomus platyrhynchus*
Pallid Sturgeon	*Scaphirhynchus albus*
Plains killifish	*Fundulus zebrinus*
Plains minnow	*Hybognathus placitus*
Plains topminnow	*Fundulus sciadicus*
Rainbow trout	*Oncorhynchus mykiss*
River carpsucker	*Carpiodes carpio*
Rock Bass	*Ambloplites rupestris*
Sand shiner	*Notropis stramineus*
Sauger	*Sander canadensis*
Shovelnose sturgeon	*Scaphirhynchus platorynchus,*
Smallmouth bass	*Micropterus dolomieu*
Stonecat	*Noturus flavus*
Sturgeon chub	*Macrhybopsis gelida*
Walleye	*Sander vitreus*
Western silvery minnow	*Hybognathus argyritis*
White sucker	*Catostomus commersoni*
Yellowstone cutthroat trout	*Oncorhynchus clarki bouvieri*
Wildlife	
American marten	*Martes americana*
Badger	*Taxidea taxus*
Baird's sparrow	*Ammodramus bairdii*
Bald eagle	*Haliaeetus leucocephalus*
Beaver	*Castor canadensisis*
Beet leafhopper	*Circulifer tenellus*
Bighorn Mountain pika	*Ochotona princeps obscura*
Bighorn Mountain snowshoe hare	*Lepus americanus seclusus*
Black bear	*Ursus americanus*
Blackbilled cuckoo	*Coccyzus erythropthalmus*
Black-tailed prairie dog	*Cynomys ludovicianus*
Blue heron	*Ardea herodias*
Bobcat	*Lynx rufus*
Boreal chorus frog	*Pseudacris triseriata*
Boreal owl	*Aegolius funereus*
Brewer's sparrow	*Spizella breweri*
Bull snake	*Pituophis catenifer*
Burrowing owl	*Speotyto cunicularia*
Calliope hummingbird	*Stellula calliope*
Chukar partridge	*Alectoris chukar*
Columbian sharp-tailed grouse	*Tympanuchus phasianellus columbianus)*

Table A-1. Common and Scientific Names of Plant and Wildlife Species Identified in the Summary of the Analysis of the Management Situation

Common Name	Scientific Name
Common loon	Gavia immer
Common merganser	*Mergus merganser*
Cormorant	*Phalacrocorax spp.*
Cottontail rabbit	*Sylvilagus spp.*
Coyote	*Canis latrans*
Eastern racer	*Coluber constrictor*
Elk	*Cervus elaphus*
Ferruginous hawk	*Buteo regalis*
Fisher	*Martes pennanti*
Fox squirrel	*Sciurus niger*
Fringed myotis	*Myotis thysanodes*
Garter snake	*Thamnophis sirtalis*
Golden eagle	*Aquila chrysaetos*
Gopher	*Gopherus sp,*
Gopher snake	*Pituophis catenifer*
Gray partridge	*Perdix perdix*
Gray squirrel	*Sciurus carolinensis*
Gray wolf	*Canis lupus*
Great horned owl	*Bubo virginianus,*
Greater sage-grouse	*Centrocercus urophasianus*
Ground squirrel	*Spermophilus sp.*
Hayden's shrew	*Sorex haydeni*
Hispid pocket mouse	*Chaetodipus hispidus*
Hoary bat	*Lasiurus cinereus*
Horse	*Equus ferus caballus*
Hungarian partridge	*Perdix perdix*
Jackrabbit	*Lepus* spp.
Leopard frog	*Rana pipiens*
Long-eared owl	*Asio otus*
Marten	*Martes sp.*
Mink	*Mustela vison*
Moose	*Alces alces*
Mormon cricket	*Anabrus simplex*
Mountain lion	*Puma concolor*
Mountain plover	*Charadrius montanus*
Mule deer	*Odocoileus hermionus*
Muskrat	*Ondata zibethicus*
North American wolverine	*Gulo gulo luscus*
Northern goshawk	*Accipiter gentilis*
Northern harrier	*Circus cyaneus*
Northern leopard frog	*Rana pipiens*

Table A-1. Common and Scientific Names of Plant and Wildlife Species Identified in the Summary of the Analysis of the Management Situation

Common Name	Scientific Name
Peregrine falcon	*Falco peregrinus*
Piping plover	*Charadrius melodus*
Pheasant	*Phasianus colchicus*
Plains gartersnake	*Thamnophis radix*
Plains harvest mouse	*Reithrodontomys montanus*
Plains pocket gopher	*Geomys bursarius*
Plains pocket gopher	*Geomys bursarius*
Porcupine	*Erethizon dorsatum*
Prairie falcon	*Falco mexicanus*
Prairie rattlesnake	*Crotalus viridis*
Pronghorn	*Antilocapra americana*
Pygmy nuthatch	*Sitta pygmaea*
Pygmy rabbit	*Brachylagus idahoensis*
Raccoon	*Procyon lotor*
Rail	*family Rallidae*
Red fox	*Vulpes vulpes*
Red squirrel	*Tamiasciurus hudsonicus*
Red-tailed hawk	*Buteo jamaicensis*
Ring-necked pheasant	*Phasianus colchicus*
Sage sparrow	*Amphispiza belli*
Sage thrasher	*Oreoscoptes montanus*
Sagebrush lizard	*Sceloporus graciosus*
Sagebrush vole	*Lemmiscus curtatus*
Short-eared owl	*Asio flammeus)*
Snipe	*Gallinago sp.*
Snowshoe hare	*Lepus americanus*
Spotted bat	*Euderma maculatum*
Spotted frog	*Rana luteiventris*
Spotted skunk	*Spilogale gracilis*
Striped skunk	*Mephitis mephitis*
Swainson's hawk	*Buteo swainsoni*
Swift fox	*Vulpes velox*
Terrestrial gartersnake	*Thamnophis elegans*
Three-toed woodpecker	*Picoides dorsalis*
Tiger salamander	*Ambystoma tigrinum mavortium*
Townsend's big-eared bat	*Corynorhinus townsendii*
Trumpeter swan	*Cygnus buccinator*
Turkey	Meleagris gallopavo
Turkey vulture	*Cathartes aura*
Virginia's warbler	*Vermivora virginiae*
Vole	*Microtus sp.*

Table A-1. Common and Scientific Names of Plant and Wildlife Species Identified in the Summary of the Analysis of the Management Situation

Common Name	Scientific Name
Water vole	*Arvicola amphibius*
Weasel	*Mustela* spp.
Western burrowing owl	*Athene cunicularia hypugea)*
White-faced ibis	*Plegadis chihi*
White-tailed deer	*Odocoileus virginianus*
Wild turkey	*Meleagris gallopavo*
Williamson's sapsucker	*Sphyrapicus thyroideus*
Woodhouse's toad	*Bufo woodhousii)*
Wyoming ground squirrel	*Spermophilus elegans*
Yellow-billed cuckoo	*Coccyzum americanus*
Yuma myotis	***Myotis*** *yumanensis.*
Invertebrates	
Mosquito	Anopheles *spp.*
Grasshopper	*suborder Caelifera; order Orthoptera*
Mussel	*various*
Crayfish	*various*
Mountain pine beetle	*Dendroctonus ponderosae*
Alfalfa weevil	*Hypera postica Gyllenhal*

Buffalo Summary of the Analysis of the Management Situation

Appendix B

Livestock Grazing Allotments

Table B-1. Current Livestock Grazing Allotment Information

Allotment Number	Allotment Name	Management Category	Total Federal Acres	Type Management	Active Preference
12182	4mile Creek/RC	C	369		41
02378	76 Creek	C	200		33
02314	Adon	C	40		6
22115	Allemandll	C	1,520		184
02246	Anderson Draw	C	178		21
12173	Antelope Basin	C	449		47
02366	Antelope Draw	C	40		6
02493	Armstrong Prong	C	223		51
02433	Arpan Butte	C	1,259		137
00698	Ash Draw	C	240		47
02323	Bader Gulch	C	83		20
02377	Badger Creek	C	40		8
02437	Badger Tract	C	40		7
22204	Baldwin Creek	C	640		47
22009	Bales Ranch Inc	C	80		11
02328	Banner	C	120		24
22011	Barbe Dorie J	C	120		13
32013	Barlow	C	89		13
02442	Barnum Mountain Rd.	C	2,735		277
02414	Barnum Mtn Road	C	40		8
22224	Barnum Mtn Spring	C	80		13
12236	Bates Creek	C	80		12
02475	Bayer Creek	C	120		34
12191	Bear Gulch	M	3,837		612
12168	Beartrap	C	483		76
12072	Beartrap Creek	I	2,171		249
22111	Beaver Creek	C	440		54
12157	Beaver Creek Slope	I	8,098		546
12041	Bed Springs Draw	C	358		23
02478	Beebee	C	320		211
22127	Bekebrede Draw	C	80		20
12209	Belle Fourche Tr	C	800		159
02288	Belus	C	120		30
22017	Belus Ranch	C	292		51
32019	Betz Alvin F	C	185		21
02262	Billy Creek	C	280		44
12228	Billy Creek Camp	C	80		6
02324	Billy Creek School	C	40		10
22021	Bishop	M	8,632		1,483
12048	Bitter Creek	C	1,025		122

Table B-1. Current Livestock Grazing Allotment Information

Allotment Number	Allotment Name	Management Category	Total Federal Acres	Type Management	Active Preference
22022	Bittercreek	C	80		16
22028	Black Draw	C	2,581		300
12230	Black Stump Draw	C	200		50
42013	Blue Creek	M	2,221		223
12189	Bode Gulch	C	560		59
22210	Bone Pile Creek	C	241		45
02254	Box Elder Draw	C	71		8
32005	Bridge Draw	M	2,720		274
12219	Bright Spring Draw	C	240		61
02243	Brower Draw	C	310		30
12035	Brown Kennedy Ranch	M	2,122		501
12192	Bugher Draw	C	1510		123
12213	Bull Camp	M	2,475		252
02474	Bull Camp Canyon	C	315		24
22212	Bull Creek	C	2,713		250
32018	Bull Creek	C	278		40
12161	Burnt Hollow	I	13,790	AMP IMPLEMENTED	2,400
12046	Butcher	C	640		119
12047	Butcher Ranch	C	240		61
12208	Caballo Draw	C	680		113
02258	Cabin Canyon	C	2,366		356
02299	Cabin Creek	M	3,139		309
12049	Camblin	C	690		130
02289	Campbell Draw	C	413		56
22201	Carpenter Draw	C	760		81
02265	Carr	C	400		43
12053	Carson Dan	C	80		16
12052	Carson,O. And R.J.	C	240		37
02450	Carter Draw	C	220		30
12165	Carter Draw	C	880		45
12054	Cash	C	80		14
12177	Castle Rock	M	5,256		610
02376	Cat Creek	I	5,696		552
12175	Cates Draw	C	1,689		173
12057	Chabot August Et Al	C	280		19
02384	Chabot, August,Et Al	C	147		14
02468	Chalk Hills	C	203		29
12211	Charlie Draw	C	1,482		306
02290	Chicken Creek Divide	C	40		7

Table B-1. Current Livestock Grazing Allotment Information

Allotment Number	Allotment Name	Management Category	Total Federal Acres	Type Management	Active Preference
32020	Clark,Glen L	C	1,247		131
02398	Claypit, Trough Draw	C	1,120		132
02093	Clear Creek	C	396		39
12065	Clear Creek Grazing	C	908		92
12149	Coal Creek	C	117		18
12069	Cook	C	40		6
02248	Coon Track Creek	C	121		18
22027	Cordero Allotment	C	480		78
12024	Corral Creek	C	36		5
00754	Cotton	C	40		4
02424	Cottonwood (Knudson)	C	923		106
02261	Cottonwood Creek	C	120		26
22130	Cottonwood Creek E	C	80		12
12143	Cottonwood Creek I	C	160		47
02427	Cottonwood Draw	C	400		72
12179	Cottonwood Draw	C	1,020		105
02357	County Line	C	1,122		153
22132	Coutant Creek	C	320		39
12186	Cow Creek	C	2,706		251
22125	Cow's Face	C	360		24
12059	Craney Draw	M	0		0
12094	Crazy Woman Creek	C	760		80
12218	Crenshaw Hill	C	719		87
12090	Cromack Draw	C	427		93
02426	Crooked Creek	I	20,367	AMP IMPLEMENTED	2,694
22206	Cross H Creek	C	313		49
12184	Croton	M	1,028		174
02352	Cutler Draw	C	161		27
02332	Dabney	C	80		11
12074	Daly	C	120		22
12075	Daly Livestock Co	C	6,138		1,107
02397	Davis Draw	M	788		81
12105	Davis Draw Common	M	970		156
02400	Davis Draw/Johnson Allotment	M	1,394		149
02322	Dead Horse	C	85		8
12176	Dead Horse Creek	I	9,119		993
22113	Dead Horse Creek Oilfield	C	1,261		216
12062	Deadman Draw	C	1,890		186

Table B-1. Current Livestock Grazing Allotment Information

Allotment Number	Allotment Name	Management Category	Total Federal Acres	Type Management	Active Preference
02396	Dean Graves	C	720		94
02267	Deep Creek	C	160		41
22102	Deer Creek	M	10,958		1,245
32004	Deer Creek I	C	80		10
12096	Deer Gulch	M	5,566		1,135
02270	Dixie Reece	C	263		30
02402	Donlin	C	501		134
12039	Drainage Draw	C	80		11
02412	Dry Creek	C	372		42
22229	Dry Creek Basin	C	79		14
12080	Dry Creek Ranch Inc	M	4,948		1,074
02285	Dry Creek Res	C	40		4
02250	Dry Fork	C	3,314		488
02341	Dry Fork P.R.	C	1,406		235
02407	Dry Muddy Creek	C	80		18
12144	Dry Trail Creek	C	2,086		389
02344	Dry Vee	M	4,442	AMP PROPOSED	911
02374	Duck Creek	C	41		12
22026	Duck Creek 2	C	217		60
02453	Dugout Creek	I	9,341		1,217
22124	Dull Knife	I	9,173		553
12031	Dull Knife Pass	M	5,047		603
02317	Dutch Creek	C	80		14
12200	E.K. Mountain	C	156		26
12037	East Fork	C	680		128
22225	East Spring Draw	M	5,683		550
12232	Echeta	C	320		37
02388	Eightyfive Divide	C	1,319		328
12100	Eighty-Five Divide	M	1,679		384
12034	Elk Creek Road	C	40		8
12086	Elliot Curtis	C	114		24
12089	Elsom Brothers	C	1,760		133
12067	Encres Draw	C	40		7
22215	Erickson Draw	C	840		96
12139	Falxa	I	14,759	AMP IMPLEMENTED	1,546
12097	Fauber George	C	120		7
12162	Fence Creek	I	4,820	AMP IMPLEMENTED	655
14811	Figure 8	C	494		42
12099	Fitch Draw	M	1,840		250

Table B-1. Current Livestock Grazing Allotment Information

Allotment Number	Allotment Name	Management Category	Total Federal Acres	Type Management	Active Preference
32006	Flats	C	2,947		254
12078	Flying E	I	16,603		1,672
12066	Flying U Ranch	M	4,236		826
12045	Forest Tract	C	320		16
12151	Fort Creek	M	19,376		2,235
42001	Fortification Creek	C	894		102
22107	Fortin Draw	C	40		10
22109	Foster, Ralph T.	C	880		147
12076	Four Corners	M	2,109		422
22126	Four Horse	C	1,175		215
02242	Four Horse Creek	C	320		84
12050	Fourmile	M	4,879		433
02293	Fourmile 94	C	156		15
02379	Fourmile Ranch	I	7,595		623
12070	Fowler Draw	C	151		18
12088	Freeman Camp	C	800		32
02391	Freeman Draw	M	2,710		445
12079	Gammon Draw	C	37		9
22112	Garber Victor Et Al	C	280		62
02306	Gardner Lake	C	40		13
02476	Gardner Mt. (South)	M	1,622	AMP IMPLEMENTED	193
02336	Gates-Yonkee	C	560		86
22120	Gibbs Brothers	C	95		12
12085	Goble Draw	C	478		48
12226	Gold Mine Road	C	494		63
22121	Gordon	M	6,674		761
02335	Gordon Creek	I	2,118		285
02428	Gosney Airstrip	C	40		2
02395	Gosney, Elmer	C	278		61
12193	Government Draw	M	3,590		380
02421	Grandma's Bend	C	84		14
02360	Gray Cabin Draw	C	2,230		270
12174	Green Draw	C	160		29
32003	Green Hill	C	40		5
02469	Grub Draw	I	10,120		1,019
22129	Hamm Don Robert	C	362		77
12154	Hampshire	C	1,144		129
12134	Harlan James S	C	441		24
12136	Harper George Mary	C	120		30
14812	Harper Reservoir	C	23		2

Table B-1. Current Livestock Grazing Allotment Information

Allotment Number	Allotment Name	Management Category	Total Federal Acres	Type Management	Active Preference
12147	Hat Ranch	M	6,573		493
32002	Hay Creek	C	80		26
02440	Healy	C	280		35
12153	Hepp Charles	M	2,404		228
12231	Hilight	C	40		8
02443	Hill Prong	C	80		13
22114	Hines	C	120		24
12180	Hoblit	C	140		23
12169	Hoe Ranch	I	15,279		1,676
02393	Hole In The Wall	I	9,000		738
22116	Holler Draw	C	482		62
02410	Homestead Draw 4150'	C	80		11
10342	Hope	I	3,423	AMP IMPLEMENTED	555
12240	Horse Creek	M	1,110		231
02434	Horse Creek	C	2,071		427
02423	Horse Creek/Pipeline	C	40		8
02327	Horseshoe Ranch	C	880		24
02461	HQ and Taylor Spring	C	912		101
02415	Indian Creek	M	2,587		301
02274	Ivy Creek	C	83		8
12061	Jackplane	C	2,664		266
02394	Jeep Trail	C	200		20
02320	Jeffers Draw	C	39		6
12158	Jiggs Reservoir	C	117		28
02257	Jim Crow Creek	C	597		113
02460	Johnson Creek	C	354		31
02401	Johnson Draw	C	2,288		232
02382	Jones Draw	C	40		6
02447	K Ranch	C	1,361		187
12148	Kaycee L And L	C	761		43
02251	Keathley Draw	C	385		39
12178	Kendrick	M	5,351		874
02277	Keyes Draw	C	79		9
22202	Kingsbury/Wild Horse	C	160		32
12038	Kline Draw	C	400		43
12056	Kurtley Draw	C	1,277		135
02364	Lanabaugh No. 4 Draw	C	40		10
02301	Larey Draw	C	2,320		385

Table B-1. Current Livestock Grazing Allotment Information

Allotment Number	Allotment Name	Management Category	Total Federal Acres	Type Management	Active Preference
02347	Lariat	C	200		20
22108	Larrechea	C	280		48
12190	Lawrence Charles	C	2,838		285
12188	Lawrence Land Co Inc	C	165		19
12023	Lawver	M	4,646		815
12194	Legerski Ranch	C	359		72
02325	Linch	C	1,441		173
12197	Linch	C	80		15
02305	Linn Draw	C	1,440		236
12198	Little Bighorn Ranch	C	40		8
12233	Little Cedar Draw	C	200		28
32007	Little Poison Creek	C	2,244		218
02358	Little Powder River	M	3,711		750
02279	Little Rawhide	C	40		10
02310	Little Willow	I	6,080	AMP IMPLEMENTED	823
02307	Little Youngs Creek	C	169		34
22123	Lone Tree	C	40		7
02343	Long Draw	C	719		99
02466	Lower Willow Glen	C	80		11
02355	Lx Bar	C	1,230		126
02368	Mark Gordon	C	1,282		132
02445	Marton	C	41		7
02309	Mary Straatsma Est	C	40		6
22221	Maycock Draw	C	719		72
02406	Mayer	C	98		12
02346	Mayor	I	3,157		384
12032	Mayoworth S. Of Sdw	C	240		20
02370	Meadow Creek	M	2,355		248
02303	Meadow Draw	C	160		16
12227	Michelena	M	3,405	AMP PROPOSED	348
22055	Mickelberry Creek	C	160		16
12030	Middleberry Draw	C	1,778		178
14952	Mitchell Breaks	M	2,268	AMP IMPLEMENTED	391
02429	Mitchell Draw	M	4,306		419
12140	Montgomery	C	1,861		204
00749	Moore Reservoir	C	40		8
12235	Moore,James R	C	3,971		782
02408	Moriarty,Jack L.	C	40		8

Table B-1. Current Livestock Grazing Allotment Information

Allotment Number	Allotment Name	Management Category	Total Federal Acres	Type Management	Active Preference
02435	Morris Draw	C	1,272		144
22029	Mosier Gulch	M	160		41
02373	Mountain	I	8,390	AMP IMPLEMENTED	778
02446	Mountain	C	1,846		223
02449	Mountain (Elm)	C	241		35
02338	Mountain East	C	260		26
02367	Mud Spring Creek	C	80		16
22223	Muddy Creek	C	40		18
22128	Mumma Draw	C	240		54
02354	Murray Draw	C	40		8
02362	N Fork 9 Mile Creek	C	283		40
02431	N Gray Cabin Draw	C	723		87
32014	N Windmill	I	2,074	AMP IMPLEMENTED	276
02418	N. Fork Powder R.	C	212		34
02340	N. Leiter	C	117		40
02444	N. Scotch	C	201		105
02092	N.Cottonwood Cr.	C	79		23
02348	Napier	M	3,242		529
12095	Neil Butte	C	40		6
12238	Niedringhaus Lambert	C	440		24
02425	Ninemile	C	40		5
12081	Nipple Butte	C	1,928		389
02239	Norfolk John	M	1,840		299
22119	North Mitten	C	103		21
02363	North Ridge	C	335		57
02295	North Trabing	M	560		78
02436	North West - Iberlin	C	320		32
22008	Number Two Draw	C	1,078		170
02457	OK Creek	C	2,302		216
02390	Olmstead	I	832	AMP IMPLEMENTED	179
02058	Olsen Draw	C	4,892		592
02249	Osborn	C	280		39
02287	Padlock Ranch Co.	C	440		88
12068	Pass Reservoir	C	1,225		118
02405	Peterson Draw	C	2,736		335
12156	Petrified Tree	M	1,867		218
12159	Phinney Draw	C	878		91
02413	Pine Ridge	C	720		76

Table B-1. Current Livestock Grazing Allotment Information

Allotment Number	Allotment Name	Management Category	Total Federal Acres	Type Management	Active Preference
12166	Pine Ridge	C	240		49
02454	Pine Ridge	C	320		27
02256	Pinette Draw	C	200		48
12229	Piney Creek	C	40		7
02252	Ploesser	C	385		38
02472	Plosser	C	415		47
02441	Plum Creek Draw	C	390		84
32012	Pointed Butte	C	40		11
12195	Poison Creek	M	1,315		148
02419	Poker Creek	I	3,697	AMP IMPLEMENTED	837
02404	Pollard Draw	C	798		79
02430	Powder River	I	4,526	AMP IMPLEMENTED	944
02260	Powder River Ranch	I	17,085		1,779
02422	Prairie Creek	C	38		13
02350	Prong	C	534		92
12164	Prong Spotted Horse	C	2,129		271
22226	Pugsley Hill	C	40		6
12138	Pumpkin Creek	I	13,325		1,454
12172	Quinn, John, Bonnie	C	40		7
02264	Rafter L	C	1,514		238
02266	Ramsbottom	M	7,189		430
02319	Rattlesnake Creek	C	40		12
12098	Rattlesnake Springs	C	432		46
12040	RBL	C	360		43
12171	Read Draw	C	40		4
02269	Reculusa	C	160		42
12051	Red Canyon	C	2,264		270
02365	Red Draw	M	2,115		128
12033	Red Fork	I	10,000	AMP IMPLEMENTED	917
02409	Red Fork Mtn Camp	C	203		7
02253	Red Hills	C	759		127
02416	Red Wall	C	459	AMP IMPLEMENTED	78
02271	Reece Ernest	M	2,715		414
02330	Reel	C	40		6
02275	Remington Creek	M	2,676	AMP IMPLEMENTED	290
02385	Reno	C	160		16
02268	Reno Draw	C	558		63
22205	Robinson Draw	C	69		9

Table B-1. Current Livestock Grazing Allotment Information

Allotment Number	Allotment Name	Management Category	Total Federal Acres	Type Management	Active Preference
12155	Robinson Place	C	630		68
02329	Rochelle Hills	C	80		12
12087	Rock Ridge	C	1,360		93
02321	Rocky Butte	C	2,075		367
12118	Rosie Draw	C	200		29
02491	Rossnecker Draw	C	42		6
02278	Rourke & Offutt	C	477		125
02263	Rozet	C	40		8
02465	Ryan	C	160		46
02259	S Wyodak	C	120		32
02386	S. Fork Otter Creek	C	120		17
02452	S. Gillette Forty	C	40		10
22203	S. Leiter	C	1,457		146
02372	S.F. Crazy Woman	C	80		14
02281	S.F. Three Bar	C	215		43
22110	Sahara Draw	C	120		20
02411	Salt Creek	M	4,249		551
02272	Sand Rock/Hoe Creek	C	74		11
00743	Sawmill	C	240		12
12185	Schiermiester	C	800		114
22122	School Sec Dr/Mdlfrk	C	160		27
12073	School Section Draw	C	478		43
22214	Schoonover Ranch	I	12,482	AMP IMPLEMENTED	1,528
12137	Scotch	C	200		10
02353	Scott Draw	C	306		32
02286	Scott Marion	C	560		124
12083	Scotty Draw	C	4,500		624
02276	Se Of Buffalo Creek	C	1,140		152
02369	Senff Ditch	C	80		13
02463	SF Holler Draw	C	280		26
02375	S Fork Arkansas Creek	C	200		36
02292	Simpson,John H	C	1,156		198
02471	Sioux Battle	C	241		26
02459	Sippie Mine	C	520		53
02291	Skidmore Estate	C	26		9
02371	Slope	I	3,960	AMP IMPLEMENTED	1,044
02399	Slope/Mountain, Allotment	C	2,032		256
02297	Smith	C	322		34

Table B-1. Current Livestock Grazing Allotment Information

Allotment Number	Allotment Name	Management Category	Total Federal Acres	Type Management	Active Preference
02300	Smith	C	120		23
32010	Smith Creek	C	160		10
02383	Smith Cut	C	3,235		615
02294	Soldier Creek Ranch	C	1,343		229
02495	Sony Draw	M	5,101		513
02498	South Carpenter Draw	C	240		2
02451	South Fork	I	7,466		726
02389	South Fork Powder R.	M	4,890		380
02280	South Middle Butte	C	639		67
12183	South Middle Prong	C	640		73
02467	South Sussex Stkrst	C	27		14
00744	South Tabletop	C	120		15
02296	South Trabing	M	1,039		111
02351	South Twin Creek	C	200		33
22220	Spellman	C	1,278		163
02477	Spotted Horse Creek	C	961		105
02241	Spring Creek	C	1,231		287
22025	Squaw Butte	C	40		11
02298	Squaw Creek	M	2,566		289
02255	Stateline	C	71		18
12131	Steel Creek	C	200		20
02308	Stephenson, Marie	C	80		20
02387	Stone Draw	C	80		20
12160	Stotts Draw	C	1,934		193
02312	Stuart, James R.	C	80		16
02403	Stubbs Draw	C	493	AMP IMPLEMENTED	69
02313	Suel Anna Trustee	C	200		40
12167	Sussex Cutoff	I	1,318		105
12133	Sussex Oil Company	C	920		46
02420	Sussex Stockrest	I	305		50
02316	Swartz, Edward H.	M	2,480		621
02438	T.W.	I	1,840	AMP IMPLEMENTED	184
12141	Tabletop	C	80		8
12145	Tarver Trust	C	689		128
02458	Td Southwest	C	120		20
02333	Thom Brothers	C	31		4
02349	Three Mile Creek	C	441		90
12101	Threemile Creek Reservoir	C	80		18

Table B-1. Current Livestock Grazing Allotment Information

Allotment Number	Allotment Name	Management Category	Total Federal Acres	Type Management	Active Preference
02337	Throne John And Earl	C	120		24
02432	Timar East	C	1,122		116
12199	Timber Draw	C	74		10
02494	Tipperary	C	360		38
22213	Tongue River	I	1,767	AMP IMPLEMENTED	476
02339	Trail Creek	M	7,244		2,624
02417	Trail Side	C	40		14
12043	Trough Draw	C	760		34
00697	Truman Draw	M	2,032		347
02282	Ttt	M	14,155		1,563
02456	Tuttle Draw	C	320		92
02470	Tuttle Draw/Deep Crk	C	554		154
12187	Twenty Mile Creek	I	6,100		808
12142	Tyree Place	C	40		8
02448	Upper Cabin Creek	C	240		43
02273	Upper Fort Creek	C	920		205
12152	Upper Grub	C	1,640		164
12207	Upper Kaufman Draw	M	1920		262
12163	Ute Creek	C	117		17
02284	V Bar F	M	2,797		364
02345	Vanderhoff	C	360		26
02311	Vanhouten	M	1,057		107
12077	W. Sussex (Hickey)	I	3,320		483
02381	Wagensen Don Et Al	C	80		20
22106	Wagonhammer	M	3,881	AMP IMPLEMENTED	1,352
02492	Walker Draw	C	440		48
12146	Wall (East)	C	1,840		247
22104	Walsh	C	340		34
02304	Washout Dr.	M	1,859		315
02318	Water Gap Draw	M	9,043		1,127
02356	Watt Ranch	C	46		6
12181	West Bowman Hill	C	2,311		522
02490	West Coutant Creek	C	80		14
02462	West Fork	C	240		26
12091	West Timber Creek	C	240		32
02170	West Timber Draw	C	960		100
12063	Weston SW	M	4,435		829
02326	White Rock	C	440		58
02247	White Tail Creek	C	200		62

Table B-1. Current Livestock Grazing Allotment Information

Allotment Number	Allotment Name	Management Category	Total Federal Acres	Type Management	Active Preference
12237	Whitetail Creek	M	3,391		751
22222	Whitetail Pines	M	1,493		299
02455	Whitmeyer	C	120		21
02302	Whitmeyer Creek	C	40		6
12082	Wild Horse Creek	C	120		24
32015	Wild Horse Creek	C	80		8
02283	Wildcat	C	80		16
10069	Willow Creek	I	26,822		4,412
12036	Willow Creek	C	2,715		462
02331	Winter Draw	C	40		6
12216	Wolf Mountain	C	515		57
02380	Wormwood Ranch	I	20,699	AMP IMPLEMENTED	2,497
12042	Wyarno	C	120		24
02334	Wythom Road	C	120		20
12150	Yellowhammer	M	1,776		206

AMP Allotment Management Plan
C Custodial
I Improve
M Maintain

Table B-2. Standards and Guidelines Summary of Grazing Allotments

Allotment Name	Allotment Number	Year Completed	Progress	Standard[1, 2]					
				1	2	3	4	5	6
Bear Gulch	12191	2006		Y	Y	Y	Y	U	U
Beartrap Creek	12072	2000		Y	Y	Y	Y	U	U
Beaver Creek Slope	12157	2002		Y	Y	Y	Y	U	U
Bishop	22021	2001		Y	Y	Y	Y	U	U
Bridge Draw	32005	2006		Y	Y	Y	Y	U	U
Bull Camp	12213	2005		Y	Y	Y	Y	U	U
Butcher	12046	2007		Y	Y	Y	Y	U	U
Cabin Creek	02299	2003		Y	Y	Y	Y	U	U
Castle Rock	12177	2007		Y	Y	Y	Y	U	U
Castle Rock	12177	2007		Y	Y	Y	Y	U	U
Cat Creek	02376	2002		Y	Y	Y	Y	U	U
Clear Creek	02093	2008		Y	Y	Y	Y	U	U
Crooked Creek	02426	1999		Y	Y	Y	Y	U	U
Croton	12184	2006		Y	Y	Y	Y	U	U
Daly	12074	2007		Y	Y	Y	Y	U	U
Daly Livestock Co	12075	2007		Y	Y	Y	Y	U	U
Davis Draw	02397	2005		Y	Y	Y	Y	U	U
Davis Draw Common	12105	2005	Y	N	Y	N	Y	U	U
Davis Draw/Johnson Allotment	02400	2005		Y	Y	Y	Y	U	U
Dead Horse Creek	12176	1999		Y	Y	Y	Y	U	U
Deer Creek	22102	2000		Y	Y	Y	Y	U	U
Deer Gulch	12096	2002		Y	Y	Y	Y	U	U
Donlin	02402	2001		Y	Y	Y	Y	U	U
Dry Creek Ranch Inc	12080	2005		Y	Y	Y	Y	U	U
Dugout Creek	02453	1999		Y	Y	Y	Y	U	U
Dull Knife	22124	2002		Y	Y	Y	Y	U	U
Dull Knife Pass	12031	2005		Y	Y	Y	Y	U	U
Eagle Creek	02344	1998		Y	Y	Y	Y	U	U
East Spring Draw	22225	2006		Y	Y	Y	Y	U	U
Eighty-Five Divide	12100	2005		Y	Y	Y	Y	U	U
Elsom Brothers	12089	2001		Y	Y	Y	Y	U	U
Falxa	12139	1999		Y	Y	Y	Y	U	U
Fence Creek	12162	1999		Y	Y	Y	Y	U	U
Fitch Draw	12099	1999		Y	Y	Y	Y	U	U
Flying E	12078	1998		Y	Y	Y	Y	U	U
Flying U Ranch	12066	2006		Y	Y	Y	Y	U	U
Fort Creek	12151	2002		Y	Y	Y	Y	U	U
Four Corners	12076	2005		Y	Y	Y	Y	U	U
Fourmile	12050	2006		Y	Y	Y	Y	U	U

Table B-2. Standards and Guidelines Summary of Grazing Allotments

Allotment Name	Allotment Number	Year Completed	Progress	Standard[1, 2]					
				1	2	3	4	5	6
Fourmile Ranch	02379	2002		Y	Y	Y	Y	U	U
Gardner Mt. (South)	02476	1999		Y	Y	Y	Y	U	U
Gordon	22121	2002		Y	Y	Y	Y	U	U
Gordon Creek	02335	1999		Y	Y	Y	Y	U	U
Government Draw	12193	2008		Y	Y	Y	Y	U	U
Grub Draw	02469	2001		Y	Y	Y	Y	U	U
Hat Ranch	12147	2004		Y	Y	Y	Y	U	U
Hepp Charles	12153	2005		Y	Y	Y	Y	U	U
Hoe Ranch	12169	2000		Y	Y	Y	Y	U	U
Hole In The Wall	02393	2002	Y	Y	N	N	Y	U	U
Hope	10342	1999		Y	Y	Y	Y	U	U
Horse Creek	02434	2007		Y	Y	Y	Y	U	U
Indian Creek	02415	2006		Y	Y	Y	Y	U	U
Jackplane	12061	2008		Y	Y	Y	Y	U	U
Johnson Draw	02401	2008		Y	Y	Y	Y	U	U
Kendrick	12178	2006		Y	Y	Y	Y	U	U
Lawver	12023	2007		Y	Y	Y	Y	U	U
Little Powder River	02358	2001		Y	Y	Y	Y	U	U
Little Willow	02310	2002		Y	Y	Y	Y	U	U
M Gordon	02368	2008		Y	Y	Y	Y	U	U
Mayor	02346	2001		Y	Y	Y	Y	U	U
Meadow Creek	02370	2006		Y	Y	Y	Y	U	U
Michelena	12227	2004		Y	Y	Y	Y	U	U
Mitchell Draw	02429	2006		Y	Y	Y	Y	U	U
Morris Draw	02435	2008		Y	Y	Y	Y	U	U
Mosier Gulch	22029	2006		Y	Y	Y	Y	U	U
Mountain	02373	1999		Y	Y	Y	Y	U	U
N Windmill	32014	1998		Y	Y	Y	Y	U	U
Napier	02348	2006		Y	Y	Y	Y	U	U
North Trabing	02295	2004		Y	Y	Y	Y	U	U
Olmstead	02390	1998		Y	Y	Y	Y	U	U
Olsen Draw	02058	2007		Y	Y	Y	Y	U	U
Petrified Tree	12156	2004		Y	Y	Y	Y	U	U
Plosser	02472	2008		Y	Y	Y	Y	U	U
Poison Creek	12195	2005		Y	Y	Y	Y	U	U
Poker Creek	02419	1999		Y	Y	Y	Y	U	U
Powder River	02430	1998		Y	Y	Y	Y	U	U
Powder River Ranch	02260	2003		Y	Y	Y	Y	U	U
Pumpkin Creek	12138	2001		Y	Y	Y	Y	U	U
Red Draw	02365	2006		Y	Y	Y	Y	U	U

Table B-2. Standards and Guidelines Summary of Grazing Allotments

Allotment Name	Allotment Number	Year Completed	Progress	Standard[1, 2]					
				1	2	3	4	5	6
Red Fork	12033	1999		Y	Y	Y	Y	U	U
Reece Ernest	02271	2006		Y	Y	Y	Y	U	U
Remington Creek	02275	2008		Y	Y	Y	Y	U	U
Rock Ridge	12087	2006		Y	Y	Y	Y	U	U
Salt Creek	02411	2005		Y	Y	Y	Y	U	U
Schiermiester	12185	2008		Y	Y	Y	Y	U	U
Schoonover Ranch	22214	1998		Y	Y	Y	Y	U	U
Sioux Battle	02471	2003	Y	Y	Y	N	Y	U	U
Slope	02371	1999		Y	Y	Y	Y	U	U
Sony Draw	02495	2006		Y	Y	Y	Y	U	U
South Fork	02451	2003		Y	Y	Y	Y	U	U
South Fork Powder R.	02389	2000		Y	Y	Y	Y	U	U
South Trabing	02296	2004		Y	Y	Y	Y	U	U
Squaw Creek	02298	2005		Y	Y	Y	Y	U	U
Stubbs Draw	02403	1999		Y	Y	Y	Y	U	U
Sussex Cutoff	12167	2000		Y	Y	Y	Y	U	U
Sussex Stockrest	02420	2000		Y	Y	Y	Y	U	U
Swartz, Edward H.	02316	2007		Y	Y	Y	Y	U	U
T.W.	02438	1998		Y	Y	Y	Y	U	U
Timar East	02432	2004		Y	Y	Y	Y	U	U
Trail Creek	02339	2006		Y	Y	Y	Y	U	U
Trough Draw	12043	2008		Y	Y	Y	Y	U	U
Ttt	02282	2000		Y	Y	Y	Y	U	U
Twenty Mile Creek	12187	2000		Y	Y	Y	Y	U	U
Upper Grub	12152	2005		Y	Y	Y	Y	U	U
Upper Kaufman Draw	12207	2006		Y	Y	Y	Y	U	U
V Bar F	02284	2006		Y	Y	Y	Y	U	U
Vanhouten	02311	2003		Y	Y	Y	Y	U	U
W. Sussex (Hickey)	12077	2001		Y	Y	Y	Y	U	U
Wagonhammer	22106	1998		Y	Y	Y	Y	U	U
Washout Dr.	02304	2005		Y	Y	Y	Y	U	U
Water Gap Draw	02318	2005		Y	Y	Y	Y	U	U
Whitetail Creek	12237	2001		Y	Y	Y	Y	U	U
Whitetail Pines	22222	2002		Y	Y	Y	Y	U	U
Willow Creek	10069	2004		Y	Y	Y	Y	U	U
Wormwood Ranch	02380	1998		Y	Y	Y	Y	U	U
Yellowhammer	12150	2004		Y	Y	Y	Y	U	U

[1] Codes in Progress and Standard columns are as follows: Y = Yes meets standard, N = No does not meet standard, U = Unknown.
[2] Standards 5 and 6 are dependent upon determinations made by the Wyoming Department of Environmental Quality (DEQ). Standard 5 is Unknown if allotment specific data is not available. DEQ has not identified air quality impairments within the Cody Field Office resulting in Standard 6 being met.

Buffalo Summary of the Analysis of the Management Situation

Appendix C

Maps

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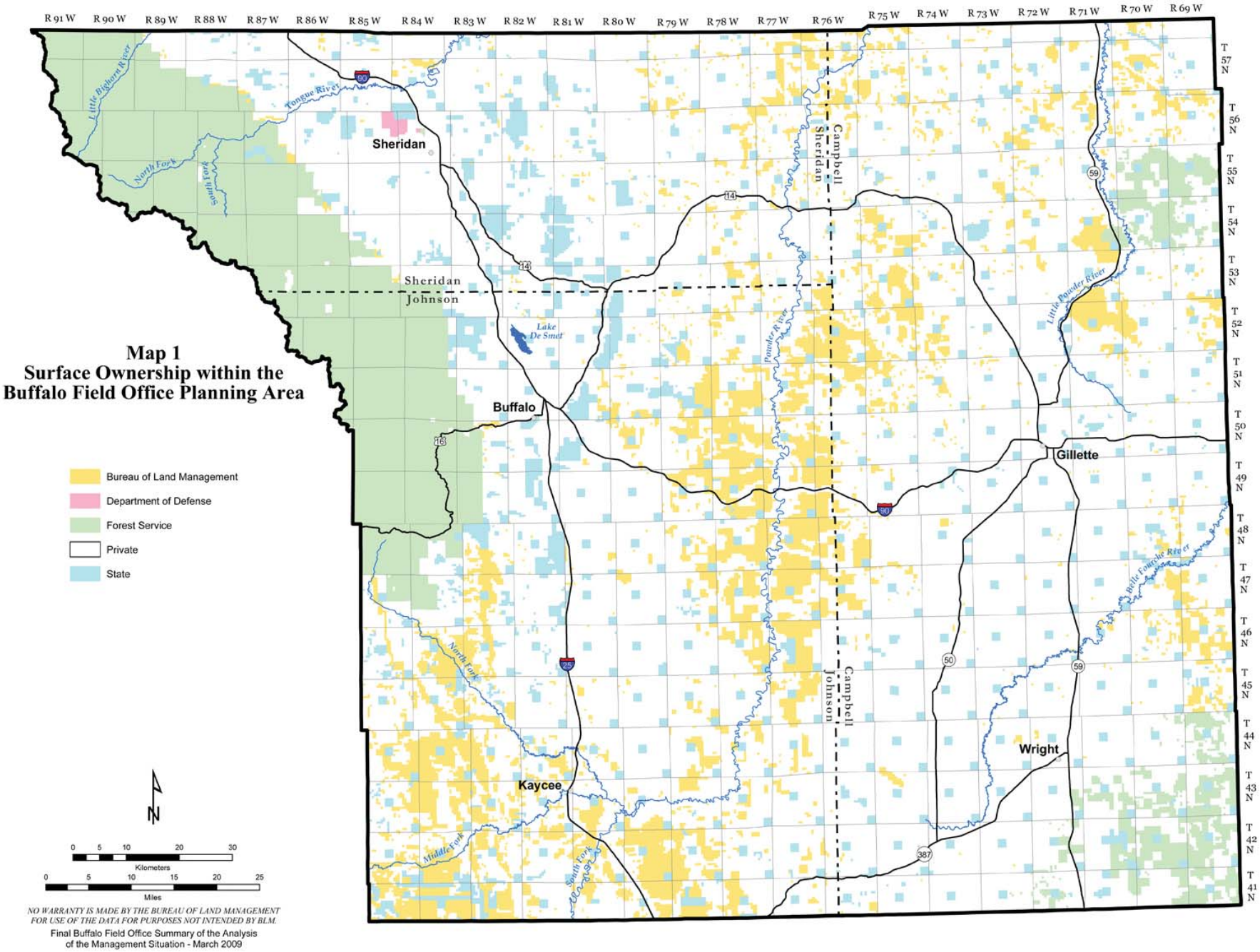
Map 1
Surface Ownership within the
Buffalo Field Office Planning Area
Bureau of Land Management
Department of Defense
Forest Service
Private
State
Sheridan
Buffalo
Gillette
Wright
Kaycee
Sheridan
Johnson
Campbell
Sheridan
Campbell
Johnson
Lake De Smet
Tongue River
Little Bighorn River
North Fork
South Fork
Powder River
Little Powder River
Belle Fourche River
Middle Fork
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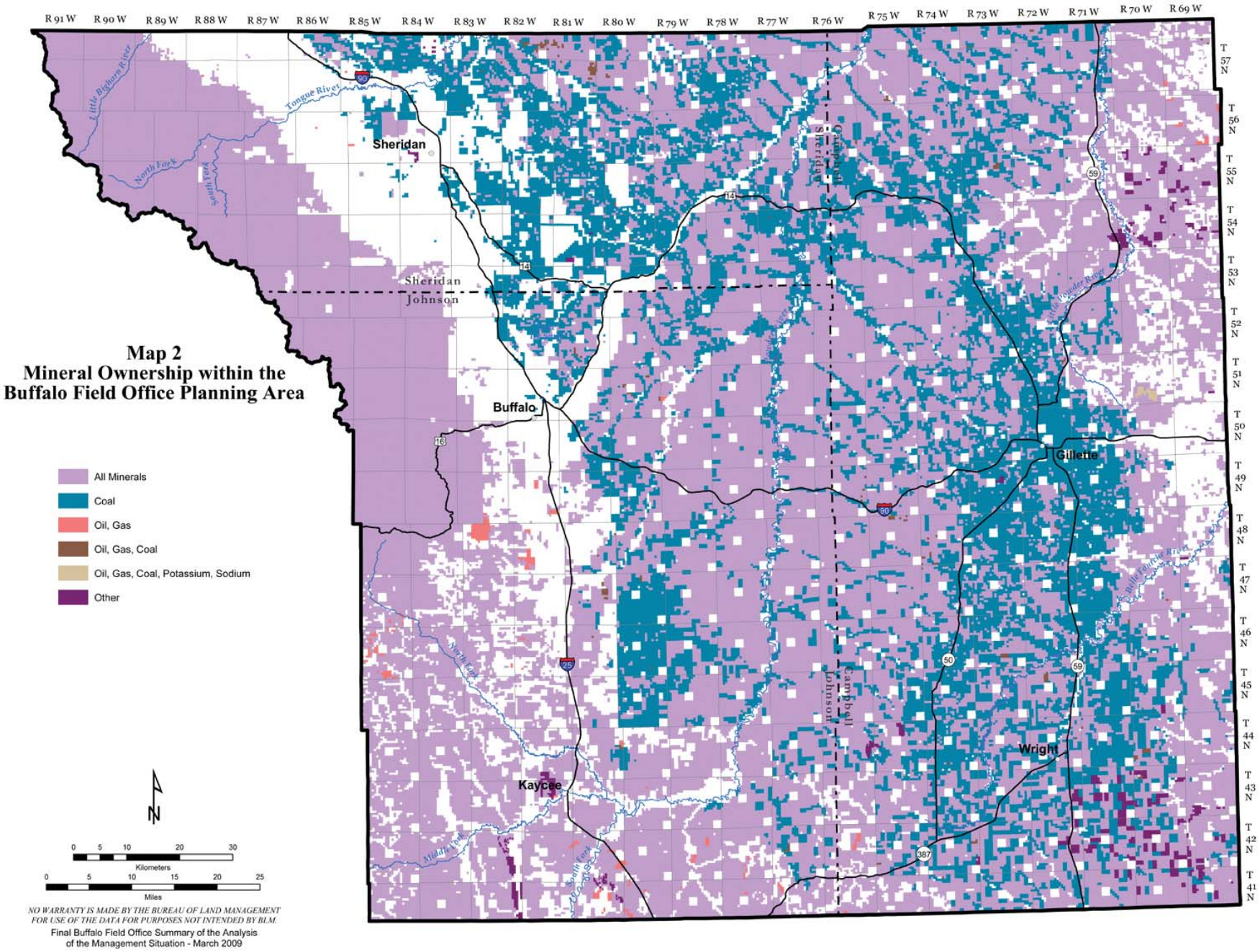
Map 2
Mineral Ownership within the
Buffalo Field Office Planning Area
All Minerals
Coal
Oil, Gas
Oil, Gas, Coal
Oil, Gas, Coal, Potassium, Sodium
Other
Sheridan
Buffalo
Gillette
Wright
Kaycee
Sheridan
Johnson
Campbell
Johnson
Little Bighorn River
Tongue River
North Fork
South Fork
Middle Fork
Little Powder River
Little Muddy River
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Kilometers
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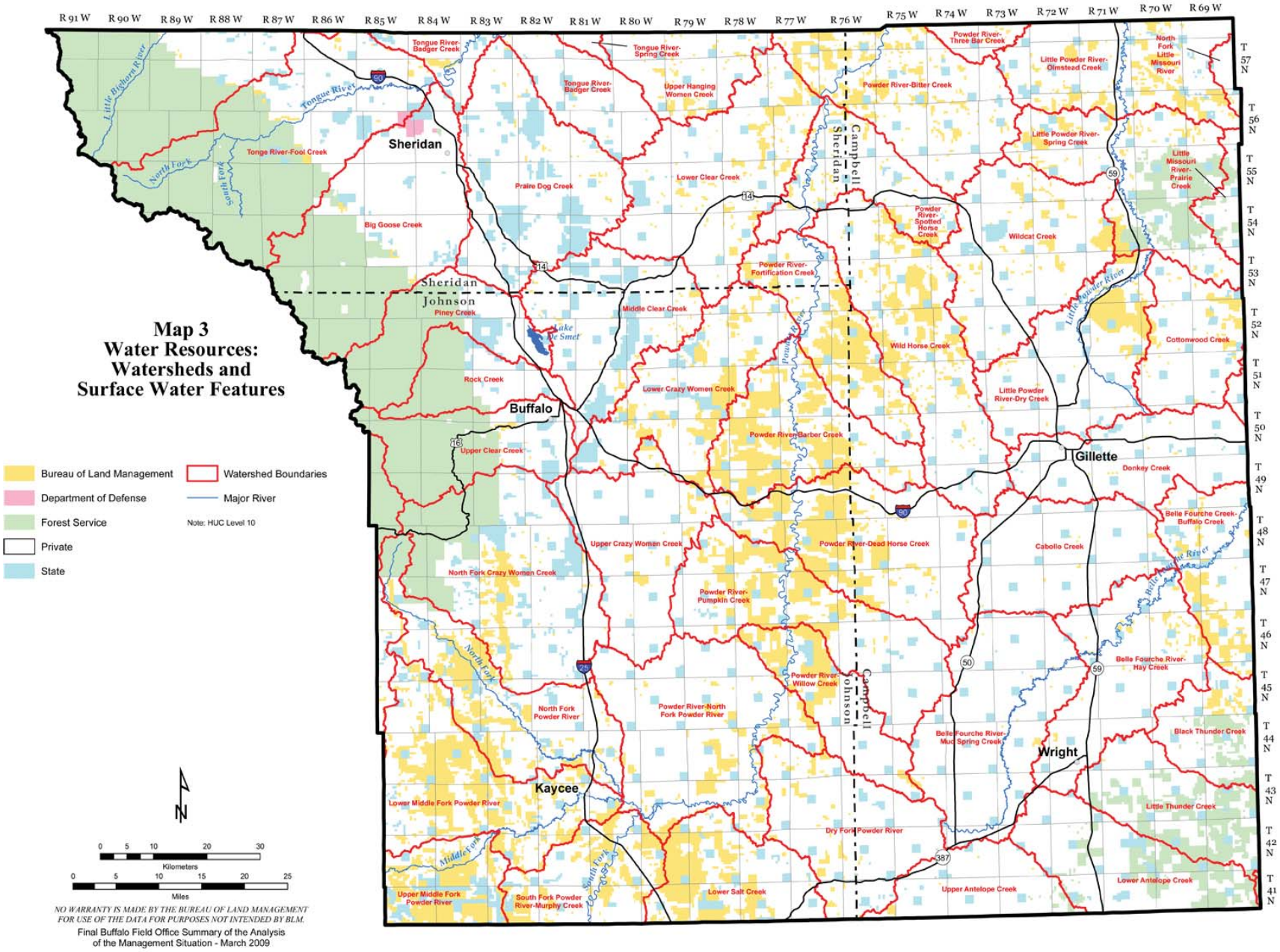
Map 3
Water Resources:
Watersheds and
Surface Water Features
Bureau of Land Management
Department of Defense
Forest Service
Private
State
Watershed Boundaries
Major River
Note: HUC Level 10
Sheridan
Buffalo
Kaycee
Gillette
Wright
Sheridan
Johnson
Campbell
Lake De Smet
Tongue River
Little Bighorn River
North Fork
South Fork
Powder River
Little Powder River
Belle Fourche River
Middle Fork
Tongue River-Fool Creek
Tongue River-Badger Creek
Tongue River-Spring Creek
Upper Hanging Women Creek
Powder River-Bitter Creek
Powder River-Three Bar Creek
Little Powder River-Olmstead Creek
North Fork Little Missouri River
Little Powder River-Spring Creek
Little Missouri River-Prairie Creek
Prairie Dog Creek
Lower Clear Creek
Big Goose Creek
Powder River-Spotted Horse Creek
Wildcat Creek
Powder River-Fortification Creek
Piney Creek
Middle Clear Creek
Wild Horse Creek
Cottonwood Creek
Rock Creek
Lower Crazy Women Creek
Little Powder River-Dry Creek
Powder River-Barber Creek
Upper Clear Creek
Donkey Creek
Belle Fourche Creek-Buffalo Creek
Upper Crazy Women Creek
Powder River-Dead Horse Creek
Caballo Creek
North Fork Crazy Women Creek
Powder River-Pumpkin Creek
Belle Fourche River-Hay Creek
Powder River-Willow Creek
North Fork Powder River
Powder River-North Fork Powder River
Belle Fourche River-Mud Spring Creek
Black Thunder Creek
Lower Middle Fork Powder River
Little Thunder Creek
Dry Fork Powder River
Upper Middle Fork Powder River
South Fork Powder River-Murphy Creek
Lower Salt Creek
Upper Antelope Creek
Lower Antelope Creek
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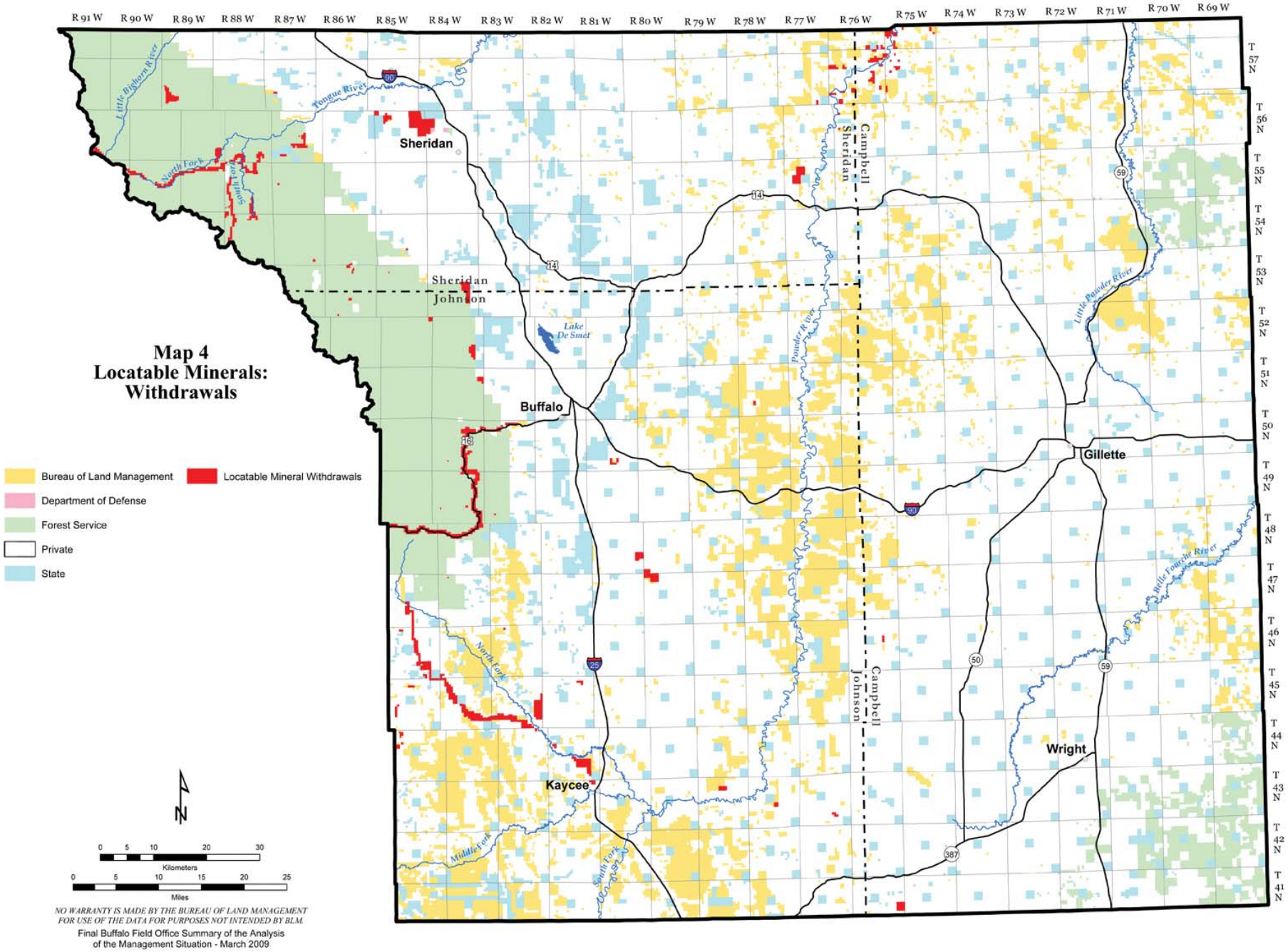
Map 4
Locatable Minerals:
Withdrawals
Bureau of Land Management
Locatable Mineral Withdrawals
Department of Defense
Forest Service
Private
State
Sheridan
Buffalo
Gillette
Wright
Kaycee
Sheridan
Johnson
Campbell
Sheridan
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De Smet
Little Bighorn River
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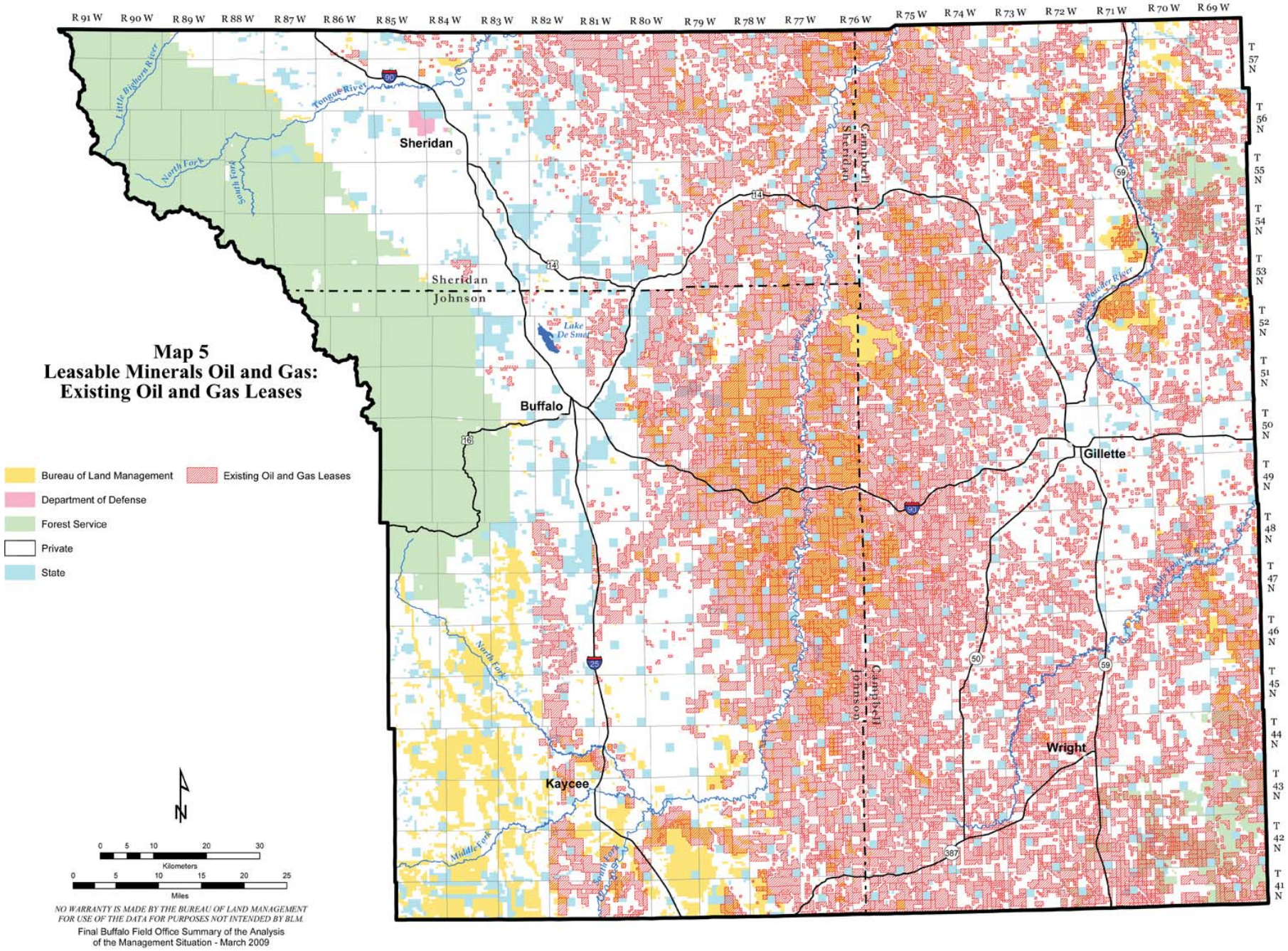
Map 5
Leasable Minerals Oil and Gas:
Existing Oil and Gas Leases
Bureau of Land Management
Department of Defense
Forest Service
Private
State
Existing Oil and Gas Leases
Sheridan
Buffalo
Gillette
Kaycee
Wright
Sheridan
Johnson
Campbell
Lake De Smet
Tongue River
Little Bighorn River
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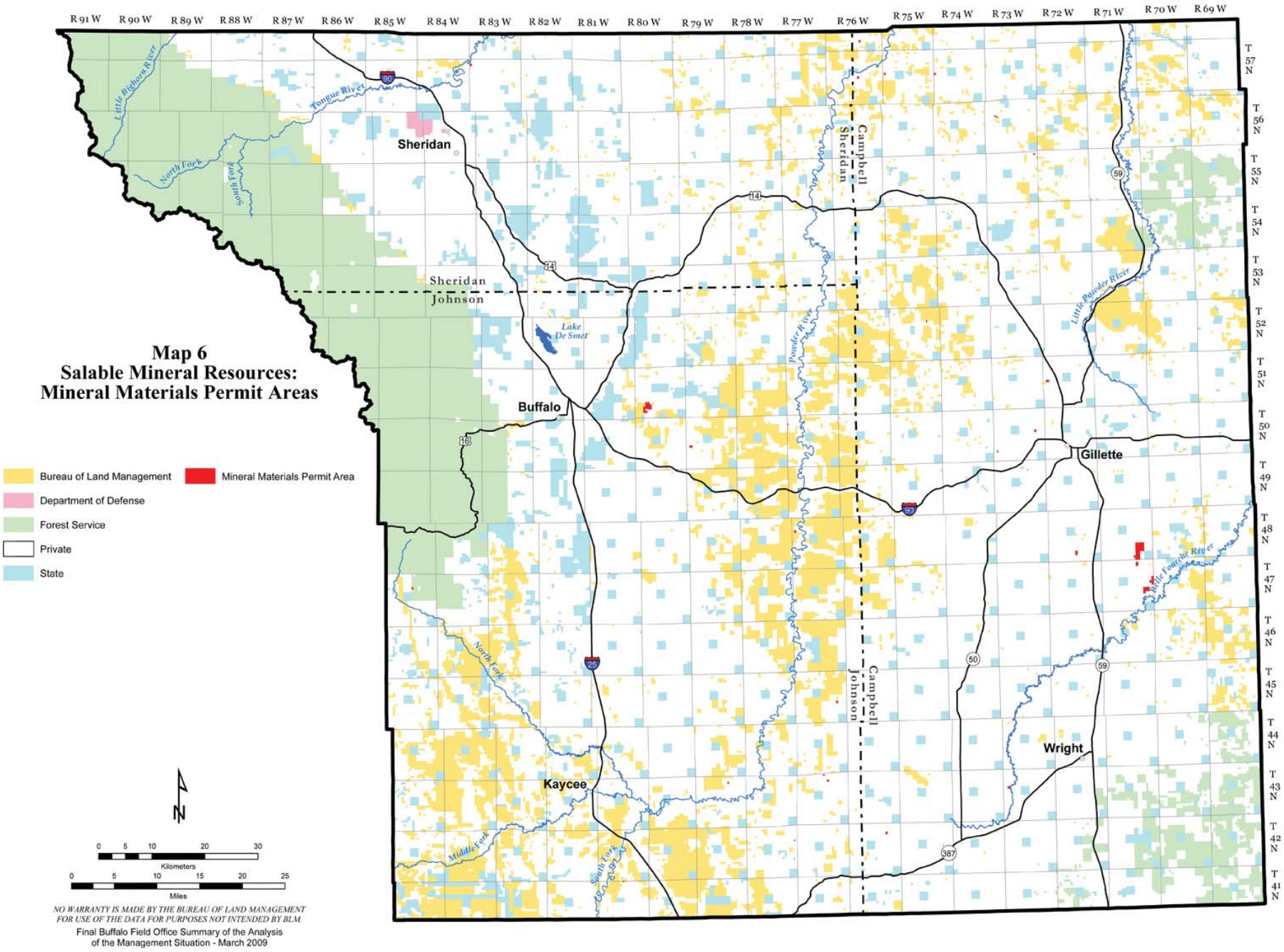
Map 6
Salable Mineral Resources:
Mineral Materials Permit Areas
Bureau of Land Management
Mineral Materials Permit Area
Department of Defense
Forest Service
Private
State
Sheridan
Buffalo
Kaycee
Gillette
Wright
Sheridan
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Campbell
Sheridan
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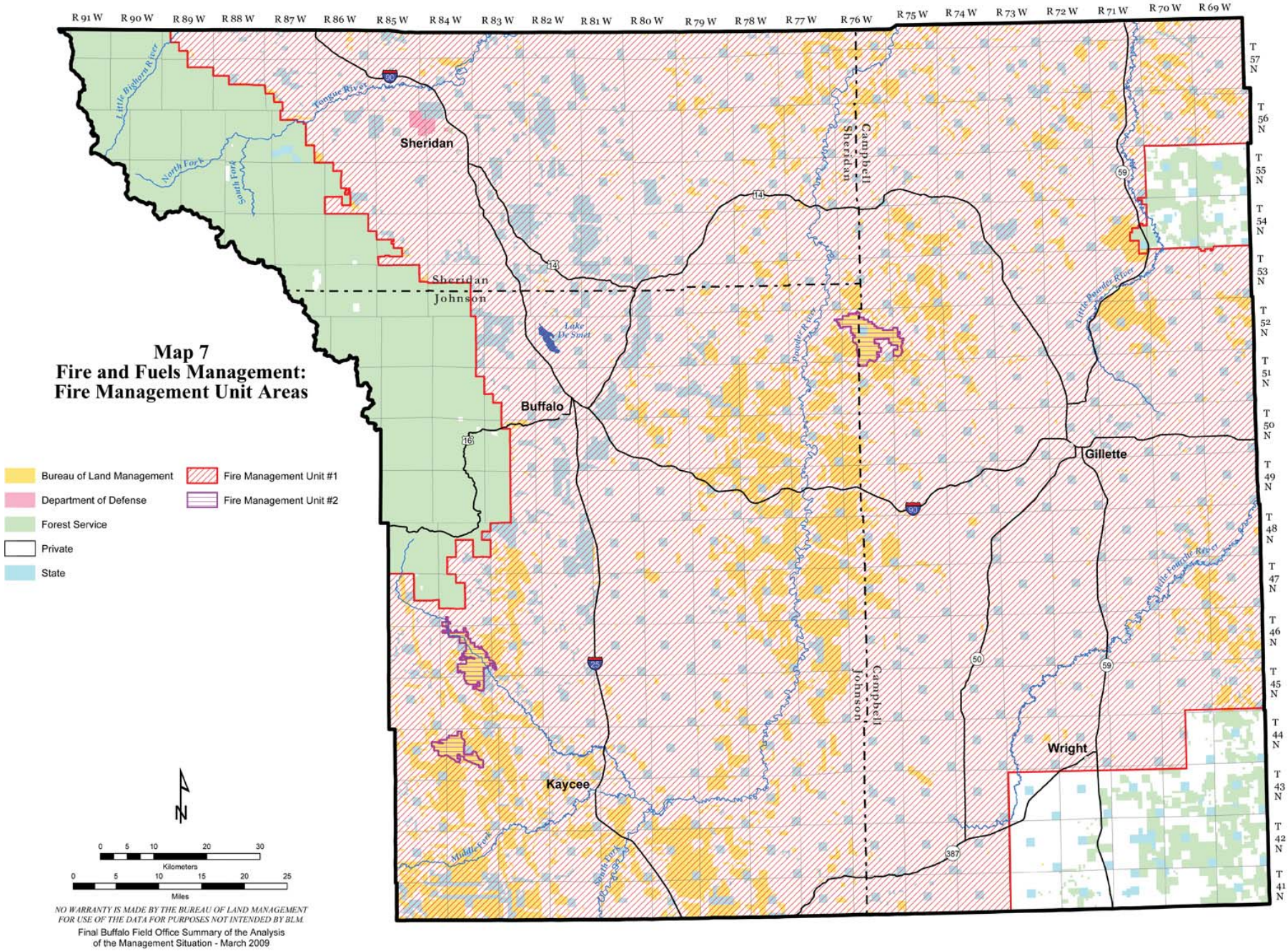
Map 7
Fire and Fuels Management:
Fire Management Unit Areas
Bureau of Land Management
Department of Defense
Forest Service
Private
State
Fire Management Unit #1
Fire Management Unit #2
Sheridan
Buffalo
Gillette
Kaycee
Wright
Sheridan
Johnson
Campbell
Sheridan
Campbell
Johnson
Little Bighorn River
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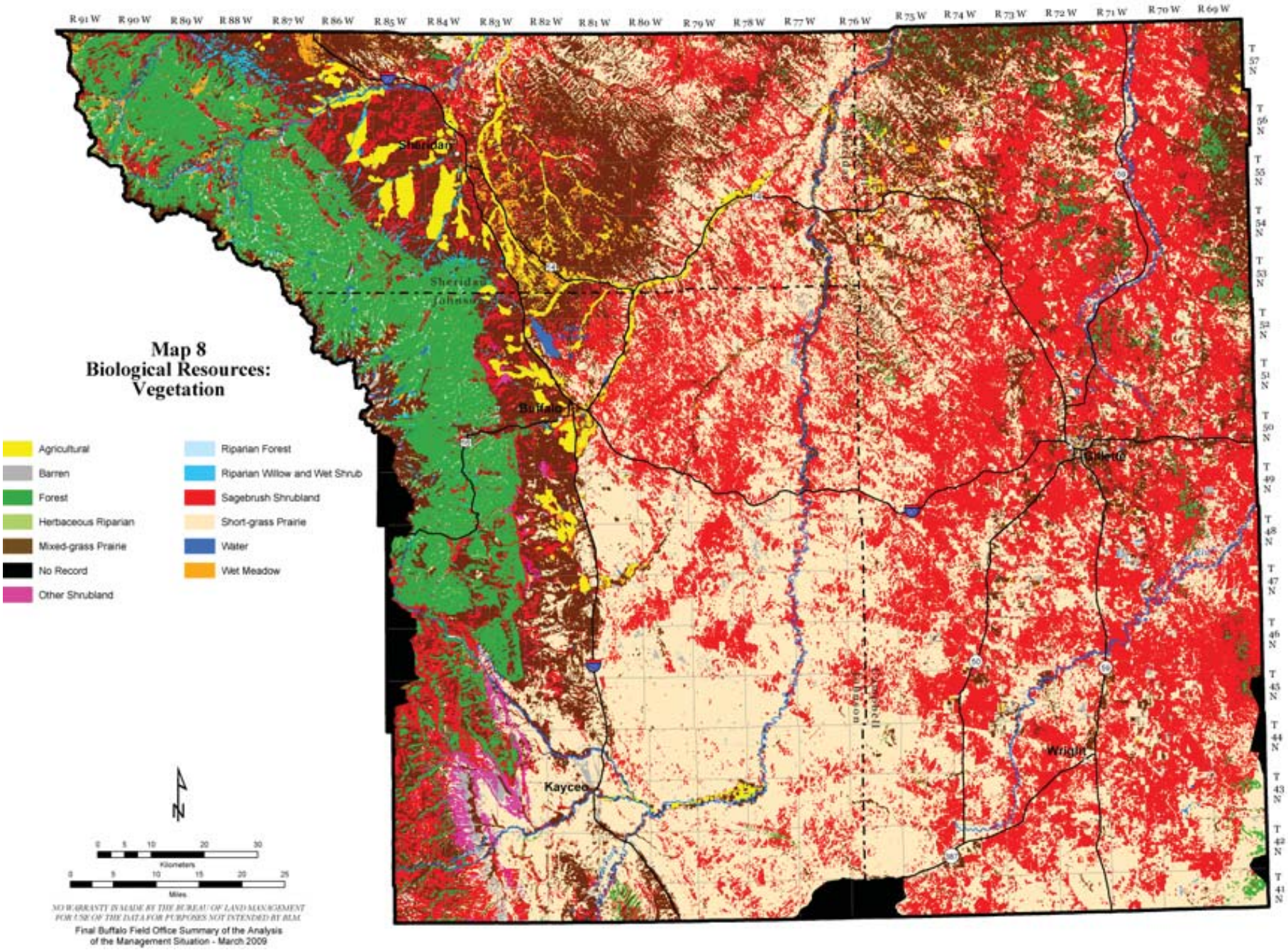
Map 8
Biological Resources:
Vegetation
Agricultural
Barren
Forest
Herbaceous Riparian
Mixed-grass Prairie
No Record
Other Shrubland
Riparian Forest
Riparian Willow and Wet Shrub
Sagebrush Shrubland
Short-grass Prairie
Water
Wet Meadow
Sheridan
Buffalo
Gillette
Kaycee
Wright
Kilometers
Miles
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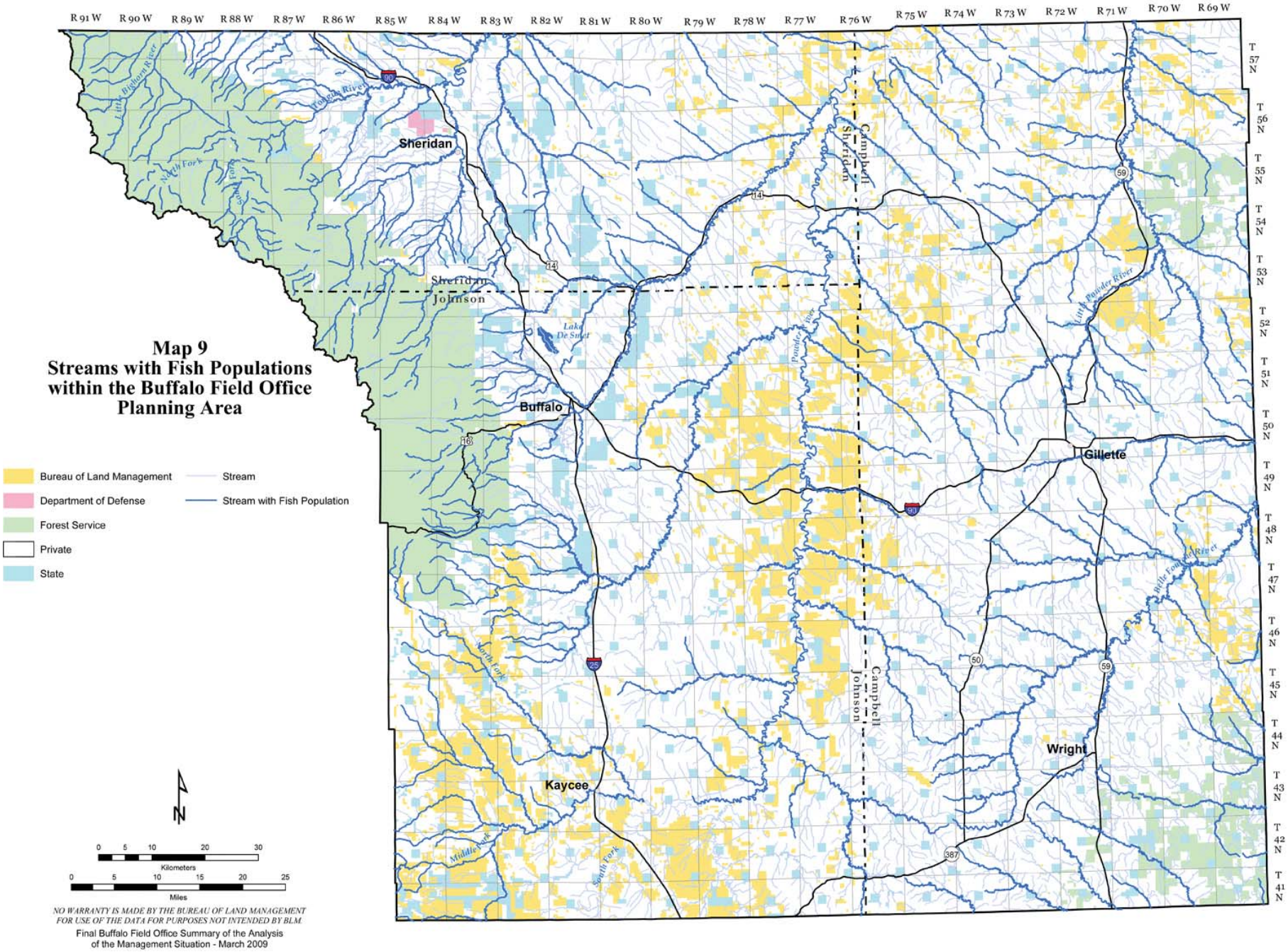
Map 9
Streams with Fish Populations within the Buffalo Field Office Planning Area
Bureau of Land Management
Department of Defense
Forest Service
Private
State
Stream
Stream with Fish Population
Sheridan
Buffalo
Gillette
Wright
Kaycee
Sheridan
Johnson
Campbell
Sheridan
Campbell
Johnson
Little Bighorn River
North Fork
Tongue River
Powder River
Little Powder River
Lake De Smet
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NO WARRANTY IS MADE BY THE BUREAU OF LAND MANAGEMENT FOR USE OF THE DATA FOR PURPOSES NOT INTENDED BY BLM
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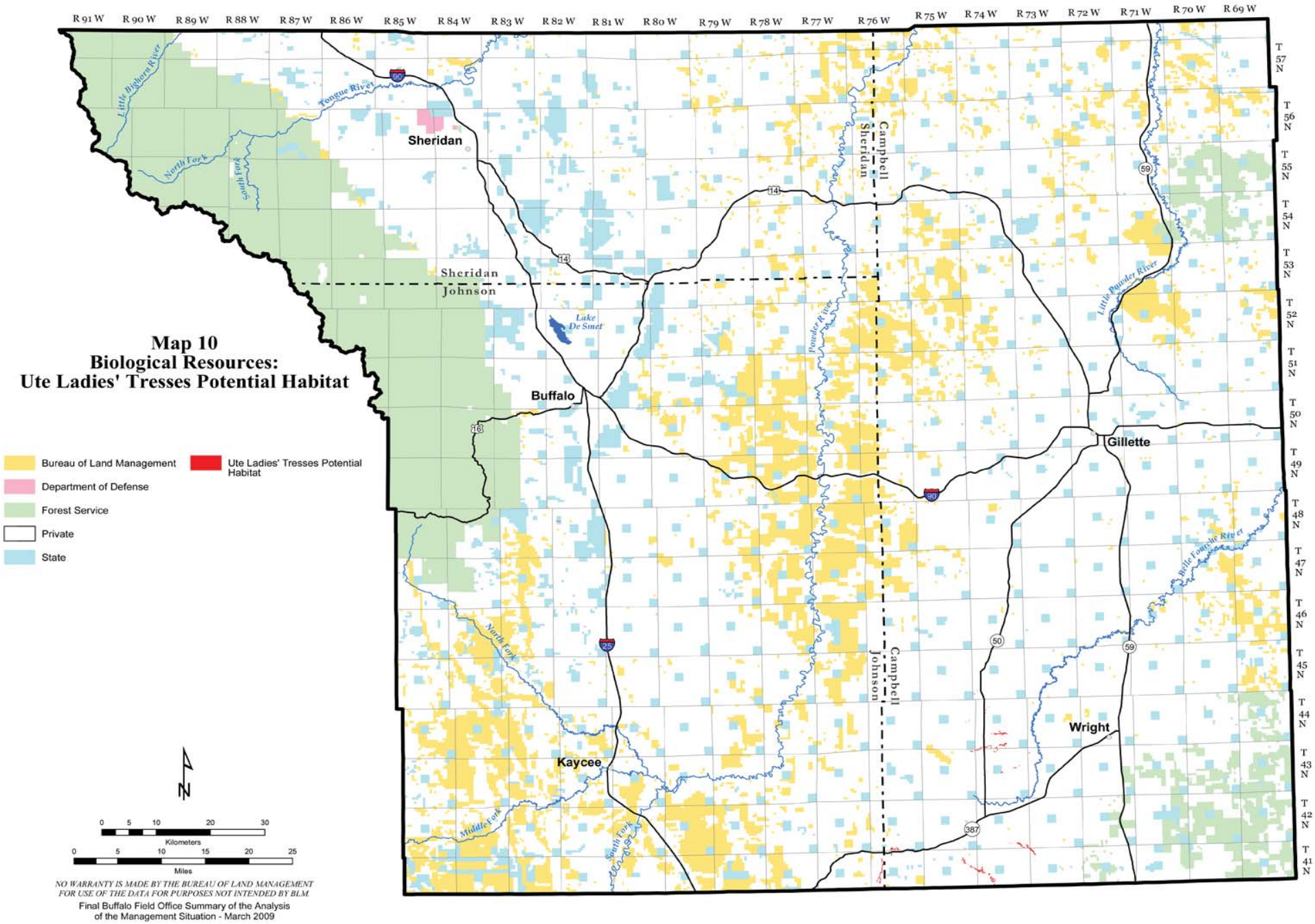
Map 10
Biological Resources:
Ute Ladies' Tresses Potential Habitat
Bureau of Land Management
Department of Defense
Forest Service
Private
State
Ute Ladies' Tresses Potential Habitat
Sheridan
Buffalo
Gillette
Kaycee
Wright
Sheridan
Johnson
Campbell
Sheridan
Campbell
Johnson
Lake De Smet
Tongue River
Little Bighorn River
North Fork
South Fork
Powder River
Little Powder River
Belle Fourche River
Middle Fork
R 91 W
R 90 W
R 89 W
R 88 W
R 87 W
R 86 W
R 85 W
R 84 W
R 83 W
R 82 W
R 81 W
R 80 W
R 79 W
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R 77 W
R 76 W
R 75 W
R 74 W
R 73 W
R 72 W
R 71 W
R 70 W
R 69 W
T 57 N
T 56 N
T 55 N
T 54 N
T 53 N
T 52 N
T 51 N
T 50 N
T 49 N
T 48 N
T 47 N
T 46 N
T 45 N
T 44 N
T 43 N
T 42 N
T 41 N
Kilometers
Miles
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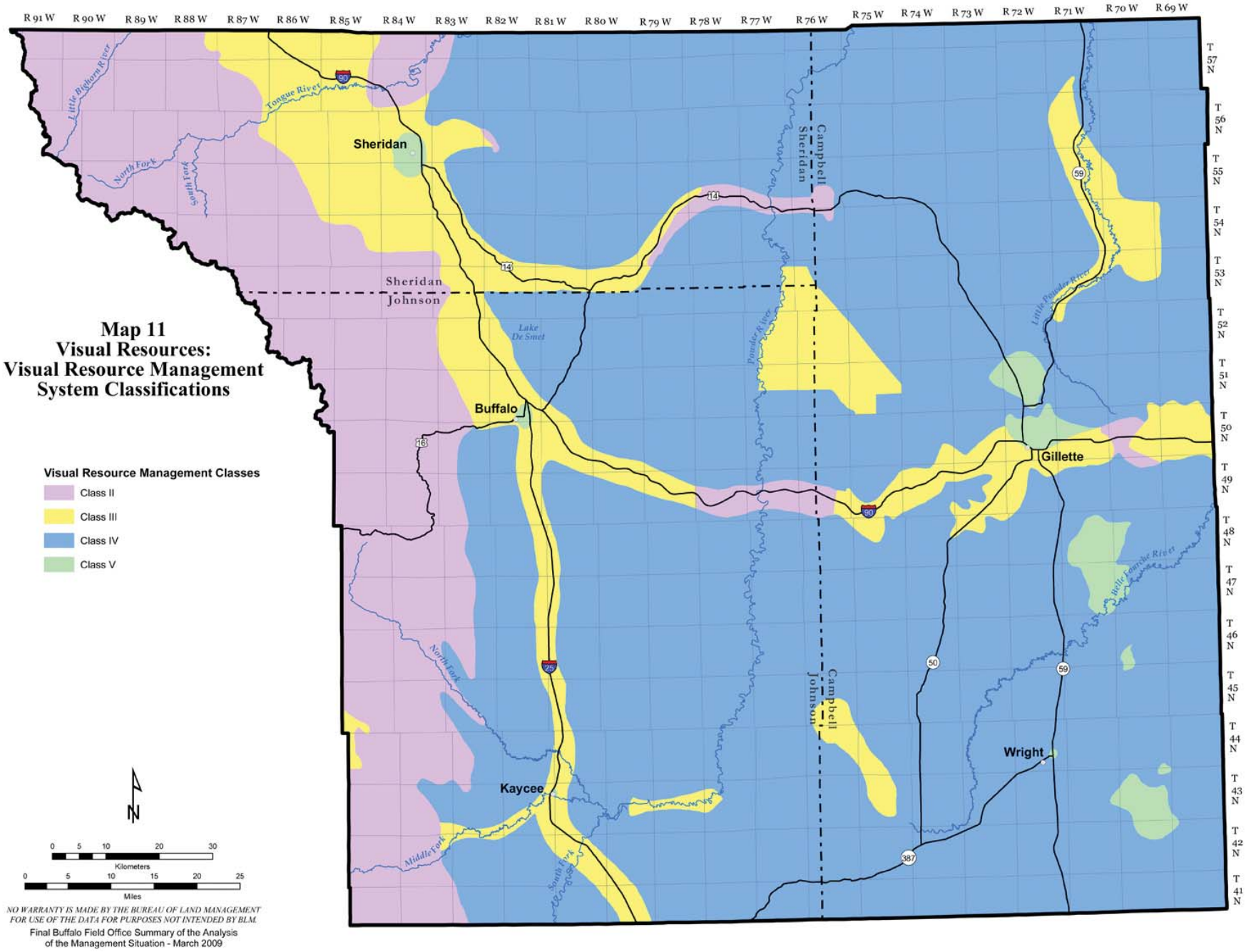
Map 11
Visual Resources:
Visual Resource Management
System Classifications
Visual Resource Management Classes
Class II
Class III
Class IV
Class V
R 91 W
R 90 W
R 89 W
R 88 W
R 87 W
R 86 W
R 85 W
R 84 W
R 83 W
R 82 W
R 81 W
R 80 W
R 79 W
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R 76 W
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T 46 N
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T 44 N
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T 42 N
T 41 N
Sheridan
Buffalo
Gillette
Kaycee
Wright
Sheridan
Johnson
Campbell
Sheridan
Campbell
Johnson
Lake De Smet
Little Bighorn River
Tongue River
North Fork
South Fork
Powder River
Little Powder River
Belle Fourche River
Middle Fork
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16
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59
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0 5 10 20 30
Kilometers
0 5 10 15 20 25
Miles
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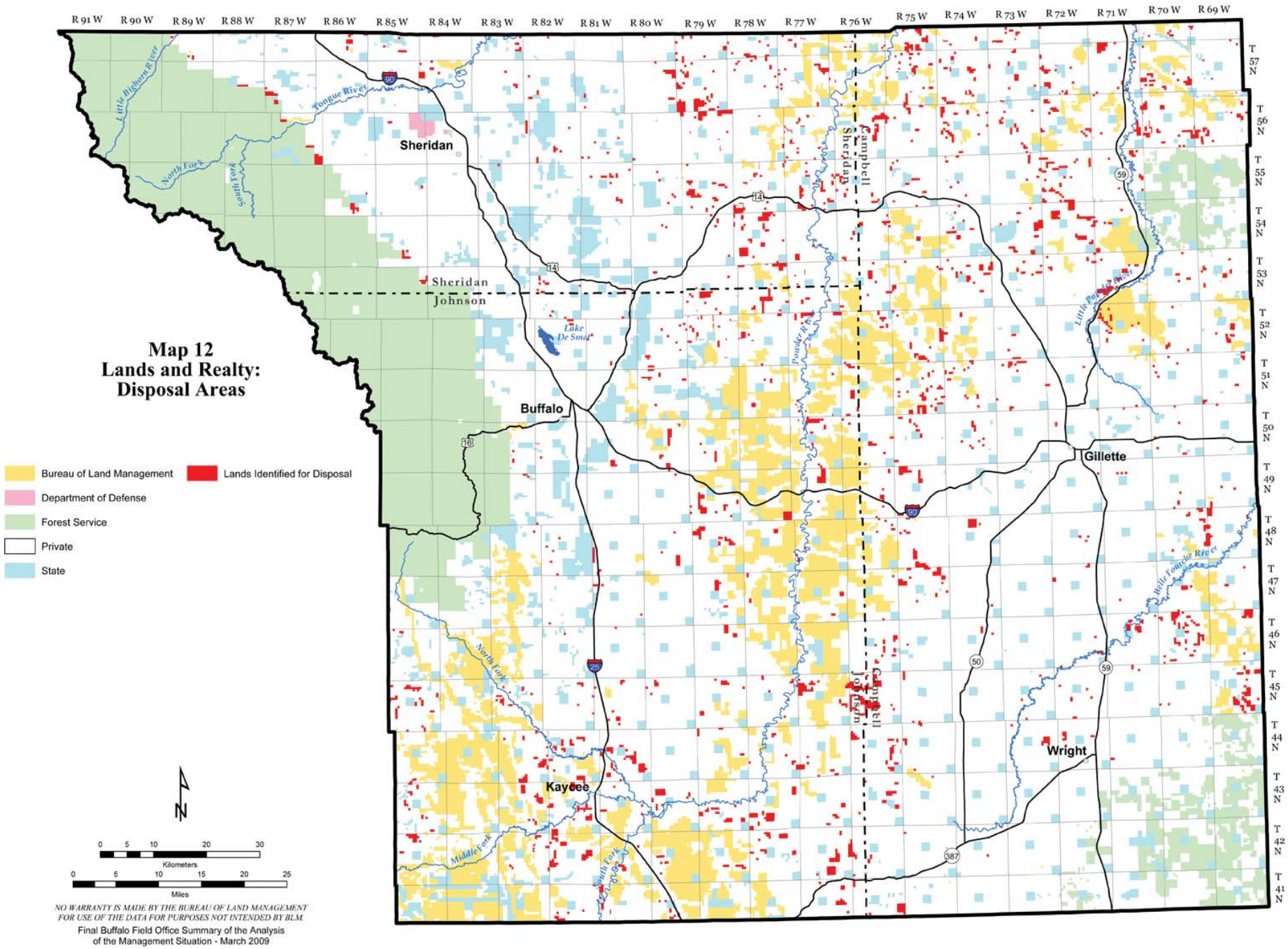
Map 12
Lands and Realty:
Disposal Areas
Bureau of Land Management
Lands Identified for Disposal
Department of Defense
Forest Service
Private
State
Sheridan
Buffalo
Gillette
Wright
Kaycee
Sheridan
Johnson
Campbell
Sheridan
Campbell
Johnson
Lake De Smet
Tongue River
Little Bighorn River
North Fork
South Fork
Powder River
Little Powder River
Belle Fourche River
Middle Fork
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R 73 W
R 72 W
R 71 W
R 70 W
R 69 W
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T 52 N
T 51 N
T 50 N
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T 46 N
T 45 N
T 44 N
T 43 N
T 42 N
T 41 N
Kilometers
Miles
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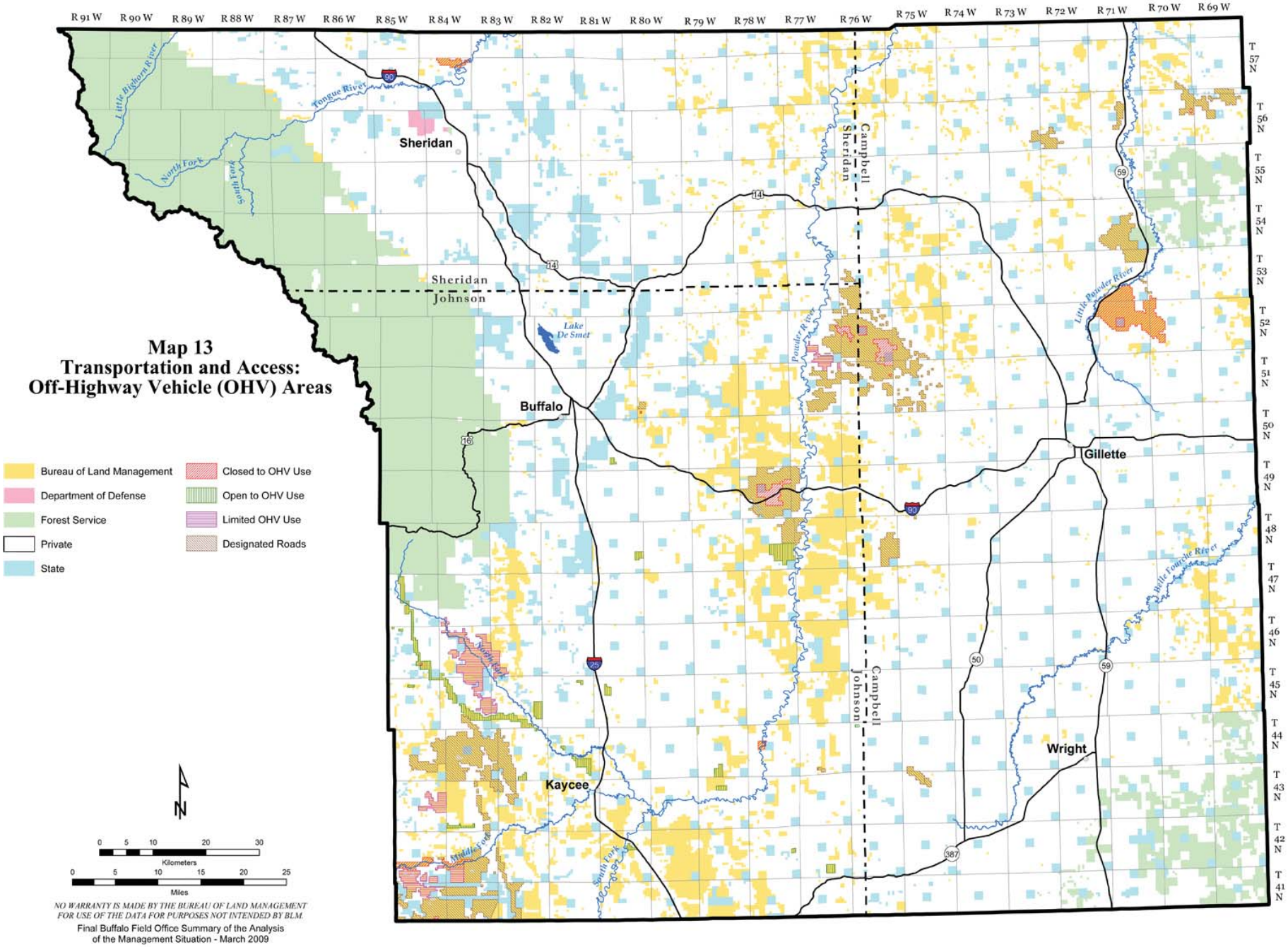
Map 13
Transportation and Access:
Off-Highway Vehicle (OHV) Areas
Bureau of Land Management
Department of Defense
Forest Service
Private
State
Closed to OHV Use
Open to OHV Use
Limited OHV Use
Designated Roads
Sheridan
Buffalo
Gillette
Wright
Kaycee
Sheridan
Johnson
Campbell
Sheridan
Campbell
Johnson
Lake De Smet
Tongue River
Little Bighorn River
North Fork
South Fork
Powder River
Little Powder River
Little Fourche River
Middle Fork
South Fork
R 91 W
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T 50 N
T 49 N
T 48 N
T 47 N
T 46 N
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T 44 N
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T 42 N
T 41 N
N
0 5 10 20 30
Kilometers
0 5 10 15 20 25
Miles
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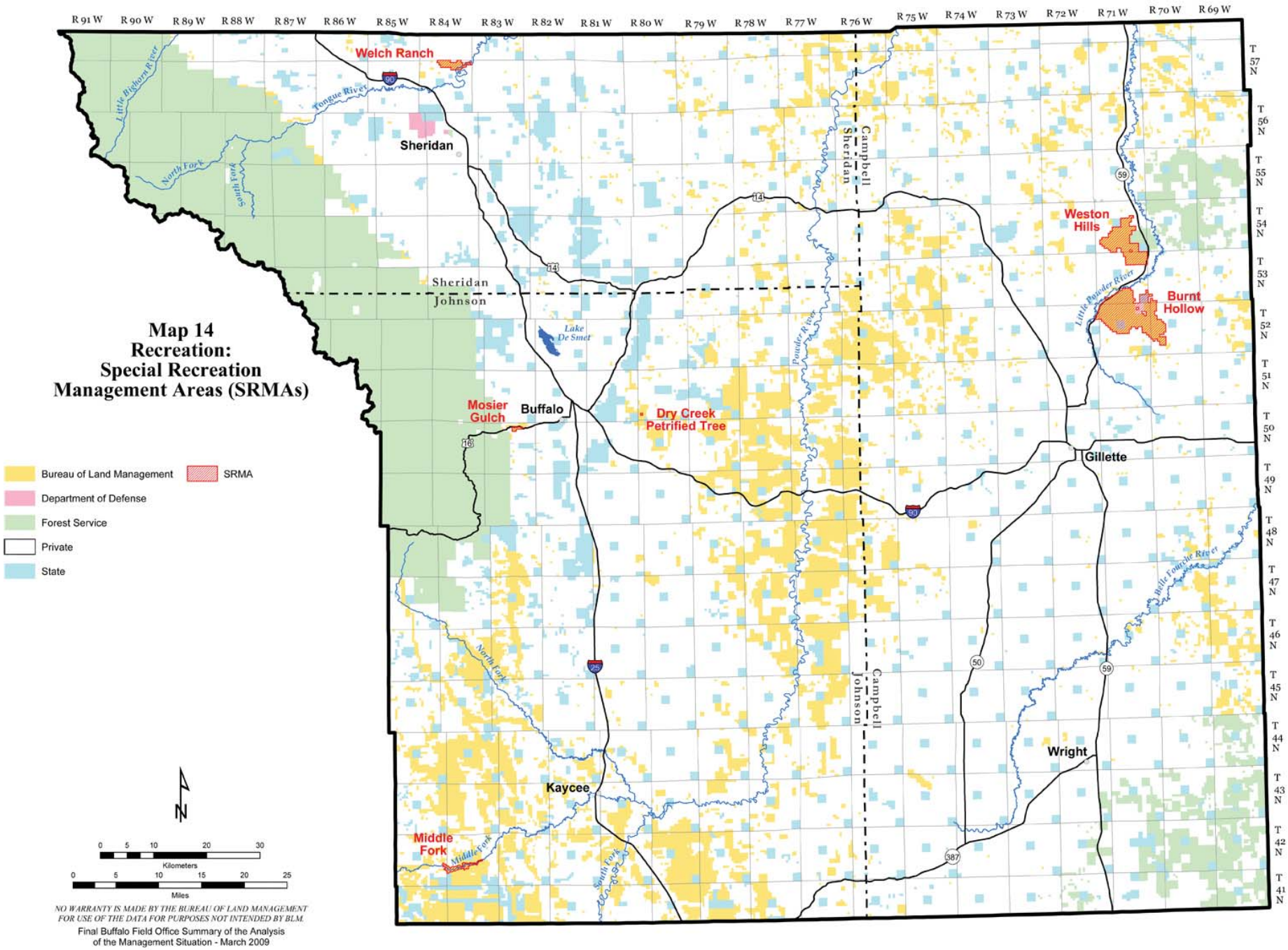
Map 14
Recreation:
Special Recreation
Management Areas (SRMAs)
Bureau of Land Management
SRMA
Department of Defense
Forest Service
Private
State
Welch Ranch
Sheridan
Weston Hills
Burnt Hollow
Mosier Gulch
Buffalo
Dry Creek Petrified Tree
Gillette
Wright
Kaycee
Middle Fork
Sheridan
Johnson
Campbell
Lake De Smet
Tongue River
Little Bighorn River
North Fork
South Fork
Little Powder River
Powder River
Belle Fourche River
Middle Fork
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T 51 N
T 50 N
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T 47 N
T 46 N
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T 44 N
T 43 N
T 42 N
T 41 N
N
Kilometers
Miles
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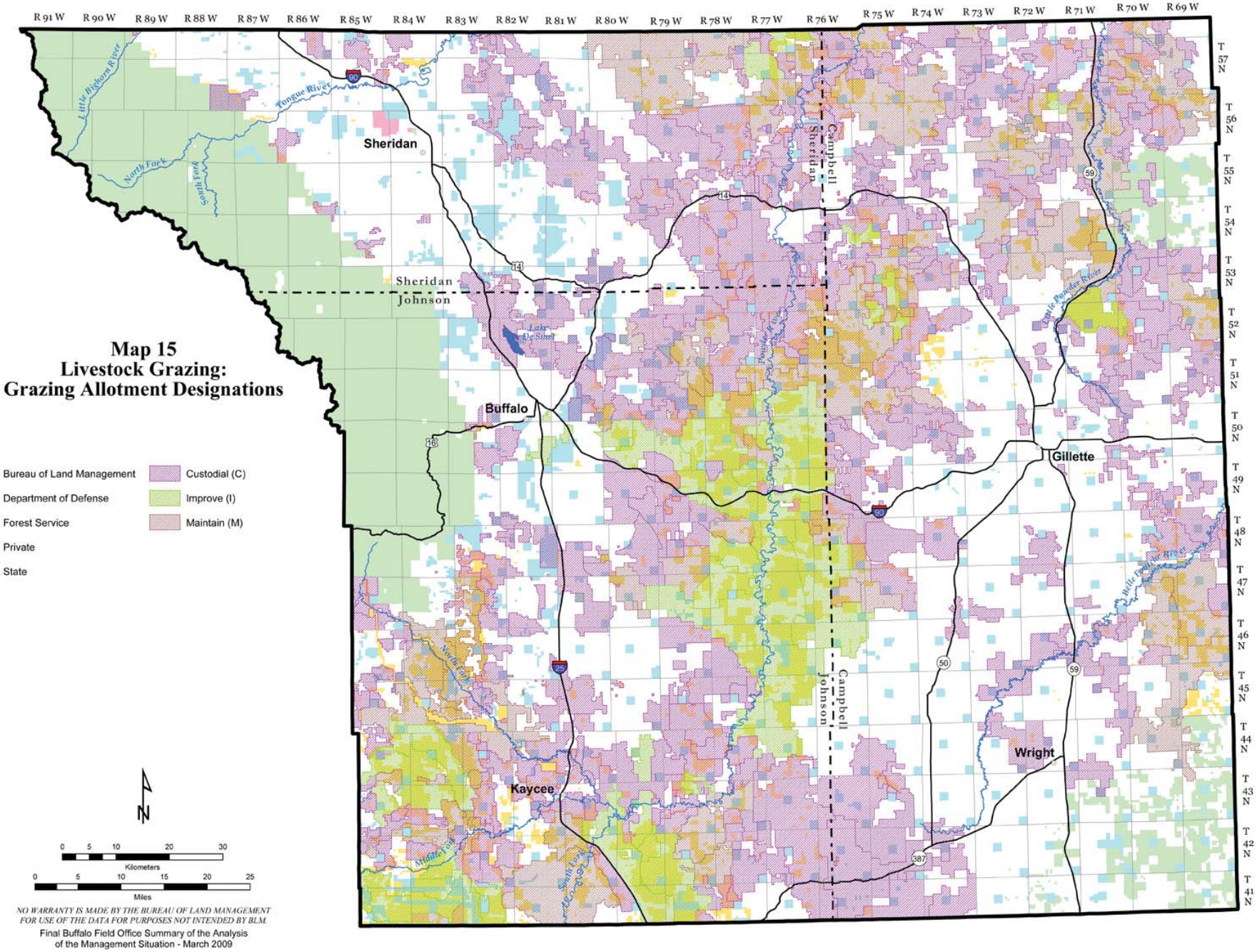
Map 15
Livestock Grazing:
Grazing Allotment Designations
Bureau of Land Management
Department of Defense
Forest Service
Private
State
Custodial (C)
Improve (I)
Maintain (M)
Sheridan
Buffalo
Gillette
Kaycee
Wright
Sheridan
Johnson
Campbell
Sheridan
Campbell
Johnson
Tongue River
Little Bighorn River
North Fork
South Fork
Lake De Smet
Powder River
Little Powder River
Middle Fork
South Fork
Kilometers
Miles
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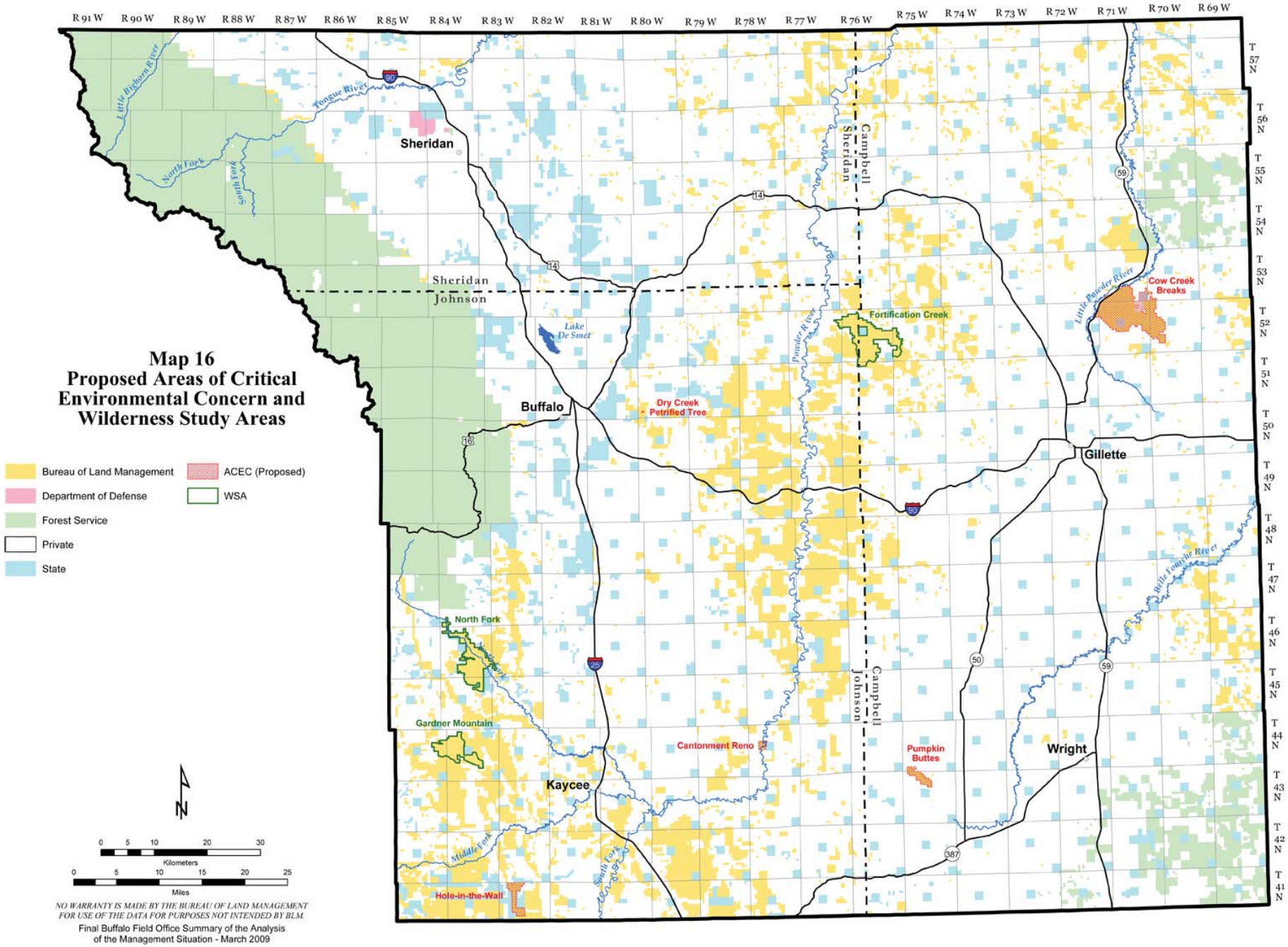
Map 16
Proposed Areas of Critical Environmental Concern and Wilderness Study Areas
Bureau of Land Management
Department of Defense
Forest Service
Private
State
ACEC (Proposed)
WSA
Sheridan
Buffalo
Gillette
Wright
Kaycee
Sheridan
Johnson
Campbell
Sheridan
Campbell
Johnson
Lake De Smet
Fortification Creek
Cow Creek Breaks
Dry Creek Petrified Tree
North Fork
Gardner Mountain
Cantonment Reno
Pumpkin Buttes
Hole-in-the-Wall
Little Bighorn River
Tongue River
North Fork
South Fork
Little Powder River
Powder River
Belle Fourche River
Middle Fork
South Fork
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