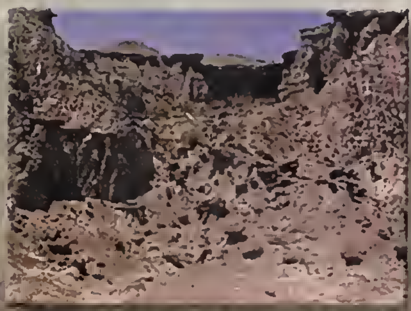
Preliminary Draft

Management Situation Analysis

Rawlins Resource Management Plan





Prepared for the Bureau of Land Management

Rawlins Field Office
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MANAGEMENT SITUATION ANALYSIS

Rawlins Resource Management Plan

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1.0. INTRODUCTION

1.1. PROJECT DESCRIPTION AND LOCATION

The Rawlins Field Office area of the Wyoming Bureau of Land Management (BLM) is located in south central Wyoming. It contains approximately 11.2 million acres of land in Albany, Carbon, Laramie, and Sweetwater Counties. Within that area the Field Office administers approximately 3.4 million acres of public land surface and mineral estate, .1 million acres of public land surface without the mineral estate that is private or state owned and 1.2 million acres of federal mineral estate where the surface is private or state owned (see Figure 1.1-1). The area includes the larger communities of Rawlins, Cheyenne, Laramie, and Saratoga, and the smaller communities of Arlington, Baggs, Bairoil, Dixon, Elk Mountain, Encampment, Hanna, McFadden, Medicine Bow, Riverside, Rock River, Savery, Sinclair and Wamsutter.

The public lands and federal mineral estate within the Rawlins Resource Management Plan (RMP) boundaries are the subject of this document. Areas within the Rawlins Planning Area administered by other federal agencies, such as the U.S. Forest Service, the Bureau of Reclamation, and the U.S. Air Force do not apply to this document nor to the Rawlins Field Office's current land use planning efforts.

1.2. PURPOSE AND NEED FOR A NEW RAWLINS RESOURCE MANAGEMENT PLAN

The Rawlins Field Office has the responsibility to prepare and modify, when necessary, the Resource Management Plan (RMP) for the Rawlins RMP Area. An RMP is a set of comprehensive long-range decisions concerning the use and management of resources administered by the BLM. In general, the RMP does two things:

- provides an overview of goals, objectives, and needs associated with public lands management, and
- resolves multiple-use conflicts or issues associated with those requirements that drive the preparation of the RMP.

The Record of Decision (ROD) for the existing Rawlins RMP which was previously known as the Great Divide Resource Area RMP was signed by the Wyoming BLM State Director on November 8, 1990. The RMP provides guidance and direction for management of BLM-administered public land surface and federal mineral estate. The planning area includes five wilderness study areas (WSAs – Encampment River Canyon, Prospect Mountain, Bennett Mountains, Adobe Town, and Ferris Mountain) four areas of critical environmental concern (ACECs – Jep Canyon, Como Bluff, Shamrock Hills, and Sand Hills), and three special recreation management areas (SRMAs – Continental Divide National Scenic Trail, North Platte River, and Shirley Mountain Caves). Major land uses in the Planning Area include mineral development, wildlife habitat, livestock grazing, and recreation.

On July 5, 2001 an evaluation of the Great Divide RMP now known as the Rawlins RMP was completed finding the RMP deficient in the following areas as a result of changing conditions and demands on the resources:

- Air quality decisions are adequate (comply with state law/standards and guidelines), but there is a need for a region wide analysis
- Environmental justice has not been addressed
- Old C&MU Act classifications and withdrawals are being used to protect various resource values
- Management direction for utility and transportation systems and communication sites may be inadequate
- Management direction for land tenure adjustment may be inadequate
- Standards for rangeland health need to be incorporated into all programs
- The vegetation resource is treated as a subset of livestock grazing
- Invasive plant decisions are absent from the RMP
- Reasonable Foreseeable Development scenarios (RFD) are deficient
- Protection standards for paleontological resources are lacking
- OHV designations have not been incorporated into the RMP
- Recreation uses and demands are increasing
- Some county soil surveys are incomplete or the status is not known
- New ACEC designations may be needed and existing ones may be outdated
- Consulting for T&E and sensitive species is incomplete or lacking
- VRM classifications are outdated. There are inconsistencies between field office and Forest Service boundaries. The designation for Adobe Town WSA is inconsistent between the RSFO and the RFO
- Federal and State requirements for addressing water quality warrants additional attention as the RMP to implemented and updated
- Wild and Scenic River evaluations have not been conducted in the Planning Area, and there is some inconsistency with Wyoming Game & Fish Department (WGFD) objective numbers and migration corridors.

As a result of these findings the Rawlins Field Office has decided to prepare a new RMP.

1.3. PURPOSE AND USE OF THE MANAGEMENT SITUATION ANALYSIS

The Management Situation Analysis (MSA) is information that describes the physical and biological characteristics and condition of the resources within a planning area and how these resources are currently being managed. An analysis of the resource conditions and capabilities provides a reference for developing land use plans.

This document, the Management Situation Analysis (MSA), is the document representing a critical, early component of BLM's land use planning process (Table 1.4-1). The land use planning process ultimately results in an RMP.

1.4. SYNOPSIS OF THE MAJOR PLANNING PROCESS STEPS

The BLM land use (or resource management plan -- RMP) planning process, explained in 43 CFR 1600, BLM 1601 Manual, and BLM Land Use Planning Handbook (H-1601-1), falls within the framework of the NEPA environmental analysis and decision making process described in the CEQ regulations of 40 CFR 1500-1508, the Department of the Interior NEPA Manual (516 DM 1-7), and the BLM NEPA Handbook H-1790-1. Table 1.4-1 provides a summary of the planning steps. As noted in the table, public participation opportunities are provided throughout the process.

1.5. MANDATES AND AUTHORITIES FOR PREPARATION OF THE PINEDALE RMP/EIS

BLM's land use planning process (as described in 43 CFR 1600) intertwines requirements from two important laws:

- Federal Land Policy Management Act (FLPMA) of 1976: "The Secretary shall, with public involvement....develop, maintain, and when appropriate, revise land use plans." FLPMA sets the overall tone and policy concerning the management of BLM lands.

- National Environmental Policy Act (NEPA) of 1969: "Utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and environmental design arts in planning and in decision making which may have an effect on man's environment." Because the development of a new RMP could cause significant impacts, NEPA requires the analysis and disclosure of potential environmental impacts in an EIS.

The planned process for the new Rawlins RMP/EIS includes consideration of both FLPMA and NEPA. Other Federal legislation has been enacted over the last 30 years to further establish a comprehensive environmental and land use planning framework. A summary of the relevant Federal statutes for the Rawlins RMP/EIS process is included in Appendix A.

1.6. CONSTRAINTS/CONSISTENCY REQUIREMENTS WITH OTHER ENTITIES

BLM land use plans and amendments must be consistent with officially approved or adopted resource-related plans of Indian tribes, other Federal agencies, and State and local governments to the maximum extent practical, given that BLM land use plans must also be consistent with the purposes, policies, and programs of FLPMA and other Federal laws and regulations applicable to public lands (see 43 CFR 1610.3-2 (a)).

If these other entities do not have officially approved or adopted resource-related plans, then BLM land use plans must, to the maximum extent practical, be consistent with their officially approved and adopted resource-related policies and programs. This consistency will be accomplished so long as BLM land use plans are consistent with the policies, programs, and provisions of public land laws and regulations (see 43 CFR 1610.3-2 (b)).

Before BLM approves proposed land use plan decisions, the Governor(s) must have 60 days to identify inconsistencies between the proposed plan and State plans and programs and to provide written comments to the State Director. (The BLM and the State may mutually agree upon a shorter review period satisfactory to both.) If the Governor(s) does not respond within this period, it is assumed that the proposed land use plan decisions are consistent. If the Governor recommends changes in the proposed plan or amendment that were not raised during the public participation process, the State Director shall provide the public with an opportunity to comment on the recommendations (see 43 CFR 1610.3-2 (e)). This public comment opportunity will be offered for 30 days and may coincide with the 30-day comment period for the Notice of Significant Change. If the State Director does not accept the Governor's recommendations, the Governor has 30 days to appeal in writing to the BLM Director (see 43 CFR 1610.3-2(e)).

1.7. PRELIMINARY PLANNING CRITERIA

Guidelines have been developed to assist in preparing the Rawlins RMP. These guidelines, or planning criteria, are the constraints or ground rules that are developed to guide and direct the planning review for and modification of the Rawlins RMP. The planning criteria serve to:

- Ensure that the planning effort follows and incorporates legal requirements, provides for management of all resources uses in the planning area, is focused on the issues, and is accomplished efficiently;
- To identify the scope and parameters of the planning effort; and
- Inform the public of what to expect of the planning effort

Planning criteria are based on standards prescribed by laws and regulations; guidance provided by the BLM Wyoming State Director; results of consultation and coordination with the public, other agencies and governmental entities, and Indian tribes; analysis of information pertinent to the planning area; public input; and professional judgment.

The planning criteria focus is on the development of management options and alternatives, analysis of their effects, and selection of the Preferred Alternative and the Proposed RMP. Planning criteria applicable to the Rawlins RMP/EIS process are organized into several categories:

- General Planning Criteria
- Planning criteria for specific resource programs
- Planning criteria for developing alternatives
- Planning criteria for analyzing environmental consequences
- Planning criteria for selecting the preferred alternative
- Planning criteria for using the NEPA procedure to develop RMP planning and management decisions

The planning criteria for modification of the RMP to date have been developed in enough detail to ensure that the process is tailored for addressing the identified resources issues and to avoid unnecessary data collection and analysis. These criteria are shown in

Appendix B. Additional planning criteria may be identified as the planning process progresses.

1.8. MANAGEMENT ISSUES

The process for developing an RMP/EIS begins with identifying the issues. Issues express concerns, conflicts, and problems with the existing management of public lands. Frequently, issues are based on how land uses affect resources. Some issues are concerned with how land uses can affect other land uses, or how the protection of resources affect land uses. The following preliminary planning issues for the Rawlins RMP have been identified.

- **Development of Energy Resources and Minerals Related Issues –** Special attention is needed to address mineral development (i.e., oil & gas, coalbed methane, coal, solar, and wind energy) and related transportation network conflicts with other land and resource uses and values. Principal considerations include disruptive activities and human presence in big game (i.e. elk, deer, antelope, moose, and bighorn sheep) habitat, big game crucial habitat (crucial winter range and birthing areas), and other important wildlife species habitats (i.e., sage grouse, plovers, raptors, and fish); on recreation values, forage uses, air quality, sensitive vegetation types, and sensitive watersheds. Areas where surface disturbing activities (i.e. mineral exploration and development activities, right-of-way construction activities, etc.) are suitable, or should be restricted, need to be identified.

- **Special Management designations -** There are unique areas or sensitive lands and resources in the planning area that meet the criteria for protection and management under special management designations. There are four areas already designated as areas of critical environmental concern (ACEC – Como Bluff, Sand Hills, Jep Canyon, and Shamrock Hills Raptor Concentration Area) that contain unique resources requiring special management attention. Three of these designated ACECs (Como Bluff, Jep Canyon, and Shamrock Hills) are within the railroad checkerboard land pattern. Effective management of these ACECs will be extremely difficult without full landowner cooperation, which presently does not exist. There are also three special reaction management areas (SRMA – Continental Divide National Scenic Trail, North Platte River, and Shirley Mountain Caves) containing recreation values that require special management attention. There are also four proposed or designated National Landmarks (NNL – Gangplank, proposed; Big Hollow, designated; Sand Creek, designated; and Como Bluff, designated) containing unique landscape values that require special management attention. In some places, unique or sensitive lands and resources are in danger of being lost. There are also concerns that special management area designations may result in too many restrictions on the use of public lands. There are some areas in the Pinedale Field Office Area that are isolated and difficult (legally or physically) to access and manage. Land disposals and acquisitions could provide improved access and manageability of public lands.

- **Resource Accessibility –** This relates to the idea that the value of usability of some resources is enhanced by improved accessibility. To be used, resources must be accessible (in terms of legal and physical access) and manageable (in terms of ability to apply constraints or requirements to benefit other resources). There are some areas in the Rawlins Field Office management area that are isolated and difficult to access (i.e. legal and physical access) and manage. Land disposals and acquisitions could provide improved access and manageability of public lands.

- **Wildland/Urban Interface -** New demands are being placed on public lands due to accelerated growth in and around cities and towns and around rural developments and subdivisions in the planning area. Growth has changed the way communities relate to surrounding public lands and has changed the communities' expectations. The basic problem is providing for public land management along with increased demands for public land and resources. Principal considerations include providing for healthy air and water quality, preventing water source depletion, reducing accelerated erosion in critical watersheds, and preventing fragmentation of critical wildlife habitat. Considerations also include providing for development patterns, transportation and utility corridor planning, and demands for open space and recreational uses, land tenure adjustment and wildland fire management.

- **Special Status Species Management –** Attention is needed to address management of special status species (threatened and endangered, proposed, candidate, and sensitive plant and animal species) and the interrelationships of these species with other resource uses and activities. Principal considerations include management of species habitat to ensure continued use by these species. Areas where other resource activities may conflict with special status species and their habitat requirements need to be identified.

- **Water Quality -** There are concerns with maintaining or improving water quality, and complying with State and Federal requirements.

- **Vegetation Management -** There are conflicting demands for consumptive and nonconsumptive uses of the vegetation resources in the planning area. The basic problem is maintaining resource values and nonconsumptive uses while allowing for consumptive uses. Resource values include vegetative cover, watershed protection, maintenance and enhancement of riparian areas, soil stabilization, maintenance and enhancement of wildlife habitat (particularly big game crucial winter range and habitat for candidate, sensitive, proposed, or threatened and endangered wildlife and vegetation species). Consumptive uses include livestock grazing; off-road vehicle use; vegetation removal by mineral development; rights-of-way construction; and other surface disturbing activities.

- **Recreation, Cultural Resources (including National Historic Trails) and Paleontological Resource Management –** There are certain resources and areas that need protection while others need to be considered for more public and recreation uses. Off-highway vehicle use can conflict with other land and resource uses and can cause damage to resources, including wildlife and watershed values and other recreation values. Principal considerations include providing for suitable and sufficient recreation uses and facilities (both dispersed and commercial), visual resource management direction, off-road vehicle use designations, management of paleontological resources, and management of cultural and historical resources (of particular concern is the need for protection of significant emigrant trails, such as the Overland and Cherokee Trails, other historic transportation resources in the region, including prehistoric and historic Indian trails, early historic exploration trails, Expansion Era roads, and Native American respected places). Visual values along these trails and surrounding Native American respected places are also an issue.

Tables/Figures

Chapter 2

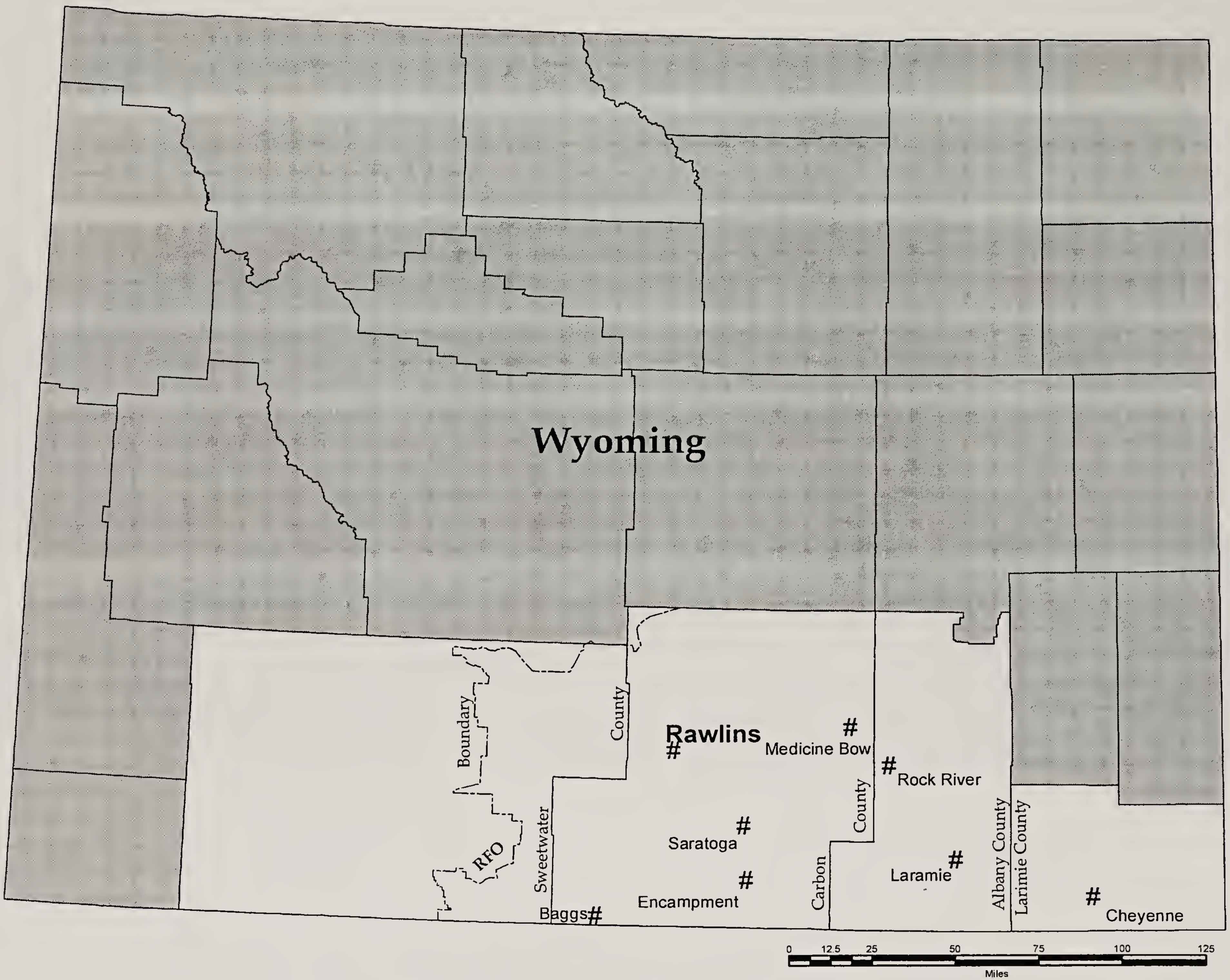
Table 1.4-1. Land Use Planning Process Steps.

PLANNING STEPS	DESCRIPTION	PUBLIC PARTICIPATION
Identify Issues	Identify issues or land use problems that need to be resolved. This is an on-going process.	
Develop Planning Criteria	Planning criteria establish constraints and guides for the planning process; streamline the process; establish standards, rules, and measures; set the scope of inventory and data collection; identify the range of alternatives; and estimate the extent of analysis.	
Issue Notice of Intent (NOI)	Publish the NOI in the *Federal Register*, local media, mailings, etc. The NOI identifies the preliminary issues and planning criteria and provides for a 30-day public review and comment period. This is also the start of the formal NEPA scoping process inviting the public to identify issues or land use problems that need to be resolved.	Public review and comment
Collect Inventory Data	Collect inventory data based on the planning criteria. Data are generally collected from existing sources. New data collection is limited to what is needed to resolve the planning issues identified.	Data call from public
Analyze the Management Situation	Gather information on the current management situation, describe pertinent physical and biological characteristics, and evaluate the capability and condition of the resources. This analysis provides a reference for developing and evaluating alternatives.	Public review and comment
Formulate Alternatives	Identify a range of reasonable combinations of resource uses and management practices. Develop reasonable alternatives that address issues identified during scoping and that offer a distinct choice among potential management strategies. Include a no action alternative.	

PLANNING STEPS	DESCRIPTION	PUBLIC PARTICIPATION
Estimate Effects of Alternatives	Estimate the impacts of each alternative on the environment and management situation.	
Select the Preferred Alternative	The Field Manager recommends to the State Director a preferred alternative that best resolves planning issues and promotes balanced multiple use objectives. The State Director approves the selection of the preferred alternative along with the other alternatives under consideration	
Issue Draft RMP/EIS	Publish the Notice of Availability (NOA) in the *Federal Registe*r, media, mailings, etc. The NOA notifies the public of the availability of the Draft RMP/EIS and provides for a 90-day public review and comment period.	Public review and comment
Prepare the Final RMP/EIS	Prepare the Final EIS to include responses to the comments received during review of the draft EIS.	
Governor's Consistency Review	Initiate a 60-day Governor's review to identify inconsistencies with State or local plans.	State Government Review and comment
Notice of Significant Change	When a protest period or consistency review results in significant changes to the propose plan, issue a Notice of Significant Change providing an additional 30 comment period	30 day public comment period
Protests	The State Director may sign and implement that portion of the plan not under protest	Public protest to decisions
Plan Approval	Once protests have been resolved and the Governor's consistency review has been completed, the State Director approves the RMP by signing the Record of Decision (ROD).	
Monitor and Evaluate the RMP	Ensure that the plan is continually monitored and evaluated until it is replaced.	

Note: Some of the planning steps can be done simultaneously while others must be completed before a step can be started e.g. the alternatives have to be formulated before a preferred alternative can be determined.

Figure 1.1-1. Overview Map.

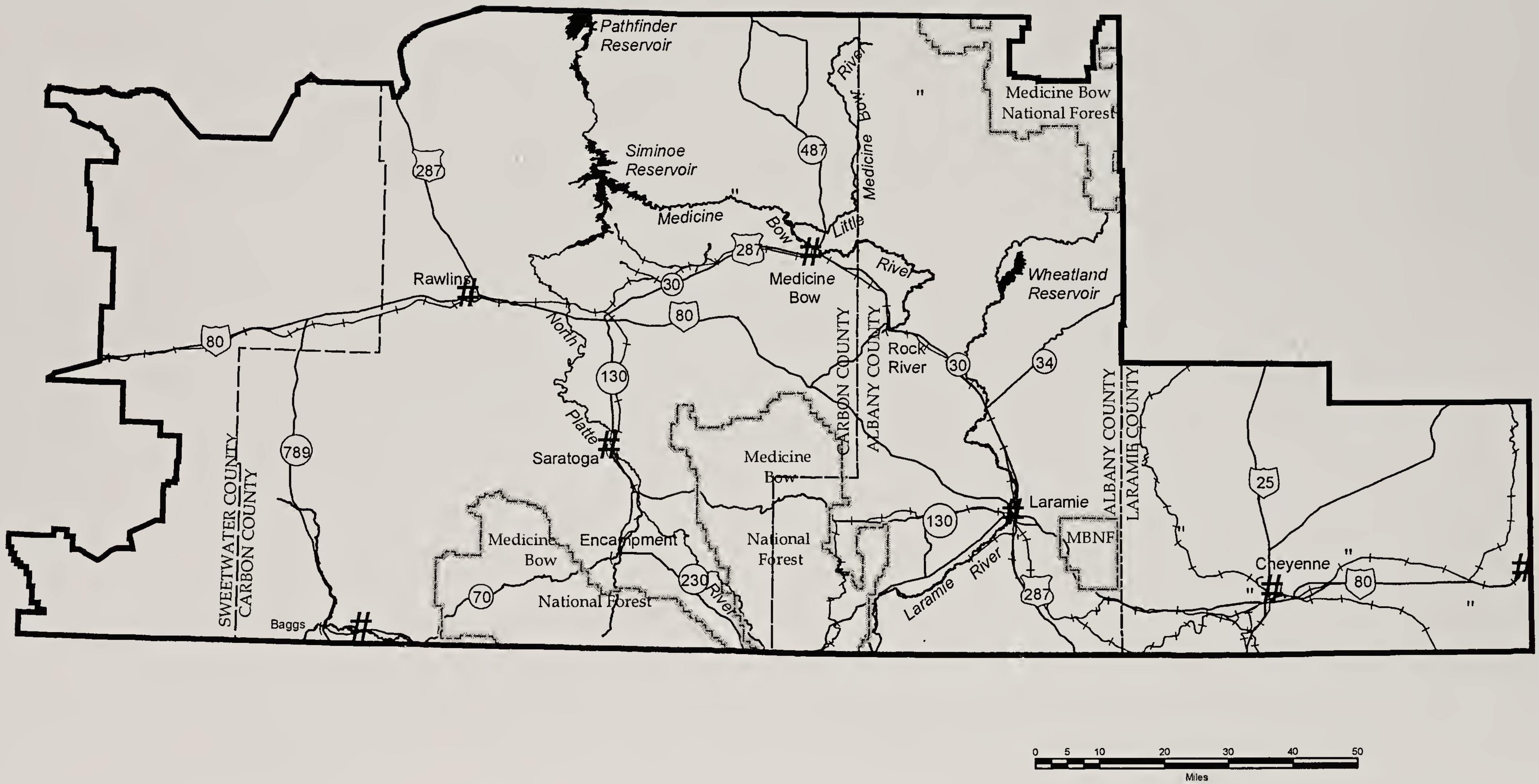


R-Figure 1.1-1 overview map

Figure 1.1-2. Rawlins Topography and Landmarks.

R-Figure 1.1-2 topography and landmarks

Figure 1.1-3. Rawlins Field Office Area.



R-Figure 1.1-3 Rawlins FO area

Chapter 2

Chapter 3

Chapter 4

2.0. CONTINUATION OF EXISTING MANAGEMENT DIRECTION & ACTIONS BY LAND USE OR RESOURCE USES

Chapter 2 describes the full range of management actions currently being employed to manage the resources in the Rawlins Field Office. Current management actions follow the guidelines stated in the *Great Divide Resource Area Record of Decision and Approved Management Plan of November1990*, and is inclusive of all maintenance, amendments and revisions made as new information has been acquired. Decisions made in the 1990 Great Divide RMP and subsequently modified focused on the following categories:

- Rangeland Management
- Mineral Leasing, Coal and Oil and Gas
- Recreational Uses
- Wilderness Designation Recommendations
- ACEC Designations
- Habitat Management
- Forest Management
- Mineral Location
- Cultural Values
- Fire Management
- Salable Minerals
- Soils, Water and Air Management.

In the MSA section of Chapter 2 new categories are introduced.

BLM's resource management plans form the basis for every action and approved use on public lands. Planning emphasizes a collaborative environment, where local, State, and tribal governments, the public, local user groups, and industry work with the BLM to identify appropriate multiple uses of the public lands. The BLM and the Department of the Interior are currently working with Congress to address land management issues and to ensure that BLM has comprehensive and legally defensible plans that will support the use and management of the public lands.

Land use plans are to be used by mangers and the public to:

- Allocate resources and determine multiple uses for the public lands;
- Develop a strategy to mange and protect resources; and

- Set up systems to monitor and evaluate status of resources and effectiveness of management practices over time.

Land Use Planning for the BLM is enabled by:

- The *Federal Land Policy Management Act* (*FLPMA*) of 1976;
- *43 CFR 1600*;
- The *National Environmental Policy Act* (NEPA, 42 U.S.C 4321 *et seq*) of 1969; and
- The *Council on Environmental Quality* (CEQ, 40 CR 1500-1508) guidelines.

The 1990 Resource Management Plan (RMP) with previous amendments and current updates provides the management direction for approximately 4 million acres of public land surface and 5 million acres of Federal mineral estate administered by the Bureau of Land Management (BLM) in the Great Divide Resource Area. Management objectives and actions in Chapter II supersede all previous planning decisions for the Great Divide Resource Area.

The resource area administrative boundary includes parts of four counties in south central Wyoming. The RMP planning area includes the larger communities of Rawlins, Cheyenne, Laramie, and Saratoga. Smaller communities within the area are Arlington, Baggs, Bairoil, Dixon, Elk Mountain, Encampment, Hanna, McFadden, Medicine Bow, Riverside, Rock River, Savery, Sinclair, and Wamsutter.

There are about 12.5 million acres within the general administrative boundary of the Great Divide Resource Area. Of this, about four million acres of both Federal surface and Federal mineral estate and another one million acres of only Federal mineral estate (i.e., Federal minerals under State and privately owned land surface) are administered by BLM and covered by this RMP.

The remaining 7.5 million acres within the resource area boundary are not covered by this RMP. On approximately one million of these 7.5 million acres, the Federal mineral estate is administered by BLM, while the surface acreage is administered by other Federal agencies, primarily the Forest Service. These acres are not addressed because the plans of those other agencies provide the basis for BLM's administration of those minerals resources. The remaining 6.5 million acres of surface and mineral estate are privately owned or owned by the State of Wyoming.

The 1990 Great Divide RMP and all amendments represents a selection of management actions which resolve the planning issues and provide for sustained multiple use management of the public lands and resources.

All resource uses in the planning area must conform with the decisions, terms, and conditions of use described in this plan. Detailed decisions for the implementation of specific projects will be made through activity planning and environmental review that will be completed prior to the implementation of the project. Likewise, the authorization of specific uses will be based on conformance with planning decisions and completion of environmental review.

This plan includes 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,"* that was approved in August 12, 1997. These guidelines have management implications for most planning and management decisions as pertaining to the different resource programs administered by the Rawlins Field Office (Appendix C).

The *Great Divide RMP* was amended in 1998 to open lands for further consideration for coal leasing and to modify the Shirley Mountain OHV designations. It has subsequently had eight maintenance actions completed. The actions were related to updating wild horse habitat management areas, designating the Continental Divide National Scenic Trail route, updating lands disposal language, terminating the Bairoil Landfill R&PP Lease, incorporating healthy rangeland standards and guidelines, and clarifying fire suppression terminology.

The general management actions for each of the following resource programs include application of "*The Wyoming Mitigation Guidelines for Surface Disturbing and Disruptive Activities*" (Appendix D) and resource program-specific guidelines.

2.1. AIR QUALITY

Air quality management is conducted through cooperation with other agencies such as the Forest Service, Department of Environmental Quality, and the Environmental Protection Agency. Air quality is maintained within or above required standards through cooperative management of emissions with industry, the State of Wyoming, and other Federal agencies.

The BLM State Office in Cheyenne is currently conducting a statewide Air Quality study to determine current air emission conditions on BLM administered lands in Wyoming. This study will be completed later in 2002.

2.1.1. MANAGEMENT OBJECTIVES

Management objectives include:

- Preventing the deterioration of air quality beyond applicable local, State, or Federal standards and to enhance air resources where practicable.
- Preventing impairment of important scenic values that may be caused by declining air quality.
- Protecting air from deterioration that might be caused by the release of toxic or hazardous materials or wastes.
- Identifying desired future conditions and area wide criteria or restrictions, in cooperation with the appropriate air quality regulatory agency, that apply to direct or authorized emission-generating activities, including the *Clean Air Act's* requirements for compliance with: applicable *National Ambient Air Quality Standards (Section 106); State Implementation Plans (Section 110); Control of Pollution from Federal Facilities (Section 118)*; prevention of *Significant Deterioration*, including visibility impacts to mandatory Federal Class I Areas *(Section 160 et. seq.)*; and *Conformity Analysis and Determination (Section 176 (c))*.

2.1.2. MANAGEMENT ACTIONS

The BLM will carry out watershed management practices designed to meet air resource management objectives. These practices will be included in activity plans such as AMPs and HMPs. In addition, the BLM will identify site-specific emission control strategies, processes, and actions to achieve desired air quality conditions from direct or authorized emission-generating activities. Finally, the BLM will consult, coordinate, and comply with applicable tribal, Federal, State, and local air quality regulations, as required by the Clean Air Act, Executive Order 12088, and tribal, Federal or State Implementation Plans.

2.2. CULTURAL RESOURCES

2.2.1. MANAGEMENT OBJECTIVES

General

The Rawlins Field Office has identified general management objectives for cultural resources. They include the following:

- Protect and preserving representative samples of the full array of cultural resources for the benefit of scientific and socio-cultural use by present and future generations.
- Ensuring that cultural resources are given full consideration in all land-use planning and management decisions.
- Managing cultural resources so that scientific and socio-cultural values are not diminished, but rather are maintained and enhanced.
- Ensuring that the BLM's undertakings avoid inadvertent damage to cultural resources both Federal and non-Federal.
- Identifying measures to pro-actively manage, protect, and use cultural resources, including traditional cultural properties.

The standards for healthy public rangelands, described in Appendix C, apply.

Trails

The objective for trails is to stabilize and protect significant sites and segments along the Overland Trail, the Cherokee Trail, and the Rawlins-Fort Washakie Stage Road.

National Natural Landmarks

The objective for National Natural Landmarks is to maintain the integrity of existing and proposed NNLs.

2.2.2. MANAGEMENT ACTIONS

General

The Rawlins Field Office will:

- Conduct Class I, II, or III inventories for actions involving BLM administered public land and/or Federal minerals that include surface disturbance as part of the action.

- Evaluate the significance of cultural resources identified during inventory in consultation with the Wyoming State Historic Preservation Office to determine whether the resources are eligible for inclusion on the National Register of Historic Places.
- Categorize cultural resources for management purposes (eg. public use, scientific, socio-cultural).
- Categorize geographic areas as high/medium/low priority for future inventory of cultural properties.
- Identify protection measures and opportunities to use cultural properties for scientific, educational, recreational, and traditional purposes. Groups and individuals with historical, scientific, Native American, interpretive, and similar kinds of information and interests will be invited to participate in the identification of cultural resources.

The above actions will be carried out in accordance with law, policy, and guidance to meet the objectives for cultural resources management inclusive of formal consultation under *Section 106 of the National Historic Preservation Act (36 CFR 800.4(c))* and the *American Indian Religious Freedom Act*, the *State Protocol Agreement between the Wyoming BLM State Director and the Wyoming State Historic Preservation Officer (1999)*, and *BLM Information Bulletin No. 2002-101 of 05/29/2002* on Cultural Resource Considerations in Resource Management.

Other actions pertaining to cultural resources are described under ACECs, Fire Management Objectives, and in Appendices C and D.

Trails

Management actions pertaining to trails located in the Rawlins Field Office include the following:

- The BLM will seek listing on the National Register of Historic Places for eligible sites along the trails.
- The BLM will take appropriate actions (such as protective fencing of trail segments or stabilization of deteriorating buildings) to meet the management objectives for significant trail segments and Rawlins-Fort Washakie Stage Road.
- Where appropriate, the BLM will pursue opportunities to acquire legal access to trail segments on land not administered by the BLM.

National Natural Landmarks

The management action for National Natural Landmarks for the Rawlins Field Office is that lands totaling 160 acres in the Gangplank proposed NNL, 640 acres in the Big Hollow NNL, and 160 acres in the Sand Creek NNL will be considered for disposal to individuals, organizations, agencies, or institutions that would manage these areas in accordance with their NNL status.

Note: Management actions pertaining to the Como Bluff NNL are described in the Como Bluff ACEC section.

2.3. FIRES

2.3.1. MANAGEMENT OBJECTIVES

Fire management objectives are geared to concentrate fire suppression efforts in areas containing high resource and/or human values and in areas with intermingled landownership patterns. Areas proximal to the urban/rural interface are also of concern. Prescribed fires will be used to help meet the objectives of other programs (such as the reduction of fuels or the maintenance and/or improvement of wildlife habitat or range condition).

The standards for healthy public rangelands, described in Appendix C, apply.

2.3.2. MANAGEMENT ACTIONS

In support of fire management objectives the BLM will develop standards and guidelines for fire prevention, fire suppression, fuels management, and rehabilitation actions on a site-specific basis. Portions of the planning area are designated for different levels of fire suppression.

Full Suppression

Approximately 60% of the planning area is designated a full suppression area. There are no equipment restrictions.

Full Suppression With Management Options

Approximately 3% of the planning area is designated a full fire suppression area "with management options." Restrictions may be placed on the use of standard full suppression firefighting techniques.

Limited Suppression

Approximately 36% of the planning area is designated a limited fire suppression area.

Limited Suppression With Consultation

Approximately 1% of the planning area is proposed for a limited suppression classification following consultation and agreement with the landowners in the area. If agreement cannot be reached to allow limited suppression of wildfires, the area will be managed under a full suppression classification.

Fire management actions include the following:

- A long term fire management plan will be prepared containing criteria for protecting high resource values such as significant cultural resources, crucial winter range for big game, high priority watersheds, and high-value scenic areas. The fire management plan will include operational aspects of implementing limited suppression designations. An escaped fire analysis will be conducted to determine the appropriate course of action if fires cannot be contained within the first burning period or if they exceed the criteria established for limited suppression.
- Prescribed burning will be used to achieve management objectives such as those for allotment management plans (AMPs) and habitat management plans (HMPs). Prescribed fire proposals will be considered case-by-case to ensure environmental integrity and consistency with multiple resource objectives and activity plans.
- Prescribed burns will be evaluated for hazardous materials prior to burning to ensure that no hazards are generated from the unintentional burning of such materials.
- Preparedness and protection strategies will be based on treatments implemented, and new and emerging resource issues.
- BLM will consult with tribes, Federal agencies, and State and local governments regarding smoke management where required by the Clean Air Act, E.O. 12088. This consultation will also establish protection and fuels management priorities.

Figure 1 provides a flowchart showing the sequence of events that should be followed in the management of wildland and prescribed fires.

2.4. FORESTRY

2.4.1.MANAGEMENT OBJECTIVES

The primary objective is to enhance forest health and wildlife habitat as well as diversity of the forestlands through forest management practices.

The standards for healthy public rangelands, described in Appendix C, apply.

2.4.2. MANAGEMENT ACTIONS

The Rawlins BLM Field Office has identified the following management actions:

- The BLM will identify the suite of management actions (including appropriate harvest, reforestation, and forest development methods), and associated best management practices that can be applied to meet desired future and underlying land use allocations.
- The allowable harvest level is 20 million board feet (MMBF) per decade. This will be harvested from the commercial forestlands in the planning area that are available for intensive or restricted management of forest products (about 25,900 acres or 23% of the total forestland in the planning area). Following are the types of actions that will be taken to meet the forest management objectives on these lands.
- About 19,200 acres will be intensively managed for forest health, wildlife habitat and forest fire fuel reduction. These lands will be managed by implementing activities that will enhance tree health and wildlife habitat. Full consideration will be given to multiple-use values. Timber sales of post poles and firewood will be concentrated in these areas as part of the objective of reducing forest fire fuels.
- A forest insect and parasite infestation management plan (i.e. for pine beetles and mistletoe) will be prepared with an objective of preventing declining health of healthy pine and aspen forest stands. Individual forest health treatments will be identified by location and schedule. Where possible, the cooperation of private landowners, and State and Federal foresters will be sought to coordinate eradication efforts.
- About 6,700 acres will be under restricted management for forest products. Included in this category are areas such as steep slopes and riparian areas with buffer zones around them.
- Forest management practices such as timber harvesting, regeneration of disturbed sites, stand replacement and pre-commercial thinning will be carried out to meet the forest management objectives.

- Stands of unmerchantable, nonproductive lodge pole pine will be replaced with young, vigorous trees.
- Minor wood products such as fuel wood, posts and poles, Christmas trees, and wildings will be available on demand.
- If needed, the BLM will pursue opportunities to acquire or maintain legal access to certain areas of public land to support intensive management of commercial forestland (see the Lands Program - Access section for areas of access needs).
- Consolidation of landownership on Elk Mountain and Shirley Mountain will be considered as opportunities arise.
- About 85,200 acres of other forestlands will be managed only to enhance other uses. Aspen, juniper, and other noncommercial tree species are included in this category.
- About 500 acres are not available for management of forest products because the timber is not harvestable and because of the small size of the stands, their scattered locations, or terrain limitations.

2.5. HAZARDOUS MATERIALS

General guidelines and regulations for hazardous materials and waste management are found in BLM manuals *H-2101-4,* and *H-1703-1.* They should be referred to for in-depth information pertaining to Pre-Acquisition Environmental Site Assessments and CERCLA Response Actions.

2.5.1. MANAGEMENT OBJECTIVES

Management objectives for hazardous materials include the following:

- Protecting public health, safety and the environment on public lands.
- Emphasizing waste reduction for BLM authorized and initiated actions.
- Complying with applicable Federal and State laws.
- Minimizing Federal exposure to the liabilities associated with hazardous materials management and waste management on public lands.
- Preventing waste contamination from BLM authorized actions.
- Integrating pollution prevention, hazardous materials and waste management, and waste reduction policies and controls into all BLM programs.

2.5.2. MANAGEMENT ACTIONS

General

For BLM –authorized activities that involve hazardous materials or their use, precautions will be taken to guard against releases into the environment. In the event of the release of hazardous materials on the public land, appropriate warnings will be provided to potentially affected communities and individuals. Precautions will be taken against public exposure to contaminated areas, and mitigation will be performed in accordance with applicable Federal and State laws and regulations.

Sale, exchange, or other transfer of public lands on which storage or disposal of hazardous substance has been know to occur will require public notification of the type and quantity of the substance. In accordance with the provisions of *602 Departmental Manual (DM) 2*, a Pre-Acquisition Environmental Assessment (ESA) following the procedures of Manual H-2101-4 will be required for all acquisitions of real property prior to acquisition.

Public lands contaminated with hazardous wastes would be reported, secured, and cleaned up according to Federal and State laws, regulations, and contingency plans, including the CERCLA. Parties responsible for contamination will be liable for cleanup and resource damage costs, as prescribed by law.

Surface-disturbing and disruptive activities associated with all types of hazardous materials and waste management and all types of fire management will be subject to appropriate mitigation.

Management Actions Specific to Oil and Gas Field Operations

Detailed hazardous material management actions specific to oil and gas field operations can be referenced in the *Record of Decision and EIS for the Continental Divide/Wamsutter II Natural Gas Project,* May 2000 (Appendix C of the aforementioned document).

A summary of these management actions include the following:

- Operators will comply with emergency reporting requirements for release of hazardous materials.
- If a reportable quantity of a hazardous or extremely hazardous substance is released, immediate notice must be given to the BLM's Authorized Officer and all other appropriate Federal and State agencies.
- Each operator will prepare and implement Spill Prevention Control and Countermeasure Plans, Spill Response Plans, and Emergency Response Plans.

- Development operations will be required to be in compliance with Federal and State regulations pertaining to environment regulations as well as those pertaining to transportation, management and disposal of hazardous materials.

2.6. LANDS AND REALTY

2.6.1. MANAGEMENT OBJECTIVES

Management objectives pertaining to the Rawlins Field Office are geared to supporting the goals and objectives of other resource programs for managing the BLM administered public lands and to responding to public demand for land use authorizations as defined in the *Federal Land Policy and Management Act* (*FLPMA*) of 1976, as amended, October 2001.

In the development and amendment of land use plans, the principle of multiple use and sustained yield shall be observed, while at the same time plans will protect areas of critical environmental concern. Present and potential land uses will be considered and long-term benefits of use will be weighed against short-term benefits. All planning decisions will be in compliance with State and Federal standards.

The standards for healthy public rangelands, described in Appendix C, and the lands exchange criteria for the Great Divide RMP (Rawlins Field Office), as described in Appendix E apply.

2.6.2. MANAGEMENT ACTIONS

2.6.2.1. Utility/Transportation Systems

Management actions specific to utility and transportation systems in the Rawlins Field Office include the following:

- All BLM administered public lands will be open to consideration for placement of utility/transportation systems, but such systems will be located next to existing facilities whenever possible.
- The BLM will seek the cooperation of WYDOT and county transportation planners to limit access points to BLM administered pubic land as a safety consideration on heavily traveled surface transportation facilities (i.e. State and county roads).

- Areas with important resource values will be avoided where possible in planning for new facility placement and routes. If it becomes necessary for facilities to be placed within avoidance areas, effects will be intensively mitigated.

Mitigation measures to avoid, reduce, or eliminate Windpower utility impacts were explored in the KENETECH/*PacifiCorp Windpower Project Environmental Impact Statement* (1995). Important management considerations and mitigation measures identified in the *Record of Decision* approved in 1997 include the following:

- Construction of wind turbines and associated facilities shall not commence until the Authorizing Officer issues a notice to proceed.
- The Authorizing Officer shall be notified before any changes, modifications, or replacement of turbines, turbine blades or other wind farm facilities are made.
- Turbines that are damaged or inoperative shall be promptly repaired and none may be inoperative for more than 90 days.
- The holder shall take all necessary precautions to prevent radio and television interference due to turbine operation.
- The holder shall inform the Authorizing Officer of any tower collapse, blade throw, wind farm caused fire, or significant injury to worker within 24 hours of nay such occurrence.
- The holder shall develop a turbine identification system whereby each turbine shall be assigned a unique identifier.
- The holder shall provide a bond in the amount of $2,000.00 per turbine installed on Public Land, to be maintained until restoration of disturbed areas and other requirements relative to the construction phase of the project has been accepted by the authorized officer.
- To prevent Federal coal resources from being devalued by surface improvements, the grant holder may place wind energy facilities on public lands, but bears the responsibility for repair, replacement, or lost revenue should the BLM subsequently lease coal and mining of such coal damage or impair the operation of wind energy facilities.
- The holder shall not initiate any construction or other surface disturbing activities on the right-of-way without prior written notice to proceed issued by the authorized officer.
- The holder shall submit a final map showing the location of all roads to be used for access to power lines. The map shall show the roads in three categories: a) used with no improvement, or maintenance within the existing disturbed area only, b) used with surface disturbance required outside of exiting disturbed areas, and c0 new construction.
- The holder shall submit a Class III Cultural Resource Inventory Report for any roads in category b or c in the above item.

- The holder shall not initiate any construction or other surface disturbing activity on the right-of-way without prior written authorization of the authorized officer.
- Mitigation measures will be adhered to on Federal and State lands, and on private lands subject to landowner preference.
- Areas with high erosion potential and/or rugged topography will be avoided where feasible.
- Surface disturbances will not occur on slopes in excess of 25% where feasible, nor will construction occur when soils are wet or frozen.
- Construction will be avoided within 500 ft of surface water or wetland areas where feasible.
- Intermittent and ephemeral drainages will be protected from surface disturbance within 75 ft of the channel or the inner gorge, whichever is closer, where feasible.
- Temporary erosion control measure will be used on unstable soils, steep slopes, and wetland areas until vegetation become established.
- 230-kV transmission line structures will be located at least 40 ft from pipelines where feasible, and conductors would be at least 30 ft above ground level at all pipeline and road crossings. Structures will be located at least 100 ft from all streams where feasible.
- Surface disturbances within 0,75 mi of active raptor nest sites will be avoided during the nesting season (February 1 through July 31).
- Windplant facilities will be designed or equipped to prevent raptor perching.
- All poles for collection and transmission lines located within .25 mi of sage grouse leks, and near prairie dog colonies and black footed ferret habitats will be equipped with antiperching devices to minimize their takes by bird of prey.
- To protect big game winter habitat, construction activities will not be allowed from November 15 to April 30 within certain areas encompassed by ROW grants. The same criteria apply to defined big game birthing areas from May 1 to June 30.
- Known active sage grouse leks and adjacent areas will be avoided during the breeding and nesting season from March 1 through June 30.
- All substations and other areas hazardous to wildlife will be fenced as directed by BLM.
- Paleontological and archeological mitigation measures previously in this document will be applied for surface disturbing activities.
- Approval from the BLM AO in consultation with other agency personnel will be required prior to construction in areas where Federal regulations are applied to protect sensitive resources.
- Operators and users will be required to prevent releases of toxic or hazardous materials, or wastes and to take appropriate corrective actions (mitigations) if releases occur.

2.6.2.2. Communication Sites

Management actions pertaining to communication sites include the following:

- Communication site plans will be developed for all existing and any new sites. New sites may be established, with appropriate analysis, on a case-by-case basis.

- Site categories will be established for all communication sites according to the following criteria:
- High-power communication sites will be reserved for broadcast television and radio transmitters of 100 watts or more.
- Low-power communication sites will be reserved for microwave, mobile telephone/radio, and other transmitters using fewer than 100 watts.
- A 2-mile buffer will be maintained around all communication sites to ensure their integrity.
- Operators and users will be required to prevent releases of toxic or hazardous materials, or wastes and to take appropriate corrective actions (mitigations) if releases occur.

Management actions pertaining to the construction and location of large structures (i.e., towers) identified in the previous section should be consulted when deciding additional mitigation measures.

2.6.2.3. Landownership Adjustments

About 48,493.27 acres are identified as available for consideration for disposal under the disposal criteria of *FLPMA*. These lands may be disposed by any appropriate means permitted under the land laws, including desert land patent, exchange, sale, and recreation and public purpose (R&PP) patent.

Lands identified for landownership adjustments during the planning effort for the *Great Divide Resource Management Plan* are lands that have met the *FLPMA* disposal criteria. The inventory of public lands that meet the *FLPMA* disposal criteria was not completed for the entire RMP planning area. No RMP decision has been made to the effect that any of these lands will be disposed of or that these lands are the only public lands in the planning area that may be considered for disposal.

In addition, proposals for disposal of lands not identified as meeting the *FLPMA* criteria will be considered if they are consistent with the objectives of the RMP.

Before taking any disposal action, consideration will be given to each individual tract and will include public involvement.

The preferred method of disposal or acquisition of lands by BLM will be through exchange. It should be noted that limited funding and personnel are available to implement disposal of rangeland. The inability of the resource area to actively pursue landownership adjustments leaves numerous, isolated tracts of land that must be administered under grazing regulations. The cost of administration is disproportionate to the grazing and other public values returned from these tracts.

Land disposals and acquisitions will be subject to a pre-acquisition environmental site assessment as required by *602 Departmental Manual (DM) 2* in accordance with manual *H-2101-4* to determine if Recognized Environmental Conditions are present that would pose an imminent threat or long term risk to human health and/or the environment.

Termination of the R&PP Lease for the Bairoil landfill was approved by memorandum signed by the Rawlins Field Manager on January 24, 2001. The site was reclaimed in conjunction with the Wyoming Department of Environmental Quality Solid and Hazardous Waste Regulations in 1994.

The Lands Exchange Criteria for the Great Divide RMP (Rawlins Field Office), as described in Appendix E apply.

2.6.2.4. Access

Consistent with the Wyoming BLM access policy, the BLM will pursue opportunities to acquire or maintain legal access to the following areas:

High Importance

- Arlington (forestry)
- Big Creek (recreation)
- Elk Mountain (forestry)
- Little Medicine (forestry)
- Shirley Mountain (forestry, recreation)
- North Platte River
- Shirley Mountain

Moderate Importance

- North Laramie River (forestry)

- Pine Mountain-Split Rock (forestry)
- Rawlins Uplift (recreation)
- Seminoe-Pathfinder (recreation)
- Toltec (forestry)
- White Rock Canyon (forestry)
- Continental Divide National Scenic Trail

Low Importance

- Seven Mile (forestry)
- Sugarloaf (forestry)
- Woodedge (forestry)

Additional access needs will be considered as they are identified or as opportunities arise.

2.6.2.5. Withdrawals

Reviews of withdrawn lands in the planning area, under *Section 204(1) of FLPMA*, will be completed to determine whether existing withdrawals are serving or needed for their intended purposes. These reviews are not a part of developing the RMP. Thus, no decisions are made on the termination of any withdrawals in this RMP. The existing withdrawals in the planning area will remain in place unless or until it is determined they should be terminated and, if necessary, a plan amendment to the Great Divide RMP is made. Such determination or amendment will be based upon full examination of the issues associated with withdrawal terminations, including the land use, environmental and other factors associated with opening public lands now closed to entry under the public land laws or to mineral location under the mining laws.

The BLM will initiate new withdrawals, which would close areas to operation of the public land laws, including disposal, and to mineral location under the mining laws. This includes recreation sites, 650 acres; historic sites, 1,320 acres; and a rare plant population, 10 acres.

Further information on withdrawals is summarized in Table 2.6-1.

2.6.2.6. Classifications

Classification and Multiple Use Act (C&MU) of 1964

A notice of classification, published in the Federal Register of November 8, 1967, classified 3,650,000 acres in the planning area for retention and multiple use management. Of this, 3,916 acres of high value recreation lands were also segregated from mineral location. With the expiration of the C&MU Act and the passage of *FLPMA*, C&MU classifications for retention and multiple use were no longer necessary. Thus, except for the 3,916 acres segregated from mineral location, the C&MU classifications in the planning area were terminated.

Under the Great Divide RMP these remaining 3,916 acres of C&MU classifications will be terminated and managed as follows:

- For those high value recreation areas, where about 600 acres of the C&MU classifications are to be replaced with withdrawals (see Table 2.6-1), the classifications will remain in effect until after the new withdrawals are in place.
- Withdrawals are not necessary to provide appropriate management for the remaining 5,322 acres. These lands will be managed under the general provisions of the RMP.

Other Classifications

Classifications on 4,197 acres for potential Recreation And Public purpose (R&PP) uses under the R&PP Act of 1926 are no longer necessary and will be terminated. Classifications on 15 acres for small tract sales are no longer necessary and will be terminated. With the passage of the Mineral Leasing Act of 1920, all prior coal classifications protecting Federal coal from mineral location on 671,768 acres are unnecessary and will be terminated.

2.7. LIVESTOCK GRAZING

Central to the implementation of livestock grazing management decisions in the Rawlins Field Office is the Bureau's objective to carry out the intent of the *Taylor Grazing Act of 1934,* as amended and supplemented, the *Federal Land Policy and Management Act of 1976*, and the *Public Rangelands Improvement Act of 1978.*

Implementation of integrated grazing management systems constitutes the primary means of improving or maintaining the desired range conditions. Approved Allotment Management Plans (AMPs) provide the necessary guidance for achieving grazing management objectives. Forage utilization levels are managed in accordance with individual approved AMPs. BLM staff work closely with operators in accordance with the standards for healthy rangelands (Appendix C) to determine the most appropriate methods for achieving the standards.

In order to identify management objectives for the Rawlins Field Office three separate grazing EISs covering the Great Divide RMP planning area were completed. Two of these EISs (the Divide Grazing EIS and the Seven Lakes Grazing EIS) were completed prior to developing the Great Divide RMP. The livestock grazing management decisions for the Divide Grazing EIS area and the Seven Lakes Grazing EIS area will continue in effect as outlined in the Divide and Seven Lakes Rangeland Program Summaries (RPS). These two RPSs are incorporated into the Great Divide RMP.

The RPS for the Medicine Bow Grazing EIS area (covered in the Great Divide RMP/EIS) will be developed in the near future. In conjunction with that RPS, a single set of priorities encompassing all three grazing EIS areas will be developed to coordinate the entire rangeland management program for the Great Divide planning area.

2.7.1. MANAGEMENT OBJECTIVES

The Great Divide area will be managed to enhance sustainable livestock grazing while maintaining a balance between economic uses and the enhancement of wildlife habitat, watershed, and riparian ecosystem areas, while maintaining range condition at, or improving ecological range condition toward, the potential for the ecological site over the long term. Ecosystems will be restored and improved to properly functioning conditions with adequate amounts of forage and habitat to maintain Wyoming Game and Fish Department Population objective levels and domestic animal levels.

2.7.2. MANAGEMENT ACTIONS

2.7.2.1. Management Actions General

Rangeland Health Standards described in document *H-4180-1* describe how the *Taylor Grazing Act of 1934*, as amended and supplemented, the *Federal Land Policy and Management Act of 1976*, and the *Public Rangelands Improvement Act of 1978* are to be implemented. The Rawlins Field Office is required to:

- Periodically and systematically inventory public lands and their resources and their present and future use projected through land use planning processes.
- Manage public lands on the basis of multiple use and sustained yield.
- Manage public lands in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values.
- Preserve and protect certain public lands in their natural conditions where appropriate.
- Provide food and habitat for fish and wildlife and domestic animals.
- Provide for outdoor recreation and human occupancy and use.
- Manage, maintain and improve the condition of public rangelands so that they become as productive as feasible for rangeland values in accordance with the management objectives and land use planning processes.

2.7.2.2. Management Actions (pertaining to the Great Divide planning area)

Livestock grazing use in the planning area will be continued. Livestock grazing will also be managed to provide for protection or enhancement of other resource values.

The total authorized livestock grazing use will not exceed the recognized active preference in the planning area. Currently, this is a maximum of 480,754 Animal Unit Months (AUMs) of annual forage use (161,340 AUMs are in the Medicine Bow Grazing EIS area; 262,101 are in the Divide Grazing EIS area; and 57,313 in the Seven Lakes Grazing EIS area).

The current amounts, kinds and seasons of livestock grazing use will continue to be authorized until monitoring indicates a grazing use adjustment is necessary or that a class of livestock or season of use modification can be accommodated.

Requests for changes in seasons of use or kind of livestock will be considered case by case. Requests for conversions from sheep to cattle will be considered with management actions to maintain or improve riparian conditions.

Any adjustments in livestock grazing use will be consistent with current policies and procedures and as a result of inventories, monitoring studies and consultation, coordination or negotiation with grazing permittees. Adjustments may also result from land use planning decisions to change the allocation of land uses or from transfers of BLM administered public lands to other agency jurisdictions or into nonfederal ownership.

Applications for changes in kind of livestock or season of use will be considered in allotments subject to the following conditions. As much as one full year may be required for complete review and determination. Range suitability will be considered. Potential impact to riparian and other sensitive areas will be considered and mitigation may be required. Conversions may be conditional, subject to further review, before becoming permanent.

When applications for the transfer of grazing preference are received, they will be reviewed carefully. All available monitoring data will be reviewed. Special attention may be given to the condition and function of authorized range improvements prior to issuance of permanent grazing authorizations.

All identified sensitive plants will be given priority in the management of the area where they occur.

The design and coordination of grazing management practices and systems and range improvement projects will give special attention to design and implementation criteria that meet the needs of priority watersheds.

The Great Divide rangeland-monitoring plan will be reviewed and updated annually. This monitoring plan, which details the type and purpose of monitoring to be done at the allotment level, is on file in the Great Divide Resource Area Office.

Grazing administration will continue to be the highest program priority. Next in priority will be to continue an increased emphasis on range use supervision. The third priority will be to provide adequate response to requests from interested parties to construct projects on public lands with private funds and to provide the necessary planning support for project construction with public funds. Priority number four will be to pursue adequate funding to develop and implement a riparian inventory program utilizing the National Wetlands Inventory that will quantify and classify riparian habitat in the Resource Area. The next priority will be to continue full support for the following special management opportunities and to seek additional opportunities to pursue similar projects (i.e. Sun Stewardship, Miracle Mile CRMP, Muddy Creek Watershed Demonstration Area, and Daley/Grizzly Special Management Area). Existing AMP's will be supported. The final priority will be to conduct additional rangeland monitoring, working toward achieving full compliance with the State monitoring standards.

Rangeland Health Standards and Guidelines as described in the 1995 revisions to the grazing regulations and the 1994 *Impact Statement* (*Instruction Memorandum No. 98-91*) have the over all purpose of working with permittees, lessees and the public, to make a difference on the land.

The six step implementing standards and guidelines require that Authorized Officers:

- Prioritize areas by allotments, groups of allotments, watersheds or other areas and set a schedule for addressing them, giving priority to areas believed to be at risk - in degraded condition or downward trend and in danger of losing potential.
- Conduct assessments to determine whether the areas are meeting standards and conforming to guidelines or making significant progress toward meeting standards and conforming to guidelines.
- Determine if existing grazing management practices or levels of grazing use are significant factors in failing to achieve the standards and conform with the guidelines.
- Take appropriate action (in consultation with permittees, lessees, the State and interested public) and modify the terms and conditions by the start of the next grazing season to ensure that the terms and conditions result in meeting the standards and conform to the guidelines, or make significant progress toward meeting the standards and conform to the guidelines if existing grazing management practices or levels of grazing use are significant factors in failing to achieve the standards and conform with the guidelines.

- Evaluate the effectiveness of management under the modified terms and conditions in meeting the standards and conforming to the guidelines. If further monitoring and evaluation indicate that the area has not achieved or is not making significant progress toward meeting the standards and conforming with the guidelines, managers must further modify the terms and conditions by the start of the next grazing season, in consultation with permittees, lessees, the State and interested public, to ensure the terms and conditions result in meeting the standards and conforming to the guidelines or making significant progress toward meeting the standards and conforming to the guidelines;
- Submit by State, assessment progress each year as part of the National Rangeland Inventory, Monitoring and Evaluation Report.

In addition, the following six standards from the Standards for Rangeland Health and Guidelines for Livestock Grazing Management for BLM Lands in the State of Wyoming (1997) are currently used to assess allotment range quality:

- Standard #1--Regarding the potential of the ecological site, the soils are stable and allow for water infiltration to provide for optimal plant growth and minimal surface runoff.
- Standard #2--Riparian and wetland vegetation has structural, age and species diversity characteristic of the stage of channel succession, and is resilient and capable of recovering from natural and human disturbances in order to provide forage and cover, capture sediment, dissipate energy, and provide for ground water recharge.
- Standard #3--Upland vegetation on each ecological site consists of plant communities appropriate to the site which are resilient, diverse, and able to recover from natural and human disturbances.
- Standard #4--Rangelands are capable of sustaining viable populations and a diversity of native plant and animal species appropriate to the habitat. Habitats that support or could support threatened species, endangered species, species of special concern, or sensitive species will be maintained or enhanced.
- Standard #5--Water quality meets State of Wyoming standards and complies with all Clean Water Act requirements, rules and laws.
- Standard #6--Air quality meets State of Wyoming standards and complies with the Clean Air Act requirements, rules and laws.

Note: The Wyoming minimum monitoring standards (MIC) for allotments have been discontinued since the introduction of the aforementioned revision of grazing regulations.

Grazing systems will be designed to achieve the livestock-grazing objective. Existing allotment management plans, (AMP's) will be maintained and updated as necessary. New AMP's will be developed for selected grazing allotments as funding allows. Maintenance and development of range improvements may be undertaken to enhance multiple-use values. Private investment will be encouraged and authorized when consistent with the multiple-use objectives for the allotment. Proposals for changes in use will be reviewed and allowed if they do not conflict with other values.

2.7.2.3. Management Actions Specific to the Medicine Bow Grazing EIS Area

Livestock grazing will continue to be excluded from the Pennock Mountain Wildlife Habitat Area (6,285 acres), the Wick Wildlife Habitat Area (320 acres), the Laramie Peak Wildlife Habitat Area (2,858 acres), and the Sybille Wildlife Research Unit (680 acres). A grazing agreement has been negotiated in the Split Rock/Duck Creek Agreement Area (1760 acres) which accommodates the special needs of the Bighorn Sheep using the area for lambing.

A projected 1,725 acres of riparian habitat will be the object for development of grazing treatments. Special riparian needs will be the primary consideration in the location and design of range improvements and grazing systems in these areas. If necessary, livestock use will be excluded from riparian areas until they improve sufficiently to support limited seasonal grazing.

Special attention will be given to maintenance of wildlife habitat on 13,140 acres that contain crucial winter range for big game and other important habitat. These areas will also receive special attention in the development and implementation of AMPS and other activity plans.

2.8. MINERALS

The public lands and Federal mineral estate are available for orderly and efficient development of mineral resources. All mineral leases will be issued with needed restrictions to protect the environment from releases of hazardous, toxic and waste materials. Stipulations pertaining to prevention and mitigation of releases and compliance with applicable Federal, State and Local hazardous materials and safety regulations will be required.

Generally, under the existing approved RMP, the Rawlins Field Office planning area is open to consideration for exploration, leasing, and development for all leasable minerals, which include oil, gas, and coal in accord with all applicable provisions (e.g., restrictions, prohibitions). All activities will be conducted in accordance with the *Guidelines for Surface-Disturbing Activities and Disruptive Activities* (Appendix II)

The standards for healthy public rangelands, described in Appendix C, apply.

2.8.1. MANAGEMENT OBJECTIVES

2.8.1.1. Leasable Minerals

Coal

Three management objectives have been identified for coal. They are:

- Providing for both short- and long-range development of Federal coal in an orderly and timely manner, consistent with the policies of the Federal coal management program, environmental integrity, national energy needs, and related demands;
- Protecting important resources by specifying whether Federal coal can be leased for surface, subsurface, or *in situ* mining methods
- Allowing analysis of alternative areas in consideration of future leasing activities.

Oil and Gas

The BLM will provide opportunities for leasing, exploration, and development of oil and gas while protecting other resource values. In addition the BLM will evaluate industry-proposed measures to protect health and safety in all areas of oil and gas extraction.

Other Leasable Minerals

Pertaining to leasable minerals the Rawlins Field Office will provide opportunity for leasing, exploration, and development of oil shale, geothermal resources, and non-energy leasable minerals while protecting other resource values.

2.8.1.2. Locatable Minerals

The objective is for BLM to provide opportunities for location of mining claims and mineral development while prohibiting such activities on lands that are not compatible with these types of activities.

2.8.1.3. Salable Minerals

The objective is for BLM to provide availability of mineral materials in convenient locations for users while protecting surface resources.

2.8.2. MANAGEMENT ACTIONS

2.8.2.1. Leasable Minerals

Coal

The Federal coal areas with potential for coal development are acceptable for further consideration for leasing (through lease applications or coal activity planning) and are listed below. The mitigation measures developed in the coal screening process will be applied in these areas as described in Appendix E. All other Federal coal areas within the planning area are unavailable for leasing consideration.

Federal coal areas acceptable for further leasing consideration:

- Hanna Basin - About 30,040 acres of public land and 760 acres of split estate lands containing about 147.6 million tons of Federal coal. Since 1980, of the original estimated 190.6 million tons of surface minable Federal 27 million tons of Federal Coal have been recovered using strip-mining methods. An additional 16 million tons of Federal coal have been extracted using underground mining methods.
- North Indian Springs - About 3,840 acres of public land containing about 25.0 million tons of Federal coal (acceptable for leasing consideration only for in situ coal development).
- Indian Springs - About 2,560 acres of public land containing about 25.0 million tons of Federal coal (acceptable for leasing consideration only for in situ coal development).
- Red Rim - About 9,720 acres of public land containing about 40.6 million tons of Federal coal.
- China Butte - About 6,240 acres of public land containing about 73.9 million tons of Federal coal.

- Atlantic Rim - About 2,850 acres of public land and 800 acres of split estate lands containing about 79.1 million tons of Federal coal.
- Carbon Basin - About 11,928 acres of Federal coal lands (approximately 7,410 acres of public land and 4,518 acres of split estate) containing 313 million tons of Federal coal. Of the 11,928 acres of Federal coal land, 120 acres is acceptable for leasing consideration for subsurface mining only.

Development Sequence:

- A north-to-south coal development sequence will be followed in the entire area west of Rawlins and south of I-80 as needs are identified.

The BLM will process all applications for leasing in areas identified as acceptable for further consideration for coal leasing. For each application, BLM will conduct a site-specific environmental analysis and will consider the development sequence described above and other environmental and socioeconomic factors (see Appendix F, see tables).

Oil and Gas

The entire planning area is open to oil and gas leasing, except Wild and Scenic Areas (WSAs) where stringent NEPA requirements prohibit any surface disturbing activities. After initial prospecting evaluation, research, and subsurface mapping, leasing is often the next step in oil and gas development.

Oil and gas leases fall into two categories, competitive and noncompetitive. Competitive leases will be issued in areas known to produce oil and gas, which are called known geological structures (KGSs). Noncompetitive leases are for land outside KGSs. They are available either through open land offers or simultaneous filing for lands previously leased. BLM district and resource offices verify KGS status, recommend any deletions or additions to the list, specify stipulations to protect surface resources and other special conditions, and prepare a discounted cash flow analysis.

When a tract of land has been determined to be within the area of a producing or presumptively productive oil or gas field, the Federal land must be included in a formally described KGS. The land inside a KGS is likely to be developed. A KGS designation means that leasing in that area will be competitive, the rate of lease rental will be double the amount for a noncompetitive lease, and the loyalties paid to the Federal government will be a higher percentage of production than that required on noncompetitive leases. Since the reservoir limits have been delineated and schedules have been shortened, increased activity is more likely, success rates are higher, and revenue to the government increases. Sealed bonus bids will be accepted for each tract recommended for lease. After bids are opened, the BLM will determine their adequacy. Competitive leases will be issued for five years.

For noncompetitive leases, action is to be initiated when an applicant applies for an unleased parcel in a non-KGS area. If the land is available, the BLM office will respond with any recommendations and, upon approval, the lease is issued to the applicant without competition or drawing. In "simultaneous filing," previously leased parcels in non-KGS areas are listed bimonthly as they become available following termination of old leases. The BLM office will make recommendations as to land-use suitability. Once a list is approved and advertised, all applications received during the filing period will considered to have been filed simultaneously. An applicant may file only one application per tract. A lottery-type drawing will be held in which one application is drawn for each tract. If there are no applications for the tract, it will be made available to the first applicant subsequent to the drawing. Non-competitive leases will be issued for ten years. All leases require either yearly rent payment in advance, or a percentage of the value of production (royalty). Further details on leasing regulations and requirements can be found in *43 CFR 3100.*

Wyoming Federal oil and gas lease sales are held on even numbered months, usually in Cheyenne. Since 1996, only lands requested for lease have been offered.

Leases will be issued with needed restrictions to protect the resources listed in Table 2.8-1.

Surface-disturbing activities will be restricted and intensively managed to maintain important resource values in the WSAs, ACECs, the Baggs Elk Crucial Winter Range, and in overlapping crucial winter ranges for the various big game species. (See the individual ACEC and wildlife sections.)

All lands that are open to oil and gas leasing are also open to geophysical exploration. In cases where Federal oil and gas leases are or have been issued (1) without stipulated restrictions or requirements that are later found to be necessary; or (2) with stipulated restrictions or requirements that are later found to be insufficient; the needed restrictions or requirements may be included in approving subsequent exploration and development activities. These restrictions or requirements may only be included as reasonable measures or as conditions of approval (COA) in authorizing applications for permit to drill (APD), sundry notices, or plans of development (POD).

Conversely, in cases where leases are or have been issued with stipulated restrictions or requirements that are later found to be excessive or unnecessary, the stipulated restrictions or requirements may be appropriately modified, excepted or waived in authorizing APDs, sundry notices, or PODs.

Note: Both the application of reasonable measures or COAs and the modification, exception or waiver of stipulated restrictions or requirements must first be based upon site specific analysis of individual APDs, sundry notices, or PODs, including the necessary supporting NEPA documentation.

In 1994 a *Memorandum of Understanding (MOU) (BLM MOU # WY920-94-79)* was signed and activated between the Wyoming BLM and the State of Wyoming Oil and Gas Conservation Commission (WOGCC). In the MOU, BLM and the WOGCC agreed to:

- Develop and share information of common need; plan and implement oil and gas development in coordination with surface management issues.
- Maintain a good faith effort to keep one another informed and advised of plans and actions which might effect each other; work in harmony to achieve the objectives of their policies and regulations;
- That the Reservoir Management Team (Casper Field Office) will be the WOGCC's local point of contact for disbursement of correspondence related to the MOU.

This agreement supplements oil and gas regulations and stipulations in the State of Wyoming.

Additional actions to consider with oil and gas field extraction activities include the following:

- An annual review of proposed and cumulative developments within the context of the Adaptive Environmental Management (AEM) planning process.
- Monitoring of direct and cumulative impacts.
- Reviewing all major road and pipeline plans to ensure their location will result in the least impact.
- Determining the extent of site-specific impacts and appropriate mitigation measures in areas to be disturbed under guidelines provided by the BLM or as developed through the AEM process.
- Initiating formal consultation with the USFWS in cases of unexpected wildlife impacts and the cessation of all such operations where necessary.
- Ceasing operations if paleontological values are observed and informing the BLM to prevent the destruction of or adverse impacts to these values.
- Investigating measures to mitigate visual impacts of oil and gas operations.
- Reclaming surface disturbances by the fall or spring after the well has been drilled and brought on line.
- Requiring best management practices (BMPs) to control sediment releases into water channels.
- Formalizing surface disturbance stipulations.
- Formalizing sensitive habitat exclusion areas.

Following BLM and WOGCC abandonment procedures on each well based on approved reclamation plans.

Other leasable minerals

The entire planning area is open to leasing of oil shale, geothermal resources, and non-energy leasable minerals. Lease applications will be considered on a case-by-case basis. Stipulations to protect important surface values will be based on interdisciplinary review of individual proposals and environmental analysis.

2.8.2.2. Locatable minerals

The entire planning area is open to location of mining claims and mineral development except for areas that are closed or to be closed and withdrawn from mineral location. These areas are shown in Table 2.8-1.

All locatable minerals actions will be reviewed to assure compliance with the BLM bonding policy for surface disturbing activities. The general purpose of the stipulations in *43 CFR 3809* is to prevent unnecessary and undue degradation of public lands by operation authorized by the mining laws. Anyone intending to develop mineral resources on public lands in the Rawlins Field Office must prevent unnecessary or undue degradation of the land and reclaim areas, as well as provide for maximum possible coordination with appropriate State agencies to avoid duplication and to ensure that operators prevent unnecessary or undue degradation of public lands. Lands under wilderness review are subject to *43 CFR 3802*.

A plan of operation has to be submitted to the Rawlins Field Office and approval has to be obtained before beginning operations greater than causal use. A plan of operations for any bulk sampling in which 1,000 tons or more of presumed ore testing is removed must be submitted. A plan of operation must be submitted for any operations causing surface disturbances greater than causal use in National Wild and Scenic River Systems; Areas of Critical Environmental Concern; areas designated as part of the National Wilderness Preservation System administered by the BLM; areas designated as closed to off-road vehicle use; any lands or waters known to contain Federally proposed or listed threatened or endangered species or their proposed or designated habitat, unless BLM allows for other action under a formal lad use plan or threatened or endangered species recovery plan; and National Monuments and National Conservation Areas administered by the BLM.

A complete notice of operations must be submitted 15 calendar days before exploration commences causing surface disturbances of 5 acres or less of public lands on which reclamation has not been completed. Upon receipt of a notice of operation, BLM will review it within 15 days. If the notice is incomplete BLM will inform the concerned party of additional information that needs to be submitted. This information will be submitted within 15 calendar days and will repeat this process until the notice is complete or that it is decided that the submitter may not conducted operations because of their inability to prevent unnecessary or undue degradation. The submitter may commence operations after completion of the review process. The submitter must also provide BLM with a financial guarantee that meets the requirements of 43 CFR 3809. Notices may be modified, but will require a new review. A completed notice remains in effect for 2 years unless extended or that the submitter informs BLM that the operations have ceased and reclamation is complete. When a notice expires operations must cease and reclamation obligations must be met. Financial guarantees may be forfeited if BLM determines that operations were abandoned without completing reclamation. A plan of operation must be submitted to the local BLM field office. Included in the plan are the following: operator information; description of operations; a reclamation plan; a monitoring plan; an interim management plan; and a reclamation cost estimate. BLM will review the plan within 30 days and will notify the operator if the plan meets content requirements. BLM will also regulatory requirements are met that include an environmental review under NEPA; the National Historic Preservation Act; the Endangered Species Act or the Fishery Conservation and Management Act; and Native American Consultation. The BLM will also conduct an on-site visit, a review of public comments and take any other necessary actions before the plan of operations is approved. Operation standards are found in *43 CFR 3809.420*. A plan of operation remains in effect as long as operations are conducted, or BLM suspends or revokes the plan of operation for failure to comply. Plans of operation may be modified but will require additional review. At any time of operation BLM may inspect operations to verify that the operation complies with operation standards. If inspection fails BLM may issues a noncompliance order or a suspension order. If the BLM order is not complied with, a civil action for an injunction or order to prevent operation on public lands and collect damages from unlawful acts may be instituted.

2.8.2.3. Salable Minerals

The planning area is open to the sale of mineral materials.

Sales will be considered on a case-by-case basis. Stipulations to protect important resource values will be based on interdisciplinary review and analysis of individual proposals. Management Actions stipulated in *43 CFR 3809* in the previous section on locatable minerals are applicable to salable minerals as well.

2.8.2.4. Geophysical Exploration

Geophysical notices of intent are evaluated on a case-by-case basis. All acreage in the planning area is subject to various appropriate limitations. Generally, all authorizations will be issued with appropriate application of surface disturbance mitigation requirements as presented in Appendix D.

2.8.2.5. Geological Hazards

No major geological hazards are found in the Rawlins Field Office.

2.9. OFF-HIGHWAY VEHICLE USE

2.9.1. MANAGEMENT OBJECTIVES

An OHV implementation plan will be prepared for the resource area. In the past decade new vehicles have become popular including 4-wheelers and jet skis. Consequently, new details on off-highway vehicular use and management will be developed in this implementation plan.

2.9.2. MANAGEMENT ACTIONS

The BLM will coordinate and cooperate with owners of adjacent properties, interested individuals, organizations, and agencies in preparing plans for implementation of the following OHV designations.

2.9.2.1. General Planning Area

With some exceptions, the planning area is open to use of motorized over-the-snow vehicles, provided that they do not adversely affect wildlife or vegetation. With some exceptions, all other motorized vehicle use in the planning area is limited to existing roads and trails. These exceptions are:

- **Pennock Mountain and Wick Wildlife Habitat Areas (crucial elk winter range - about 10,126 acres).** These areas are closed to motorized vehicle use, including over-the-snow vehicles, from November 15 to April 30.
- **Encampment River Canyon crucial big horn winter range (about 6,700 acres).** This area is closed to motorized vehicle use, including over-the-snow vehicles, from December 1 to April 30.
- **Encampment River Trail.** Those portions of this trail that cross BLM administered public lands are closed to all types of motorized vehicle use, year-round.
- **Dune Ponds Cooperative Management Area (3,240 acres).** Motorized vehicle use is limited to open sand areas west of Carbon County Road 351 and to existing roads and trails in the rest of the area.
- **West Seminoe Area (99,162 acres).** Motorized vehicle use will be limited to roads and trails to help resolve resource conflicts and preserve public access.
- **Ferris Mountains**. This area is closed to all types of motorized vehicle use, year-round (see Adobe Town/Ferris Mountains Wilderness Final EIS). Emergency closures will be implemented in areas where motorized vehicle users have entered this area on undesignated roads and trails.
- **Adobe Town**. Motorized vehicle use will be limited to roads and trails (see Adobe Town/Ferris Mountains Wilderness Final EIS).
- **Shirley Mountain**. Motorized vehicle use will be limited to designated roads and trails to help resolve resource conflicts and preserve public access (see Shirley Mountain Planning Review Travel Management Strategy).

2.9.2.2. Specific Problem Areas

Plans for rehabilitation or mitigation of OHV use will be developed and implemented for specific problem areas within the Sand Hills area and the Dune Ponds Cooperative Management Area. A new cooperative management agreement for the Dune Ponds Cooperative Management area will be pursued.

Because of the mixed landownership pattern and multiple resource concerns, completion of an effective OHV implementation plan for the Dune Ponds area is entirely dependent on close coordination with private land owners of adjacent property, the Wyoming State Land Board, Wyoming Game and Fish Department, and other interested parties. The plan will also be closely coordinated with the wildlife, soils, and livestock grazing programs to ensure multiple resource concerns are addressed.

2.9.2.3. Consolidation of Landownership

Consolidation of landownership will be pursued to acquire inholdings in WSAs and lands deemed desirable for recreational activities should the opportunities arise. Consolidated lands that meet the objective of increasing public recreational opportunities must be beneficial in the interests of public health and safety. The preferred method of consolidation is through exchange.

2.10. PALEONTOLOGY

2.10.1. MANAGEMENT OBJECTIVES

BLM has identified the following management objectives for paleontology:

- Maintaining the integrity of the scientific value of paleontological resources.
- Identifying area wide criteria or site-specific use restrictions to ensure that areas containing, or that are likely to contain, vertebrate or noteworthy occurrences of invertebrate or plant fossils are identified and evaluated prior to authorizing surface disturbing activities.
- Ensuring that management decisions are developed to promote the scientific, educational, and recreational uses of fossils.
- Identifying and mitigating threats to paleontological resources.

The standards for healthy public rangelands, described in Appendix C, apply.

2.10.2. MANAGEMENT ACTIONS

BLM will identify appropriate measures and scientific, educational and recreational use opportunities for paleontological localities. The *Probable Fossil Yield Classification* (PFYC) system developed by the Paleontological Center of Excellence and Region 2 (USFS) as modified by the Regional Paleontologist, Wyoming BLM in 2002 is used as standards for the classification of probable paleontological resources.

Inventories will be conducted on a case-by-case basis for each proposed surface-disturbing activity to ensure maintenance or integrity of paleontological values. These include the following:

- The operator shall be responsible for informing all persons associated with this project that they shall be subject to prosecution for damaging, altering, excavating or removing any archaeological, historical, or vertebrate fossil objects or site.
- If archaeological, historical, or vertebrate fossil materials are discovered, the operator shall suspend all operations that further disturb such materials and immediately contact the authorized officer.
- Operations shall not resume until written authorization to proceed is issued by the authorized officer.
- Within five (5) working days, the authorized officer will evaluate the discovery and inform the operator of actions that will be necessary to prevent loss of significant cultural or scientific values.
- The operator shall be responsible for the cost of any mitigation required by the authorized officer.
- The authorized officer will provide technical and procedural guidelines for the conduct of mitigation.
- Upon verification from the authorized officer that the required mitigation has been completed, the operator shall be allowed to resume operations.

Other actions pertaining to paleontological resources are described in Appendix F and the Como Bluff ACEC section.

2.11. RECREATION RESOURCES

2.11.1. MANAGEMENT OBJECTIVES

The primary objectives for recreation are:

- To ensure the continued availability of outdoor recreational opportunities.
- To meet legal requirements for the health and safety and accessibility of visitors.
- To control associated undesirable environmental impacts.
- To mitigate conflicts with other resource uses.

The standards for healthy public rangelands, described in Appendix C, apply.

2.11.2. MANAGEMENT ACTIONS

2.11.2.1.Recreation Areas and Sites

Existing activity plans for the Nine Mile Hill and Big Creek sites will be revised before implementation. Coral Creek will have an updated activity plan before implementation of the new RMP.

Existing Sites

Management Actions for existing sites include the following:

- Maintenance of existing developed and undeveloped recreation sites will be continued.
- Existing activity plans for the Nine Mile Hill and Big Creek sites will be revised before implementation.
- Ongoing efforts are being made to make recreational sites more accessible to people with disabilities, including replacing old inaccessible rest rooms, as mandated by UFAS and by policy following ADAAG where possible.

New Sites

Management Actions for new sites include the following:

- The development of new recreation sites remains a priority. Additional sites will be considered for development in the future as opportunities arise and as demand warrants. However, intensive use during hunting season does not warrant development of new sites.
- Actions will be pursued to protect and enhance sites where habitat improvements (i.e. fisheries) have created a new recreation attraction.
- New site development will focus on access to the North Platte River, starting with limited improvements at the Big Creek Site and it's access road.

Special Recreation Management Areas

These areas will be managed as follows:

- Continental Divide National Scenic Trail SRMA

This SRMA covers 110 miles of trail through BLM-administered public land. The area will be managed to protect the trail, provide opportunities for trail users to view the diverse topographic, geologic, vegetative, and scenic phenomena and wildlife that characterize the Continental Divide, and to observe examples of human use of the natural resources.

The exact trail route will be identified through activity planning, which also will determine where easements or rights-of-way will be needed on private or State-owned land. Where the opportunity arises, land exchanges will be pursued to consolidate the contiguity of the trail. Kiosks will be erected at each end of the Rawlins Field Office portion of the trail to manage access to the trail.

- North Platte River SRMA

This SRMA will be managed to provide high-quality recreational opportunities, especially for boating, fishing, camping, and sightseeing. Management also will be aimed at providing public facilities and continued access. Surface-disturbing activities within 1/4 mile on either side of the river will be restricted to maintain the quality of the visual resources. An activity plan has been written for a portion of this area. That plan will be revised to include the entire SRMA.

- Shirley Mountains SRMA

This 24,800-acre SRMA will be managed to provide for protection of the cave system while other resource uses will be allowed aboveground. Hunting will become the primary activity in the SRMA. Specific recreation management guidelines and surface use guidelines will be developed during activity planning. If land swaps occur, any private acreage that becomes public within and adjacent to the SRMA boundary will become part o the SRMA.

Access to Recreation Areas

Consistent with the Wyoming BLM access policy, the BLM will pursue opportunities to acquire legal access to certain areas to ensure continued availability of outdoor environmentally responsible recreational opportunities. See Lands Program - Access section for the areas needing access.

2.12. SOILS AND WATERSHED

2.12.1. MANAGEMENT OBJECTIVES

The following management objectives are applicable to the Rawlins Field Office:

- To improve soil cover and productivity where they are adequate and to increase soil cover and productivity where they are in a downward trend.
- To maintain or improve soil stability, within the potential of the ecological site, to insure adequate water infiltration, optimal plant growth, and minimal surface runoff.
- To protect soil from deterioration that might be caused by the release of toxic or hazardous materials or wastes.

The following watershed objectives are applicable to the Rawlins Field Office. They include:

- Maintaining riparian areas in good or excellent condition and to improve riparian areas that are in fair or poor condition.
- Controlling flood and sediment damage from natural or human-induced causes.
- Reducing salt loading in watersheds that lie within the Colorado River Basin.
- Meeting or exceeding established standards for quality of surface water and groundwater where water quality has been lowered by human-induced causes.
- Providinge for physical and legal availability of water for use by the public and by Federal, State, and local agencies for fisheries and wildlife and for livestock, recreational, municipal, and industrial uses.
- Protecting water from deterioration that might be caused by the release of toxic or hazardous materials or wastes.
- Identifying desired future conditions (including standards or goals under the Clean Water Act).
- Identifying watersheds that may need special protection from the standpoint of human health concerns, aquatic ecosystem health, or other public uses.
- Identifying area wide use restrictions or other protective measures to meet tribal, State, and local water requirements.
- Identifying measures, including filing for water rights under State permit procedures, to ensure water availability for multiple use management and functioning, healthy riparian and upland systems.

2.12.2. MANAGEMENT ACTIONS

The BLM will carry out watershed management practices designed to meet soil management objectives. These practices will be included in activity plans such as AMPs and HMPs.

The BLM will implement intensive land-use practices to mitigate salt and sediment loading caused by surface-disturbing activities. These practices will be carried out in the following areas in priority order: (1) Muddy Creek, (2) Sage Creek, (3) Second and Third Sand creeks, and (4) the Little Snake River Basin (excluding the Muddy Creek watershed). Watershed or other activity plans will address site specific problems and will include monitoring for salt, and sediment loading to meet tribal, State and local water quality requirements.

Releases of hazardous materials and wastes will be subject to applicable regulations such as the *Resource and Conservation Recovery Act* (RCRA), *National Oil and Hazardous Substance Pollution Contingency Plan* (NCP), and the *Comprehensive Environmental Response and Compensation and Liability Act* (CERCLA).

The BLM will carry out watershed management practices designed to meet water resource management objectives. These practices will be included in activity plans such as AMPs and HMPs and will be required to meet tribal, State and local water quality standards.

Surface disturbing activities will be prohibited on unstable areas unless it can be demonstrated that the instability can be alleviated. Specific unstable areas such as landslides, slumps, and areas exhibiting soil creep will be identified individually.

The BLM will consult and coordinate with other Federal, State and local agencies, as directed by the *Watershed Protection and Flood Prevention Act (16 U.S.C. 1001-1009),* and the *Clean Water Act (33 U.S.C. 1251).*

2.13. TRANSPORTATION AND ACCESS

Adequate transportation facilities and access to resources on public lands is a pressing issue in the Rawlins Field Office management area. Solutions to problems associated with transportation facilities and access to public land resources is exacerbated by the checkerboard pattern of landownership in much of the Rawlins Field Office Management area.

Recent direction from the Washington BLM Office on June 25, 2002 *Instructional Memorandum No. 2002-196* was issued by the Assistant Director, Minerals, Realty, and Resources Protection. In this memorandum new guidance on ROW corridor and ROW Use Area planning and designation, and the consideration of energy related ROWs and other ROWs as part of the BLM Land Use Planning process was provided.

In essence, this memorandum will determine ROW objectives and actions, thereby impacting on transportation facilities across and access to public lands.

2.13.1. MANAGEMENT OBJECTIVES

Transportation and Access to Public Lands

The objective for access management in the Rawlins Field Office is to provide suitable public access to BLM-administered public lands. This may include acquiring new access where needed, maintaining existing access and expanding existing access facilities, or abandoning and closing access where it is not compatible with resource values and objectives. Much of this objective is achieved through obtaining ROWs.

Rights-of-Way

The overall objective is to continue to make BLM-administered lands available for needed ROWs where consistent with national, State, and local plans, and use ROWs in common, to minimize environmental impacts and proliferation of separate ROWs.

An additional objective is BLM is its requirement to ensure that there is sufficient means to develop energy where authorizations require a ROW (e.g. wind energy) and to transport energy supplies in an effective manner (e.g., oil and as pipelines and electric transmission lines), while maintaining current environmental standards and good stewardship principles.

2.13.2. MANAGEMENT ACTIONS

Transportation and Access to Public Lands

Access across private lands will be pursued as needed through a variety of methods, including but not limited to purchase of rights-of-way or easements, land exchange, reciprocal rights-of-way, and other statutory authorities. (*Refer to USDI 1985b for a description of specific access acquisition procedures.*) Specific routes and acquisition procedures for securing access will be determined through route analyses and environmental analyses as part of specific project and activity planning. Where appropriate, land exchanges or cooperative agreements will be considered and used to provide access needs.

A detailed evaluation and prioritization of high-density road areas in the planning area will be completed to determine needs for specific road closures and (or) rehabilitation. Some existing roads may be closed except for administrative purposes. Specific mitigation measures and design requirements for roads will be developed through environmental analyses as part of specific project or activity planning. Proliferation of roads will be managed.

Access closure, abandonment, and acquisition will be considered and established through activity planning and environmental analysis processes. Road or trail closure and abandonment will be based on desired road or trail densities; demands for new roads; closure methods (e.g., abandonment and rehabilitation, closures by signing, temporary or seasonal closures); type of access needed; resource development or protection needs; and existing uses.

Rights-of-Way

Two primary ROW management actions drive decisions in the Rawlins Field Office. In the first place all land use plans must assess the impacts of land use decisions on the current and potential ROW corridors and ROW Use Areas and the authorization of energy related and other ROWs within land affected by the plan. In the second place, the need for ROW corridors, ROW Use Areas and the effects of land use plan decisions on energy related POWs must be factored into all of the steps of the land use planning process.

Each land use plan should include the following to the extent that is reasonable and appropriate:

- Identifying existing and potential corridors.
- Identifying existing and potential ROW development sites such as energy development areas (e.g., wind energy sites) and communication sites.
- Describing likely developments of potential corridors and other ROW sites as a basis for impact assessment and the development of the stipulations or conditions of use.
- Describing limitations on other uses in the potential corridors or at potential ROW development sites which would be necessary to maintain the ROW and corridor values.
- Describing corridor and ROW development area selection criteria, including goals and objectives for the areas identified.
- Describing any adverse effects on the distribution or production of energy supplies if the decision is inconsistent with authorizing energy related facilities.
- Describing reasonable alternatives to a proposed action having adverse energy effects and the anticipated effects of such alternatives on the production of energy.

2.14. VEGETATION

2.14.1. MANAGEMENT OBJECTIVES

2.14.1.1. General

Vegetation is managed to maintain or improve ecological range condition, and to maintain or increase forage for livestock grazing, while providing for the maintenance or improvement of wildlife habitat, watershed values, and riparian areas (*standards for healthy public rangelands*, Appendix C).

2.14.1.2. Noxious weeds

Noxious weed invasion contributes to the loss of rangeland productivity, increased soil erosion, reduced species and structural diversity, loss of wildlife habitat, and in some instances, is hazardous to human health and welfare, as emphasized in the *Federal Noxious Weed Act" (Public Law 93-629)* and the accompanying *Executive Order 13112.* Noxious weeds will be controlled through continuation of the existing noxious weed extermination program being conducted within the planning area.

Executive Order 13112

Executive Order 13112 required that a Council of Departments dealing with invasive species be created to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause.

Rawlins Field Office

The Rawlins Field Office identified two management objectives which are to control the introduction and proliferation of noxious weeds and competing undesirable plant species, and to reduce the extent and density of established populations to acceptable levels.

2.14.1.3. Sensitive Plants Management Decisions

The Wyoming BLM developed a *Sensitive Species Policy and List in April 9*, 2002 as a reaction to declining wildlife and plant species populations caused by a loss of habitat from the existing landscape. This policy underlies all management decisions made in the Rawlins Field Office pertaining to sensitive, threatened and endangered species. It is not the intent of the policy and list to establish rangewide species evaluation and tracking. These functions are performed by other entities (e.g., *Wyoming Game and Fish Department's Species Watch List*, and their *Non-Game Bird and Mammal Plan*; Wyoming Natural Diversity Databases' [WYNDD] *List of Plant and Animal Species of Special Concern*, etc.).

The Bureau's order of priority for the management of all special species is: 1) listed T/E species; 2) proposed T/E species; 3) candidate T/E species; 4) Bureau sensitive species; and 5) State listed species. All management actions should follow this action priority as appropriate.

It is the intent of the BLM to emphasize the inventory, planning consideration, management implementation, monitoring, and information exchange for the sensitive species on the list in the light of statutory and administrative priorities mentioned above.

The goals of this sensitive species policy are to:

- Maintain vulnerable species and habitat components in functional BLM ecosystems.
- Ensure sensitive species are considered in land management decisions.
- Prevent a need for species listing under the Endangered Species Act; and prioritize needed conservation work with an emphasis on habitat.

2.14.2. MANAGEMENT ACTIONS

2.14.2.1. General

Prescribed fire is the preferred method of vegetation manipulation for the conversion of brushland to grassland. A Wildfire occurring in areas with a fire prescription will be allowed to burn as long as it remains within the fire prescriptions and meets land use objectives for large burns. Other vegetation manipulation methods, including chemical and/or mechanical methods, will be considered on a case-by-case basis.

2.14.2.2. Noxious weeds

Executive Order 13112

Management actions for noxious weeds as mandated by Executive Order 13112 include the following:

- Preventing the introduction of invasive species; detecting and responding rapidly to and controlling populations of such species in a cost-effective and environmentally sound manner.
- Monitoring invasive species populations accurately and reliably

- Providing for restoration of native species and habitat conditions in ecosystems that have been invaded.
- Conducting research on invasive species and developing technologies to prevent introduction and providing for environmentally sound control of invasive species
- Promoting public education on invasive species and the means to address them.

Following the guidance of *EO 13112*, the *Rawlins Weed Prevention Plan of April 1999*, was developed from the original *BLM Weed Prevention Action Plan of January 1996*. The current action plan forms that basis of management objectives and actions pertaining to the Rawlins Field Office.

Rawlins Field Office

General Management Actions include the following:

- Applying integrated management practices.
- Emphasizing disturbances of areas such as roads, rights-of-way, and recreation sites.
- Detecting new invaders first and controlling small populations of priority second.
- Continuing public education in local area.
- Emphasizing mechanical control, but also using biological control and herbicides where such methods are effective.

Land Use Planning Management Actions include the following:

- Working with Federal, county and city planning staff and zoning committees to include consideration for noxious weed management when developing or approving plans, permits or leases.
- Including weed risk factors and weed prevention considerations in all environmental analyses for projects, permits, plans, alternative development, etc.

Surface Disturbance Management Actions include the following:

- Minimizing the amount of surface disturbance when possible to reduce area for weed establishment.
- Reestablishing vegetation on all disturbed soil from construction, reconstruction and maintenance activities, except road travelways.
- Accomplishing reseeding during the first available window of opportunity.

- Requiring certified noxious weed free seed or testing at a suitable laboratory before allowing the use of the seed for any reclamation or rehabilitation project.
- Requiring certified weed-free straw or hay for use as mulch.
- Requiring power or high pressure cleaning of construction equipment prior to moving into relatively weed-free areas and/or leaving known weed infested areas. This currently is used on multi-State and multi-county projects.
- Inspecting gravel pits and fill sources to insure the material comes from weed-free sources.
- Monitoring the construction site for weed control needs until vegetation is re-established.
- Retaining reclamation bonds for weed control until the site is returned to the desired vegetative condition.
- Removing weed seed sources from adjacent sites or from the access route that may contaminate the construction site.

Vehicle Management Actions include the following:

- Surveying roads for the presence of weed sources before maintenance activities.
- Controlling weeds if necessary before maintaining the roadway.
- Reseeding disturbed areas that are not part of the road running surface or needed for maintenance purposes.
- Retaining desirable roadside vegetation to discourage weeds.
- Removing seed sources or control weeds that could be picked up by passing vehicles on significant access routes.
- Requiring power or high pressure cleaning of off-road equipment before moving into relatively weed free areas.
- Ensuring that weed prevention and related resource protection is considered in travel management plans.
- Closing or reducing the number of vehicle trails in weed-infested areas to reduce the spread of weeds.

Livestock Management Actions include the following:

- Avoiding trailing livestock through weed-infested areas.
- Where possible, trailing on roadways where detection of weeds is more likely to occur.
- Allowing only certified weed free hay and grain (whole, rolled, steamed or cubed) or pelletized feeds to be fed on Federally managed lands (Emergency feeding may be exempted with written authorization from the Field Manager).
- Managing grazing allotments to prevent excessive soil disturbance at salt licks, watering sites and other livestock concentration areas.
- Avoiding grazing any reseeded sites until vegetation is well established.

- Holding livestock used in cultural management of weeds in a weed-free environment for a period of time before and after moving them into the weed management area (This is to allow the animals to clean their digestive tract of weed seeds).

Recreation Site Management Actions include the following:

- Ensuring that areas under recreation permit have on site weed control and minimize the spread to other areas.
- Requiring that all pack and saddle stock use only certified weed-free feeds and straw bedding.
- Signing trailheads and campgrounds for weed awareness, weed prevention, and weed reporting techniques.

Fire Management Actions for Prescribed and Wild fires include the following:

- Requiring the cleaning of fire equipment following fire activities in weed-infested areas (if possible, complete the cleaning before leaving the fire site).
- Considering weed prevention measures in all fire rehabilitation plans by including the weed coordinator on the rehabilitation team.
- Requiring certified weed free seed or testing at a suitable laboratory before allowing the use of the seed in fire rehabilitation projects.
- Emphasizing "light hand" fire suppression tactics to minimize the amount of surface disturbance.
- Avoiding staging equipment and resources in weedy areas.
- Avoiding off road travel in weed-infested areas.
- Establishing a weed control and monitoring plan, and requiring that a map of weeds in the area should be in place as part of the environmental analysis before conducting any prescribed burn.
- Including funding in budget for weed control and monitoring.

Land Management Actions include the following:

- Evaluating private lands being considered for Federal acquisition through purchase, exchange or donation for the presence of noxious weeds.
- Partnering with private landowners as much as possible to control weeds on private land.
- Including a requirement to control and manage noxious weeds on Federally authorized actions.

Early Detection Management Actions include the following:

- Providing training to field personnel in the identification of weed species known to occur in the area and preventative measures they are expected to follow (special attention should be given to equipment operators and fire personnel).
- Making weed identification handbooks available to all field going personnel.
- Making inventory and weed occurrence information readily available to field personnel and personnel actively involved in planning and designing projects.
- Encouraging field staff, landowners and managers to recognize and document weed populations.
- Developing education and awareness programs where visitors and users of the lands assist managers in locating and identifying new invader species.
- Conducting systematic and periodic inventories to detect new weed infestations.

2.14.2.3. Sensitive Plants

The following decisions describe the management actions for known populations of sensitive plant species within the resource area. As habitats or sites for any future listed species are identified within the resource area, protection measures will be developed in consultation with the USFWS. The following actions and activities are appropriate and expected for sensitive species management:

Inventory

Determine the distribution, abundance, reasons for current status (to the extent reasonably possible), and habitat needs of the sensitive species occurring on lands administered by BLM, and some assessment (to the extent reasonably possible) of the significance of lands administered by BLM, or Federal actions occurring thereon, in maintaining these species. This may include input to conservation assessments prepared for some species. Clients and partners of BLM should be encouraged to assist with, or participate in, inventories for sensitive species as opportunities arise; however, no otherwise lawful action or authorization of the Bureau should be delayed or denied pending completion of an inventory.

Land Use Planning

Include sensitive species as species of management consideration, as appropriate, in land use and activity plans. Sensitive species should be included in land use plans as a maintenance action, in most routine cases. When land use plans are being amended or revised, sensitive species should be incorporated, where appropriate, at that time. Where they exist, sensitive species should be considered in all activity plans.

Conservation Strategies

Participate in the development of conservation strategies for sensitive species in the State.

NEPA Analysis

Ensure sensitive species are considered, as appropriate, in NEPA analyses for all activities occurring on the Public Lands.

Best Practices

Ensure that all Federal actions (i.e., Federally funded, authorized, or carried out) on the Public Lands affecting the populations or habitat of sensitive species are conducted in a manner consistent with the accepted management objectives and best practices for managing those species when known. Various species monographs and conservation strategies often provide synopses of appropriate management techniques. Where necessary to prevent unnecessary and undue degradation to sensitive species or their habitats, apply appropriate mitigation for the protection of sensitive species to Public Land management actions/activities. Emphasis should be placed on developing mitigation in a collaborative effort with the applicant/user.

Monitoring

Incorporate sensitive species populations and habitats, where appropriate, in the monitoring schemes of Public Land management actions/activities.

Information Interchange

Provide information when requested, and request technical assistance from sources of expertise as needed, on Public Land actions/activities that could affect sensitive species and their habitats. As more is known about many of these sensitive species, more effective management practices can be developed and adopted.

Sensitive plant specie specific management objectives and actions are discussed below:

Utes ladies' tresses

Management Objective

The objective is to maintain or enhance the population of Utes Ladies' tresses *(Spiranthus diluvialis)* in the site area.

Management Actions

- Site-specific surveys will be conducted for populations.
- Conflict resolution with BLM and USFWS will the undertaken.
- Potential habitat will be avoided where possible.

Gibben's Beardtongue Site (about 10 acres)

Management Objective

The objective is to maintain or enhance the population of Gibben's beardtongue (Penstemon gibbensii) in the site area.

Management Actions

- The known population of Gibben's beardtongue will be protected from disturbance by maintaining the fencing around the population and by intensively managing surface disturbing activities in adjacent areas that could affect the population.
-
- Case by case examination of any proposed surface disturbing activity will be made to determine potential adverse effects and appropriate mitigation to minimize those effects.
- Developments, uses and facilities will be managed temporally and spatially to avoid damage to the sensitive plant species.
- Established trend studies will be continued.
- BLM intends to close this area to mineral location. A withdrawal will be initiated to implement this closure.

Muddy Gap Cushion Plant Community (about 100 acres)

Management Objective

The objective is to maintain or enhance the population of the Muddy Gap Cushion Plant Community.

Management Actions

- Notices will be required for locatable mineral exploration and development (except casual use) consistent with regulations.
- A plan of operations will be required for disturbance of more than 5 acres.
- The BLM will coordinate management of the plant community with The Nature Conservancy. If a need for protective measures is indicated, they will be taken to protect the plant community.

Persistent Sepal Yellowcress

Management Objectives

The objective is to maintain or enhance the population of persistent sepal yellowcress (Rorippa calycina).

Management Actions

- The planning area contains known populations of the persistent sepal yellowcress (Rorippa calycina) plant which has been proposed for threatened or endangered status. Surveys are ongoing to discover new populations. Some of this is on land administered by the Bureau of Reclamation (BuRec); therefore, the BLM will coordinate with BuRec to manage populations of persistent sepal yellowcress.
- The BLM will coordinate with county weed and pest control districts to ensure that populations of the plant are not affected by weed control programs. Since locations and degree of occurrence of this plant are extremely unstable, no acreage estimates have been attempted. Occurrence fluctuates with high and low reservoir or stream water lines.

Laramie Columbine

Management Objective

The management objective is to maintain or enhance the populations of Laramie Columbine (*Aquilegia laraminesis*).

Management Actions

- The known populations of Laramie Columbine will be protected.
- Case by case examination of any proposed surface disturbing activity will be made to determine potential adverse effects and appropriate mitigation to minimize those effects.

- Developments, uses and facilities will be managed temporally and spatially to avoid damage to the sensitive plant species.
- Established trend studies will be continued.

Nelson's Milkvetch

Management Objective

The objective is to maintain or enhance the populations of Nelson's Milkvetch (*Astragalus nelsonianus or Astragalus pectinatus var. platyphyllus*).

Management Actions

- The known populations of Nelson's Milkvetch will be protected.
- Case by case examination of any proposed surface disturbing activity will be made to determine potential adverse effects and appropriate mitigation to minimize those effects.
- Developments, uses and facilities will be managed temporally and spatially to avoid damage to the sensitive plant species.
- Established trend studies will be continued.

Cedar Rim Thistle

Management Objective

The objective is to maintain or enhance the populations of Cedar Rim Thistle (*Cirsium aridum*).

Management Actions

- The known populations of Cedar Rim Thistle will be protected.
- Case by case examination of any proposed surface disturbing activity will be made to determine potential adverse effects and appropriate mitigation to minimize those effects.
- Developments, uses and facilities will be managed temporally and spatially to avoid damage to the sensitive plant species.
- Established trend studies will be continued.

Weber's Scarlet-Gilia

Management Objective

The objective is to maintain or enhance the populations of Weber's Scarlet-Gilia (*Ipomopsis aggregata ssp. Weberi*).

Management Actions

- The known populations of Weber's Scarlet-Gilia will be protected.
- Case by case examination of any proposed surface disturbing activity will be made to determine potential adverse effects and appropriate mitigation to minimize those effects.
- Developments, uses and facilities will be managed temporally and spatially to avoid damage to the sensitive plant species.
- Established trend studies will be continued.

Pale Blue-eyed Grass

Management Objective

The objective is to maintain or enhance the populations of Pale Blue-eyed Grass (*Sisyrinchium pallidum*).

Management Actions

- The known populations of Pale Blue-eyed Grass will be protected.
- Case by case examination of any proposed surface disturbing activity will be made to determine potential adverse effects and appropriate mitigation to minimize those effects.
- Developments, uses and facilities will be managed temporally and spatially to avoid damage to the sensitive plant species.
- Established trend studies will be continued.

Laramie False Sagebrush

Management Objective

The objective is to maintain or enhance the populations of Laramie False Sagebrush (*Sphaeromeria simplex*).

Management Actions

- The known populations of Laramie False Sagebrush will be protected.

- Case by case examination of any proposed surface disturbing activity will be made to determine potential adverse effects and appropriate mitigation to minimize those effects.
- Developments, uses and facilities will be managed temporally and spatially to avoid damage to the sensitive plant species.
- Established trend studies will be continued.

Note: Appendix E (Biological Assessment) of the *Record of Decision and Environmental Impact Statement for the Continental Divide/Wamsutter II Natural Gas Project, Sweetwater and Carbon Counties, Wyoming, May 2000* should be referenced for specie specific management decisions and mitigation measures as a supplement to the *Great Divide Resource Area Record of Decision and Approved Resource Management Plan of November 1990.*

2.15. VISUAL RESOURCES

Visual Resource Management Policy (VRM) for the BLM is described in BLM Manual *H-8410-1.* Within the manual, VRM Classes are identified that are the degree of acceptable visual change within a characteristic landscape. A class is based on the physical and sociological characteristics of any given homogeneous area and serves as a management objective. The four classes are described in the visual resources section of Chapter 4 and in the document glossary.

In March 2000, *Instructional Memorandum No. 2000-096* was released by the BLM Washington Office which directed that recognizing case-by-case exceptions for valid existing rights and grandfathered uses, that all WSAs should be classified as Class I, and managed according to VRM Class I management objectives until such time as the Congress decides to designate the area as a wilderness or release it for other uses. This memorandum impacts on the VRM Class Acres determined in the 1990 Great Divide ROD.

2.15.1. MANAGEMENT OBJECTIVES

Public Lands will be managed in a manner which will protect the quality of the scenic visual values of the land (*FLPMA*, 1976) and measures will be taken to assure for all

Americans aesthetically pleasing surrounds (NEPA, 1969), thereby minimizing adverse effects on visual resources while maintaining the effectiveness of land-use allocations.

2.15.2. MANAGEMENT ACTIONS

The planning area will be managed according to visual resource management (VRM) classes as follows: Class I, 33,490 acres; Class II, 859,493 acres; Class 111, 3,582,192 acres; Class IV, 849,877,000 acres

BLM will implement:

- Techniques that will reduce the amount of land disturbed during the construction of projects, thereby reducing the extent of visual impacts.
- Measures that will repeat elements of form, line, color, and texture that will reduce contrasts between the landscape and the proposed activity or development.
- Measures that will reduce the visual contrasts caused by earthwork construction.

Existing vegetation will be retained where possible to screen and reduce visual impacts from proposed activities and development. Strategies for restoration and reclamation that will reduce long-term visual impacts by decreasing the amount of disturbed areas will be pursued. Linear alignments of corridors will be selected that will avoid new disturbances and follow the natural lines of the landscape.

2.16. WATER QUALITY AND RIPARIAN

2.16.1. MANAGEMENT OBJECTIVE

Management objectives for riparian areas are focused on maintaining, improving, or restoring riparian values to provide enhanced forage, habitat, and stream quality.

2.16.2. MANAGEMENT ACTIONS

Riparian management is an integral part of all resources and related management programs. Activities that affect or are affected by riparian values, will take into account the riparian objectives and direction. Resource values and uses that affect or are affected by riparian values include: wildlife and fisheries habitat, forest resources, livestock grazing, ORV use, visual resources, cultural and historical resources, minerals exploration and development activities, lands and realty activities, watershed and soils resources, recreation uses, fire management, and access.

All surface disturbing activities are required to adopt design strategies that serve to reduce erosion and maintain or improve water quality. The area within 500 feet of wetlands, riparian areas, and 100-year flood plains, and within 100 feet of the edge of the inner gorge of intermittent and large ephemeral drainages are avoidance areas for surface disturbing activities, and exclusion areas for new permanent facilities. Proposals for linear crossings in these areas are considered on a case-by-case basis.

Riparian exclosures are required to be developed and/or maintained, and exclosure plans implemented. Riparian exclosures are used to protect degraded riparian habitat from further impacts associated with livestock grazing and to ensure reclamation of vegetation communities and ecological processes. Exclosures are closed to livestock grazing and AUMs in these exclosures are not available for livestock use.

2.17. WILD HORSES

2.17.1. MANAGEMENT OBJECTIVES

To protect, maintain, and control a viable, stable, healthy herd of wild horses while retaining their free roaming nature and to provide adequate habitat for free-roaming wild horses through management consistent with scientific stewardship methods, environmental protection and enhancement policies.

The standards for healthy public rangelands, described in Appendix C, apply.

2.17.2. MANAGEMENT ACTIONS

New wild horse management policies have been developed since the completion of the 1990 RMP. Appropriate management levels (AML's) will be re-evaluated, as will wildlife horse management areas and management objectives. The monitoring of wild horses will be used to re-examine the AML's to determine what levels of wild horse use, in concert with other uses, will achieve a thriving natural ecological balance.

There are three wild horse herd management areas (HMAs) within the Rawlins Field Office (FO) jurisdiction. They are the Adobe Town HMA, the Lost Creek HMA, and the Stewart Creek HMA. Appropriate Management levels (AMLs) for these areas are: Adobe Town 700; Lost Creek 70; and Stewart Creek 150. These HMAs and AMLs were determined in 1994 through analysis and interpretation of extensive monitoring. The adjusted HMA boundaries are the result of additional monitoring since 1994. Inventory, population monitoring, and wild horse management actions are the responsibility of the Rawlins FO staff. A portion of the Antelope Hills HMA is within the Rawlins FO jurisdiction. Habitat monitoring for this portion of the Antelope Hills HMA is the responsibility of the Lander FO staff. Herd management area plans (HMAPs) for each of the three Rawlins FO HMAs will be revised and updated to reflect current policies and circumstances.

The Adobe Town HMA includes land within the Rawlins and Rock Springs Field Office administrative boundaries. The northern boundary of the Adobe Town HMA corresponds to the southeastern boundary of the Salt Wells HMA in the Rock Springs Field Office Area. Included within the Adobe Town HMA is the Adobe Town Wilderness Study Area and all or portions of fourteen grazing allotments. The respective AMLs for the two HMAs are unaffected by this maintenance action.

Horse management actions will be coordinated between the Rawlins, Rock Springs and Lander BLM Field Offices. The Rawlins Field Office is required to consult with Federal and State wildlife agencies and all other affected interests during land use and implementation planning for the management of wild horses. Intensive monitoring will continue to focus on determining appropriate management levels and to ensure that a thriving, natural ecological balance is maintained in grazing allotments inside established Wild Horse Management Areas.

Collection of habitat-related monitoring data for wild horse management areas will be performed in conjunction with studies designed for livestock grazing and wildlife. Wild horses will be considered when selecting key areas for placement of monitoring studies.

Collection of herd-related monitoring data will be conducted as outlined in the specific HMAP, or if an HMAP has not been completed, will be conducted as follows:

- Population Levels will be collected by conducting aerial inventories semiannually: summer (August 15) and winter (February 15).
- A fixed wing aircraft or a helicopter will be used.
- Herd Composition Data will be collected at the time of gathering wild horses.
- During processing of wild horses for the Bureau's Adopt-A-Horse program, data such as age, structure, sex ratios, and color schemes will be collected.
- As the necessary data and funds become available, the BLM's Strategic Plan for the Management of Wild Horses and Burros will be fully implemented in these allotments.

Wyoming EAs and Record of Decisions *EA# WY030-EA0-037 (2000)* and *EA# WY030-EA2-007 (2001)* established procedures for the management of wild horses in established wild horse herd areas. These procedures will remain in effect as long as they remain appropriate under applicable laws and regulations. These include the following:

- Humane care and treatment of horses.
- The review and revision of HMAPs periodically.
- Timely responses to emergency situations and to requests to remove strayed horses from private lands will be a priority.
- Regular recurrent population management actions (i.e. a Selective Removal Policy) to achieve population levels will occur. Fertility control will not be an operational component of population management actions.
- Removals will be targeted at entire family groups and to achieve distribution targets.
- Upon the completion of successful removals applications for changes in grazing use within HMAs will be given consideration.
- Except for emergency conditions and landowner requests, no removals will be conducted during the period beginning on or about April 1 and concluding on or about July 4 of each calendar year.

2.18. WILDLIFE AND FISHERIES

In March 1990, an Umbrella Memorandum Of Understanding (MOU) between the Wyoming Game and Fish Department (WGFD) and USDI BLM Wyoming for Management of the Fish and Wildlife Resources on the Public Lands was signed. The purpose of the MOU was for the two agencies to work together to benefit all wildlife in Wyoming by cooperating in planning, and sharing data among other efforts.

The Wyoming BLM developed a Sensitive Species Policy and List in April 9, 2002 as a reaction to declining wildlife and plant species populations caused by a loss of habitat from the existing landscape. This policy underlies all management decisions made in the Rawlins Field Office pertaining to sensitive, threatened and endangered species. It is not the intent of the policy and list to establish rangewide species evaluation and tracking. These functions are performed by other entities (e.g., Wyoming Game and Fish Department's Species Watch List, and their Non-Game Bird and Mammal Plan; Wyoming Natural Diversity Databases' [WYNDD] List of Plant and Animal Species of Special Concern: etc.).

The 29 standard habitat types in the Great Divide Resource Area have been ranked by management priority into three categories. High priority habitat types, which usually support a large number of wildlife species, are not common in the planning area. Sound management is required to ensure maintenance or improvement of the vegetative composition and structure of moderate priority habitat types, which usually are of lesser importance to wildlife but are in greater supply than high priority types. In low priority habitat types, there is less vegetative diversity. Because of their abundance and lower wildlife value, these types can be more heavily used by conflicting resources without significant wildlife impacts.

2.18.1. MANAGEMENT OBJECTIVES

<u>2.18.1.1. Special Species</u>

The Bureau's order of priority for the management of all special species is: 1) listed T/E species; 2) proposed T/E species; 3) candidate T/E species; 4) Bureau sensitive species; and 5) State listed species. All management actions should follow this action priority as appropriate. It is the intent of the BLM to emphasize the inventory, planning consideration, management implementation, monitoring, and information exchange for the sensitive species on the list in the light of statutory and administrative priorities mentioned above. The goals of this sensitive species policy are to:

- Maintain vulnerable species and habitat components in functional BLM ecosystems.

- Ensure sensitive species are considered in land management decisions; prevent a need for species listing under the Endangered Species Act.
- Prioritize needed conservation work with an emphasis on habitat.

Additional Objectives include:

- Providing habitat quality (food, cover, space, and water) adequate to support a natural diversity of wildlife and fisheries, including big game, upland game, waterfowl, non-game species, game fish, sensitive, threatened, and endangered species, species of special management interest in Wyoming, as well as to assist in meeting goals of recovery plans.
- Maintaining or improving vegetation condition and/or avoid long-term disturbance in high priority standard habitat sites and fisheries areas.
- Maintaining or improving overall ecological quality, thus providing good wildlife habitat, within the constraints of multiple-use management in moderate and low priority standard habitat sites (see Table 2.18-1).

The standards for healthy public rangelands, described in Appendix C, apply.

2.18.1.2. Fisheries

Fisheries resources on lands administered by the Bureau of Land Management are economically important to individuals and local communities and provide recreation to the American people. Considerable effort has been expended in the past 20 years to maintain and increase habitat for natural production of fish spawned and reared on public lands. These efforts depend on the interest and the capability of the local field office staff. Species identified as sensitive species by BLM Wyoming (BLM Wyoming State Director's Sensitive Species List) and found in the Rawlins Field Office area include: the roundtail chub (*Gila robusta*), the bluehead sucker (*Catostomus discobolus*), the flannelmouth sucker (*Catostomus latipinnis*), and the cutthroat trout (*Oncorhynchus clarki pleuriticus*). This list does not include species designated by the FWS as Federally endangered, threatened, proposed, and/or candidate.

General

The Rawlins Field Office will manage riparian areas to achieve a healthy and productive condition for long-term benefits and values, on concert with the range and watershed programs. Maintain and, where necessary, restore riparian areas via an interdisciplinary approach and participative effort in allotment management plans, habitat management plans, and other appropriate plans in accordance with schedules and decisions resulting from the Bureau planning system at the State, district and resource are levels.

Resident Species

The Rawlins Field Office will manage habitat for resident species that spend all or part of their life cycles on public lands and that are of high economic, social, or scientific value to local communities or the nation. This includes both warm and cold-water resident species, such as bass, rainbow, and cutthroat trout.

Sensitive, Threatened and Endangered Fish Species

The Rawlins Field Office will manage to increase populations of fish T&E species on lands administered by the Rawlins Field Office and restore species and populations to historic ranges, consistent with BLM land use plans, after consultation with Federal and State wildlife agencies.

Cutthroat trout

The Rawlins Field Office will manage to assure the long-term prosperity of the Colorado River cutthroat trout throughout their historic range.

2.18.1.3. Raptor Concentration Areas

The Rawlins field Office will manage resources so that productivity of nesting raptor pairs is maintained, while allowing for development of coal and oil and gas, and to seek the cooperation of owners of adjacent property in management of raptor nesting habitat.

2.18.1.4. Winter Range for all Wildlife

A portion of the Baggs Crucial Elk Winter Range is included in the Sand Hills and Jep Canyon ACEC. See the ACEC section for details. Objectives for the remainder of the area follow.

The objectives for winter ranges are to:

- Maintain the integrity of crucial winter habitats.
- Allow non-intrusive development of oil and gas and coal.
- Seek the cooperation of owners of adjacent property in management of the habitat.

2.18.1.5. White Pelican Island

Pelican Island located on Pathfinder Reservoir has been identified as an important bird site with environmental recreational potential.

The primary management objective is to maintain and enhance nesting habitat for a colony of white pelicans on the 12-acre island when the island natural causeway is not exposed by low water levels due to climatic and seasonal cycles.

2.18.2. MANAGEMENT ACTIONS

2.18.2.1.Special Species

The actions and activities appropriate and expected for sensitive species management found in section 2.14.2.3 of this chapter pertaining to inventory, land use planning, conservation strategies, NEPA analysis, best practices, monitoring, and information exchange are relevant management actions for the Rawlins Field Office.

2.18.2.2. Habitat Management Areas

There will be 6 habitat management areas:

Two existing HMP areas: Ferris/Seminoe and Laramie Peak

Four existing cooperative management agreement areas (CMAs): Laramie Peak, Pennock Mountain, Wick, and the Sybille Wildlife Research Unit.

A new cooperative management agreement area will be pursued at the Dune Ponds area (See OHV Management under Recreation Management Objectives).

Site-specific management actions, if feasible and practical, will be implemented in HMP areas and cooperative management areas to improve wildlife habitat. These site-specific management actions will be identified in existing, revised, or proposed Habitat Management Plans (HMPs). These HMPs will also address transplants or augmentations of endemic wildlife species. However, new HMPs will be identified and implemented through internal management decisions by the Rawlins BLM Field Office staff.

Wildlife and wildlife habitat inventory and monitoring will be implemented in all HMP areas, cooperative management areas and other portions of the planning area. These inventories and monitoring studies will conform to Bureau policy and standards found in Bureau Manuals, Wyoming State Office Supplements and Wyoming Instruction Memorandums.

The estimated areas that will be involved in management actions in HMP areas are: 60 miles of streams (fisheries); 545 acres of reservoirs; 271,000 acres of raptor habitat; 243,000 acres of high priority habitat (including wetlands and riparian zone); and crucial winter range for big game species as follows: antelope, 375,000 acres; bighorn sheep, 23,000 acres; deer, 288,000 acres; elk, 153,000 acres.

2.18.2.3. Fisheries

General Objectives

Legislative Acts, Executive Orders, and Departmental Policy Directives direct the BLM to:

- Manage resources on a multiple-use and sustainable yield basis.
- Maintain and improve fish habitat.
- Give priority to species listed under the Endangered Species Act, and to those, which may become eligible for listing.
- Conduct and keep current an inventory of resources.
- Coordinate fisheries inventory, planning, and management with other Federal and State agencies, local governments, and Indian tribes.

- Comply, with appropriate State and Federal pollution standards, and aid in the implementation of pollution abatement plans.
- Develop and implement fish habitat management plans as prescribed by resource management plans in cooperation with State fish and Wildlife Agencies and other interested publics.
- Monitor and evaluate management of aquatic resources.

The BLM will monitor important riparian/wetland areas and flood plains under management and other areas with identified conflicting uses according to schedules developed by State, district, and area office managers. The BLM will implement riparian management, protection, and restoration efforts so that at least 75% of riparian areas are in good or better ecological condition.

The Rawlins Field Office will actively prevent the spread of the whirling disease parasite (*Myxobolus cerebralis*) and other invasive species (see Instructional Memorandum No. WY-030-99-007).

Research will be carried out to develop habitat suitability criteria for fishes native to the Muddy Creek watershed, in order to employ science-based habitat models in land management decisions and avoid possible Endangered Species Act listings.

Management Actions specific to Resident Species

The BLM will:

- Implement current land use plans for species or habitats identified as important to local communities within time frames established by BLM managers.
- Emphasize coordinated management approaches for resident fish species and their habitats, where needs have been identified through the BLM land use planning process or appropriate procedures, by cooperating with appropriate agencies, organizations, and landowners at local level.
- Maintain or enhance resident fisheries resources by implementing habitat management or improvement projects as identified during the planning process in accordance with priorities established by management.
- Secure access to sport fishing waters on the public lands by working with private landowners, and other concerned agencies and organizations to identify access problems and solutions at the State, district, and resource area levels according to a

schedule developed jointly by the BLM State office and the Wyoming State fish and wildlife agency.

Management Actions specific to Sensitive, Threatened and Endangered Fish Species

The Rawlins Field Office will develop a database that will identify:

- Distribution of all T&E fish species on public land.
- Significance of public lands for recovery of each species; exiting and potential threats to the survival of those species.
- Opportunities to improve habitat conditions.
- Habitat acquisition needs.

In addition, the Rawlins Field Office will:

- Conduct research pertaining to the distribution and habitat needs of fishes included on the BLM (Wyoming) Sensitive Species List.
- Develop a system to track and display recovery actions.
- Implement a monitoring system for T&E species.
- Expand cooperative efforts between BLM, State of Wyoming wildlife agencies, and the Fish and Wild Life Service.
- Evaluate species that have made significant recovery.
- Cooperate on conducting studies to provide information necessary for management of T&E species.
- Manage habitat to maintain populations of candidate species at levels that will avoid endangering the species.

Management Actions Specific to the Colorado River Cutthroat Trout

The BLM will develop conservation agreements and strategies for the cutthroat trout and the reintroduction of this species.

Management of the cutthroat trout is directed by the: *Conservation Agreement and Strategy for Colorado Cutthroat Trout in the States of Colorado, Utah, and Wyoming*; and the *Conservation Plan for Colorado River Cutthroat Trout in the Little Snake River Drainage, Southeast Wyoming*. These documents should be referred to for in-depth specie management actions. Summaries of important management actions listed in the documents are listed below.

The BLM Field Office will:

- Maintain areas which currently support cutthroat trout and to manage areas for increased abundance.
- Maintain the genetic diversity of the species.
- Increase the distribution of cutthroat trout where ecologically and economically feasible.
- Protect existing and restored ecosystems as well as restoring degraded ecosystems.
- Improve watershed conditions.
- Increase sport-fishing opportunities so that the public can benefit from its attributes and management characteristic.
- Develop a public awareness program to facilitate cutthroat recovery.

2.18.2.4. Raptor Concentration Areas

The following management actions will be implemented in Rawlins Field Office:

- Surface-disturbing activities will be intensively managed in all RCAs to reduce physical disturbance of raptor habitat and disturbance of the birds. This will entail case by case examination of proposals to determine potential adverse effects and appropriate mitigation to minimize those effects. Certain times of the year and certain areas will be avoided by spatial and temporal management of development, facilities, and uses.
- Oil and gas leasing will be allowed in the RCAs. Coal leasing will be allowed in those portions of RCAs found to be acceptable for further leasing consideration.
- Most of the Atlantic Rim RCA is included in the Jep Canyon ACEC and the Shamrock Hills RCA is designated an ACEC. Refer to the ACEC section for discussion of management guidelines for these two RCAs.
- In the remaining RCAs, a notice will be required for locatable mineral exploration and development (except casual use) for disturbances of five acres or less; a plan of operations will be required for disturbances of more than five acres.

2.18.2.5. Winter Range for all Wildlife

The following management actions for winter ranges will be implemented:

- Surface-disturbing activities will be intensively managed to prevent loss of significant elk winter habitat. This will entail case-by-case examination of proposals to determine potential adverse effects and appropriate mitigation to minimize those effects. Certain times of the year and certain areas will be avoided by spatial and temporal management of development, facilities, and uses.
- Oil and gas leasing will be allowed with application of surface protection measures as described above.
- Plans of operations or notices will be required for locatable mineral exploration and development (except casual use) consistent with regulations. A plan of operations will be required for disturbances of more than 5 acres.

- The BLM will cooperate with owners of intermingled or adjacent property to manage the habitat, coordinate efforts with the Wyoming Game and Fish Department (WGFD), and recommend managing elk population objective levels at a number supportable by the habitat.

2.18.2.6. White Pelican Island

The following management actions will be implemented:

- The BLM will develop a cooperative agreement with the WGFD and BuRec for management of the pelican habitat on the island. Management actions will be carried out with the concurrence of BuRec.
- The white pelican population will be monitored for disturbance and habitat change.
- General avian management principles will be adhered to.

2.18.2.7. Other Areas Important to Wildlife

Application of the Wyoming BLM Standard Mitigation Guidelines for Surface Disturbing Activities will be used to protect many types of areas of importance to wildlife. In addition, other special management practices will be used as appropriate to focus management emphasis on important resources or to minimize potential conflicts.

When considering needs for protective measures, the WGFD will be consulted concerning proposals involving surface disturbance and other disruptive activities in these important habitats. The BLM will also coordinate and cooperate with intermingled and adjacent landowners in managing these habitats.

Crucial winter ranges for all big game species will be protected. Surface disturbance will be mitigated to restore or replace habitat. In addition, previously depleted habitat in crucial big game winter ranges will be reclaimed to the extent possible.

In areas where crucial winter ranges for more than one species of big game overlap (approximately 122,880 acres of BLM administered public land), habitat quality will be maintained. Previously depleted habitat in these areas will be reclaimed to the extent possible. In addition, the BLM will employ spatial and temporal management of development, facilities, and users to avoid activity in sensitive areas or during sensitive times of the year.

Sage grouse and sharp-tailed grouse strutting/dancing grounds and nesting habitat will be protected by a ¼ mile buffer zone. No activities or surface use will be allowed on that portion of the authorization area (for surface disturbing activities) identified within (legal description) for the purpose of protecting sage grouse habitat. Exception, waiver, or modification of this limitation in any year may be approved in writing, including documented supporting analysis, by the Authorized Officer.

The BLM will consider consolidating public land to obtain important wildlife habitat areas such as (a) perennial streams, lakes and wetlands (USFWS also has identified this as a priority); (b) raptor concentration areas; (c) crucial winter range for bighorn sheep, elk, mule deer, or antelope; and (d) other high priority habitats.

2.18.2.8. Other

In addition to the actions outlined above, some management actions that will benefit wildlife are included in the discussions on management of ACECs, fire, forests, livestock grazing, coal, oil and gas, locatable minerals, and recreation.

As proposals are submitted, animal damage control (ADC) activities in the planning area, including the use of poisons that are lethal to vertebrate animals, will be considered. These activities are subject to established ADC procedures and policies, including NEPA requirements, as outlined in the national and State level memoranda of understanding between BLM and USDA Animal and Plant Health Inspection Service (APHIS), BLM manual 6830, and other directives. These activities are also subject to the Rawlins BLM District ADC Management Plan which is maintained current and consistent with those procedures and policies.

The *Wildlife Protection Plan of the Continental Divide/Wamsutter II EIS* (found in Appendix D of that document) provides guidance on avoiding and/or minimizing adverse impacts to wildlife. Although specific to the aforementioned project affected area, the guidance provided in this document is applicable to all wildlife mitigation actions and should be consulted for specie specific management actions.

2.19. SPECIAL MANAGEMENT AREAS

2.19.1. AREAS OF CRITICAL ENVIRONMENTAL CONCERN

These decisions apply only to the BLM-administered public lands within the boundaries of the ACECs. Most ACECs lie within checkerboard land ownership areas of the project area and consequently the practical implementation of management actions is difficult. The successful implementation of management actions identified in the MSA within BLM-administered public lands is dependent on cooperation between private landowners, Federal land agencies and the State of Wyoming.

The general management direction for each designated ACEC is described in this section. The only management actions presented here are for the specific resource management programs that directly pertain to the issues for each ACEC. Management actions for other programs in the ACECs will be guided by the general RMP decisions found in the other sections of the RMP. Management actions for ACECs include appropriate application of "*The Wyoming Mitigation Guidelines for Surface Disturbing and Disruptive Activities* (Appendix II)"and resource program-specific guidelines. More specific and detailed management prescriptions and monitoring requirements will be identified when activity plans are prepared for each ACEC.

The standards for healthy public rangelands, described in Appendix C, apply.

2.19.1.1. Como Bluff

The Como Bluff area (1,760 acres of public land) is designated an ACEC.

The objectives for management of the Como Bluff ACEC are to manage it in a manner that will maintain the integrity of the Como Bluff National Register District/National Natural Landmark, to preserve historically significant sites, and to allow for mineral development. The National Natural Landmark (NNL) will be managed for its paleontological resource and historical values.

An activity plan will be prepared to provide detailed guidance for management of the Como Bluff ACEC.

Cultural and Paleontological Resource Management

Within 1/4 mile of exposures of the Morrison Formation (a fossil-bearing formation) surface-disturbing activities will be intensively managed. Case-by-case examination of any proposed surface disturbing activity will be made to determine potential adverse effects and appropriate mitigation to minimize those effects.

Minerals Management

Oil and gas leasing will be allowed with intensive management of surface disturbing activities.

Plans of operations will be required for locatable mineral exploration and development (except casual use), regardless of the number of acres that may be disturbed.

2.19.1.2. Sand Hills

The Sand Hills area (about 8,300 acres of public land) is designated an ACEC.

The objectives for management of the Sand Hills ACEC are to protect the unique vegetation complex, maintain wildlife habitat values, minimize soil erosion, and promote recreational opportunities.

An activity plan will be prepared to provide detailed guidance for management of the Sand Hills ACEC.

Fire Management

The ACEC is designated a full fire suppression area with management options (i.e., restrictions may be placed on the use of standard full suppression firefighting techniques).

Minerals Management

Oil and gas leasing will be allowed with intensive management of surface disturbing activities.

Plans of operations will be required for locatable mineral exploration and development (except casual use), regardless of the number of acres that may be disturbed.

Off-Road Vehicle Management

Motor vehicle use will be limited to existing roads and trails. Rehabilitation and mitigation practices will be carried out in specific problem areas.

Vegetation/Soils Management

The unique vegetation complex of the Sand Hills area will be protected from sources of disturbance through intensive management of surface-disturbing activities.

Case-by-case examination of any proposed surface disturbing activity will be made to determine potential adverse effects and appropriate mitigation to minimize those effects.

Developments, uses, and facilities will be managed temporally (time of year) and spatially (space or distance) to avoid damage to the vegetation.

Wildlife Habitat Management

Inventories will be conducted to identify the location of existing roads and trails, areas that mule deer avoid because of human activities, and areas where soil disturbance and wind erosion are concentrated.

Action plans will be developed to mitigate the effects in identified mule deer behavioral avoidance zones and to rehabilitate concentrated soil disturbance and wind erosion.

Livestock Grazing Management

The unique plant/animal relationships require special consideration in the design of range improvements and grazing systems in the ACEC and adjacent areas. Focus on the unique values of the area may increase public awareness and use and require additional consideration to minimize people/livestock conflicts.

WSAs

Fuel management is essential in WSAs to avoid fires. This will require "light on the land" techniques because of their Class I VRM rating and non-impairment mandates.

2.19.1.3. Jep Canyon

The Jep Canyon area (about 13,320 acres of public land) is designated an ACEC.

The objectives for management of the Jep Canyon ACEC are to maintain the integrity of crucial winter habitat for elk, to maintain the productivity of nesting raptor pairs, to allow for development of oil and gas and coal, and to seek the cooperation of owners of adjacent property in management of the habitat.

An activity plan will be prepared to provide detailed guidance for management of the Jep Canyon ACEC.

Minerals Management

Oil and gas leasing will be allowed with intensive management of surface disturbing activities.

Plans of operations will be required for locatable mineral exploration and development (except casual use), regardless of the number of acres that would be disturbed.

Coal development will be permitted in the Jep Canyon ACEC with application of mitigation and protection requirements developed during the coal screening process (see Appendix F, Atlantic Rim).

Vegetation/Soils Management

Surface-disturbing activities will be intensively managed to prevent loss of significant habitat. This will entail case-by-case examination of proposals to determine potential adverse effects and appropriate mitigation to minimize those effects. Certain times, of the year and certain areas will be avoided by spatial and temporal management of development, facilities, and uses.

Livestock Grazing Management

The habitat requirements of the elk and raptors may place additional constraints on the design of range improvements and grazing systems.

2.19.1.4. Shamrock Hills Raptor Concentration Areas

The Shamrock Hills Raptor Concentration Area (RCA) (about 17,280 acres of public land) is designated an ACEC.

The objectives for management of this area are to maintain the productivity of nesting raptor pairs, to allow for development of coal and oil and gas, and to seek the cooperation of owners of adjacent property in management of raptor nesting habitat.

An activity plan will be prepared to provide detailed guidance for management of the Shamrock Hills ACEC.

Vegetation/Soils Management

Surface-disturbing activities will be intensively managed to maintain raptor-nesting habitat. This will entail case-by-case examination of proposals to determine potential adverse effects and appropriate mitigation to minimize those effects. Developments, uses, and facilities will be managed temporally and spatially to avoid certain times of the year and certain areas.

Minerals Management

Oil and gas leasing will be allowed with intensive management of surface disturbing activities.

Plans of operations will be required for locatable mineral exploration and development (except casual use), regardless of the number of acres in the ACEC that would be disturbed.

Coal development will be permitted in the Shamrock Hills ACEC with application of mitigation and protection requirements developed during the coal screening process (see Appendix F, Indian Springs and North Indian Springs).

Livestock Grazing Management

The vegetation communities and conditions required to support the large prey bases necessary for these areas preclude certain vegetation manipulation/improvement practices. The rodent populations place significant specific demands on the vegetation.

2.19.1.5. Seminoe Raptor Concentration Area

The Seminoe Raptor Concentration Area (RCA) was originally proposed for ACEC designation because of its historically high concentrations of nesting ferruginous hawks. Review of nesting activity in the Seminoe RCA from 1987 to 1990 determined that only one or two pairs of ferruginous hawks utilized the area for nesting habitat. The decline in ferruginous hawk use is believed to have occurred since the late 1970s following the decline of both prairie dogs and Richardson's ground squirrels inhabiting the area. Ferruginous hawk nests originally located in the 1970s and early 1980s are generally in poor condition. Many of the nests are merely stick remnants now.

For these reasons the Seminoe RCA will not be designated an ACEC. However, the area will continue to be monitored. In the event that populations of hawks and prey rebound in the future, management direction in the area will be reconsidered.

Livestock Grazing Management

The vegetation communities and conditions required to support the large prey bases necessary for these areas preclude certain vegetation manipulation/improvement practices. The rodent populations place significant specific demands on the vegetation.

2.20. REFERENCES FOR RAWLINS CHAPTER 2 OF THE MSA

SECTION 2.2 CULTURAL RESOURCES

- Cultural Resource Considerations in Resource Management, United States Department of the Interior, Bureau of Land Management, (Date: May 24, 2002)
- State Protocol Agreement Between the Wyoming BLM State Director and The Wyoming State Historic Preservation Officer, (Date: Final Version 04/15/99)

2.5 HAZARDOUS MATERIALS

- Rawlins Field Office (write-up from Rawlins Specialists), Comments on November 1990 Great Divide RMP on Hazardous Materials
- H-2101 Preacquisition Environmental Site Assessments, Manual Transmittal Sheet, US Department of the Interior, Bureau of Land Management, (Date: 8/17/00)
- CERCLA Response Action Handbook, Manual Transmittal Sheet, US Department of the Interior, Bureau of Land Management, (Date: 07-02-01)
- Hazardous Materials Management, Manual Transmittal Sheet, US Department of the Interior, Bureau of Land Management, (Date: 10/20/95)

2.6 LANDS AND REALTY

- The Land Policy and Management Act of 1976, as Amended, Bureau of Land Management, (Date: 2001)
- E-Mail message from Chuck Valentine, BLM Rawlins FO. " The revised area of lands identified for disposal is 48,493.27 acres. This figure is subject to further adjustments."
- Final KENETECH/PacificCorp Windpower Project Environmental Impact Statement, US Department of the Interior, Bureau of Land Management, Rawlins District (Date August 1995); Draft Document (Date: January 1995); ROD (Date: July 1997)
- Final, Addendum to Final Seawest/Kenetech Windfarm Development Comparison, Carbon County, Wyoming, Prepared fro Bureau of Land Management, Rawlins, Wyoming (Date November 1997)

2.7 LIVESTOCK GRAZING

- United States Department of the Interior, Bureau of Land Management, Transmittal of 4180 Rangeland Health Standards Manual Section and Handbook and Guidance for Conduction Watershed-Based Land Health Assessments (Date: January 19, 2001)
- Management Actions From Jeff Petty and Rawlins Staff Specialists
- Seven Lakes Grazing Environmental Statement, US Department of Interior, Bureau of Land Management, Rawlins District (no specific date indicated)
- Divide Grazing, Draft, Final and ROD/Environmental Impact Statement, US States Department of Interior, Bureau of Land Management, Rawlins District, Wyoming, (Date: 1983)

2.8 MINERALS

- Record of Decision, Environmental Impact Statement Continental Divide/Wamsutter II Natural Gas Project, Sweetwater and Carbon Counties, Wyoming, US Department of Interior, Rawlins and Rock Springs Field Offices (May 2000)
- Rawlins Field Office (write-up from Rawlins Specialists) Information on Deep Gas, Coal Bed Methane, Oil and Gas Appendix, and other information on Drilling

2.10 PALENONTOLOGY

- Historic, Cultural, and Paleontological Resources E-mail

2.11 RECREATION RESOURCES

- Rawlins Field Office (write-up from Rawlins Specialists) Recreation, Wilderness, VRM, WSR, Accessibility, & SRMA Comments on November 1990 Great Divide RMP
- Reasonably Foreseeable Developments in Recreation & Wilderness. (WRITE-UP FROM Rawlins Specialist)

2.13 TRANSPORTATION AND ACCESS

- Right-of-Way Management – Land Use Planning, United States Department of the Interior, Bureau of Land Management (Date: June 25, 2002)

2.14 VEGETATION

- Rawlins Field Office (write-up from Rawlins Specialists) Noxious Weed Prevention Plan
- Pamphlet: Noxious Weeds A Growing Concern, You Can Help Stop Their Spread
- Executive Order #13112, Invasive Species and Noxious Weeds
- Summary of the Analysis of the Management Situation, Lakeview Resource Area Resource Management Plan, US Department of the Interior, Bureau of Land Management (Date: July 2000)
- Rawlins Field Office (write-up from Rawlins Specialist) Rare Plant Program Management Situation Analysis Comments for the Rawlins FO RMP
- United States Department of the Interior, Bureau of Land Management, Issuance of BLM (Wyoming) Sensitive Species Policy and List (Date: April 9, 2001)

2.15 VISUAL RESOURCES

- VRM Bulletin Class I and WSAs, Recreation, Wilderness, VRM, WSR, Accessibility, & SRMA Comments on November 1990 Great Divide RMP

2.18 WILDLIFE AND FISHERIES

- Rawlins Field Office (write-up from Rawlins Specialist) Summary Report
- Existing Great Divide Resources Area Record of Decision and Approved Resources Management Plan (RMP)
- Rawlins Field Office (write-up from Rawlins Specialist) Fisheries Program Management Situation Analysis Comments from the Great Divide RMP
- Fish and Wildlife 2000: A Plan for the Future, Bureau of Land Management
- Summary of Accomplishments, Colorado Rive Cutthroat Trout, Inter-Agency Five Year Management Plane (1993-1997)

- Conservation Agreement and Strategy for Colorado River Cutthroat Trout (oncorhynchus clarki pleuriticus) in the Stats of Colorado, Utah, and Wyoming, March 1999
- Colorado River Cutthroat Trout Inter-Agency Five Year Management Plan (1993-1997) Green River Westside Tributary Enclave
- Fisheries Habitat Management on Public Land: *A Strategy for the Future*, US Department of Interior, Bureau of Land Management (Date: January 1989)

2.19 SPECIAL MANAGEMENT AREAS

- Rawlins Field Office (write-up from Rawlins Specialist) ACEC
- Notes from Raptor Concentration Areas Discussion and Comments on November, 1990 Great Divide RMP
- Rawlins Field Office (write-up from Rawlins Specialists) Recreation, Wilderness, VRM, WSR, Accessibility, & SRMA Comments on November 1990 Great Divide RMP
- Reasonably Foreseeable Developments in Recreation & Wilderness. (write-up from Rawlins Specialist)

Tables/Figures

Chapter 3

Chapter 4

Table 2.6-1 Withdrawl Summary

Type of Withdrawal	Acreage[1]
Existing Withdrawals [2 3]	
Administrative Sites (BLM)	93
Administrative Sites (FS)	720
Reclamation (BuRec)	73,290
Wildlife Refuges	3,915
Air Navigation Sites (FAA)	440
Public Water Reserves[4]	46,095
Oil Shale	564,758
Coal Withdrawals	610,170
Power Sites[5]	5,150
Stock Driveways[5]	263,258
New Withdrawal Initiatives[2]	
Encampment Campground	10
Coral Creek Campground[6]	20
Bennett Peak Campground	20
Teton Reservoir Campground[6]	160
Pryor Flats Campground[6]	40
Dugway Recreation Sites[6]	320
Fort Washakie Stage Station	640
Big Creek Proposed Recreation Site	5
Jelm Mountain Proposed Recreation Site	10

Table 2.6-1 Withdrawl Summary

ABBREVIATIONS: BLM = Bureau of Land Management, U.S. Department of the Interior; BuRec = Bureau of Reclamation, U.S. Department of the Interior; FAA = Federal Aviation Administration; FS = Forest Service, U.S. Department of Agriculture; FWS = Fish and Wildlife Service, U.S. Department of the Interior.

[1] Due to overlaps, acreages are not additive.

[2] Except for powersites and stock driveways, these withdrawals segregate the land against operation of the public land laws and from mineral location under the 1872 General Mining Law.

[3] These withdrawals are scheduled for future review. The recommendations from the reviews will be arrived at on a case-by-case basis. It is possible that portions of the Bureau of reclamation withdrawals may be revoked, returning the lands to the jurisdiction of the BLM.

[4] The original public water reserve withdrawals included segregation against the location of nonmetalliferous minerals. Withdrawal review reports completed in 1982 revealed that this segregation is unnecessary to protect the water sources. Public Water Reserve 107 also said that all water sources existing on the date of the withdrawal order were protected and withdrawn even if they were not noted to the official records. Therefore, 4,850 acres of previously unrecorded water sources are included.

Public water reserves withdrawn under Secretarial Order 107 and other classification orders will be reviewed to determine if they meet the retention requirements of legal opinions of the solicitor of the Department of the Interior and the agreement made between the state of Wyoming and the Department of Justice (for the Department of the Interior) regarding the adjudication of water rights. Withdrawals will be terminated on public water reserves that do not meet retention requirements.

[5] These withdrawals segregate the land against operation of the public land laws but not the 1872 General Mining Law.

[6] These withdrawal initiatives would replace segregations previously established with C&MU classification

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Table 2.8-1 Acreages with Seasonal and Surface Disturbance Restrictions

Type of Area	Estimated Acreage
Steep slopes	320,000
Riparian areas and/or perennial surface water	140,000
Historic Trails	43,0000
VRM Class I and Class II areas	194,000
Existing and proposed recreation sites	560
North Platte River SRMA (1/4 mile on either side of river	3,550
Sage grouse leks	22,900
Sage grouse wintering range	Acreage not available
High priority wildlife habitat	240,000
Raptor concentration areas	60,000
Raptor wintering range	Acreage not available
Baggs crucial winter range for elk	79,000
Overlapping big game crucial winter range	122,880
Wild and Scenic Areas	68,074

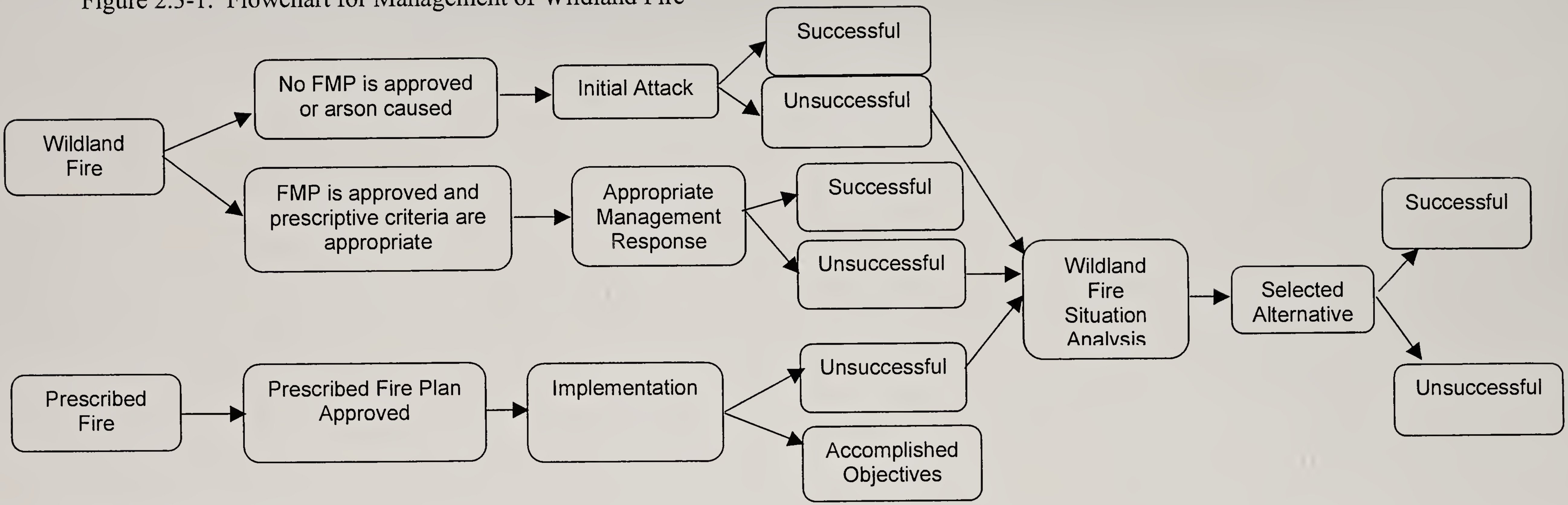
Note: The above acreages are estimates based on the best available information and may not include all reasons for the restrictions. They are intended to give the reader a concept of the area involved. Some acreage may overlap. Seasonal restrictions to protect wildlife during crucial periods will be applied to about 1.4 million acres. This acreage includes raptor concentration areas, sage grouse and sharp-tailed grouse nesting habitat, and big game crucial winter range and birthing areas. It overlaps with some of the acreages listed above.

Table 2-18-1. Ranking of Standard Habitat Types

HIGH PRIORITY	MODERATE PRIORITY	LOW PRIORTY[1]
Open aquatic	Greasewood-sagebrush-rabbitbrush	Short grasslands
Riparian grassland	Big sagebrush-rabbitbrush	Saltbush steppe
Willow-waterbirch riparian	Bitterbrush	Greasewood
Aspen riparian	Sagebrush-mixed grass	Badland
Mountain shrub	Silver sagebrush steppe	True sand dunes
Utah juniper	Lodgepole pine	Upland Meadows
Quaking aspen	Limber pine	
Aspen conifer	Early successional conifer	
Ponderosa pine/Douglas-fir	Rockland	
Platte Valley rockland	Saline sub-irrigated grassland	
Laramie Peak rockland		
Wet forested meadow		

Note: Ranking is based on the wildlife communities (total species, number of breeders, number of rare species) combined with the availability of each type.
[1] High priority habitats are those that require intensive management actions (data collection, enhancement, protection) to maintain their productivity as diverse wildlife communities; moderate-priority habitats are those that require less intensive management to maintain their productivity as wildlife communities; low-priority habitats are those that can be more heavily used by conflicting resources so that the higher priority wildlife habitats can be maintained.

Figure 2.3-1. Flowchart for Management of Wildland Fire*



Explaination of the Flowchart*
There are two types of fire: Prescribed Fire and Wildland Fire.

Prescribed Fire*
A Prescribed Fire is any fire ignited by management actions to meet specific objectives. A written and approved prescribed fire plan must exist, and NEPA requirements must be meet, prior to ignition. The plan must be implemented as written and approved.

The prescribed fire is successful if objectives were accomplished. If one or more of the prescriptive criteria are exceeded, or in the estimation of the Burn Boss are about to be exceeded, the prescribed fire is unsuccessful and a WSFA is completed. Initial attack should be initiated immediately rather than wait for the WSFA analysis and decision. Note that this process does not relieve prescribed fire plans of the requirement for an embedded contingency plan.

Wildland Fire*
The flowchart depicts two paths, depending on whether an approved FMP exists and whether a person caused the fire is subject to fire trespass.

No approved FMP exists or the fire is subject to trespass: The fire is wildfire and initial attack is initiated. However, common sense still applies and safety and cost of suppression should be designed into all suppression actions. If initial attack is successful, no further action is required. If initial attack is unsuccessful, a WFSA will be prepared to evaluate management strategies and select the appropriate strategy. This process is continued until the fire is out. Under this scenario, wildfires cannot be managed to achieve natural resource management objectives.

Approved FMP exists, the fire is not subject to trespass, and prescriptive criteria in the FMP are appropriate under the current circumstances: This scenario provides for natural resource benefits to be achieved through the appropriate management response(s) as identified in the FMP. The full range of management options are available, based on existing policy. I.e., safety of firefighters and the public clearly remain the number one priority, whereas the value of property and natural resources at risk must be clearly identified and evaluated in order to select the appropriate actions. If the appropriate management response is successful, no further action is required. If response fails, a WFSA is completed and additional management actions are implemented until the fire is out.

Chapter 3

Chapter 4

3.0 EXISTING ENVIRONMENT

In this chapter, the existing environment of the Rawlins Resource Management Plan Planning Area (RMPPA) is characterized. While all environmental resources are described to some degree, emphasis is placed on those resources that are managed by the BLM or on which BLM's management actions have some influence. Further, emphasis is placed on those resources that are or are anticipated to be impacted by one or more of the management alternatives to be potentially implemented by the BLM in response to changes in land use.

To facilitate ease of reference by the reader, the sections below are arranged alphabetically, except that Special Management Areas are presented at the end of the chapter. This alphabetical arrangement is supported by cross–referencing, as needed, in those instances where a resource has not been preceded by the resources that support it ecologically.

3.1. AIR RESOURCES

3.1.1. CLIMATE

The climate of the Rawlins RMPPA is classified as semi-arid steppe with areas of mid-latitude highland or alpine (Trewartha & Horn, 1980; Martner, 1986).

Steppe climate is characterized by large seasonal variations in temperature (cold winters and warm summers) and precipitation that is slight but still sufficient for the growth of short sparse grass. The dryness of the mid-latitude steppe climate of southeast Wyoming is due to its distance from the Pacific Ocean, the main source of precipitable water for North America. This aridity is further intensified by the Sierra Nevada and Rocky Mountains that block the eastward flow of humid coastal air. Also, annual rainfall amounts can vary greatly from year to year.

Mountainous areas within the Rawlins RMPPA are classified as alpine. Alpine climate is characterized by large varieties of local climates, depending on altitude and slope exposure, but is generally a similar and cooler version of nearby lowland climate

(Trewartha and Horn, 1980). Temperature and precipitation vary as a function of several factors, including season, time of day and elevation.

Weather stations in the Rawlins RMPPA include stations located in Rawlins in Carbon County and Centennial in Albany County, Wyoming. Rawlins is at an elevation of 6,736 feet and is in the western part of the Rawlins RMPPA. Centennial is at an elevation of 8,140 feet and is in the southeastern part of the Rawlins RMPPA. Meteorological data available for Rawlins from 1951 through 2000, and for Centennial from 1948 through 2000 form the basis of the climate characterization below.

3.1.1.1. Temperature

Diurnal (morning to night) and seasonal (summer to winter) ranges in temperature are greater in valleys than on slopes (Martner 1986). Mean annual temperatures range from 43 degrees Fahrenheit (°F) in Rawlins to 40°F at Centennial. Mean maximum summer temperatures are 80°F in Rawlins, and 74°F in Centennial. Mean minimum winter temperatures are 14°F in Rawlins and Centennial. Figure 3.1-1a shows mean monthly temperatures at Rawlins and Centennial (Western Regional Climate Center).

The mean maximum monthly temperatures in Rawlins and Centennial show a slight warming in Rawlins (Figure 3.1-1b), and a very slight cooling over a similar period in Centennial (Figure 3.1-1c; Western Regional Climate Center).

3.1.1.2. Precipitation

High elevations generally experience greater amounts of precipitation than lower elevations. Mean annual precipitation is 9 inches in Rawlins and 14.5 inches in the higher elevation Centennial. Mean annual precipitation ranges from 5 inches in dry years to 13 inches in wet years in Rawlins. Mean annual precipitation in Centennial ranges from 9 inches in dry years to 20 inches in wet years (Western Regional Climate Center).

Figure 3.1-2a shows mean monthly water content of precipitation in Rawlins and Centennial. Mean monthly precipitation varies from 0.5 to 1.4 inches throughout the year in Rawlins, while precipitation in Centennial varies from 0.8 to 1.7 inches in Centennial (Western Regional Climate Center).

Mean total snowfall is 4.3 feet in Rawlins and 9.5 feet in Centennial, with most snow occurring from November through April. Figure 3.1-2b shows mean monthly winter snowfall to range from 7 to 8 inches in Rawlins, and from 15 to 20 inches in Centennial (Western Regional Climate Center).

The mean monthly water content of precipitation in Rawlins and Centennial since 1951 shows a very slight precipitation increase (<0.3 inch) in most months in Rawlins (Figure 3.1-2c), and a variable pattern in Centennial (Figure 3.1-2d). The mean annual total water content of precipitation in Rawlins and Centennial for the same periods (Figure 3.1-2e) shows a very slight increase in precipitation in Rawlins, and an extremely slight decrease in Centennial (Western Regional Climate Center).

3.1.1.3. Dispersion

Atmospheric stability is a measure of the atmosphere's capacity to disperse pollutants. Although stability data are not available for the Rawlins RMPPA, they are available for Rock Springs, Wyoming (about 100 miles west of Rawlins). Figure 3.1-3 shows that mean annual dispersion at Rock Springs is very strong to moderate less than 20 percent of the time, weak to very weak about 20 percent of the time, and fair more than 60 percent of the time (BLM 1999a).

3.1.1.4. Wind Velocity

Wind speed and direction are highly variable due to the affect of local topography in the Rawlins RMPPA. Annual average wind speed in Rawlins is 12 miles per hour (Martner 1986), and annual wind direction is generally from the northwest, west or southwest.

Wind data are often presented graphically by a "wind rose", which shows the occurrence frequency of wind speeds and wind directions. Figure 3.1-4 shows wind roses for Rawlins and Centennial, Wyoming. Figure 3.1-4a shows that winds in Rawlins are relatively strong and are generally from the west and west-southwest (BLM 1999a). In mountainous areas like Centennial, local topography can strongly affect wind direction, particularly at night and under low wind speed conditions (Figure 3.1-4b).

3.1.2. AIR QUALITY

3.1.2.1. Air Quality Regulations

The basic framework for controlling air pollutants in the United States is mandated by the 1970 Clean Air Act and its amendments, and the 1999 Regional Haze Regulations. The Clean Air Act addresses criteria air pollutants, State and national ambient air quality standards for criteria air pollutants and the Prevention of Significant Deterioration program. The Regional Haze Regulations address visibility impairment.

3.1.2.1.1 Pollutants

Air Pollutants addressed in this study include criteria pollutants, hazardous air pollutants (HAP) and sulfur and nitrogen compounds, which could cause visibility impairment or acid rain.

Criteria Pollutants

Criteria pollutants are those for which national standards of concentration have been established. Pollutant concentrations greater than these standards represent a risk to human health. Criteria pollutants include carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), ozone (O_3), particulate matter (PM_{10}, $PM_{2.5}$), and lead (Pb).

Carbon Monoxide

CO is an odorless, colorless gas formed during any combustion process, such as operation of engines, fireplaces, and furnaces. High concentrations of CO affect the oxygen-carrying capacity of the blood and can lead to unconsciousness and asphyxiation. Wildfires are natural sources of CO.

Nitrogen and Sulfur Compounds

NO_2 is a red-brown gas formed during operation of internal combustion engines. Such engines emit a mixture of nitrogen gases, collectively called nitrogen oxides (NO_x). NO_2

can contribute to brown cloud conditions, and can convert to ammonium nitrate particles and nitric acid, which can cause visibility impairment and acid rain. Bacterial action in soil can be a natural source of nitrogen compounds.

SO_2 forms during combustion from trace levels of sulfur in coal or diesel fuel. It can convert to ammonium sulfate ($(NH_4)_2SO_4$) and sulfuric acid (H_2SO_4), which can cause visibility impairment and acid rain. Volcanoes are natural sources of SO_2.

Sulfur and nitrogen compounds that can be deposited on terrestrial and aquatic ecosystems include nitric acid (HNO_3), nitrate (NO_3^-), ammonium (NH_4^+), and sulfate (SO_4^{--}). Nitric acid (HNO_3), and nitrate (NO_3^-) are not emitted directly into the air, but form in the atmosphere from industrial and automotive emissions of nitrogen oxides (NO_x). Sulfate (SO_4^{--}) is formed in the atmosphere from industrial emission of sulfur dioxide (SO_2). Deposition of HNO_3, NO_3^- and SO_4^{--} can adversely affect plant growth, soil chemistry, lichens, aquatic environments, and petroglyphs. Ammonium (NH_4^+) is associated with feedlots and agricultural fertilization. Deposition of NH_4^+ can affect terrestrial and aquatic vegetation. While deposition may be beneficial as a fertilizer, it can adversely affect the timing of plant growth and dormancy.

Ozone

O_3 is a faintly blue gas that is generally not emitted directly into the atmosphere, but is formed from NO_x and volatile organic compound (VOC) emissions. As stated above, internal combustion engines are the main source of NO_x. Volatile organic compounds, like terpenes, are very reactive. Sources of VOC include, but are not limited to, paint, varnish and some types of vegetation. The faint acrid smell common after thunderstorms is due to ozone formation by lightning. O_3 is a strong oxidizing chemical that can burn lungs and eyes, and damage plants.

Particulate Matter

Particulate matter (e.g., soil particles, hair, pollen, etc.) is essentially small particles suspended in the air that settle to the ground slowly and may be re-suspended if disturbed. Separate allowable concentration levels for particulate matter are based on the relative size of the particle:

- PM_{10}, particles with diameters less than 10 micrometers, are small enough to be inhaled and can cause adverse health effects.
- $PM_{2.5}$, particles with diameters less than 2.5 micrometers, are so small that they can be drawn deeply into the lungs and cause serious health problems. Particles in this size range are also the main cause of visibility impairment.

Before the wide use of unleaded fuel for automobiles, lead particles were emitted from tailpipes. Lead is not considered in this EIS because no proposed projects are expected to emit lead.

Hazardous Air Pollutants

There are a wide variety of hazardous air pollutants (HAPs) including N-hexane, ethylbenzene, toluene, xylene, formaldehyde, and benzene. Although HAPs do not have Federal standards, they may have "significance thresholds" established by some states and are typically evaluated for potential chronic inhalation and cancer risks.

Hazardous air pollutant emissions are associated with industrial activities, such as oil and gas operations, refineries, paint shops, dry cleaning facilities, and wood working shops.

3.1.2.1.2. Wyoming and National Ambient Air Quality Standards

Wyoming Ambient Air Quality Standards (WAAQS) and National Ambient Air Quality Standards (NAAQS) set the absolute upper 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. State standards must be equally or more strict than Federal standards.

The EPA has developed standards for each criteria pollutant for a specific averaging time (Table 3.1-1). Short averaging times (1, 3, and 24 hours) address short-term exposure while the annual standards address long-term exposure. Longer-term standards are set to lower allowable concentrations than are short-term standards to recognize the cumulative effects of long-term exposure.

3.1.2.1.3. Prevention of Significant Deterioration

The goal of the Prevention of Significant Deterioration (PSD) program is to ensure that air quality in areas with clean air does not significantly deteriorate, while maintaining a 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 Indian reservations, are accorded the strictest protection. Only very small incremental increases in concentration are allowed in order to maintain the very clean 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 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.

The incremental increases allowed for specific pollutants in Class I and Class II areas are provided in (Table 3.1-2).

PSD Class I areas within the Great Divide region include the Savage Run Wilderness Area. Sensitive Class II areas include the Medicine Bow National Forest. The Great Divide project area is also classified as PSD Class II (Figure 3.1-5).

Comparisons of potential NO_2 and SO_2 concentrations with PSD increments are intended only to evaluate a threshold of concern and do not represent a regulatory PSD Increment Consumption analysis. Regulatory PSD Increment Consumption analyses are solely the responsibility of the State of Wyoming, which has been granted primacy under the Clean Air Act.

3.1.2.1.4. Regional Haze Regulations

Visibility impairment in the form of regional haze obscures the clarity, color, texture and form of what we see. Haze-causing pollutants (mostly fine particles) are directly emitted to the atmosphere or are formed when gases emitted to the air form particles as they are carried downwind. Emissions from human-caused and natural sources can be carried great distances contributing to regional haze.

Visual range, one of several ways to express visibility, is the furthest distance a person can distinguish a dark landscape feature from a light background like the sky. Without human-caused visibility impairment, natural visual range is estimated to average about 150 miles in the western United States and about 70 miles in the eastern United States.

The Regional Haze Regulations were developed by the EPA in response to the Clean Air Act Amendments of 1990. They are intended to maintain visibility on the least impaired days and improve visibility on the most impaired days in mandatory Federal Class I areas across the United States, so that visibility in these areas is returned to natural conditions by the year 2064. These regulations require states to submit a regional haze State Implementation Plan (SIP) and progress reports to demonstrate reasonable progress toward the 2064 goal.

3.1.2.2. Air Quality Characterization

Elements of air quality addressed in this analysis include concentrations of air pollutants, visibility, and atmospheric deposition.

3.1.2.2.1. Pollutant Concentrations

Pollutant concentration refers to the mass of pollutant 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). Air quality in the Rawlins RMPPA is considered excellent, however, current and complete criteria air pollutant concentration data for the RMPPA area are not available. The State of Wyoming has used monitoring to determine that the Rawlins RMPPA region is in compliance with Wyoming and National Ambient Air Quality Standards. Concentrations of criteria air pollutants are shown in Table 3.1-3 for the Rawlins RMPPA region.

Carbon Monoxide

Carbon monoxide data were collected in Colorado in conjunction with the proposed oil shale development in the 1980's. Because CO data are generally collected only in urban areas where automobile traffic levels are high, recent data are often unavailable for rural areas.

Nitrogen Dioxide

Nitrogen dioxide data were collected at the Carbon County Underground Coal Gasification site in 1994 and 1995. Although more recent NO_2 data are not available, monitoring of other nitrogen-containing pollutants shows concentrations at Centennial and Rocky Mountain National Park of nitric acid (HNO_3), nitrate (NO_3), and particulate ammonium (NH_4) are fairly low and are not increasing over time.

The Clean Air Status and Trends Network (CASTNet) has measured concentrations of nitrogen-containing pollutants (nitric acid, nitrate and ammonium), as well as sulfur-containing pollutants (sulfur dioxide and sulfate) and ozone, in the United States since the late 1980's. There are three CASTNet stations in Wyoming (Centennial, Yellowstone National Park and Pinedale) and several stations in Colorado, including one at Rocky Mountain National Park. CASTNet data are available for Centennial from 1990 through 1999, and for Rocky Mountain National Park from 1995 through 1999.

Figure 3.1-6 shows mean annual concentrations of nitrogen-containing pollutants in Centennial and Rocky Mountain National Park. Mean annual concentrations of HNO_3 are less than 0.6 ppb at Centennial (Figure 3.1-6a), and less than 1 ppb in Rocky Mountain National Park (Figure 3.1-6b). Nitric acid concentrations typically range from 0.02 to 0.3 ppb in remote areas, and from 3 to 50 ppb in urban areas (Seinfeld 1986). Although nitric acid concentrations are well below urban levels, concentrations are slightly above levels typical in remote areas.

Mean annual concentrations of NO_3^- are less than 0.25 ppb at Centennial and less than 0.4 in Rocky Mountain National Park. Nitrate concentrations are typically about 0.2 ppb in remote areas and 1 ppb in urban areas (Stern, 1973). Although nitrate concentrations are well below urban levels, concentrations in Rocky Mountain National Park are above levels typical in remote areas.

Mean annual concentrations of NH_4^+ are 0.3 ppb in Centennial and 0.4 ppb in Rocky Mountain National Park. Ammonium concentrations are typically 0.3 ppb in remote areas and 1.4 ppb in urban areas (Stern, 1973).

The Wyoming Air Resources Monitoring System (WARMS) has measured concentrations of nitrate and particulate ammonium, as well as sulfur dioxide and particulate sulfate, in Wyoming since 1999. There are five WARMS stations in Wyoming: Centennial, Buffalo, Sheridan, Newcastle, and Pinedale. Figures 3.1-7a and 3.1-7b, respectively, show that weekly concentrations in Centennial of NO_3^- are below 1.5 $\mu g/m^3$, and concentrations of NH_4^+ are below .5 $\mu g/m^3$.

Because the chemistry of nitrogen-containing pollutants is very complex, it would be inappropriate to infer NO_2 concentrations from concentrations of HNO_3, NO_3^-, and NH_4^+. But it would be unlikely that high NO_2 concentrations would occur with low concentrations of other nitrogen-based pollutants.

Sulfur Dioxide

Sulfur dioxide data were collected at the La Barge study area in the 1980s. More recent SO_2 data, as well as SO_4^{--} data, were collected by CASTNet in Centennial and Rocky Mountain National Park, and WARMS in Centennial.

Figure 3.1-8 shows mean annual CASTNet concentrations of SO_2 and SO_4^{--} in Centennial and Rocky Mountain National Park. Concentrations of SO_2 are about 0.5 ppb in Centennial, and less than 0.7 ppb in Rocky Mountain National Park. Sulfur dioxide concentrations typically range from 1 to 10 ppb in remote areas, and from 20 to 200 ppb in urban areas (Seinfeld, 1986). Sulfur dioxide concentrations in Centennial and Rocky Mountain National Park are consistent with concentrations typical of remote areas.

Mean annual concentrations of SO_4^{--} are below 1 ppb in Centennial and Rocky Mountain National Park. Sulfate concentrations are typically about 0.6 ppb in remote areas, and about 2.5 ppb in urban areas (Stern, 1973). Although sulfate concentrations are well below urban levels, concentrations in Centennial and Rocky Mountain National Park are slightly above levels typical in remote areas.

Figures 3.1-9a and 3.1-9b, respectively, show weekly WARMS concentrations of SO_2 and SO_4 from mid 1999 through 2001 in Centennial to be less than 1 .5 $\mu g/m^3$, while SO4 concentrations are also less than 1.5 $\mu g/m^3$, but closer to that value. It would be inappropriate to compare weekly WARMS concentrations directly with mean annual concentrations.

Although it would not be appropriate to compare mean annual CASTNet SO_2 concentrations with national or Wyoming standards, the CASTNet and WARMS concentrations do suggest that SO_2 concentrations in Centennial and Rocky Mountain National Park are still well below the NAAQS and WAAQS.

<u>Ozone</u>

O_3 data are collected by the CASTNet stations at Pinedale, Centennial, and Rocky Mountain National Park. Figure 3.1-10 shows mean annual O_3 concentrations in Centennial and Rocky Mountain National Park have remained steady from 1989 through 1999, and are typical for remote areas in the western United States (Singh, et al. 1978).

<u>Particulate Matter</u>

Particulate matter (PM_{10}) data were collected at the Carbon County Underground Coal Gasification site in 1994 and 1995. Fine particulate matter ($PM_{2.5}$) data were estimated at one half PM_{10} concentrations as recommended by EPA. Mean annual PM_{10} concentrations were 24 percent of the NAAQS and WAAQS, and mean annual $PM_{2.5}$ were 40 percent of the NAAQS.

3.1.2.2.2. Visibility

The Inter-Agency Monitoring of Protected Visual Environments (IMPROVE) has measured visibility in national parks and wilderness areas in the United States since the 1980's. There are six IMPROVE aerosol monitoring stations in Wyoming: Brooklyn Lake (near Centennial), Bridger Wilderness (near Pinedale), Yellowstone National Park, North Absaroka Wilderness (near Dead Indian Pass), Cloud Peak, and Thunder Basin. The best visibility monitored in the contiguous United States is at the Bridger Wilderness station in western Wyoming. 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, about a 10 percent change in light extinction.

Monitored aerosol concentrations are used to reconstruct visibility conditions for each day monitored, ranked from cleanest to haziest, and divided into three categories:

- 10 percent cleanest: mean visibility for the 10 percent of days with the best visibility,
- average: the annual median visibility,
- 10 percent haziest: mean visibility for the 10 percent of days with the poorest visibility.

Figure 3.1-11 shows annual visibility in Rocky Mountain National Park from 1988 through 1998. Visibility on the 10 percent cleanest days varies from 6 to 4 dv (visual range of about 130 to 160 miles). Average visibility varies from 8 to 10 dv (about 80 to 100 miles). Visibility for the 10 percent haziest days varies from 12 to 14 dv (about 50 to 60 miles). Trend analysis of Rocky Mountain National Park visibility data reveals no significant trend of worsening visibility from 1989 through 1998.

3.1.2.2.3. Atmospheric Deposition

Atmospheric deposition refers to the processes by which air pollutants are removed from the atmosphere and deposited on terrestrial and aquatic ecosystems, and is reported as the mass of material deposited on an area (kilogram per hectare). Air pollutants are deposited by wet deposition (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 acid (H_2SO_4) and nitric acid (HNO_3); this acid deposition is sometimes referred to as acid rain,
- air toxics: such as pesticides, herbicides and volatile organic compounds (VOCs),
- nutrients: such as nitrate (NO_3^-) and ammonium (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, which, in turn, varies with elevation and time.

Wet Deposition

The National Atmospheric Deposition Program (NADP) assesses wet deposition by measuring the chemical composition of precipitation (rain and snow). There are 8 NADP stations in Wyoming. Figure 3.1-12 shows the precipitation pH in the Snowy Range and South Pass City from 1987 through 2000. The natural acidity of rainwater is generally considered to be represented by a range of pH values from 5.0 to 5.6 (Seinfeld, 1986).

Mean annual pH in the Snowy Range and South Pass City was below this range from 1987 through 1989, indicating acidification of precipitation during that period. Mean annual pH ranged from 4.9 to 5.1 during the years from 1990 through 2000.

Figure 3.1-13 shows mean annual wet deposition of ammonium (NH_4^+), nitrate (NO_3^-) and sulfate (SO_4^{--}) at the Snowy Range and South Pass City NADP stations. Wet ammonium deposition values are low: below 2 kg/ha in the Snowy Range and below 1 kg/ha in South Pass City.

Wet deposition of both nitrate and sulfate at the Snowy Range station is elevated. Wet nitrate deposition ranged from 3 to 13 kg/ha, and wet sulfate deposition ranged from 3 to 10 kg/ha (Figure 3.1-13a).

Wet deposition of both nitrate and sulfate is low at South Pass City. Wet deposition of both nitrate and sulfate are below 4 kg/ha at South Pass City (Figure 3.1-13b). Deposition values from 1985 through 2000 are low and steady, indicating that deposition has not worsened during that time.

Dry Deposition

Dry deposition refers to the transfer of airborne gaseous and particulate material from the atmosphere to the Earth's surface. CASTNet measures dry deposition of sulfur dioxide (SO_2), nitric acid (HNO_3), sulfate (SO_4), nitrate (NO_3), and ammonium (NH_4). Figure 3.1-14 shows mean annual dry deposition of sulfur- and nitrogen-containing compounds for Centennial (from 1991 through 1999) and Rocky Mountain National Park (from 1995 through 1999).

Dry deposition values in Centennial are low and steady for all pollutants except HNO_3. Dry nitric acid deposition ranged from 3.5 to nearly 4.5 kg/ha. Dry deposition for other pollutants is less than 1 kg/ha.

Dry deposition values in Rocky Mountain National Park were also low and steady for all pollutants except HNO_3. Dry nitric acid deposition ranged from 4.6 to 5.7 kg/ha.

3.1.3. SUMMARY OF EXISTING AIR QUALITY

Air quality monitoring and dispersion modeling show that air quality in the Rawlins RMPPA region is generally good (Table 3.1-4).

3.2. CULTURAL RESOURCES

Cultural resources, defined as nonrenewable remains of past human activity, are protected under the following legislative mandates: National Historic Preservation Act of 1966, the Archaeological Resources Protection Act, the American Indians Religious Freedom Act, the Native American Graves Protection and Repatriation Act, and the National Trails System Act of 1968, as well as FLPMA and NEPA. Executive Order 13007, issued by President Clinton on May 25, 1996, requires the Federal government to take positive steps to identify and manage places and values that are of importance to Native American people for sacred and religious reasons. Departmental and BLM guidance, especially the Programmatic Agreement (PA) between the BLM, the Advisory Council on Historic Preservation, and the National Council of State Historic Preservation Officers, and its corollary protocol between the BLM and the Wyoming State Historic Preservation Officer (W-SHPO), requires that certain procedures be followed prior to authorizing Federally licensed, funded, or assisted undertakings.

Procedures required to comply with these Federal mandates include some level of inventory to identify historically, archaeologically, and/or culturally significant resources. Federal agencies are also required to assess the potential effects of their actions upon these resources. An array of measures may be implemented to ameliorate or mitigate adverse effects that an undertaking may have upon these resources, which generically are referred to as “cultural resources”.

Over the past ____[1]years, approximately ____ cultural resource properties have been discovered in the Rawlins RMPPA. As of ____, cultural resources inventories had been conducted on approximately ____ percent (____ square miles) of the public lands within the Rawlins RMPPA. The following sections present a general overview of cultural resources in the Rawlins RMPPA. The history of human occupation in the Rawlins RMPPA, which began approximately 12,000 years ago, is presented in two, slightly overlapping categories, the Prehistoric and Historic Periods.

3.2.1. PREHISTORY

The prehistoric period began with the first human occupation of the area approximately 12,000 years ago and lasted into the late eighteenth century or early nineteenth century. The period is defined by an absence of written records, and predates extensive contact between Native Americans and Euro-Americans (BLM 1987). Inventory data as of _____ indicates that approximately ______ cultural resource properties in the Rawlins RMPPA date to the prehistoric time period. Of these ____ cultural resource properties, ____ are listed on or have been determined to be eligible for listing on the National Register of Historic Places. The BLM has found, in conjunction with the W-SHPO, that _____ of these properties meet National Register criteria and _____ do not, while the eligibility of ____ properties is undetermined. Based on data from recorded sites, the percentages of various types of prehistoric cultural resources are: _____ (__%), _____ (__%), _____ (____%), _____ (__%), ____ (__%), and _____ (__%). These resources are found especially along ____ and on _____, with the greatest concentrations in the _____, _____, and _____ portions of the Rawlins RMPPA.

Native Americans in Wyoming were nomadic tribes known as the Plains Indians. They included the Arapaho, Arikara, Bannock, Blackfeet, Cheyenne, Crow, Gros Ventre, Kiowa, Nez Perce, Sheep Eater, Sioux, Shoshone and Ute tribes. The tribes did not settle within the Rawlins RMPPA; instead, they passed through during hunting and gathering expeditions. Summer camps were typically located on ridges to avoid insects, while winter camps were located in riparian areas where topography provided shelter and wood

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[1] *Throughout this section, information is needed from BLM and was requested on 27 March 2002.*

was more available. Some of the more recent locales can be identified by tepee rings which are a relatively recent phenomenon, occurring within the last 100 years. The area was considered to be sacred, and medicinal ingredients and wood for hunting bows were frequently gathered here.

Lithic scatters, stone circle features, petroglyphs and pictographs, game drive lines, hearths and firepits, lithic material quarries, and rock shelter sites recovered from the Rawlins RMPPA and dating to the prehistoric period indicate that the period was characterized by a relatively stable, nomadic way of life (ANG 2000). House pits have also been discovered in the Rawlins RMPPA, indicating that some locations were used for more extended periods of time, most likely during inclement seasons. Interpretation of cultural resources found in the Rawlins RMPPA has shown that the Native Americans were nomadic hunters and gatherers who lived and traveled in small bands. Seasonal changes in the availability of resources dictated their movements. Nonperishable artifacts, such as stone tools, pottery, bone, and charcoal, have been recovered from prehistoric sites within the area (BLM 1987).

3.2.2. HISTORY

3.2.2.1. Historical Context

Beginning in the late 1700s, increasing amounts of contact between Native Americans and Euro-Americans catalyzed the transformation from the prehistoric to the historic period. The beginning of the historic period is generally considered to coincide with the arrival of well-organized fur trading expeditions into the region in the early 1800's.

The historic period is characterized by early Rocky Mountain fur trading; early military explorations; transcontinental emigration; Indian wars; gold, silver, and copper mining; open-range livestock grazing; transcontinental railroading; and energy exploration. Inventory data as of _____ indicate that approximately ______ cultural resource properties in the Rawlins RMPPA date to the historic time period. Of these ____ cultural resource properties, ____ are listed on or have been determined to be eligible for listing on the National Register of Historic Places. The BLM has found, in conjunction with the

W-SHPO, that _____ of these properties meet National Register criteria and _____ do not, while the eligibility of ____ properties is undetermined. Based on data from recorded sites, the percentages of various types of historic cultural resources are: _____ (_%), _____ (__%), _____ (___%), _____ (__%), ____ (__%), and _____ (__%). These resources are found especially along ____ and on _____, with the greatest concentrations in the _____, _____, and _____ portions of the Rawlins RMPPA.

3.2.2.2. Early Exploration

In 1825, the Ashley-Smith Expedition entered Carbon County, followed by John C. Fremont in 1843. Led by Jim Bridger, the Stanbury Expedition passed through the region in 1849 along a route that later became known as the Overland Trail (BLM 2002).

3.2.2.3. Transportation

Historic transportation corridors are the primary type of historical resource known in the Rawlins RMPPA. The first tracks across Wyoming were Native American trails connecting villages with hunting grounds. Starting in the early 1800s, the early explorers, settlers, hunters and trappers often crossed the area, refining these dim trails into an established travel network. Figure 3.2-1 provides a map of historic trails and associated points that are located within the Rawlins Field Office.

In response to news of the 1848 gold strike in California, several groups of Cherokee left Oklahoma for California. The first known party to cross southern Wyoming on the way to California in 1849, led by Lewis and Evans, pioneered the Cherokee Trail. Their route crossed the Laramie Plains and the Red Desert, connecting with the Oregon-California trail at the junction of Hams Fork and Blacks Fork Rivers. In 1850, four separate companies of Euro-Americans and Cherokees followed a second route across the extreme southern portion of Wyoming, dipping into Colorado on their way to Fort Bridger along the Oregon Trail.

The Cherokee Trails are not well marked. They involve private lands as well as Forest Service and BLM-managed public lands. The trail generally entered Wyoming south of Laramie and pioneered routes across the Laramie Plains and Red Desert in passing toward western Wyoming where they joined the Oregon/California Trail. Within the Rawlins RMPPA, the trail appears to have followed three main routes. The northern branch of the Cherokee Trail was first used in the 1840s to provide access to otherwise inaccessible areas. Segments of the northern branch later became the Overland Trail of the 1860s. Segments of the southern branch of the trail near Baggs, Wyoming were used as freight routes serving all of northwestern Colorado and southwestern Wyoming. These freight routes were later replaced by the Denver and Rio Grande Railroad. The Cherokee Trail was never used as a major migratory emigrant route across Wyoming, and the Overland Trail replaced the Cherokee trail as the main thoroughfare from 1862 until 1869, when the transcontinental railroad was completed (BLM 1999). The BLM and the W-SHPO have determined that the Cherokee Trail meets the criteria for eligibility on the National Register.

In the early 1850s, the Overland Trail was forged by explorers in an attempt to identify a route shorter than the Oregon Trail between Fort Bridger and the Laramie Range. The trail enters Wyoming southeast of Laramie, passing northwest around the Medicine Bow Mountains and then westward through Bridger Pass at the north end of the Park Range. Its route was shorter and safer than that of the Overland Stage, and it was also used by many emigrant parties (ANG 2000). Six segments of the trail that remain relatively intact have been determined by the BLM and the W-SHPO to meet the eligibility criteria for the National Register. Visible wheel ruts measuring less than 1.7 meters apart presumably were made by horse-drawn wagons. The Washakie Stage Station, one of the few remaining stage stations along the Overland Trail at which there are standing ruins, consisted of a main building with attached corral and shed. The Washakie Stage Station was listed on the National Register of Historic Places in 1978. The native sandstone walls of the main building (constructed in 1862) are still standing, and a foundation or footing for the shed is discernable. The area surrounding the Washakie Stage Station contains sites that could provide information about Native American/Euro-American contact in the 1860s.

First established in 1878, the Rawlins to Fort Washakie Stage Road opened a corridor from south central to northwestern Wyoming and served military, commercial, and public interests. In 1906, the northwestern railway line from Casper to Lander was constructed. Consequently, freight commerce along the stage road declined, but private vehicles continued to use the stage road as a transportation corridor. Telegraph lines linking Rawlins, Fort Washakie, and Lander were constructed in the 1880s, and the stage road route became a communications corridor. The present condition of the trail varies with location. The BLM and the W-SHPO have determined that the trail meets the National Register criteria for eligibility.

The Texas Trail runs north to south along the eastern border of the Rawlins RMPPA. In the 1860s, cowboys drove their great herds of cattle north along the old Texas Trail to the grass-rich prairies of eastern Wyoming.

The Pacific Railroad Act of 1862 made construction of a transcontinental railroad possible. At that time, wagon trails provided the only accessible route across the country. Construction of the transcontinental railroad took six years and 20,000 men, most of them immigrants from China and Europe. The railroad was built entirely by hand. In 1868, construction of the Union Pacific Railroad reached Wyoming. Pushing west through Wyoming was exhausting and treacherous. A 650-foot bridge spanning Dale Creek had to be constructed. The longest trestle on the line, it rose 150 feet up from the bottom of the canyon, swayed in the wind and was terrifying to cross. Weather was a constant opponent as well. West of Cheyenne, one encounters some of the most inclement weather in the country (Internet: uprr 2002).

Constructed between 1919 and 1924, the Lincoln Highway traversed the Rawlins RMPPA, making transcontinental automobile travel a reality along a route that would become U.S. Highway 30 (US-30) and, finally, present day Interstate 80 (I-80) (BLM 1999).

3.2.2.4. Settlement

In an effort to make overland trails safe for travel, a series of forts was constructed along the major trails. Due to the improved safety for Euro-Americans from the presence of the forts and associated U.S. Cavalry, as well as the increasing number of travelers in the area, the number of permanent ranches and settlements in Wyoming increased, while numbers of Native Americans decreased. (ANG 2000). During the late nineteenth and early twentieth centuries, settlements sprang up around coal resource developments for the railroad and grazing land for sheep and cattle.

Settlement increased after 1868, when the Union Pacific Railroad reached the area, spurring the local economy by encouraging mining and lumbering. As the railroad construction advanced west, the end-of-track tent towns evolved into permanent communities, and new communities sprang up all along the railroad. Vast coal fields discovered in the area supplied fuel for the locomotives, and created jobs that attracted a varied ethnic population to the area. Homesteaders and entrepreneurs soon found their way into southern Wyoming bringing farming, shops, newspapers, saloons, churches, and schools. Cheyenne, Laramie, and Rawlins became major railroad towns providing shipping and supply services for surrounding ranches and industries.

In 1868, the town of Carbon, Wyoming was established by the Union Pacific Railroad as the first coal mining town on the main Union Pacific line. The Wyoming Coal and Mining Company initiated mining operations, which later were taken over by the Union Pacific Coal Company. In 1899, Union Pacific surveyors found an easier grade through present day Hanna. Most coal mining shifted to the Hanna area around 1900, when coal deposits at Carbon were depleted. In 1902, the town of Carbon was abandoned.

The railroad promoted growth of the livestock industry, and large ranches sprang up before 1880. Huge ranching operations were established, with land holdings measured in thousands of sections. The Swan Land and Cattle Company, headquartered in Cheyenne and Chugwater, once ran cattle from central Wyoming to west-central Nebraska (Internet: tracksacrosswyoming 2002). Large-scale sheep grazing began in the late 1800s (BLM 2002). Sheep ranches prospered near Rawlins. Historic sites that might be expected in the area include historic homesteads, ranches, major ranch facilities, shearing pens, lambing pens, corrals, windmills, ditches, and stock ponds (BLM 1999).

In 1869 the twenty-member Territorial Legislature approved a revolutionary measure stating: "That every woman of the age of twenty-one years, residing in this Territory, may at every election to be holden under the law thereof, cast her vote." Women kept vigil outside Governor John A. Campbell's office until he signed the bill into law. Wyoming's first female ballot was cast in 1870. The next year Wyoming's women sat on juries (Internet: womenofthewest 2002).

3.2.2.5. Oil and Gas Development

The presence of oil in the region was known throughout the 19th century, but it was not until the early 20th century that oil production in central Wyoming became truly profitable. At the turn of the century, oil and later natural gas slowly emerged as important local industries and became leading employers in the area.

3.2.2.6. Economic Development and Government Programs

Land grants to the railroads and the Homestead Act for farmers and ranchers, which were initiated by the Republican Party during the Lincoln administration, had enormous impact on settlement in the area. Land grants and loans made by the Federal government to the Union Pacific Railroad led to the creation of the Wyoming Territory. The Homestead Act, which became law on Jan. 1, 1863, allowed anyone to claim a 160–acre parcel of land. Each homesteader had to live on the land, build a home, make improvements, and farm for five years before they were eligible to become owner of the parcel.

Overgrazing became a major concern in the area in the 1920s, and small ranchers required increasing amounts of land to run a profitable operation. The Taylor Grazing Act of 1934 based the amount of public land that could be leased on the amount of land the rancher owned. At the same time, agricultural prices were depressed in the years following World War I.

Wyoming had entered the Union as a Republican state in 1890. Wyoming has traditionally been a Republican state, and the Democratic party had its greatest success within Wyoming as a result of the Depression of 1893 and again during the Great Depression of 1929. During the early years of the Great Depression, the amount of private investment reaching the West dwindled, and consequently the area turned to the Federal government for revenue. In the 1930s, in a change of political leaning, Wyoming turned to the Democratic Party to solve the State's fiscal problems. The New Deal programs of the Democratic Party provided more funds to the western United States than to any other region. New Deal policies, however, were controversial within Wyoming because direct Federal involvement resulted from the arrival of Federal funds.

Currently, Wyoming's economic well–being is centered around three industries: minerals extraction, tourism and agriculture. Important minerals mined from the State include coal, natural gas, sodium carbonate-bicarbonate, and bentonite. Selling livestock and livestock products accounts for about three-fourths of farm income. Within Wyoming, cattle make up almost four-fifths of that amount. Wyoming also holds the second largest number of sheep in the United States (Internet: senate.gov 2002).

3.2.2.7. Ethno-history

Native American tribes represented in the Rawlins RMPPA include Arapaho, Arikara, Bannock, Blackfeet, Cheyenne, Crow, Gros Ventre, Kiowa, Nez Perce, Sheep Eater, Sioux, Shoshone, and Ute tribes. These tribes historically considered the area to be sacred. They traveled through the area during hunting and gathering expeditions but did not historically settle here. As a result, none of the tribes have claimed the area. The closest reservation is the Wind River Reservation, located 15 miles northwest of Lander on Hwy 287. This reservation is inhabited by the Shoshone and Northern Arapaho tribes.

In some cases, it is appropriate for the BLM to consult with Native American traditional elders to identify resources that may be important to the people they represent. Management of locations important for religious or sacred purposes, or “respected places,” identified by traditional elders is a developing process, and specific management prescriptions are not well established at present.

In the late 1800s, Chinese railroad workers and later coal miners worked along the Union Pacific railroad from Laramie to Evanston. The 1870 United States Census records show that in southwest Wyoming, specifically Uinta and Sweetwater Counties, all the Chinese listed were employed as railroad laborers at either stations or at section camps. Within the Rawlins RMPPA, both Sweetwater and Carbon Counties had large populations of

Chinese. In the years between 1868 and 1885, the Chinese contributed much to the development of southern Wyoming, but they were also subjected to intense racial prejudice (Internet: wwc 2002).

Due to its diverse ethnic population, the political behavior of Sweetwater County has traditionally been an anomaly in the State. The county briefly experimented with Populism in the 1890s, then moved towards Socialism at the end of the century, and finally settled on the Democratic Party in the 1920s. Other counties within the Rawlins RMPPA, including Albany, Carbon, and Laramie, have traditionally supported Republican candidates, as noted previously.

3.3. FIRE

Fire in the Rawlins RMPPA falls under two categories: unplanned and planned. Unplanned fires are those that occur as the result of an act of nature, such as lightening, or occur as human accident or intent to cause damage. Planned fire is used for beneficial purposes, such as clearing of vegetation, in a controlled manner under a specific prescription or planned effort. Over the past 100 years, fire has been suppressed extensively in the Rawlins RMPPA, causing the general build-up of vegetative fuels and deadwood. Also, extremely dry conditions over the past few years have made vegetation less resistant to fire.

3.3.1. SOURCES OF FIRE

3.3.1.1. Unplanned Fire

Lightening is the primary natural cause of fire. Lightning accounts for most of the fires within the Rawlins RMPPA and natural ignitions are widespread.

All of the human-caused fires are widespread and no pattern exists to enable planning for future unplanned fire problems. The majority of human-caused fires have been located along the I-80 and railroad corridors. Historically, wildfires have also occurred in camping and wood-cutting areas from accidental ignition from fireworks, campfires and machinery. Fireworks and railroad associated causes have the highest occurrence.

3.3.1.2. Planned Fire

Planned fires are used effectively in the Rawlins RMPPA to control the buildup of fuels, to rejuvenate areas where woody vegetation has become decadent, and to set back local succession so that diverse patches of habitat are present. Burns also tend to open the timber so that more grasses and forbs are available and areas are sufficiently open to be used by foraging wildlife. In addition, fire provides a mechanism for controlling plant diseases such as insect and parasitic plant invasions. For example, large acreages of sagebrush that had become decadent were burned in the Muddy Creek drainage. In addition, aspen gradually succeeds to lodgepole pine in the absence of fire. This type of successional takeover is common throughout the Rawlins RMPPA.

3.3.2. DISTRIBUTION OF FIRE

3.3.2.1. Types of Vegetation Susceptible to Fire

Fires along the I-80 and railroad corridors have primarily occurred in sagebrush and grassland communities. Fires in wooded areas generally involve conifer species, such as lodgepole and limber pine. Aspen is not as susceptible to fire as conifers. In wooded areas, dead and down timber or standing timber with high loading value because of the lack of fire in the past and dry weather conditions can result in unplanned fires burning out of control.

3.3.2.2. Distribution of Fire in the Rawlins RMPPA

Fire in the Rawlins RMPPA is widespread with concentrations along the I-80 and railroad corridors. Areas with improved campgrounds or popular unimproved areas also show some concentration. Fires caused by lightning are more widespread and have fewer concentration areas. The locations of planned fires are carefully selected so that fire will benefit the ecosystem and be appropriately contained and controlled.

3.4. FORESTRY

Forested areas within the field office boundaries are mainly located within two mountainous areas: Shirley Mountain located in the north and Elk Mountain located in the south. There are also a number of forested areas located on the fringe of the Forest Service boundaries (Figure 3.4-1). Acreage of forest area within the field office is small when compared with the total area. Total forested acres managed by the BLM within the Rawlins RMPPA are 1,483,203, or 13.2 percent of the total area.

The condition or health of forest stands varies by location. The general absence of large fires over the past 80 years, however, has made forests more susceptible to disease, and increased the amount of deadwood on the forest floor. In addition, species such as lodgepole pine have not experienced the natural regenerative properties of fire. Conifers are encroaching on aspen stands, limiting aspen regeneration. There has also been a decline in timber harvesting over the past decade, allowing for additional build-up of overall biomass.

3.4.1. SHIRLEY MOUNTAIN FOREST

The Shirley Mountains are a relatively isolated mountain range in the northern portion of Carbon County in south-central Wyoming. They are located entirely within the Rawlins RMPPA and contain a mixture of BLM-managed public lands and private land parcels. The Shirley Mountains provide a diversity of resource values and uses (such as forests, wildlife habitat, recreational opportunities, minerals, watershed, livestock grazing, communication sites, and cultural resources). Forested land within the field office's jurisdiction encompasses approximately 25,600 acres.

The condition of forest resources in the Shirley Mountain Forest is discussed below by forest type. Due to differences in forest harvest practices, the condition of BLM-managed public parcels and private parcels that have been timbered differs markedly. Not only is diversity low from the standpoint of relative acreage in the different forest types, it is also low from the standpoint of diversity within different successional stages for all of these forest types. This is primarily due to the lack of stand-replacing disturbances for the past 80 years.

3.4.1.1. Lodgepole Pine Forest

Comprising approximately 9,860 acres, the lodgepole pine forest type is the result of past, stand-replacing wildfires, dating from the 1860s to the 1910s. This forest type is generally healthy, but will decline in vigor and productivity as the forest becomes more over-mature. Also, there are some insect and disease concerns that may compromise future health. Infestations of pine beetle and dwarf mistletoe are apparent. Current age class distribution is unbalanced heavily toward the mature age class, reflecting the long period since the last fires. Another concern is the present lack of late-successional lodgepole pine forests. Any future wildfire disturbance has the risk of reverting the entire forest type back to early-successional forests.

3.4.1.2. Spruce-Fir Forest

The major species component of the spruce-fir forest type is subalpine fir, with occasional Engelmann spruce. This forest type is found on only about 330 acres. Additionally, this forest type is even-aged and fairly young, considering the longevity of Engelmann spruce and subalpine fir. Also, spruce-fir exists as small, isolated stands away from the large acreages of dense lodgepole pine and have the same origin date as their neighboring stands. Old, remnant lodgepole pine trees are not found in these stands. The occurrence of the spruce-fir forest type is probably a result of less intense wildfire in their particular area and available seed source. There is an established understory (more than 50 trees per acre) of young subalpine fir seedlings and/or saplings on about 5,877 acres of lodgepole pine forest. These forested areas will convert to subalpine fir forests, but this may take 100 years or more, and will only occur if there are no wildfires.

3.4.1.3. Aspen Forest

Comprising about 810 acres, the aspen forest type is also not well represented in the area. Because aspen are found mostly on steep, rocky slopes or in low wet areas, opportunities for management are limited. Also, conifer invasion is occurring in most of the aspen stands, which could result in further reductions in aspen presence. Barring any major surface disturbance (e.g. fire, mechanical treatment, etc.), the majority of the aspen stands will eventually be replaced by conifers, but are not anticipated to convert within the next

20 years. Aspen is a minor component in over one third of the lodgepole pine stands. Removal of the conifers would promote aspen regeneration.

3.4.1.4. Woodland Forest

The majority (14,600 acres) of the forested land is in the woodland forest type, with the most common tree species being limber pine. Juniper woodlands also occur. The trend in this type is toward gradually increasing tree density, as existing vegetation modifies site conditions and allows seedlings to establish in previously open areas. This "filling in" will increase crown cover and reduce forage for wild and domestic ungulates.

3.4.2. ELK MOUNTAIN FOREST

Elk Mountain is located in the southeast quarter of Carbon County just north of the Medicine Bow National Forest. The BLM administers approximately 5,670 acres of forested land in this area.

Forest types in this area change with respect to elevation. In the subalpine zone at 9,000 to 11,000 feet, Engelmann spruce and subalpine fir are dominant. Below this level, lodgepole pine is almost exclusive to the area. Below the lodgepole pine is an area of mixed lodgepole pine and Douglas fir. The foothills of Elk Mountain are predominantly covered by aspen, limber pine, scattered ponderosa pine, some Douglas fir, and lodgepole pine. More productive forest stands are located on the areas with north to northeast aspects. Stands that occur on the west and south slopes are not as productive.

Forests on Elk Mountain are not in good condition. Past cutting practices, often in the form of high grading, along with past insect epidemics and fire suppression have resulted in a deteriorating forest resource on Elk Mountain on both public and private land. Many acres have had poor natural regeneration. Dwarf mistletoe occurs on all coniferous species on Elk Mountain with considerable damage appearing in lodgepole pine. The condition of forest resources in the Elk Mountain Forest is discussed below by forest type.

3.4.2.1. Lodgepole Pine Forest

Within the Rawlins RMPPA, 1,083 acres fall within the lodgepole pine forest type. The majority of lodgepole stands have reached their recommended rotation age of 100 years, thus growth has slowed. There are patches that are in a severely deteriorated condition. Virtually all of the lodgepole stands owe their origin to fires that occurred in the 1800s. Because of this, extensive even-aged stands, many of which are overcrowded, are present. Lodgepole pine is generally considered a long-lived seral species, with subalpine fir and Engelmann spruce being the eventual climax species. Situations do exist, however, where seral species remain on site, rather than being replaced by normal climax species. In such a situation, the lodgepole pine would be considered as the climax tree species.

The Douglas fir forest type is generally found in association with lodgepole pine in this area on the lower reaches of the mountain. Many of these trees are residual trees from prior stands.

3.4.2.2. Spruce-Fir Forest

Subalpine fir and Engelmann spruce are generally becoming established under much of the lodgepole pine, following forest succession into a climax forest. There are even large areas where subalpine fir comprises a large portion of the over story.

Engelmann spruce occupies a mixed conifer forest with subalpine fir, the latter being the first species to grow. Spruce stands comprise approximately 2,486 acres.

3.4.2.3. Aspen Forest

Aspen occupy wet draws and drainages on Elk Mountain. Aspen stands generally provide an over story for subalpine fir seedlings, with the probability that the stand will eventually reach a spruce-fir climax condition. Many of the aspen stands are disease-ridden and of poor quality.

3.4.2.4. Woodland Forest

Limber pine occupies the more exposed and harsh sites through the area. The drier south-facing slopes on Elk Mountain are often covered with widely spaced limber pine. In some locations, the limber pine appears to be invading sagebrush-covered meadows, competing successfully with the deep-rooted sagebrush. After the limber pine has been established on a site for several decades, a desirable environment for other tree species such as lodgepole pine seems to have developed, and the species composition of the site changes.

3.5. GEOLOGY, TOPOGRAPHY, AND MINERALS

This section describes the geologic and mineral resources found within the Rawlins RMPPA. Information provided in this section is specific to the planning area and includes geologic history, structural geology and tectonics, a description of geologic units, and topography. A discussion is also included on leaseable, locatable, and salable minerals found within the RMPPA. Unless otherwise noted, information for this section is based on the Draft Mineral Occurrence and Development Potential Report, which was prepared in support of this planning process.

3.5.1. GEOLOGY

3.5.1.1. Geologic History

3.5.1.1.1. Cambrian Through Mississippian Periods

During the Cambrian through Mississippian Periods (about 550 to 330 million years ago), present-day Wyoming and much of the Rocky Mountain west were located along a fairly stable continental shelf (Lageson and Spearing 1991). The area was generally inundated by shallow seas, and fluctuations in sea level resulted in the deposition or erosion of sediments. The rocks that were deposited on this shallow continental shelf were the result of numerous changes in sea level referred to as transgressions (relative rise in sea level) or regressions (relative falling of sea level or movement of coastlines seaward). Changes in sea level also caused many deposits to be eroded, resulting in unconformities, or gaps, in the rock record. The limestone, dolomite, and shale deposited from Cambrian to Mississippian are typical of rocks that were originally deposited in a shallow marine environment. Within the Rawlins RMPPA, sedimentary Ordovician and Silurian rocks are present only as xenoliths in diatremes that may been emplaced in Silurian or Devonian time (Boyd 1993).

3.5.1.1.2. Pennsylvanian-Permian Periods

The Pennsylvanian through Permian Periods occurred about 330 to 240 million years ago). The sandstones of the Pennsylvanian Period represent an influx of sediment due to the uplift of the ancestral Rocky Mountains (Mallory 1972). Erosion from the uplifts resulted in the deposition of the Tensleep Sandstone and equivalents across the Rocky Mountain region. Locally, in the Laramie and Denver-Cheyenne Basins, the Fountain Formation is composed of clastic debris shed from the Ancestral Rockies. The Permian rocks indicate alternating shallow marine to continental environments as indicated by the shale, limestone, and anhydrites in the Phosphoria and Goose Egg Formations and Satanka Shale (Boyd 1993).

3.5.1.1.3. Triassic-Jurassic Periods

The Triassic through Jurassic Periods occurred about 240 to 140 million years ago. Shallow marine conditions appear to have been predominant in early Triassic Period with deposition of the Dinwoody Formation, which lacks the organic-rich material that was available during deposition of the Phosphoria Formation. Conditions in the later Triassic Period changed greatly compared with earlier Triassic. During much of the late Triassic and Jurassic Periods, the Wyoming shelf was emergent and many of the deposits were terrestrial in origin typified by the red beds and evaporites of the Chugwater Group (Picard 1993). In the western part of the planning area, the Nugget was deposited in late Triassic mainly in an eolian (wind-blown) environment as sand dunes. The Sundance Formation deposits are representative of a transgressive-regressive sequence during later Jurassic. The Canyon Springs Sandstone Member was deposited during the advance of the sea onto the Wyoming shelf (Picard 1993). At the end of the Jurassic, terrestrial conditions predominated resulting in the Morrison Formation, which is characterized by stream deposits that were laid down on an alluvial plain.

3.5.1.1.4. Lower Cretaceous Period

During the lower Cretaceous Period (about 140 to 100 million years ago), a feature known as the Western Interior Seaway developed from the Gulf of Mexico to the Arctic Ocean (McGookey et al. 1972). During the Cretaceous there were numerous episodes of transgressions and regressions that resulted in the deposition of thousands of feet of sedimentary rock. The lower part of the Cloverly Group (Dakota Conglomerate) was deposited in alluvial fan and fluvial environments on the western shore of the seaway (Steidtmann 1993). Following the deposition of the Dakota Conglomerate, the first major Cretaceous transgression began, resulting in the deposition of the marginal marine Fall River Sandstone then the Thermopolis-Skull Creek Shales. A regression followed that resulted in the deposition of the widespread Muddy Formation.

3.5.1.1.5. Upper Cretaceous-Tertiary Periods

The Upper Cretaceous through Tertiary Periods occurred about 100 to 15 million years ago. At the close of the lower Cretaceous Period, sea level rose and the Mowry Shale was deposited. The Frontier Formation resulted from several transgression-regression cycles and from west to east grades from fluvial to marine (Steidtmann 1993). The near shore and transitional marine deposits of the Frontier Formation in the western parts of the planning area grade to the east into the Graneros Shale and Greenhorn Limestone, which represent shallow marine conditions. After the Frontier, the Niobrara transgression resulted in the deposition of the marine Carlile, Niobrara, Steele Shale sequence (McGookey et al. 1972). Following the Niobrara Transgression, a regressive sequence was deposited composed of sandstone and shale that were deposited in near-shore and marginal marine environments (Steidtmann 1993). In the western part of the planning area, this regressive sequence is called the Mesaverde Group. To the east, however, the Mesaverde equivalents, the Pierre Shale and associated sandstones, are marine in origin. The last major Cretaceous transgression resulted in the deposition of the Lewis Shale.

Within the Lewis Shale are sandstones and siltstones that were deposited in marine and transitional marine environments (Van Horn and Shannon 1989).

Near the end of the Cretaceous, mountain building began west of the Green River Basin in the area of the western Wyoming-eastern Idaho Thrustbelt. As the mountains were uplifted, erosion occurred and sediment was shed into the shallow Cretaceous seaway. In the planning area, the uppermost Cretaceous units are the Lance and Medicine Bow Formations, which are composed of alluvial plain deposits marking the end of the Cretaceous (Lilligraven 1993). Also at the end of the Cretaceous and the beginning of Tertiary time, another episode of mountain building was occurring in the area. This episode of mountain building is referred to as the Laramide Orogeny (Lageson and Spearing 1991). The uplift of the Precambrian basement occurred in the structural style described above; movement of Precambrian basement blocks along low- to high-angle reverse faults. This period of mountain building resulted in the mountain ranges of the Southern and Middle Rocky Mountains. The uplifted blocks of basement rock were eroded and the sediment was deposited resulting in the Fort Union, Wasatch, Ferris, Hanna, and Wind River Formations. As mountain building subsided, the area of the Green River Basin became a large lake. Sediments associated with this lake are represented by the Green River Formation in the western part of the Rawlins RMPPA. The Green River Formation contains abundant fossils and organic-rich rock referred to as oil shale.

In later Tertiary Period (Oligocene to Miocene Epochs), large volcanic eruptions occurred to the west and north of the area. Prevailing winds carried the ash aloft over an extensive area and thick layers of ash were deposited as a result of these eruptions. These ash deposits are found in the White River Formation. Also in later Tertiary time, one more episode of uplift occurred, again resulting in the deposition of material in the basins resulting in the Browns Park, North Park, Ogallala, and Arikaree Formations. Erosion of the Tertiary deposits by the end of Tertiary and the beginning of Quaternary resulted in the emergence of the present-day topography. The “Gangplank” in Laramie County is an erosional remnant of Tertiary rock and is evidence that by late Tertiary, the Rocky Mountains were nearly buried in debris that had been shed from them (Blackstone 1996).

Erosion along the mountain fronts has removed the mantle Tertiary deposits in most places, resulting in abrupt changes in elevation along the mountain fronts.

3.5.1.1.6. Quaternary Period

During the Quaternary Period (about 15 million to the present in terms of geologic time), there were several episodes of glaciation. Evidence of the several glaciations is exhibited in the Medicine Bow Mountains and Sierra Madre. Valley glaciers and icecaps over the mountain ranges probably began to recede about 15,000 years ago (Knight 1990). The glacial deposits consist of lateral moraines, end moraines, and glacial outwash deposits that were laid down during successive glacial episodes. Small glacial lakes were formed in the Snowy Range in the core of the Medicine Bow Mountains. Continued erosion of the mountain ranges has resulted in the deposition of alluvial and terrace deposits in the basins.

3.5.1.2. Structural Geology and Tectonics

The Laramie and Medicine Bow Mountains and Sierra Madre are composed of Precambrian rocks that have been uplifted by low- to high–angle reverse faults. These major mountain ranges are typical of the nature of the predominant structural style found in mountain ranges of Wyoming, Colorado, Utah, and the Beartooth Mountains of Montana. The cores of the ranges contain Precambrian rocks that have been uplifted many thousands of feet through movement on low-angle to high-angle reverse faults. The nature of the faulting in these mountain ranges was first postulated by Berg (1961) based on the structure of the Wind River Mountains. He described the main fault as a low-angle reverse fault or thrust fault based on seismic records. The exact geometry of the thrust is more complicated than the first proposed model, and the Precambrian wedge on the west flank of the mountain range is probably highly fractured (Berg 1983). These mountain ranges are unique to the Western Hemisphere in structural style (Grose 1972).

In addition to the major mountain ranges, there are smaller scale uplifts with Precambrian cores within the planning area such as the Ferris, Seminoe, and Shirley Mountains, and the Rawlins Uplift. The Rawlins Uplift is an asymmetric anticline bounded by a reverse fault on the west. An anticline is a geologic structure in which the rocks have been folded in a convex upward shape (Gary and others 1974). The Ferris, Seminoe, and Shirley Mountains are uplifted Precambrian blocks that were originally part of the Sweetwater Uplift that also was uplifted during the Laramide Orogeny. Later in Tertiary time the uplift subsided (Blackstone 1971). The Ferris and Seminoe Mountains are bounded on the north by normal faults that mark the boundary of the south side of the Granite Mountains, the remnants of the subsided Sweetwater Uplift (Mears et al. 1986). This type of subsided block is called a graben.

In addition to major faults at the boundaries of the mountain ranges and smaller uplifts, there is a major shear zone in the Rawlins RMPPA called the Cheyenne Belt. The Cheyenne Belt is a series of southwest to northeast trending fault blocks that cut through the Precambrian rocks of the Sierra Madre, the Medicine Bow Mountains, and the Laramie Mountains (Houston 1993). The Cheyenne Belt separates metamorphic sedimentary rocks on the north side from largely igneous rocks to the south of the belt.

On the west side of the Rawlins RMPPA are sub-basins on the eastern edge of the Greater Green River Basin called the Washakie and Great Divide Basins. The Washakie and Great Divide Basins are separated by a structural high called the Wamsutter Arch that generally trends from west to east paralleling Interstate 80. The Washakie Basin is bounded on the south by another west to east trending structural high called the Cherokee Arch. The Cherokee Arch lies generally along the Wyoming-Colorado state line and separates the Washakie Basin from the Sand Wash Basin in northwest Colorado (Law 1995). Other smaller basins entirely within the Rawlins RMPPA include the Hanna, Shirley, and Laramie Basins. In the southeast part of the Rawlins RMPPA is the Denver-Cheyenne Basin that occupies northeast Colorado, southwest Nebraska, and southeastern corner of Wyoming. Within these basins are anticlines commonly along the basin margins. These anticlines are generally asymmetric, faulted at depth, and provide traps for hydrocarbons.

3.5.1.3. Description of Geologic Units

The rocks in the Rawlins RMPPA range in age from Precambrian to Recent deposits. In the eastern Green River Basin, at the western edge of the Rawlins RMPPA, the total thickness of sedimentary rock above the Precambrian is about 30,000 in the Washakie Basin (Kent 1972). The Hanna Basin contains a thick sequence of post Precambrian rocks that is estimated to be greater than 42,000 feet (Law 1995). Precambrian rocks are generally exposed in the cores of the mountain ranges and smaller uplifts such as the Rawlins uplift. In southeastern Wyoming in the northwest portion of the Denver-Cheyenne Basin, the sedimentary rock section is slightly more than 10,000 feet thick (Kent 1972). Paleozoic, Mesozoic, and Cenozoic rocks are exposed throughout the Rawlins RMPPA.

The major structural elements of the Rawlins RMPPA are shown in Figure 3.5-1. Exposed across the Rawlins RMPPA are rocks that range in age from Precambrian to Quaternary. The Precambrian rocks that are exposed in the mountain ranges are complex assemblages of igneous and metamorphic rocks (Houston 1993). Cambrian rocks are present in the west and northwest portion of the Rawlins RMPPA (Boyd 1993). There are no widespread rocks representing Ordovician through Devonian; however, there is evidence that rocks of the Ordovician and Silurian were present, but were eroded at a later time. The Mississippian System is represented by the Madison Limestone and the Darwin Sandstone in the western portion of the Rawlins RMPPA, but the Mississippian rocks thin from west to east until they are absent east of the line from Centennial, Wyoming to northwest Laramie County (Boyd 1993). Pennsylvanian rocks in the Rawlins RMPPA consist of the Amsden Formation, the Tensleep Sandstone, the Casper Formation, and the Fountain Formation. In the western part of the Rawlins RMPPA, Permian rocks are represented by the Phosphoria Formation and the Goose Egg Formation. The Dinwoody Formation, Chugwater Group, and the Nugget Sandstone represent Triassic rocks in the western and northern parts of the Rawlins RMPPA. The Jurassic Formations throughout the Rawlins RMPPA consist of the Nugget Sandstone Sundance, and Morrison Formations. In the eastern Hanna Basin at Como Bluff, outcrops of the Morrison Formation have yielded abundant dinosaur bones (Mears et al. 1986). Cretaceous rocks are usually divided into upper and lower Cretaceous. The lower part of the lower Cretaceous is represented by sandstones that are loosely correlated and referred to as the Lakota Sandstone, and Fall River Sandstone. Above the Lakota and Fall River Sandstones is the Thermopolis or Skull Creek Shale (depending on locale), while above these shales is the Muddy or “J” Sandstone (depending on locale) (Watson 1980).

In the western parts of the Rawlins RMPPA, the upper Cretaceous consists of the Mowry Shale, Frontier Formation, Niobrara Formation, Steele (Baxter) Shale, the Mesaverde Group, the Lewis Shale, and the Lance Formation. The Mesaverde Group designates widespread sedimentary rocks in the Greater Green River Basin consisting of sandstone, carbonaceous shale, and coal (Ver Ploeg 1992). The Lance Formation is made up of carbonaceous shale, sandstone, siltstone, and coal (Watson 1980). In the Hanna, Shirley, and Laramie Basins, the last upper Cretaceous units are the Medicine Bow and Ferris Formations that are composed of carbonaceous shale, coal, and sandstone. In the Denver-Cheyenne Basin portion of the Rawlins RMPPA, the lowest upper Cretaceous units in ascending order are the Graneros Shale, Greenhorn Formation, Carlile Shale, and Niobrara Shaleoverlain by a dark gray marine shale called the Pierre Shale. Overlying the Pierre Shale is the Fox Hills Sandstone. The Lance Formation overlies the Fox Hills Sandstone in the northern part of the Denver-Cheyenne Basin (Lilligraven 1993). The earliest Tertiary rocks (Paleocene Series) in the western portions of the Rawlins RMPPA are in the Paleocene Fort Union Formation, which is composed of sandstone, conglomerate, shale, and coal (Watson 1980). In the Hanna, Shirley, and Laramie Basins, the Paleocene is represented by the Ferris and Hanna Formations (carbonaceous shale, sandstone, conglomerate and numerous coalbeds). There are no lower Tertiary rocks in the Denver-Cheyenne Basin (Lilligraven 1993). Eocene Series rocks in the western part of the Rawlins RMPPA are the Wasatch (mudstone, red sandstone, carbonaceous shale, and sub-bituminous coal (Watson 1980)) and Green River Formations (shale, oil shale, marlstone, and occasional sandstone). In the Shirley and Laramie Basins, the Eocene is represented by the Wind River (sandstone, conglomerate, mudstone, carbonaceous shale, and minor coal (Watson 1980)) and Wagon Bed Formations. In the Denver-Cheyenne Basin, there are no Eocene rocks (Love et al. 1993). The Oligocene White River Formation is present in the western part of the

Rawlins RMPPA and in the Hanna, Shirley, and Laramie Basins. The White River in the Denver-Cheyenne Basin may contain vertebrate fossils in isolated localities (Watson 1980). In the western parts of the Rawlins RMPPA, the Miocene is represented by the Browns Park Formation and Split Rock Formations. In the Denver-Cheyenne Basin, the Miocene Ogallala Formation covers the surface in most of Laramie County (Love and Christiansen 1985). In northeastern Laramie County, the upper Oligocene and Miocene Arikaree Formation is present. Unconsolidated Quaternary deposits consist of alluvium, terraces, colluvium, gravels, pediments, and glacial deposits (Love and Christiansen 1985). Alluvial deposits are generally associated with alluvial valleys of the major rivers and tributaries. Glacial deposits are limited to the Medicine Bow Mountains and Sierra Madre and are largely composed of boulders, cobbles, and fine materials that were scoured from the mountains by the glaciers. More detail on geologic structure can be found in a separate Minerals Report for the Rawlins RMPPA.

3.5.2. TOPOGRAPHY

The Rawlins RMPPA is located in three major physiographic provinces: the Wyoming Basin, the Southern Rocky Mountains, and the Great Plains (Howard and Williams 1972). The western and northwestern portions of the Rawlins RMPPA are located in the Wyoming Basin, a 40,000-square-mile area that includes much of southwestern Wyoming and part of northwestern Colorado. The Wyoming Basin Province is typified by topographic and structural basins that are either bounded by mountains in the adjacent provinces or bounded by ranges within the province itself. There are several west-east trending mountain ranges in the north-central part of the Rawlins RMPPA. The ranges are, from west to east, the Ferris Mountains, the Seminoe Mountains, and the Shirley Mountains. The Ferris Mountains are up to 10,000 feet national geodetic vertical datum (NGVD), while the Seminoe and Shirley Mountains peak at about 9,500 feet (NGVD).

Sub-basins of the Wyoming Basin within the Rawlins RMPPA boundaries include the Washakie and Great Divide Basins of the eastern Greater Green River Basin, the Hanna Basin, Shirley Basin, and the Laramie Basin. In the basin areas the topography is typified by badlands, playas, and sand dunes (Howard and Williams 1972).

Elevations in the Wyoming Basin portion of the Rawlins RMPPA generally range from 6,500 to 7,500 feet (NGVD). The Great Divide Basin is bounded by branches of the Continental Divide and has no external drainage outlet. Major river drainages in the Wyoming Basin portion of the Rawlins RMPPA are the North Platte River, Laramie River, and the Little Snake River. All of these rivers have their origins in the Southern Rocky Mountains.

A small part of the Southern Rocky Mountains Province is in the south and south-central portions of the Rawlins RMPPA. The Southern Rocky Mountains extends through northern New Mexico, Colorado, and southern Wyoming. Mountain ranges in the Rawlins RMPPA consist of the northernmost portions of the Southern Rocky Mountains. Those ranges are the Laramie Mountains, Medicine Bow Mountains, and the Sierra Madre (the northern extension of Colorado's Park Range). The portions of the Rawlins RMPPA on the flanks of the mountains generally range from 7,500 to 8,000 feet (NGVD) with the highest point in the Rawlins RMPPA being Elk Mountain at 11,156 feet (NGVD). In many places, hogback ridges mark the flanks of the mountain ranges.

The southeastern portion of the Rawlins RMPPA is located in the Great Plains province in a sub-province called the High Plains (USGS, 1970). The High Plains are characterized by nearly flat-lying Tertiary deposits with mesas and badland topography. A prominent physiographic feature in southeastern Wyoming is called the "Gangplank," so-called because the Tertiary rocks form a long sloping surface up to the 7,000-foot level of the Laramie Range (Howard and Williams 1972). Elevations in the High Plains portion of the Rawlins RMPPA range from 7,000 feet (NGVD) at the east flank of the Laramie Range to less than 5,000 feet (NGVD) in northeastern Laramie County.

In this portion of the Rawlins RMPPA, drainages originate in the Laramie Range and flow from west to east. The important drainages from south to north include Crow Creek, Lodgepole Creek, Horse Creek, and Little Bear Creek. Crow Creek eventually empties into the South Platte River in Colorado and the others are in the North Platte River Basin. Figure 1.1-2 illustrates the general topography of the Rawlins RMPPA.

3.5.3. MINERALS

3.5.3.1. Leaseable Minerals

3.5.3.1.1. Oil and Conventional Natural Gas

Based on production figures through year 2000, three of Wyoming's top 25 gas-producing fields are within or partially within the Rawlins RMPPA. The fields and year 2000 production rank are as follows: Standard Draw (10), Wild Rose (14), and Wamsutter (16) (WOGCC 2002b). In addition, the Rawlins RMPPA contains two of the top 25 oil fields in the State: Lost Soldier (3) and Standard Draw (24).

Records indicate that before 1910 only one well had been drilled in the Rawlins RMPPA. Since that time there has been a pronounced upward trend in the number of wells drilled. Seventy-four percent of the wells drilled were between 8,000 and 12,000 feet deep. The average total depth was 9,249 feet. As the number of wells drilled has increased during this period, the depth of the wells also has increased.

Within the Rawlins RMPPA, 5,515 wells are present. To date, 59 percent of all wells have been drilled on Federal lands, with the other 41 percent drilled on fee or State lands. Fifty-two percent of all wells drilled have been abandoned. The great majority of abandoned wells are either unproductive (dry holes), or have become depleted and are no longer economical. Since 1980, well abandonments have been 37 percent of the total number of wells drilled.

Within the Rawlins RMPPA, drilling activity has been concentrated in three regions. The first and most heavily drilled region is in the eastern Green River Basin and includes the Great Divide Basin, Wamsutter Arch, and Washakie Basin. This region is located in the westernmost part of the Rawlins RMPPA. In spite of the heavy drilling in parts of these areas, there are some townships in this region that have been only lightly tested.

The two other regions of concentrated activity lie in the eastern part of the Rawlins RMPPA and in a region across its center. These regions have been less heavily explored and developed than in the region on the west. Many townships within these two regions have been only lightly tested. Outside of these three regions, many townships have not been tested.

Production was flat early on, but began a steady increase in 1978 that carried through 1981. After a period of fluctuation during 1982-1985, production increases resumed. During 1986 through 1997, production increased at a nominal annual rate of 4.2 percent. Gas production was 7.5 times higher in 2001 than in 1974. The decline in production during 2000 and 2001 was mostly due to decline in production from private wells. Gas production from the Rawlins RMPPA in 2001 was 11 percent of Wyoming's total gas production.

During 1978 to 1995, production fluctuated around an annual rate of 8 million barrels. Beginning in 1990, annual production began declining and has declined at a nominal rate of 2.8 percent per year through 2001. About half the oil produced in the Rawlins RMPPA during 2000 and 2001 was from the Lost Soldier-Wertz Field near Bairoil, Wyoming. In 2001, only 7 percent of Wyoming's total oil production came from the Rawlins RMPPA.

3.5.3.1.2. Coalbed Methane

Although there is substantial interest in coalbed methane (CBM) development in the Rawlins RMPPA, there has been little production. Only 0.179 billion cubic feet of gas (BCFG) and 10.3 million barrels of water have been produced in the Rawlins RMPPA (WOGCC 2002a).

At present, two CBM exploratory unit agreements have been authorized and six are pending. These units, listed in Table 3.5-1, cover an area of about 166,460 acres. Wells for a pilot test have been drilled in the Hanna Draw Unit. Additional testing is needed to determine this unit's economic viability. The coal being tested is in the Tertiary aged Hanna Formation.

The Magic Unit has only recently been proposed and details about it are still confidential. This unit lies along the crest of the Wamsutter Arch, between the Great Divide and Washakie Basins.

The Sun Dog Unit and the five other unit proposals are located along the east flank of the Washakie Basin. They are part of a larger proposal by Petroleum Development Corporation and others, to test coal gas in an area between townships 13 and 20 north, and ranges 89 and 92 west. The "Atlantic Rim Project" will be testing Cretaceous aged coals of the Mesaverde Group. A separate EIS is being prepared for this proposed project. Initial wells for pilot tests in the north and middle parts of the project area have been drilled and testing is planned to begin in 2002. The Sun Dog unit operator plans to drill wells for a pilot test in 2002.

3.5.3.1.3. Coal

There are six identified coalfields within the Rawlins RMPPA. Of these, the Hanna Field has been the most significant in terms of historic, and projected, coal production. Most activity within the remaining fields has typically been of small-scale, or in some cases, the coal resource has yet to be economically exploited.

In recent years, there has been a contraction of the coal sector within the Hanna Coalfield. As of 1979, five mining companies were still active in the Hanna Field (Glass and Roberts 1979), but by the year 2000 there were only three active coal mines in the Hanna Field (two surface mines and one underground mine) operated by two companies. As of mid-2002, only one is operational, the Seminoe No. II mine (a combination dragline and shovel/truck operation) operated by Arch of Wyoming, Inc. (a subsidiary of Arch Western Resources, LLC). Remaining economic/strippable reserves have been indicated as sufficient to sustain operations for about 2 years.

Coal is classified by rank, in accordance with standard specifications of the American Society for Testing Materials (ASTM). Most of the Wyoming coals are of bituminous and sub-bituminous rank. ASTM D-388 provides detailed information regarding coal classification specifications and considerations. Within the Rawlins RMPPA there are six significant coalfields containing coal resources of sub-bituminous to bituminous rank (Berryhill et al. 1950), as follows: the Hanna; Great Divide Basin; Rock Creek; Kindt Basin; Little Snake River; and Goshen Hole Coalfields.

3.5.3.2. Locateable Minerals

Wyoming is a uranium province. Uranium was discovered in the Powder River and Wind River basins during the 1950s, and continued exploration for uranium resulted in discovery of additional sedimentary uranium deposits in the major basins of central and southern Wyoming. The Rawlins RMPPA contains its share of sedimentary uranium deposits in the Shirley Basin, the Great Divide Basin, the Red Desert area, and around Baggs in the Poison Buttes area. In addition to uranium, the Rawlins RMPPA encompasses deposits of titaniferous magnetite, stratabound gold, copper-gold deposits, and diamonds hosted in kimberlite pipes. Commercial development of the sedimentary uranium and the titaniferous magnetite deposits has occurred over the past 50 years. The other locatable mineral deposits have seen only limited production and sporadic exploration. Locatable mineral deposits in the Rawlins RMPPA are summarized in Table 3.5-2.

3.5.3.3. Saleable Minerals

Salable minerals disposition is addressed under the Materials Act of 1947, as amended by the Acts of 1955 and 1962. These Acts authorized that certain mineral materials be disposed either through a contract of sale or a free-use permit. This group of mineral materials, commonly known as “salable minerals”, includes common varieties of sand, stone, gravel, pumice, pumicite, cinders, clay, and petrified wood in public lands of the U.S. (Maley 1977).

Salable minerals that occur within the Rawlins RMPPA include aggregate, silica sand, dimension stone, vermiculite, pumice and scoria, common clay, and decorative stone (e.g., moss rock). To the extent petrified wood may be present within the Rawlins RMPPA, it has been considered a paleontological resource rather than a mineral resource.

By far, the most significant salable mineral within the Rawlins RMPPA, both in terms of occurrence and demand, is aggregates, or sand and gravel. Aggregate resources typically occur in one or more of the following forms: natural gravel deposits, alluvial sand and gravel deposits, terrace sand and gravel deposits, glacial gravels, older gravel deposits, or windblown deposits. Within the Rawlins RMPPA, the aggregates resource base is generally present as windblown, terrace, and alluvial deposits; however, coarser, gravel-type materials are present to a somewhat lesser degree. Where gravel is present, it is generally as an older gravel (conglomeratic) deposit, often situated beneath surficial deposits. Former gravel and aggregate deposits within the Rawlins RMPPA are noted as having been present near Ft. Steele (T21N, R85W), Elmo (T22-23N, R81W), Creston Junction (T21N, R92W), and in the Red Desert Basin (T21-23N, R95-97W).

3.6. HEALTH/SAFETY AND HAZARDOUS MATERIALS

Health and safety threats within the Rawlins RMPPA may affect workers, recreationists, or wildlife. Personal injury and exposure to hazardous materials are the common threats to health and safety in the RMPPA.

3.6.1. SOURCES OF THREATS TO HEALTH/SAFETY

3.6.1.1. Fire

Wildfires remove existing vegetation and create opportunities for new plant growth. Although wildfires are a natural process, large-scale wildfires could cause undesirable ecological, economic, and social impacts. Therefore, the BLM conducts commercial timber harvesting and occasional prescribed burning as a means of replacing existing forest stands, rejuvenating shrub communities, and reinvigorating forb and grass communities. Timber harvesting and prescribed burns mimic natural wildfires, but have a reduced potential for negative effects, such as health and safety threats to nearby residents, destruction of homes and communities, and harm to wildlife. The areas subjected to prescribed burns in the Rawlins RMPPA are largely comprised of sagebrush and grass. Prescribed burning of sagebrush communities removes decadent stands, produces diverse age stands, and renews forage production in sagebrush, grassland, and forbs. At the same time, excessive fuels are removed, thus reducing the chance of fire that is out of control.

3.6.1.2. Minerals Extraction

Leasing for exploration and development of oil and gas, coal, and mineral materials occurs throughout the Rawlins RMPPA. Exposure to hydrogen sulfide gas is the primary hazard associated with the exploration and development of oil and gas. Leaks of hydrogen sulfide, a toxic byproduct of oil and gas drilling that attacks the central nervous system, have the potential to injure nearby human or ecological receptors. The locations of the oil and gas well fields are generally remote within the Rawlins RMPPA, primarily limiting the threat of human exposure to workers and recreationists. Some well fields, however, such as the Table Rock well field, are close to transportation corridors and could present exposure potential to people traveling through the area.

Generally, oil and gas exploration and development consists of the drilling, completion, and production of wells, along with the associated construction of access roads, gas gathering lines, power lines, water discharge lines, and water discharge points. Associated construction activities create increases in particulate emissions from disturbed soils on roads, well pads, and infrastructure installation, as well as exhaust from equipment and vehicles. In addition, water discharges from oil and gas wells can be point sources of water pollution. Groundwater with increased metals and other constituents is pumped and sometimes disposed of in surface pits, creating increased runoff and contaminated sediment that can potentially reach local waterways. Hazardous materials, such as petroleum hydrocarbons, caustics, and methanol, could possibly be released during exploration and development for oil and gas or coalbed methane. Hazardous materials potentially used or produced during construction, drilling, production, and reclamation operations associated with the oil and gas and coalbed methane industries are listed in Table 3.6-1. Accidental hazardous material spills or pipeline ruptures could adversely impact air, soils, and surface water, and pose an exposure threat to nearby humans and wildlife.

3.6.1.3. Ranching Operations

On BLM-managed public land contained within the Rawlins RMPPA, ranching operations are managed through grazing allotments issued by the BLM. Activities associated with ranching are limited to moving cattle, horses, or sheep through the area for grazing opportunities, along with upkeep of range improvements, such as corrals, fencing, water developments (reservoirs, spring developments, pipelines, wells, etc.), and land treatments (prescribed fire, herbicide treatments, mechanical treatments, etc.). To enable livestock grazing and repair of range improvements, permittees travel through the Rawlins RMPPA on roads of various quality or trails in vehicles, on horseback, or on foot. Health and safety hazards associated with ranching operations on BLM-managed land within the Rawlins RMPPA are limited to the potential for accidents during travel through the area, and typical construction-related hazards associated with repair of range improvements.

3.6.1.4. Recreation

Recreational activities commonly pursued in the Rawlins RMPPA include hiking, boating, fishing, hunting, camping, and sightseeing. Travel by off-highway vehicle (OHV) is the primary method for accessing many recreation areas, and it is increasingly considered as a recreational activity. Health and safety threats from recreational activities include the potential for vehicular accidents during OHV travel. The Sand Dunes and Dune Pond areas are frequently used by OHVs, and the steep slopes found in these areas create especially hazardous driving conditions. Threat of injury associated with hunting accidents is also a recreation health and safety hazard.

3.6.2. TYPES OF THREATS

3.6.2.1. Personal Injury

Personal injury to recreationists or workers may occur within the Rawlins RMPPA. The primary threat in the Rawlins RMPPA is injury associated with vehicular accidents during OHV travel. In addition, construction-related accidents can cause personal injury during industrial activities conducted within the Rawlins RMPPA, such as oil and gas exploration and development, minerals extraction, and ranching operations. Recreationists engaged in hunting may accidentally injure themselves or others.

3.6.2.2. Hazardous Materials

Exploration and development of oil and gas and coal bed methane are common activities within the Rawlins RMPPA. The processes involved with these activities require the use of hazardous materials that could be released to the environment, thereby exposing nearby human and ecological receptors. Hazardous materials can include dusts, mixtures, and common materials such as paints, fuels, and solvents. Exposure of humans or ecological receptors to hazardous materials in the Rawlins RMPPA may occur because of releases, spills, improper storage and transport, and other accidents. Hazardous materials can pose a wide range of health hazards (such as irritation, sensitization, and carcinogenicity) and physical hazards (such as flammability, corrosion, and reactivity).

3.7. LANDS AND REALTY

The Rawlins field office manages approximately 3.5 million acres of public land. Uses of the land are diverse from oil and gas development to wildlife habitat and recreation. The current environment of land use is characterized by an increase in development from the oil and gas industry as well as private and urban development. The production of new energy sources, such as coalbed methane and wind energy will likely have a greater impact on land distribution and use in the near future. Changes in land ownership of surrounding private lands also has an impact on the development of public lands. The most important characteristic of such ownership changes may be the resultant fragmentation and isolation of segregated parcels of public land.

3.7.1. BACKGROUND AND HISTORY

Land ownership, land adjustment parcels, existing withdrawals, major utility lines and utility corridors are shown in Figure 3.7-1. The acreages associated with each of these land uses within the Rawlins RMPPA are summarized in Table 3.7-1.

As shown on Figure 3.7-1, the most prominent land resource feature within the Rawlins RMPPA is a large swath of land that is divided in to a checkerboard pattern of ownership. This swath of land is approximately 40 miles wide and runs from east to west across the entire resource area. The checkerboard pattern, with alternating sections of private and public land, runs 20 miles to the south and 20 miles to the north of the Union Pacific railroad line. Each section within the checkerboard is one mile square. Ownership is divided between private, BLM-managed and State land. Little consolidation has taken place over the years and the majority of this "checkerboard" pattern remains intact. Much of the private land within the checkerboard is owned by the Union Pacific Railroad.

3.7.2. EVALUATION PROCESS FOR LAND TENURE AND REALITY

3.7.2.1. Land Ownership Adjustment

Under the disposal criteria of the Federal Land Policy Management Act of 1976 (FLPMA), 66,000 acres have been identified for consideration of disposal. Exchanges are subject to procedures outlined in the Code of Federal Regulations, Title 43, chapter II, part 2200 section 0-6.

All lands considered for disposal must meet one or more of the criteria outlined in Section 203(a) of the Federal Land Policy and Management Act. These characterize lands for potential disposal as lands that are difficult or uneconomical to manage; lands acquired for a specific purpose, but no longer required for that or another Federal purpose; or lands that will serve important public objectives, including, but not limited to, expansion of communities and economic development, and that outweigh other public objectives and values. Currently there are no requests for land exchange or active efforts being made on the part of the field office to implement adjustments in land ownership.

3.7.2.2. Withdrawals/Classifications

Current withdrawals of public land comprise over 1.5 million acres within the resource area. The largest withdrawals have been made for coal, oil shale and stock driveways respectively, with coal being the largest at over 600,000 acres. The Bureau of

Reclamation lands and public water reserves comprise over 120,000 acres. Remaining acres that have been withdrawn include wildlife refuges, air navigation sites, power sites, and administrative sites.

3.7.2.3. Leases and Permits

The majority of leases and permits within the resource area are comprised of oil and gas developments as well as wind energy rights-of-way. Wind energy rights-of-way on BLM-managed land comprise approximately 17,000 acres with 35 turbines currently (mid–2002) on public land.

Leases and permits are spread throughout the resource area. Table 3.7-2 gives an idea of the acreage of surface disturbance potentially associated with oil and gas and coal bed methane development as characterized by projects proposed in the Rawlins RMPPA.

3.7.2.4. Land Consolidations

Currently there are no active efforts to consolidate land within the resource area.

3.8. LIVESTOCK GRAZING

Livestock grazing on BLM-managed public lands includes primarily cattle, and also sheep, as well as some horses and buffalo. The relative numbers of these grazing livestock have varied in response to their economic value as a commodity (cattle, sheep, and buffalo), and use in ranching operations (horses).

3.8.1. HISTORIC USE

Historically, there have been much higher numbers of sheep on Rawlins RMPPA rangelands than cattle. A steady decline in sheep numbers shows sheep have diminished to nearly one third of the present cattle numbers, and to one-fifth of their former population in the 1920's. Table 3.8-1 outlines the livestock populations in Albany, Carbon and Laramie Counties since approximately 1900. In 1920, the earliest year for which data are available for both cattle and sheep, 24.1 percent of the livestock were cattle. Based on the available data, this percentage dropped even further until 1940 (17.7 percent) and then rose rather consistently to 73.5 percent in the year 2000.

3.8.2. CURRENT USE

The percentage of actual use by cattle and sheep over the last ten years is presented in Table 3.8-2. Even over the past ten years, the shift from sheep to cattle has continued. The percentage of cattle use in AUMs has increased from 84.5 percent in 1991 to 93.1 percent in 2000.

There are a total of 586 grazing allotments within the Rawlins RMPPA (Table 3.8-3, Figure 3.8-1). These are spread across 4,033,928 acres of public land (89.6%), other Federal land (1.4%), and State land (9.0%). They provide 880,938 AUMs that are public (55.0%), private (37%), other Federal (0.9%), and State (5.5%), as well as suspended (1.5%). Livestock grazing occurs on the Rawlins RMPPA allotments year round by cattle, sheep, horses and buffalo. Of the 586 allotments, 88 percent are used by cattle alone, and 9 percent by cattle and sheep, with bison added on one additional cattle allotment and on one additional cattle/sheep allotment. Cattle also share two allotments with horses. Sheep alone use 1.5 percent of the allotments, while two allotments are used by horses alone and one by goats. Table 3.8-3 also outlines the public, private and State AUMs per allotment, as well as the class of livestock, the timing of grazing and the grazing management of the allotment. Based on the data in Table 3.8-3, active preference for grazing livestock on the Rawlins RMPPA is 484,619 animal unit months (AUMs) on Federally owned land; the Total Active use is 471,421 AUMs and the Total Suspended is 13,198 AUMs.

Strategic grazing systems implemented over the past 30 years have enabled grazing on public lands by getting optimal use of forage without damaging the resource. Grazing management plans are devised with an understanding of the resource limits and the needs of the livestock owner. Knowledge of vegetation production and type, as well as the topography, water locations and access to cover are considered. Grazing systems fall into the following eight categories:

- Permit Long--Grazing throughout the permit for the duration of the permitted time with care taken not to overuse the resource.
- Year Long Permit--Permitted for year long use.
- Winter Permit Long--Permit long grazing for late fall through late winter.
- Rotation--Grazing rotation between pastures in the allotment for the permitted time.
- Deferred Rotation--Rotation grazing with regard to deferring pastures beyond the growing season, if they were used early the prior year, or that have been identified as needing deferment for resource reasons.
- Late Season--Fall or late summer grazing.
- Split Season--Livestock removed from the allotment and returned later in the year within the permitted time.
- Rest Rotation--Grazing rotation resting pastures that have been grazed early the prior year, or that have been identified as needing rest for resource reasons.

All of these categories are applied to the cattle allotments, although the most frequently used categories for cattle are permit long leases (54% of total allotments), deferred rotation (18%), and rotation (10%). Most of the cattle/sheep allotments are either permit long (4% of total allotments), deferred rotation (2%) or rotation (2%) leases.

3.8.3. RESULTS OF RANGELAND BEST MANAGEMENT PRACTICE APPLICATION

Rangeland Best Management Practices (BMPs) have been implemented on several allotments to solve problems particular to the vegetation type, topography, availability to water, as well as the needs of the permittees. The following outlines examples of successful BMPs used to improve grazing and ecological stability on individual allotments and describe the existing conditions in these allotments.

3.8.3.1. Bolten/Pine Grove Allotment

Grazing management has improved and resource oriented objectives have been established with the current permittee. Several range improvements have been completed within the allotment, which have greatly benefited grazing flexibility. These include additional fencing (55 miles, 34 of which are electric), which has resulted in 45 pastures within the allotment rather than the original 21 pastures. Several water developments have also been completed: 70 wells, 30 miles of pipelines, 18 spring developments and 11 reservoirs. A long-term vegetation treatment to diversify habitat has also been developed and in 2001, 4,600 acres were treated with tebuthiuron (Spike).

Wyoming Department of Environmental Quality, Water Quality Division (DEQ-WQD) has determined McKinney and Sage Creek have impaired water quality within the allotment. Both of these streams drain areas of highly erosive shale formations (Niobrara), and in turn carry sediment loads that exceed beneficial use standards. Since the present permittee has improved grazing management, portions of McKinney Creek have been delisted. Work continues along Sage Creek including intensive water quality monitoring, and improvements on diversions that were engineered to reduce siltation. The permittee has hired consultants that, along with BLM, jointly monitor range conditions and improvements in the allotment.

3.8.3.2. Riner Allotment

Water development, improved livestock management, and electric fences are management practices that have been implemented in the Riner Allotment. The current permittee acquired the permitted use on public land within the Riner allotment in 1993. The allotment is in a mixed ownership, checkerboard land pattern, with less than 50% public land. The permittee immediately changed the livestock management from essentially a permit long use cycle to a rotation, especially within the largest pasture. In order to do this, existing water sources were improved and additional water sources were developed, both on public and private land. The rotation within the largest pasture initially relied on extensive herding of livestock, which soon proved impractical. Electric fences have since been constructed to split the largest pasture into five smaller pastures. With these changes, conditions near water sources existing prior to 1993 have greatly improved. Conditions throughout the allotment also appear to have improved.

3.8.3.3. Beaver Hills Allotment

Although the Beaver Hills allotment was originally categorized as Custodial, the current livestock operator is enthusiastic about developing a cooperative management plan for the unit, with the goal to benefit the livestock operation as well as important big game species habitat. A deferred rotation grazing system is currently employed on the allotment, which utilizes short duration grazing treatments after early summer, but prior to moving the livestock onto summer U.S. Forest Service grazing allotments. A proposed prescribed burn in four pastures will improve forage conditions, wildlife habitat values, and watershed health. Several spring developments are planned to protect important riparian habitat and to improve livestock distribution. Cooperators include the BLM, the Wyoming Game and Fish Department, the landowner, and the Natural Resources Conservation Service. Important big game habitat, including bighorn sheep winter range, winter and crucial winter elk range, and transitional habitat for mule deer, will be enhanced through this process.

3.8.3.4. Doty Mountain Allotment

The Middle Fork of Muddy Creek flows through the Doty Mountain Allotment in the southwestern portion of the Rawlins RMPPA. Objectives established on the Doty Mountain allotment included: enhanced bank cover, increased stream width/depth ratio, improved herbaceous species composition, riparian shrub regeneration, decreased upland shrub density and diversified age structure, and improved waterfowl habitat. These objectives were attained through better livestock distribution, deferring grazing past the hot season, and creating riparian pastures.

Implemented BMPs included converting the two–pasture rotation to a nine pasture rotation, which defers grazing in five riparian pastures until late summer or early fall. Use in the remaining pastures is limited to two to six weeks. Range improvements include ten upland water developments and 28 miles of pasture fencing, as well as two well and pipeline projects. Range vegetation on 3,500 acres was treated using burns and Spike. Constructed ponds and wetlands created 220 acres for wildlife habitat as well. Photos, vegetation inspections, and riparian cross-section survey data show major improvements in bank cover, channel width decreases and enhanced species composition. Livestock conception rates have also improved.

3.8.3.5. Grizzly Allotment

The Wyoming Game and Fish Department controls the private land within this allotment and leases the cattle use to a private livestock operator. Prior to 1990, a rest rotation system was in place with seven pastures. There are currently twelve pastures and several new water developments, such as spring improvements and reservoir construction. Recent vegetation treatments, consisting of three prescribed burns and two Spike treatments, have reduced shrub cover and increased plant diversity. Improvement in both riparian and upland conditions have resulted, and the recent allotment evaluation suggested there are additional AUMs within the allotment. The Grizzly allotment was the primary target for the reintroduction of Colorado River Cutthroat Trout (a sensitive species), a portion of which was completed in 2001. Additional areas for reintroduction are identified and will be accomplished as resources allow.

3.8.3.6. Monument Draw Allotment

Livestock management, water development, and vegetation treatment are a few of the management practices within the Monument Draw Allotment. A new permittee acquired the permitted use within the allotment in 1997. The season of use was extended, with a more intensive management system using the two existing pastures and available water sources. Additional water sources were needed for the more intensive management. The new permittee cleaned and repaired existing reservoirs, and also greatly extended a livestock water pipeline. Livestock watering sources continue to be developed, including the additions to the pipeline. The allotment had also been identified as having areas of excessively high sagebrush cover, especially on the plateau in the southeast third of the allotment. A Spike treatment is proposed this year. The management changes have improved ground cover to above 75% in an area with limited rainfall.

3.8.3.7. Powder Rim Allotment

The original Powder Rim Allotment Management Plan (AMP), implemented in the late 1960's, had proved to be impractical due to conflicting uses and increased activation of previously rested (voluntary non-use) privileges. As a result of the livestock permittee's concerns about declining forage conditions, and the results of a Standards and Guidelines review of the allotment, the AMP was revised in 2001 to account for current conditions and issues. Two permittees were split from the allotment and allocated use in separate pastures. Improvements currently being developed in these pastures include six to seven miles of fencing, several new water developments (two wells, one spring development, and several small pit reservoirs), and two separate vegetation treatments. In addition, split season livestock use, designed to rest the vegetation during the peak growing season and defer use until late fall, has been initiated in two pastures. Three other pastures in the rotation receive split season and deferred summer cattle use in conjunction with winter sheep use.

Fencing two natural spring sites, determined as "non-functional" during the Standards and Guidelines review, resulted in increased flow and water quality. Protecting the associated riparian areas improved stream and riparian stability. One additional spring/seep complex will be developed, and several water wells will be completed in order to provide reliable, controllable water in dry portions of the pastures. Management in the pastures will enhance habitat for mule deer and elk, including crucial winter range.

3.8.3.8. Bar Eleven Allotment

In the Bar Eleven Allotment objectives were set to increase stream width/depth ratio, increase riparian shrub regeneration, change herbaceous species composition from Kentucky bluegrass to Nebraska sedge, reduce bare areas in the riparian areas, and increase trout size and population. Implemented best management practices included adjustments to the duration of use in June through September by fencing the allotment into pastures. This reduced grazing duration from four months to one month or less. Riparian pastures were established on Trout Creek to limit grazing to the fall. The remaining upland pastures now employ a deferred rotation grazing system. Grazing distribution was improved with the installation of proper pasture fencing and upland water improvements.

Recent monitoring data such as photo point pictures, riparian cross-sections and vegetation inspections have been encouraging. The BMP measures resulted in narrowing stream widths, improving stream bank cover, diversifying riparian and upland vegetation, and increasing willow regeneration.

3.9. OFF-HIGHWAY VEHICLES

This section addresses Off-Highway Vehicles (OHV) use and trends throughout the Rawlins RMPPA. OHV use is closely related to several environmental resources addressed in other sections of this chapter on the existing environment. Aspects of OHV use that are specifically addressed in other sections of this document, such as Hazardous Materials and Health/Safety (Section 3.6), Recreation (Section 3.11), Soils (Section 3.13), Transportation and Access (Section 3.14) will not be addressed in this section. All information for this section, unless otherwise noted, was gathered from personal conversations with the Recreation Planner for the Rawlins Field Office, from the Great Divide Resource Area RMP, or from the BLM's Recreation Management Information System (Clair 2002; BLM 1990; BLM 2002).

3.9.1. DESIGNATED OFF-HIGHWAY VEHICLE USE AREAS

OHV use is managed by designations finalized in the Great Divide Resource Area RMP. These designations prescribe the available management environment in which OHV users can ride. Potential OHV designations are open, closed, or limited with a pre-defined limitation in either time or use area. With the exceptions listed below, the Rawlins RMPPA is open to the use of motorized over-the-snow vehicles. In addition, the RMP prescribes OHV use throughout the entire Rawlins RMPPA to be limited to existing roads and trails, excepting in seven specified areas that contain different designations. These seven areas and their OHV use environments are defined as follows:

- West Seminoe and Dune Ponds--Located just west of Seminoe Reservoir, OHV users are limited to designated roads and trails. The area of open sand just west of Seminoe road is open to OHV use.
- Adobe Town--Located in the southwest corner of the Rawlins RMPPA, motorized vehicle use is limited to designated roads and trails.
- Encampment River Canyon--Located just north of the Medicine Bow National Forest and west of State route 230, it is closed to motorized vehicle use, including over-the-snow vehicles, from December 1 to April 30.
- Encampment River Trail--Straddling the Encampment River Canyon area referred to above, the portions of the Encampment River Trail that cross BLM-administered public land are closed to all types of motorized vehicle use year-round.
- Ferris Mountains--Located near the northern boundary of the Rawlins RMPPA and northeast of U.S. route 287, this area is closed to all types of motorized vehicle use, year-round.

- Pennock Mountains Wildlife Habitat Area--Located east of Saratoga, Wyoming, this area is closed to motorized vehicle use, including over-the-snow vehicles, from November 15 through April 30.
- Wick Brothers Wildlife Habitat Area--Located on both sides of I 80 and between the towns of Saratoga and Rock River, Wyoming, this area is closed to motorized vehicle use, including over-the-snow vehicles, from November 15 through April 30.

3.9.2. OFF-HIGHWAY VEHICLE USE AND TRENDS

OHVs are widely used for a variety of purposes. In the Recreation Management Information System (RMIS), OHVs are separated into four categories: ATVs, Cars/Trucks/SUVs, motorcycles, and snowmobiles. Snowmobile use, while technically considered OHVs use, was not included in the OHV categories in RMIS, but it will be addressed in this section. Table 3.9-1 shows the number of participants and visitor days associated with OHV use in the Rawlins RMPPA. By far the most commonly used of the four potential OHV categories in the Rawlins RMPPA is the cars/trucks/SUV category. While the others receive some use, cars/trucks/SUVs are used by well over 86 percent of OHV participants, and nearly 90 percent of visitor days are dedicated to OHV use.

OHV use, while recorded by RMIS, extends beyond recreational use. The row within the above table that refers to gathering non-commercial products addresses one of the other uses, the gathering of shed deer and elk antlers, which is a growing use of OHVs, especially ATVs. The OHVs provide access to large amounts of land and easy access to antlers on the ground. In addition to antler collection, OHVs are integral in big-game hunting.

Another significant use of OHVs is not visible in the above table. Ranchers and oil and gas interests use OHVs to access and upkeep the developments that are integral to the continued operation of their facilities.

Lack of enforcement of OHV designations and general increases in OHV use throughout the Rawlins FO have resulted in a proliferation of roads and trails used by OHV riders. This generally occurs more often in areas of higher recreation use, but there is evidence of route proliferation throughout the Rawlins RMPPA.

3.10. PALEONTOLOGY

The Draft Wyoming Paleontology Manual issued by the Wyoming BLM State Office presents guidelines used to ensure that the BLM in Wyoming meets their statutory obligations for protection of paleontological resources. The following sections present an overview of paleontological resources present in the Rawlins RMPPA, along with the associated paleontological classifications.

3.10.1. DESCRIPTION OF RESOURCES PRESENT

Some of the richest paleontological resources in the United States are present in the Rawlins RMPPA. Vertebrate fossils are especially significant in the Rawlins RMPPA. Paleontological research has been conducted in this part of Wyoming since 1856. More than 30 museums and universities have searched the area for vertebrate fossils, and fossils recovered from the RMPPA can be found in public and private collections around the world (BLM 1987).

The rich paleoenvironment in the RMPPA can be attributed to the area's high elevation and continental climate, which hinder vegetative growth and soil development and support erosion and bedrock exposure. Most fossils are recovered as scattered surface finds in areas of exposed rocks. Paleontologists often rely on chance for discoveries. Exposures that produce significant fossils, particularly vertebrates, are rare, and consequently the fossils are of considerable scientific value and interest wherever they are found. Some sites in the Rawlins RMPPA have yielded the only fossil record of several extinct animals (BLM 1987).

The most important paleontological resource in the Rawlins RMPPA is the Como Bluff National Natural Landmark area, which encompasses 7,680 acres located about five miles east of Medicine Bow. Como Bluff is a westward-plunging anticline containing formations from the Cretaceous through the Triassic Periods exposed in the face of the bluff. It has yielded fossil evidence for at least 80 new vertebrate species, including a new genus of Mesozoic mammals. The dinosaur graveyard fossil bed, an uncommon concentration of well–preserved fossils in the Mesozoic Morrison Formation, has also been found here. This finding played a significant historic role in the development of paleontology as a scientific dicipline (BLM 1987).

Within the Sand Creek National Natural Landmark (NNL), late Pleistocene and more recent vertebrate fossil deposits were recovered within a feature known as the "animal trap." This NNL is located about 20 miles southwest of Laramie and includes 4,800 acres, of which the BLM administers a 160-acre parcel of public land. Fossil deposits recovered from the "animal trap" include a large extinct lion, an eagle-like vulture, and a marten, as well as other species no longer found in the area (BLM 1987).

The Washakie Basin, a large physiographic feature with an area of 525 square miles, is located in the southeastern corner of Sweetwater County. Characterized as a intermontane desert basin and considered as an NNL, the Washakie Basin contains important paleontological resources. Fossils are present in abundance, and many institutions have actively studied the paleontology of the area (BLM 1987).

The area in and around the Continental Divide contain one of the most complete records of continental deposition in North America with exposures of the Fort Union, Battle Springs, Wasatch, Green River, and Washakie Formations. The Washakie Formation contains fossils of algae and mollusks. Well-preserved fossil fish are contained in the Laney Member of the Green River Formation. Within the Wasatch Formation, vertebrate fossils are found primarily in the non-red facies of the variegated beds including sandstones. The paleontology of the Battle Springs Formation has not been studied in detail, but it has been found to contain turtle shell fragments, mollusks, and notable amounts of calcite. Plant and animal fossils have been found throughout the Fort Union Formation (BLM 1999).

The Medicine Bow Formation, which underlies a portion of the RMPPA, is known to produce vertebrate fossils of scientific significance. Fossils known from the Medicine Bow Formation include the remains of marine and freshwater invertebrates, terrestrial plants, and terrestrial vertebrates. Microfossil (pollen) and megafossil (leaf and stem imprints, and petrified and carbonized wood) have been found in the formation. Invertebrate fossils include marine foraminifers and brackish-water gastropods and bivalves. The formation has also produced dinosaur bone fragments from the ceratopsian Triceratops and the remains of a small number of mammals from the late Cretaceous Period (BLM 2001).

The Ferris and Medicine Bow Formations and Lewis Shale within the RMPPA produce fossils of particular significance because they preserve strata containing the Cretaceous-Tertiary boundary, which dates to the time of the extinction of the dinosaurs and adaptive radiation of mammals. The Ferris Formation has produced the remains of early Paleocene mammals, as well as fossil leaves and shells of freshwater invertebrates, and trace fossils. The Lewis Shale has produced a variety of marine invertebrate fossils, including bivalves, baculites, scaphites, and ammonites, as well as isurid shark teeth. The Hanna Formation has produced the remains of terrestrial and aquatic vertebrates, invertebrates, and plants of Paleocene to possibly earliest Eocene age. These fossils are significant because the Paleocene-Eocene boundary dates to the transition from Archaic to Modern orders of mammals (BLM 2002).

3.10.2. FOSSIL YIELD POTENTIAL CLASSIFICATION (FYPC)

The classifications of paleontological resources determine the procedures to be followed before a paleontological clearance to proceed with a project can be granted. Table 3.10-1 describes the five paleontological classifications (Class I through V) and procedures associated with each. Before surface–disturbing activities can begin in Class I, II, III, or IV areas, a BLM inventory must be conducted. In addition, in order to manage the collection of scientifically significant fossils, the BLM requires that a paleontological collecting permit be obtained for collection of fossil vertebrates and scientifically significant invertebrate and plant fossils.

Significant fossils are known to occur in certain geologic units or formations within the RMPPA. These geologic units and formations have been classified to indicate the actual and potential occurrence of significant fossils. Table 3.10-2 describes the paleontological classes present in the RMPPA by geologic unit.

3.11. RECREATION

Recreation is one of the major resource uses within the Rawlins RMPPA. The term recreation includes a variety of activities that impact and are impacted by resources and other resource uses. This section addresses the existing recreational environment within the Rawlins RMPPA by describing the recreation resources and the levels of use these resources receive and their trends. This section will also address threats to recreation resources within the Rawlins RMPPA. All information for this section, unless otherwise noted, was gathered from personal conversations with the Recreation Planner for the Rawlins Field Office (Clair 2002), from the Great Divide Resource Area RMP (BLM 1990), or from the BLM's Recreation Management Information System (BLM 2002).

3.11.1. RECREATION RESOURCES

Recreation resources include recreation sites and areas, wildlife resources, and other resources (physical, historical, etc), each of which provides a different opportunity for recreational use. The resources available, whether developed or natural, have resulted in the high level of recreational use within the Rawlins RMPPA.

3.11.1.1. Recreation Sites and Areas

In areas where recreation resources receive heavy use, recreation sites are formally designated to enable management and mitigation of impact to those resources. Consequently, recreation sites are located near high-use recreation areas. There are seven developed recreation sites and two undeveloped recreation sites within the Rawlins RMPPA. Following is a list of these sites, which are illustrated on Figure 3.11-1a:

- Developed Recreation Sites:
  - Rim Lake Recreation Site
  - Teton Reservoir Recreation Site
  - Encampment River Campground (fee site)
  - Bennett Peak Campground (fee site)
  - Corral Creek Campground
  - Prior Flat Campground.
- Undeveloped Recreation Sites:
  - Nine Mile Hill Campground
  - Big Creek Access.

In addition to these recreation sites, there are larger areas that receive heavy recreation use. These areas, similar to recreation sites, receive designations, known as Special Recreation Management Areas (SRMA), that acknowledge the importance of their recreation resources and manage these resources in a way that will allow continued high levels of use without damaging the resources. There are three SRMAs in the Rawlins RMPPA: Shirley Mountain SRMA, North Platte River SRMA, and Continental Divide National Scenic Trail SRMA (Figure 3.11-1b). The existing recreation environment of these areas is addressed in the Special Management Designation portion of this document (Section 3.20).

3.11.1.2. Wildlife Resources

The wildlife resources (big game, small game, waterfowl, upland birds, fish, etc.) within the Rawlins RMPPA provide several opportunities for recreation uses. There are several world-class fisheries, and the Rawlins RMPPA contains prime habitat for several big-game species, as well as habitat for a variety of game birds. The abundance of wildlife in the Rawlins RMPPA directly impacts the amount and type of certain recreational uses available. As a result, when wildlife populations fluctuate, so do the opportunities for recreation that involves those populations.

Recreationists directly impacted by wildlife (hunting, fishing, trapping, wildlife viewing) make up nearly 57 percent of all recreationists in the Rawlins RMPPA. In addition to this, visitor days (one visitor day represents an aggregate of twelve hours a visitor spends at a site, area, or activity) spent on the previously mentioned activities comprise over 63 percent of all visitor days spent recreating. For more information concerning the existing environment of wildlife, refer to the Wildlife discussion in this document (Section 3.19).

3.11.1.3. Other Resources

Several other resources provide recreational opportunities within the Rawlins RMPPA. While Seminoe Reservoir's recreation is managed by Wyoming State Parks, it has several nearby recreation resources that visitors to the reservoir use. In addition, rivers throughout the Rawlins RMPPA provide opportunities for fishing, as mentioned above, as well as other water based recreational activities, such as canoeing and floating. The system of roads throughout the Rawlins RMPPA provides an opportunity for casual driving, viewing wildlife and wild horses, and other such activities. There are two major trails in the Rawlins RMPPA: Continental Divide National Scenic Trail and the Overland Trail. The Continental Divide Trail, with national scenic trail designation, is the more well known of the two and receives more use. The Overland Trail runs through the bottom portion of the resource area, with recreation on the trail interrupted by the checkerboard land ownership pattern through which the trail runs. Both trails, in addition to several other shorter routes, provide opportunities for hiking, backpacking, horse riding, OHV riding, mountain bike riding, and other trail related recreational activities.

3.11.2. RECREATION USE

Recreation use is estimated by the Recreation Management Information System (RMIS). RMIS estimates recreation participation in 65 types of recreation activities recorded at BLM-managed sites and areas. Estimates are based on registration records, permit records, observations, and professional judgment. Visitation is estimated by numbers of participants as well as visitor days. Participants are the actual number of people who take part in a recreational activity. A visitor day is a common unit of measure of recreation used among Federal agencies. One visitor day represents an aggregate of twelve visitor hours to a site or area. It should be noted that the number of participants and the number of visitors may vary since one visitor can participate in several recreational activities, thereby being recorded as a participant in several different activities. Table 3.11-1 shows a summary of the RMIS data for the RMPPA.

From October 1998 through September 2001, there were more dispersed recreation visits and visitor days than there were visits or visitor days in recreation sites (Table 3.11-2). This is due to the type of use the two different areas receive, but more importantly, this difference is due to the amount of land available for dispersed recreation.

According to data from fiscal years 1999, 2000, and 2001, dispersed recreation tends to mirror the pattern shown above for the entire RMPPA, with big game hunting, freshwater fishing, wildlife viewing, and driving for pleasure topping the list of activities. Within these few activities, over 400,000 participants viewed wildlife for over 25,000 visitor days while just under 170,000 participants spent over 500,000 visitor days hunting big game. Recreation in developed and undeveloped sites, however, shows a different trend. Due to the large number of developed campgrounds, more visitor days are spent camping than any other activity, with nearly 69,000 visitor days. The standout figure is that there were nearly 96,000 individuals participating in freshwater fishing, with the nearest number of participants at just under 41,000 viewing wildlife. Trail activities, such as walking, hiking, and running, were another activity regularly practiced in recreation sites. If the dispersed recreation tends to mirror the RMPPA recreation patterns, then recreation near developed and undeveloped sites tends to be water related, with more participants recreating for fewer visitor days.

3.11.3. RECREATION TRENDS

The current trends for recreation use in the Rawlins RMPPA are steady to slight increases. Since many of the recreational activities in the Rawlins RMPPA are directly tied to various natural resources, the condition of the resources will affect, in large part, the number of users able to participate in a given activity and as a result, the trend for those given recreation activities. Specifically, the recreation trends tied most directly to resource conditions are those that require wildlife populations to be strong, such as hunting and fishing. Likewise, annual precipitation will affect the level of rivers and streams and the subsequent recreation that requires these resources, such as fishing and floating. Given favorable conditions for these resources, their recreational use will likely continue to rise slowly.

3.12. SOCIOECONOMICS

The Rawlins RMPPA encompasses a large area across much of southern Wyoming and is located within four counties: Albany, Carbon, Laramie and Sweetwater. Activities in the RMPPA have the potential to affect all of these counties; therefore, the socioeconomic study area will be defined as these four counties. Demographic and economic data for the socioeconomic study area have been collected from a variety of sources and covers the last twenty years. A twenty-year time horizon was chosen in order to examine recent trends in demographic and economic parameters for the socioeconomic study area that are discussed in detail below.

3.12.1. COUNTY CHARACTERISTICS

Like much of Wyoming, the counties within the socioeconomic study area are quite rural in nature. Three of the four counties encompass a rather large land area with a dispersed population as summarized in Table 3.12-1. Laramie County, the exception, has a higher population density due largely to the location of Cheyenne within its border. The number of persons per square mile range from 2.0 in Sublette County to 30.4 in Laramie County.

The largest population centers in the socioeconomic study area are listed in Table 3.12-2. These areas are reporting changes in population over the last decade that vary by location. Population is increasing in the eastern portions of the Rawlins socioeconomic study area, while declining in western areas.

Land ownership in the socioeconomic study area is summarized in Figure 3.12-1. Public lands account for a significant proportion of the land base with 49 percent of total land area owned and managed by Federal agencies, including the BLM. The Rawlins RMPPA, comprises approximately 3.5 million surface acres, which is 22 percent of the socioeconomic study area. In addition, the Rawlins Field Office is responsible for 4.67 million acres of BLM-administered Federal mineral estate.

The Rawlins RMPPA is known for the checkerboard pattern of land ownership within a large portion of its boundaries. Figure 3.12-2 summarizes the land ownership within the boundaries and shows that the BLM manages only 32 percent of the total land area, while 52 percent is held in private ownership. This unique land ownership pattern presents challenges to managing resources.

3.12.2. DEMOGRAPHIC CHARACTERISTICS

3.12.2.1. Population

Annual population estimates for each of the four counties in the socioeconomic study area for 1980 to 2000 are plotted in Figure 3.12-3. Population increased by 19 percent over the twenty years, equating to an annual average increase of less than one percent. While total population in the socioeconomic study area grew modestly over the last twenty years, examination of the components of population growth reveals some additional insights. In Table 3.12-3, the components of population change show that increases in population in this area are due to natural changes (more births than deaths), while net migration is continuing to draw individuals away from this area. Overall, the socioeconomic study area followed a statewide trend of declining population due to net migration. All four counties experienced decreases in population due to net migration during both decades, with population declining by nearly 14 percent during the 1980s and over 5 percent during the 1990s. The trend indicates that more individuals continue to leave than are moving into the area in spite of the increases in total population during the last two decades.

The distribution of the population by ethnicity for 2000 in the socioeconomic study area and the State of Wyoming is summarized in Figure 3.12-4. The socioeconomic study area, when compared with the State, reported a lower percentage of "whites" and a slightly higher percentage of individuals indicating they are of Hispanic or Latino descent. The percentage of other ethnic groups is quite small, which is common throughout Wyoming.

3.12.2.2. Personal Income Trends

Personal income data were obtained for each county in the socioeconomic study area from the U.S. Bureau of Economic Analysis. Table 3.12-4 summarizes components of personal income for 1979, 1989 and 1999 for the combined socioeconomic study area in 2001, in inflation–adjusted dollars. Total personal income increased to over $4.4 billion in 1999, up from $3.4 billion in 1979. During this twenty-year period, personal income grew by over 29 percent with almost all of this growth occurring during the 1990s. Table 3.12-5 places these data in perspective by summarizing the estimated poverty rates for the four counties in the socioeconomic study area, Wyoming, the West and the U.S.

Personal income can be broken down into three categories: labor income, investment income, and transfer payments. Labor income is derived through wages, salaries and self-employment income. Investment income is in the form of rents, dividends and interest earnings. Transfer payments are largely derived from Social Security benefits, Medicare and Medicaid benefits and other income support and assistance.

The socioeconomic study area is showing signs of shifting patterns of income growth. Labor income now accounts for 65 percent of total personal income, down from 78 percent in 1979. Income from non-labor sources has grown from 21 percent in 1979 to 34 percent in 1999. This change in how individuals earn income is not unlike national or State trends. For the nation as a whole, labor income fell from 73 percent in 1979 to 68 percent in 1999. Similarly, labor income as a percentage of total income in Wyoming fell from 82 percent in 1979 to 66 percent in 1999.

Investment income in the socioeconomic study area grew by 111 percent between 1979 and 1999 and accounted for 23 percent of personal income by 1999. Investment income as a percentage of personal income for this area in 1999 was higher than the national average (19 percent) but below the State average (40 percent). The increasing dependence on investment income is common throughout the country with the increasing percentage of the population that is retired.

Transfer payments accounted for 11 percent of total personal income in the socioeconomic study area in 1999. While this area has experienced an increasing dependence on transfer payments as a source of income it is very similar to State and national trends where transfer payments accounted for 12 percent of personal income for residents of Wyoming in 1999 and 13.1 percent nationally.

The socioeconomic study area has followed closely the State and national trends associated with per capita income. In 1999, per capita income for the socioeconomic study area was $27,262, which was just slightly lower than the national ($27,358) and State ($27,528) averages.

3.12.3. ECONOMIC CHARACTERISTICS

This section focuses on trends associated with certain economic characteristics in the socioeconomic study area. This includes changes in the labor force and unemployment and trends in employment and earnings by industry.

3.12.3.1. Labor Force And Unemployment

Change in the labor force and unemployment can provide information on the health of the local economy. The average annual unemployment rates for each of the counties, Wyoming, and the U.S. are summarized in Figure 3.12-5. Unemployment in Carbon and Sweetwater Counties has consistently been higher than unemployment for the State of Wyoming during the 1990s and higher than the national average since 1997. Unemployment in Albany and Laramie Counties, however, has been below the State and national averages for almost the entire ten-year period. The significant difference in the unemployment rates between the eastern and western half of the socioeconomic study area likely reflects the availability of jobs in the larger cities of Laramie and Cheyenne in the east in comparison to job scarcity in western portions of the socioeconomic study area.

Changes in the civilian labor force during the 1990's are summarized for each county and Wyoming in Table 3.12-6. The civilian labor force is defined as all persons over 16-years of age in the civilian non-institutional population who either had a job or was looking for a job in the last 12 months. Overall, the socioeconomic study area realized slower growth in the civilian labor force than for the State. In addition, the eastern portion of the socioeconomic study area realized growth in the labor force while western counties witnessed a decline.

3.12.3.2. Employment And Earnings By Industry

The U.S. Bureau of Economic Analysis (BEA) estimates annual employment and earnings for counties throughout the U.S. Total annual employment includes both full-time and part-time jobs so individuals with more than one job will be counted twice. The employment estimates include those that are employed by businesses and public entities as well as individuals that are self-employed. Data were obtained from BEA regarding total annual employment for each of the counties in the socioeconomic study area, Wyoming and the U.S. for 1979, 1989 and 1999 in order to examine trends in employment by industry over the twenty-year period.

Total employment in the socioeconomic study area increased by 17 percent over the twenty-year period from 92,126 in 1979 to 108,067 in 1999. Compared with employment growth in Wyoming and nationwide this area showed slower growth in employment. For instance, over the same twenty-year period total employment grew by 19 percent in Wyoming and 36.4 percent nationwide.

Employment by industry for 1999 is summarized in Figure 3.12-6. Services, government and retail trade comprise the largest percentage of total employment for this area. These three industries accounted for over 70 percent of total employment in 1999. These three industries also experienced that greatest growth in employment for this area between 1979 and 1999 accounting for 20,000 new jobs. Industries showing the greatest decline in employment between 1979 and 1999 were mining, construction, and transportation and utilities.

Total earnings by industry for counties in the socioeconomic study area, Wyoming and the U.S. for 1979, 1989 and 1999 were also obtained from BEA. Total gross earnings for all industries (private non-farm, farm and government) increased by 3 percent between 1979 and 1999. Growth in earnings for this area, however, was substantially slower than State and national growth rates where earnings increased by over 80 percent during this time period.

Figure 3.12-7 provides a summary of gross earnings by industry for the socioeconomic study area in 1999. The government sector provided the largest percentage of earnings of any industry in this area in 1999, accounting for nearly a third of total earnings. Services accounted for the second highest percentage of total earnings in the socioeconomic study area. This category includes metal, nonmetallic and coal mining and oil and gas operations. While mining remains important in terms of earnings for this area, the industry has reported a 44 percent decline in earnings between 1979 and 1999. Other industries reporting declines in earnings between 1979 and 1999 include construction, transportation and utilities and farms. Additional industries important to this area in terms of earnings include transportation and utilities and retail trade while manufacturing has been gaining in importance.

3.12.3.3. Economic Base

An area's economic base is comprised of industries that are primarily responsible for bringing outside income into the local economy. Certain sectors within the economy are thought to be basic in nature since most of their sales are tied to outside markets or customers. These industries include manufacturing, mining, and agriculture. In addition, certain government sectors, mainly Federal and state government are considered basic in nature because employees are paid from sources outside the local area.

Outside sources of income can also be derived from non-labor sources (investment income and transfer payments). Transfer payment income can become an "economic driver" for the area's economy since many transfer payment programs are sustained by sources outside the local area. Income of this type is received, spent and re-spent in the area, which generates additional income for the local economy. This is also true for investment income though it is not known for certain what percentage of investment income is generated from outside sources. Therefore, an assumption was made here that 30 percent of investment income is generated from outside sources.

Using these definitions of basic industries and outside sources of income, an analysis was conducted on the components of the economic base of the economy in the socioeconomic study area. Table 3.12-7 provides a breakdown of the components of the area's economic base and outside sources of income for the socioeconomic study area for 1979, 1989 and 1999. Columns 6 through 8 show the percentage of income earned from outside sources decreased from 57 percent in 1979 to 50 percent 1999. In addition, there appears to be a shift in the sources of this outside income during the study period. Non-labor sources of income now account for the largest percentage of personal income. This is a shift since 1979 when mining provided the largest percentage of total personal income for this area. By 1999, mining accounted for less than ten percent of total personal income. Other traditional basic industries such as agriculture and manufacturing have consistently provided a small percentage of outside income for this area.

Grazing is an important use of BLM-managed lands within the Rawlins RMPPA. An estimate of the importance of this use in the four-county study area is summarized in Table 3.12-8 and Table 3.12-9. The value of grazing on BLM-managed public lands was calculated as shown in Table 3.12-8. Total annual AUMs were obtained from the BLM from 1990-2000. Using data on the number of AUMs used in 1997 and data on the value cattle and sheep sales from the Wyoming Statistical Service, the value of grazing on BLM-managed public lands for the Rawlins RMPPA was estimated to be over $10 million. The value of grazing associated with the Rawlins Field Office was then compared to livestock sales during 1997 for the four-county socioeconomic study area. The most recent data on sales was obtained from the 1997 Census of Agriculture published by the National Agricultural Statistical Service. According to Table 3.12-9, total agricultural sales in the four-county area exceeded $180 million, of which 85 percent was associated with livestock sales. Comparing livestock sales throughout the study area with the value of grazing on BLM-managed lands within the Rawlins RMPPA indicates that grazing activities accounted for 6.9 percent of all livestock sales and 5.9 percent of all agricultural sales for this area.

Examination of Table 3.12-7 also reveals the importance of State and Federal government agencies as a driver for the regional economy. The government sector accounted for between 14 and 18 of personal income during this time. Examination of these data also indicates that the economy in the socioeconomic study area is now more dependent on non-labor sources (transfer payments and investments of income than traditional basic industries for outside sources of income. These two sources now account for 18 percent of total personal income.

These data do not shed light on how the economy may be diversifying into other industries that are capable of bringing in outside income to the local economy. Other industries such as real estate, and some service sectors will bring in outside income into the economy. For this area, it is likely that certain service sectors and the F.I.R.E. sector have brought in additional outside income due the nature of their business and modest growth during the study period.

3.12.4. PROPERTY VALUATION AND TAXATION

Total property valuation for the four counties in the socioeconomic study area for 2001 is summarized in Table 3.12-10. This includes property assessed by the State of Wyoming and locally assessed property. The State of Wyoming assesses taxes on both mineral and non-mineral property. Non-mineral property assessed by the State includes airlines, utilities, pipelines and gas distribution systems, railroads, and phone service (Wyoming Department of Revenue 2001). During fiscal year 2001, the valuation of property assessed by the State was $1.6 billion for the socioeconomic study area. Local government also assesses four categories of property including agricultural land, residential and commercial land, improvements and personal property and industrial property (Figure 3.12-8). During fiscal year 2001, the value of property assessed by local governments in the socioeconomic study area exceeded $946 million as summarized in Table 3.12-10. Total value of assessed property in the four county socioeconomic study area was $2.6 billion in fiscal year 2001.

Mineral production (Figure 3.12-9 and Figure 3.12-10) in the socioeconomic study area continues to be a major source of tax revenue for local government entities. During fiscal year 2001, minerals accounted for over 80 percent of the value of property assessed in the area (Figure 3.12-11). In addition, oil and gas production and operations provide a significant percentage of the assessed value of minerals especially in Carbon and Sweetwater Counties. Table 3.12-11 summarizes the assessed value of oil and gas production and property for fiscal year 2001 for each of the counties in the socioeconomic study area. For 2001, oil and gas production accounted for 75 percent of all mineral valuation in the socioeconomic study area as assessed by the State. For Carbon and Sweetwater Counties, oil and gas production accounted for 92 and and 68 percent of all assessed mineral production, respectively. Physical assets of the oil and gas industry (property) comprised an additional 2.7 percent of all property assessed by local governments. Of all property and production assessed by the State and local governments, oil and gas operations accounted for 42 percent of assessed value in the socioeconomic study area during fiscal year 2001.

3.12.4.1. Ad Valorem Taxes – Counties

Estimated ad valorem taxes from mineral production for each county during fiscal year 2001 are summarized in Table 3.12-12. These counties generated $76 million in tax revenues from mineral production during fiscal year 2001. Of this $76 million, $67 million was derived from oil and gas production or 89 percent. Ad valorem taxes derived from mineral production accounted for 53 percent of total county tax levies in 2001. Table 3.12-13 provides an estimate of the ad valorem taxes assessed on property associated with oil and gas and coal operations. During fiscal year 2001, the four counties generated an estimated $3.9 million in property taxes associated with oil and gas and coal extraction assets.

Table 3.12-14 estimates the importance of oil and gas operations in terms of local government property tax revenues. The two counties in the socioeconomic study area generated $71 million in tax revenues due to oil and gas operations. This accounted for 42 percent of property taxes generated in this area for Fiscal Year 2001.

3.12.4.2. Mineral Severance Taxes – State of Wyoming

Local government entities also benefit from severance taxes collected on mineral production throughout the State. Table 3.12-10 shows that $1.4 billion was assessed by the State of Wyoming for mineral production in the four county socioeconomic study area. Severance taxes collected on mineral production, however, are distributed within the State according to a formula published in the State statutes (W.S. 39-14-801.). Severance tax revenues are distributed to a variety of sources including the State general fund, water development account, State highway fund, counties, cities and towns. Therefore, the government entities within the socioeconomic study area will only benefit from a percentage of severance taxes collected on production within the socioeconomic study area. However, these entities will also benefit from severance taxes collected on mineral production occurring in other parts of the State as well. Table 3.12-15 summarizes the total severance tax revenues that were distributed to the local government entities within the socioeconomic study area during fiscal year 2001.

Table 3.12-16 estimates the severance taxes that are generated from mineral production originating within the socioeconomic study area. The estimated severance taxes for each mineral type are based on production and assessed values and the effective tax rates, all which were obtained from the Wyoming Department of Revenue, Mineral Tax Division. Natural gas production generated the most severance tax revenue in the socioeconomic study area, accounting for nearly 67 percent of all severance taxes generated with the majority of production occurring in Carbon and Sweetwater Counties.

3.12.4.3. Federal Royalties

Mineral production occurring on Federally owned public lands are also assessed a Federal mineral royalty. Production is assessed at 12.5 percent of value after allowable deductions. The Federal government returns fifty percent of the total royalties collected to the State where the mineral production occurs. In Wyoming, the distribution of the Federal royalties is based on a formula promulgated by the Wyoming State Statutes (W.S. 9-4-601). The State allows a percentage of these Federal royalties to be distributed to cities and towns for planning, construction and maintenance of public facilities, capital construction funds and transportation projects. In addition, local school districts may benefit from Federal royalty payments thorough advanced entitlement grants for capital construction funds.

Total Federal royalties distributed to local government agencies in the socioeconomic study area for fiscal year 2001 were $6.04 million (State of Wyoming 2001).

3.12.4.4. Mineral Tax Revenues – Rawlins Field Office

Tables 3.12-17 through 3.12-19 provide an estimate of the mineral tax revenues associated with oil and gas production within the RMPPA for production year 2000. Actual production was obtained from the Wyoming Geologic Survey and used in combination with the average taxable valuation per unit and average tax and royalty rates to estimate ad valorem taxes (county), severance taxes (State) and Federal royalties. Oil and gas production occurring within the RMPPA generated an estimated $55 million in mineral tax revenues to the county, State and Federal government during fiscal year 2001.

Tax revenues associated with coal production on BLM-managed public lands within the Rawlins Field Office are also included in Table 3.12-17 and Table 3.12-18. Coal production resulted in an estimated $3.2 million in tax revenues to State and local government entities.

3.12.4.5. Other Tax Revenue Sources

Other tax revenue sources that may be impacted by management actions associated with BLM-managed lands including lodging taxes (Table 3.12-20), sales and use taxes (Table 3.12-21) and gas taxes. Annual receipts from these three taxes for counties in the socioeconomic study area are summarized below. Lodging taxes have ranged from $0.93 to $1.2 million per year between 1999 and 2000 for the socioeconomic study area while sales and use taxes generate between $61 and $74 million during this time.

3.12.4.6. Payment in Lieu of Taxes (PILT)

Each county in the socioeconomic study area receives Payments in Lieu of Taxes (PILT) to compensate local governments for hardships caused by Federal lands being exempt from local property taxes. PILT payments are allowed in addition to other revenue sharing programs such as Federal Mineral Royalties and U.S. Forest Reserve payments. The PILT payment made to each county is based on a complex formula that takes into account revenue sharing from the previous year, county population, and acreage of the county in Federal ownership. PILT payments received by the counties in the socioeconomic study area for the last ten years are summarized in Figure 3.12-12.

3.12.5. ENVIRONMENTAL JUSTICE

Executive Order 12898 (*Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations*) requires identifying and addressing disproportionately high and adverse human health and environmental impacts of Federal programs, policies and activities on minority and low-income populations.

Relevant census data were used to determine whether the populations residing within the four county study area constitute an "environmental justice population" by meeting either of the following criteria:

- At least one-half of the population is of minority or low-income status.
- The percentage of population of minority or low-income status is at least 10 percentage points higher than for the entire State of Wyoming.

3.12.5.1. Population by Race

The population distribution by race is summarized in Table 3.12-22 for all counties in the study area. In addition, Figure 3.12-13 shows the minority population for each county in the State of Wyoming where minority population is calculated as total population less non-hispanic white alone. All four counties show minority populations that are greater than the State average. This is mainly attributable to the higher Hispanic population that lives in these four counties than in the rest of the State. Laramie County also has a slightly higher Black or African American population than the rest of the State.

Even with the greater percentage of minority populations living in the four county study area, this does not constitute an "environmental justice population" because it does not meet either of the criteria above.

3.12.5.2. Population in Poverty

Poverty level is often used as a determination of low-income status. The U.S. Census Bureau estimates poverty levels using a set of money income thresholds that vary by family size and composition. If a household's income is below the money threshold, then the family and all individuals of that household are considered to be in poverty. Using this criterion, the Census Bureau provides estimates of the percentage of individuals that fall below the poverty level for each county in the U.S. Poverty estimates are also provided for different regions of the U.S., as well as for the U.S. as a whole.

Table 3.12-5 summarizes the estimated poverty rates for the four counties in the socioeconomic study area, Wyoming, the West and the U.S. Carbon, Laramie and

Sweetwater counties have experienced estimated poverty rates over the last decade below the State, regional and national averages. The exception is Albany County, which has estimated poverty rates that area higher than all other areas.

Figure 3.12-14 summarizes the median household income and poverty rates for each county in Wyoming for 2000. This figure shows that the median household income in Laramie and Sweetwater Counties are above the State average, while poverty levels (Figure 3.12-14) are lower than poverty levels throughout the State. This indicates the absence of low-income populations within these two counties that could be impacted by BLM actions. This is not the case in Carbon and Albany Counties, however, which reported a lower median household income and higher poverty rates than throughout Wyoming. For Albany County, the poverty rate is ten percentage points above the State average indicating the potential for a low-income "environmental justice population". This will need further analysis to determine if low-income populations may be impacted by BLM management actions.

3.13. SOILS

Soil data have been used by the BLM as a basis for range sites, range improvements, and wildlife habitat sites, as well as for determining reclamation practices for surface disturbance due to mineral development. In addition, soil data have been used to locate sources of gravel and to determine the suitability of areas for use as water disposal pits for water produced from gas wells (BLM 1987). In the sections below, the soil types found within the Rawlins RMPPA are identified and discussed, along with specific conditions and trends.

3.13.1. SOIL TYPES

Soils in the Rawlins RMPPA are variable. They include shallow to deep and fine to coarse textured soils. They vary in salt content, organic matter content, and parent material.

A large–scale (1:500,000) depiction of Wyoming soils was compiled in 1998 (Munn & Anderson 1998) based on the five-factor (soil parent material, climate, biota, topography, and time) soil forming model using digital surficial geology, bedrock geology, and elevation to develop 45 separate soil descriptions across Wyoming soil zones (Figure 3.13-1). The ten statewide soil zones include: (1) Yellowstone National Park area—mountains, cryic, udic; (2) Absaroka Volcanics—mountains, cryic, udic; (3) Middle Rocky Mountains—cryic, udic; (4) Bighorn Basin—intermountain basin, mesic, aridic; (5) Powder River Basin, Northern Great Plains—mesic, aridic; (6) Black Hill—mountains, frigid, ustic; (7) Southeast Wyoming—Northern Great Plains—frigid, aridic; (8) Medicine Bow and Laramie Mountains—mountains, cryic, udic; (9) Laramie and Wind River Basins—Wyoming Basin—frigid, aridic; and (10) Green River Basin—Wyoming Basin, frigid, aridic. Seven of the ten soil zones (3, 4, 5, 7, 8, 9, and 10) and twenty-six of the 45 soil descriptions are found in the Rawlins RMPPA. The soil zones and descriptions that are found in the Rawlins RMPPA are briefly described in Table 3.13-1. WY44 is the primary soil in the Rawlins RMPPA (53%), followed by WY17 (18%) and then WY45 (12%).

Figure 3.13-2 delineates broad regions within the Rawlins RMPPA for which generalizations can be made about soil productivity, soil permeability and infiltration, soil stability and strength, and soil erosion. These areas are distinguished by the varying amounts of precipitation, elevation, soil temperature, and soil parent material (BLM 1987). General conditions found in soils within map units A through F are discussed in more detail in the following sections.

3.13.2. CONDITIONS

3.13.2.1. Soil Productivity

Soil productivity is the most important soil value in the Rawlins RMPPA because it determines stocking rates for livestock through the amount of vegetation produced, dictates the kinds of plant communities on which wildlife habitat is based, and determines reclamation potential on areas of surface disturbance. Most soils in the Rawlins RMPPA are used for livestock grazing and wildlife habitat. Range improvement projects such as burning, spraying, plowing, and seeding are determined by amount of vegetation being produced and the potential amount that can be produced. Soil characteristics and environmental factors that affect soil productivity include organic matter content, soil content, amount of precipitation, soil temperature, wind speed, aspect, soil depth, and soil parent material. Soil productivity is highest along springs and natural drainage ways (BLM 1987).

Soil productivity is naturally low throughout the Rawlins RMPPA. Productivity varies depending on a number of factors, including soil depth, texture, topographic slope, slope aspect, and permeability. Variability in the amount of precipitation, however, is the main factor in variations in soil production within the Rawlins RMPPA. Within the Rawlins RMPPA, map unit A, shown in Figure 3.13-2, receives the least amount of precipitation, and map unit C receives the most. The more precipitation an area receives, the more vegetative cover is present. Vegetative cover contributes organic matter to the soil, which in turn provides nutrients for plants, stores more moisture, and improves soil structure, all of which promote vegetative growth.

Map units C and F have many soils with thicker and darker surface horizons, indicating higher organic matter content. The darker surface horizons are due to the higher amount of vegetation typically found within these areas, and to colder temperatures in map unit C. Colder temperatures slow the decay of organic material, thus allowing more organic matter to accumulate. The warmer temperatures in map unit F create a longer growing season, thus allowing more vegetation to grow and plants to produce more vegetative material. Map units B, D, and E contain more organic matter than map unit A, although none of these units have the dark surface layer (BLM 1987).

Map unit A has the lowest overall soil productivity; map units B, D, and E are intermediate in production; and map units C and F have the highest soil productivity (BLM 1987). Bottomland and stream terrace soils are the most productive, but limitations include alkalinity, high clay content, low permeability, and flooding. Upland soils are moderately productive. Limitations include shallow depths, low permeability, and alkalinity. Productivity of dissected upland soil is unknown but is likely low. Playa productivity may be high if salinity is not a limiting factor.

3.13.2.2. Soil Strength and Stability

Soil strength is an important consideration during construction of roads and facilities because low strength soils are subject to deformation. In areas of low soil strength, building foundation stability is low, and roads and drill pads can become rutted and slippery when wet. Soils composed predominately of one particle size exhibit low strength. Soils containing a variety of particle sizes exhibit greatest strength because they better fill in voids of varying sizes, causing more friction among particles. Within the Rawlins RMPPA, soils within map unit A have low strength. Map units B, C, E, and F have moderate strength; these textures are typically loamy, and compaction may be possible to increase strength and reduce the potential for deformation under a load. Soils in map unit D and portions of map unit A are sandy; because these soils are loose, they are subject to displacement under dry conditions. In map unit A, many soils have clayey or silty textures, making compaction difficult and creating deformation upon wetting under a load (BLM 1987).

Soil stability problems occur in map units A, B, E, and F, but map unit C has the greatest stability problems. Map unit C area receives the greatest amount of precipitation, primarily in the form of snow. Soil becomes saturated from snow melt and increases soil weight. This can cause mass wasting, which is the downslope movement of rock and soil under the influence of gravity (BLM 1987).

3.13.2.3. Highly Erodible Soils

Accelerated erosion normally coincides with poor range conditions. Due to the relatively good range condition throughout the Rawlins RMPPA, most locations are undergoing natural rates of erosion. Accelerated rates of erosion do occur within localized areas, including areas of surface disturbance and overgrazing in some drainage areas, especially riparian areas where livestock tend to congregate. Reduced vegetation along drainage ways tends to destabilize stream banks and cause stream downcutting and gullying. Accelerated stream bank erosion has historically occurred within the Rawlins RMPPA in the Muddy Creek, Sage Creek, Second Creek, and Third Sand Creek watersheds (BLM,1987).

Upland soils and bottomland and stream terrace soils have a slight to moderate potential for water erosion and a moderate to severe potential for wind erosion. Soils on dissected uplands are actively eroding, and water erosion and soil blowing hazards are slight to severe.

Within the Rawlins RMPPA, the highest soil erosion rates occur within map unit A, due to naturally low vegetative cover, soil crusting, low organic matter content, and soft shales, which are susceptible to erosion. These characteristics are especially apparent in the Muddy Creek drainage. Due to greater vegetative cover and organic matter content, and lower sodium content, rates of water erosion are lower in map units B, E, and F, and lowest in map unit D. Map unit D is susceptible to wind erosion; it is protected by a good vegetative cover, but it could actively erode if vegetative cover were reduced. Wind erosion also occurs in map units A, B, C, E, and F, but at lower rates (BLM 1987).

3.13.2.4. Saline Soils

Soluble salt levels affect management potentials due to toxicity, reduced infiltration rates, limits on nutrient availability, and reduction of water available to plants. Major causes of increased salinity contribution from public lands include overgrazing, OHV use, and energy exploration and extraction. These activities compact the soil surface and cause a reduction in plant cover, creating increased runoff carrying salt laden sediments into drainage ways (BLM 1996).

Salts in the soil stress plants by making water uptake more difficult. The more precipitation an area receives, the more moisture becomes available to leach salt out of the rooting zone. Areas in which soils are sufficiently leached can produce good vegetative cover.

Varying concentrations of soluble salt in soil occur throughout the Rawlins RMPPA. The most leaching occurs in map units C, D, and F, and the least in map unit A. Map units B and E have soils that are sufficiently leached to produce good vegetative cover (BLM 1987).

3.13.2.5. Sand Dunes

Stabilized intermittent sand dunes are present in hilly upland areas within the Rawlins RMPPA. Scattered areas of sand dunes are easily eroded by wind when vegetation is removed. The Rawlins RMPPA contains the Sand Hills area, which is a unique and fragile dune area with diverse vegetation. It serves as crucial winter range for the Baggs elk herd. The Sand Hills area is designated as an ACEC, and BLM management objectives include protection of the unique vegetation complex and minimization of soil erosion. In addition, there is a band of frequently active sand dunes north of Seminoe Reservoir and stretching across the northern portion of the Rawlins RMPPA. Dune Ponds, also within the Rawlins RMPPA, is a150-acre area consisting of large sand dunes.

3.13.2.6. Oil & Gas Roads

This surface disturbing activity often results in loss of vegetation and compaction of the soil surface thereby creating the potential for increased runoff and erosion. The number of unpaved oil and gas roads in the area is increasing, creating increased wind erosion along roadway corridors.

3.13.2.7. OHV Use

Within the Rawlins RMPPA, OHV use provides access to hunting, fishing, and camping. In addition, OHV use is increasingly regarded as a method of recreation in itself. The current general BLM policy in Wyoming regarding OHV use is "limited to existing roads and trails." The number of unpaved OHV roads within the Rawlins RMPPA is increasing.

OHV use on unpaved roads is a surface disturbing activity that often results in loss of vegetation and compaction of the soil surface, both of which can cause increased runoff and erosion. Within the Rawlins RMPPA, OHV use in the Sand Hills and Dune Ponds areas is of special concern due to the fragile nature of these areas. The Dune Ponds area receives a number of visitors due to its proximity to the major population center of Rawlins, Wyoming.

3.14. TRANSPORTATION AND ACCESS

Roads, product transfers (oil, gas, coal etc.) and access to resources comprises the transportation and access system within the Rawlins RMPPA. This section addresses the current roadway network, access issues, and the trends for the transportation and access system. Unless otherwise noted, this section synthesizes information from the Great Divide Resource Area Record of Decision and Approved Resource Management Plan and personal communications with BLM specialists during a Rawlins RMPPA tour (BLM 1990, BLM 2002)

3.14.1. ROADWAY NETWORK

The Rawlins RMPPA roadway network includes a spectrum of roads for varying purposes. Figure 3.14-1 shows interstates, U.S. and state highways, and county roads. There are two interstate highways through the Rawlins RMPPA, I-25 that runs north-south, running through Cheyenne and Wheatland in the far eastern portion of the area, and I-80, running westward from Cheyenne to generally bisect the RMPPA. For the most part, U.S. highways are co-located on interstate highways, with US 87 following I-25 and US 30 following I-80. An important exception is the divergence of US 30 from I-80 between Laramie and Walcott, where it is co-located with US 287. This route is less subject to the blizzard conditions that sometime occur in this segment of I-80. As would be expected on the basis of population, state highways are much more numerous in the portion of the RMPPA east of Rawlins. West of Rawlins, SH 789 is the only state highway, and other routes are typically unpaved.

Not shown on this map are numerous smaller roads laced throughout the RMPPA, connecting various resources with the larger collector roads. These roads are used for recreational purposes, as well as for access to maintain oil and gas wells and range management improvements. Most of these roads are not paved and are dirt, gravel, or sand. Regular traffic on these roads creates large amounts of dust that falls on the surrounding vegetation. There are roads that are maintained by the BLM, counties, and private corporations. Larger collector roads shown on Figure 3.14-1 are not maintained by the BLM.

3.14.2. ACCESS

The checkerboard land ownership pattern and other non-BLM-managed inholdings create access problems to land and resources administered by BLM. Some easements exist to allow access across these lands. There are several locations where public access to public land is not available due to the absence of easements or contiguous BLM-managed public land. This is evident with some recreation sites where access to the sites in not possible due to roads that cross private inholdings. Access to the Overland Trail is hampered due to non-contiguous BLM-managed land, as well. In addition, public access to streams and reservoirs is often restricted by the absence of accessible public lands adjacent to the water.

3.14.3. TRANSPORTATION TRENDS

Transportation of extracted resources (oil, gas, coal, etc.) along transportation corridors increases as new development occurs. Not only is there an increase in pipelines, there is also an increase in access and utility roads needed for the maintenance and construction of wells. Thus, trends in transportation coincide directly with development of extracted resources.

3.15. VEGETATION

Vegetation resources within the Rawlins RMPPA are diverse, and in some areas unique. The precipitation, elevation and temperature extremes, combined with soil and geology variability, create a variety of vegetation habitat types. The eastern areas of the Rawlins RMPPA, located in Wyoming's southeast corner, are within the vast North American prairies, where mixed grass communities dominate. The desert areas provide habitat for a variety of hearty plants tolerant of low precipitation, temperature extremes and saline soils. Alpine areas on Elk Mountain, the Seminoe and Ferris Mountains support plants adapted to very low temperatures, an extremely short growing season, and high snow accumulation.

This discussion focuses on vegetation distribution and types at three levels. The top level divides the Rawlins RMPPA into three vegetation provinces. These were taken from

Bailey (1995), which describes the Ecoregions of the United States. The middle level uses vegetation map zones aggregated from GAP satellite imagery interpretation. The map zones allow for quantitative measurements of broad vegetation types. The lowest level describes the individual plant communities, including the soil, climate and vegetation characteristics. Each level is useful as a management tool with various applications.

3.15.1. ECOLOGICAL PROVINCES

Bailey's (1995) description of North American Ecoregions places the Rawlins RMPPA in three different vegetation provinces (Figure 3.15-1). These include the Intermountain Semi-Desert Province (342), Great Plains Dry Steppe Province (331), and Southern Rocky Mountain Steppe – Open Woodland – Coniferous Forest Province (M331). The following provides an overview of each of these vegetation provinces.

3.15.1.1. Intermountain Semi-Desert Province (342)

This area is contained within the intermountain basins of Wyoming and Northern Colorado. The chief vegetation type, sagebrush steppe, is made up of sagebrush, saltbush and a mixture of grasses and forbs. Willows, rushes and sedges dominate the wetter valley bottoms, while greasewood and inland saltgrass dominate drier streams and ephemeral washes (Bailey 1995 and Knight 1994). The higher elevations may contain pockets of aspen in the wetter areas and juniper/limber pine stands in the drier areas.

The Intermountain Semi-desert Province is sometimes considered a cold desert, as the summers are hot and the winters can be extremely cold. The growing season is short (Rawlins has a frost-free period of 106 days) and the annual precipitation varies between 5 and 14 inches. Snowfall averages between 20 and 60 inches (Martner 1986). Winter snow accumulation and runoff provides available moisture for spring plant growth. Snow distribution patterns caused by wind, topography and existing vegetation develop pockets of highly productive sites within the drier, less productive surrounding areas.

This area lays predominately in the western and central regions of the Rawlins RMPPA at elevations below 8,000 feet. Forest and alpine areas dissect this vegetation province;

therefore, these areas provide winter habitat for many wildlife species. Livestock and wildlife grazing are the primary uses of this area.

3.15.1.2. Great Plains Dry Steppe Province (331)

Mixed and shortgrass prairies found east of the central Rocky Mountains dominate this region. Typical grasses in these areas include buffalo grass, grama grasses, wheat grasses and needle grasses. Deeper soils in wetter areas may grow taller grasses such as Indian grass and little bluestem. Scattered shrub colonies may dot the landscape with big sagebrush, sand sagebrush and rabbitbrush. Wet riparian areas provide habitat for cottonwood, sumac, willow and alder (Bailey 1995 and Knight 1994).

This area lies in the rain shadow of the Rocky Mountains. Winters are cold and dry, and summers are warm with frequent thunderstorms (Martner 1986 and Bailey 1995). Cheyenne has a moderate growing season of 138 days, but Laramie, forty miles west, has a much shorter growing season of only 93 days. The annual precipitation for the area is between 10 inches in the far west and 16 inches east of Cheyenne. The average annual snowfall is between 60 and 80 inches (Martner 1986).

Within the Rawlins RMPPA, the Great Plains Dry Steppe Province dominates the ecology of the Laramie Basin and the prairie east of the Laramie Range to Nebraska. The Laramie Basin varies in elevation between 7000 and 7500 feet, while the far southeast of the Rawlins RMPPA ranges between 5500 and 7000 feet. Most of this area is privately owned, and either used as grazing for livestock, irrigated cropland or dryland farming.

3.15.1.3. Southern Rocky Mountain Steppe – Open Woodland – Coniferous Forest Province (M331)

This area is a transition from the grass and shrub dominated areas to shrub and tree dominated areas. Brome and fescue grasses, mountain mahogany, sagebrush, aspen and juniper dominate the 8000 to 9000 feet elevations. The middle elevations of pine and spruce forest lie between 8,500 and 12,000 feet. Alpine tundra only occurs in the Rawlins RMPPA area above 10,000 feet and is dominated by short grasses and cushion type forbs, as well as krummholz patches of spruce and fir. Riparian vegetation varies according to elevation as well, however, willows and water tolerant grasses, sedges and rushes often dominate from the foothills to the alpine (Bailey 1995 and Knight 1994).

The climate of these areas is very variable and dynamic due to factors such as elevation, aspect, slope and topographical change. Eastern and southern slopes are generally drier and warmer than the western and northern slopes. As the elevation rises, the mean temperature lowers, and the growing season shortens (Fox Park at 9,065 feet has a frost-free period of only 21 days). Annual precipitation generally rises from 14 inches in the foothills to over 60 inches in the alpine. Winter mountain snowpack may reach over 200 inches per year and provides a reservoir for lower elevation water users (Martner 1985 and Knight 1994).

Mountain ranges dominated by the Southern Rocky Mountain Steppe – Open Woodland – Coniferous Forest Province are well distributed throughout the Rawlins RMPPA and include the Snowy Range, Sierra Madre Range, Laramie Range, Shirley Mountains, Seminoe Mountains, and Ferris Mountains. These areas provide summer forage for wildlife and livestock, as well as important habitat for many non-game mammals, birds and fish. Higher elevation provides areas of increased diversity and productivity within large areas of lower precipitation and often-more harsh environments.

3.15.2 GENERAL VEGETATION MAP ZONES

The general vegetation zones illustrated in Figure 3.15-2 represent combinations of plant community classes taken directly from the GAP Satellite imagery analysis (Table 3.15-1). The classes combined for each zone, the zone's total area, dominant vegetation, and a description of the area where it occurs are also provided in Table 3.15-1. Note that the acreages provided represent total area within the Rawlins RMPPA, some of which is owned by private, State, or other Federal entities.

Distinct plant communities within the Rawlins RMPPA are influenced by characteristics such as soil depth, texture and salt content; climate variables, particularly temperature, total and seasonal distribution of precipitation, and wind; and topographic features, most importantly elevation, aspect and slope. Plant communities respond to other environmental influences such as wildlife foraging, rodent burrowing and ant hills. Plants themselves also influence soil chemistry and soil resistance to wind and water erosion. The following plant community overviews show the diverse and complex nature of vegetation communities in the Rawlins RMPPA.

3.15.2.1. Agriculture/Town

This highly modified vegetation zone is mapped within the Rawlins RMPPA. It includes areas that are settled, farmed with or without irrigation, or mined. It also includes areas mapped by GAP as forest dominated riparian, because in reality such areas are primarily hayfields with only linear cottonwood stands remaining. With the exception of mined areas, little or none of this vegetation zone occurs on land managed by BLM.

River Bottom Cottonwood Forests occur along the Platte River bottom and are dominated by plains cottonwood and narrowleaf cottonwood. The vegetation type is very similar to the riparian woodlands, however these areas are drier and usually have a natural understory dominated by upland grasses and forbs in areas where agriculture is absent.

3.15.2.2. Barren

The barren vegetation zone occurs in diverse locations, all of which are inhospitable to vegetation. They range from exposed areas on mountaintops to rocky areas in basins to basin soils that do not support plants for various reasons, often because they are highly saline. This zone also includes areas mapped as open water, because these are primarily large, deep reservoirs that do not support plant life.

3.15.2.3. Forest and Woodland Communities

3.15.2.3.1. Broadleaf Communities—Aspen

Quaking aspen communities in the Rawlins RMPPA occupy the transitional zones between the sagebrush dominated communities and the coniferous forests. Aspen are also present along streams, in draws, or on the leeward areas of hills and ridges where snow collects. Aspen colonies typically reproduce asexually producing clones in which separate trees are connected by root suckers. Therefore, several acres of aspen maybe interconnected through their roots (Barns 1966). Soils of these areas are usually well-developed deep loam and sandy loam soils, with good drainage and high organic matter.

Acting as snow traps, aspen stands are able to support higher productivity and more diverse herbaceous plants than either the adjacent coniferous or sagebrush communities. Understory plants commonly include king spike fescue, bluebunch wheatgrass, smooth brome, mountain brome, lupine, columbine, Indian paintbrush, snowberry, current, serviceberry, Wood rose and common juniper.

Aspen respond well to fire and fires typically stimulate repressed colonies to increase root sucker regeneration. This may diversify the age structure of the stand and increase herbaceous production. The occurrence of spring and fall fires has produced the best results.

Wildlife depend on aspen in the fall, winter and spring for both cover and forage. The open cover of aspen stands provides mule deer fawning and elk calving areas as well. High grass production and shade draws wildlife and cattle into these areas during summer grazing seasons. Birds use these areas for important nesting sites and other non-game species also rely on this habitat.

3.15.2.3.2. Conifer Communities

Juniper and Limber Pine Woodland

Juniper woodlands often have Rocky Mountain Juniper as the single-tree species or, on steeper slopes or rockier soil, may have limber pine as a sub-dominant tree. These sites may occur in association with Wyoming and mountain big sagebrush steppe, occurring on shallow, poorly developed soils in elevations between 7,500 and 8,500 feet. The annual precipitation in these areas is between 16 and 20 inches. Understory vegetation includes bluebunch wheatgrass, needle and thread, slender wheatgrass, Idaho fescue, Wyoming big sagebrush, mountain big sagebrush, snowberry mountain mahogany, bitterbrush, and common juniper.

Juniper dominated communities often become decadent because the dominant species pumps most of the soil water into the atmosphere, resulting in a monoculture of juniper. At this point, prescribed fire does not result in an effective burn, as the fine fuels on the ground do not carry the fire into the trees. However, when these communities do eventually burn, they may sustain dangerous high intensity wildfire during high winds in the hot season. After juniper woodlands burn, production of herbaceous vegetation responds very well.

<u>Other Conifer</u>

Limber Pine Woodland

Limber pine is the dominant tree on rocky escarpments, surrounded by more productive grasslands (Knight 1994). It may also occur as a sub-dominant tree in juniper woodland, as mentioned above. Limber pine dominated areas are normally associated with Idaho fescue, bluebunch wheatgrass, globemallow, phlox, sand sage, fringed sage, snowberry and mountain big sagebrush.

Lodgepole Pine Forest

The most common tree in the mountains of northern Colorado, Wyoming and much of the Northern Rockies is lodgepole pine. These forests occur in the middle elevations of the area mountain ranges between 8,000 and 10,000 feet (Knight 1984). Lodgepole pine is considered a pioneer species, as it returns rather quickly following fire, and it does not regenerate well in a continuously shaded environment. These trees also produce serotinous cones, which are more likely to release their seed and germinate following intense heat.

The lodgepole pine forest canopy does not allow for a very diverse understory plant community. Plants that occur here are pine reedgrass, Wheeler bluegrass, heartleaf arnica, bedstraw, wortle berry, common juniper, Wood rose, wax currant and russet buffalo berry. Lodgepole will grow in mixed stands of aspen, Engleman spruce, sub-alpine fir, Douglas fir and Ponderosa pine (Knight 1994).

Lodgepole pine forests are present in many mountain areas of the Rawlins RMPPA and are managed for wildlife habitat, watershed maintenance and timber production. A detailed discussion of the management of these areas is included in Section 3.4 on (Forest Resources).

Ponderosa Pine Forest

Ponderosa pine occurs at lower elevations on the eastern slopes of mountains, where summer precipitation maybe higher and the growing season is longer and warmer. The most extensive ponderosa pine forests in the Rawlins RMPPA are on the eastern slopes of the Laramie Range, Shirley and Seminoe Mountains. Ponderosa pine forests are often open woodlands and support a mixed grass or shortgrass understory.

Scattered Upper Elevation Species

Scattered in the upper elevations of the Rawlins RMPPA, on north facing slopes, and in cold air drainages are individuals of species often found at higher elevations than typically characterize the RMPPA. These include spruces, firs, and Douglas fir. Logged conifers, and subalpine meadows are also mapped in this vegetation zone. Most stands of these species occur on Forest Service lands.

3.15.2.4. Grassland

Three grassland types occur in the Rawlins RMPPA: mixed grass prairie, shortgrass prairie, and a shortgrass prairie variant sometimes called desert grassland.

3.15.2.4.1. Mixed Grass Prairie

Due to the altitude and prevalence of sandy soils, the Laramie Basin is an isolated pocket of mixed grass prairie. Summers in this area are cool, which reduces the evapotransporation. Frequent thunderstorms in July and August maintain this grassland, which is also found in higher precipitation zones to the north and east. Mixed grass prairie is characterized by needle and thread, western wheatgrass, blue grama, Sandberg bluegrass, threadleaf sedge, needleleaf sedge, prairie junegrass, Indian ricegrass, prickly-pear cactus, globemallow, fringed sagebrush, sand sagebrush and various species of milkvetch and locoweed. This area is predominately used for livestock and wildlife grazing.

3.15.2.4.2. Shortgrass Prairie

The shortgrass prairie occurs in the southeastern corner of the Rawlins RMPPA and is characterized by buffalo grass and blue grama. Other associated species include hairy grama, western wheatgrass, side-oats grama, yucca and prickly-pear cactus (Barker and Whitman 1994). This area lies in the 12 to 20 inch annual precipitation zone in the rain shadow of the Rocky Mountains. Soils are sandy loams, loams and clay loams. Most of the area is used for livestock grazing and very little is managed by the BLM. To the west, this vegetation type is replaced by the ponderosa pine and lodgepole pine forests of the Laramie Range.

On sandier soils and dunes, where water is more available and the shifting dunes restricted by shrub establishment, desert grasslands commonly occur as a variant of shortgrass prairie. Common grass species include thickspike wheatgrass, slender wheatgrass, bluebunch wheatgrass, Indian ricegrass, needle and thread, Sandberg bluegrass and sand dropseed. Other shrubs and forbs growing amongst the grasses are sand sagewort, phlox, Hooker sandwart, bud sagebrush, fringed sagebrush, Wyoming big sagebrush, rubber rabbitbrush, horsebrush, and prickly pear cactus (Knight 1994).

Saltgrass meadows occur in shallow depressions or adjacent to playa lakes where groundwater is near the desert surface. These areas are characterized by inland saltgrass, alkaligrass, alkali sacaton and, in wetter areas, alkali cordgrass (Knight 1994). Desert grasslands provide palatable forage and often provide islands of diversity within the desert shrublands.

3.15.2.5 Shrub Communities

Shrublands dominate the majority of lands administered by the BLM in the Rawlins RMPPA. These areas are very diverse and, therefore, this section discusses several shrub community types.

3.15.2.5.1. Greasewood

Greasewood dominated shrublands occur on the fringes of playas, desert lakes, ponds and desert streams. Greasewood is a halophyte that does well in very saline soils, however, it needs more soil moisture to survive than saltbush.

Where greasewood is the dominant shrub, sub-dominant shrubs include shadscale, Gardener saltbush, alkali sagebrush and basin big sagebrush. The understory is limited to salt tolerant herbaceous vegetation such as inland saltgrass, western wheatgrass, alkali sacaton, halogeton, pepperweed, and sea blight.

Large expanses of this vegetation type occur in the Great Divide Basin. Greasewood shrublands often occur on the terraces above wetter areas where silver sagebrush or basin big sagebrush dominate (Knight 1994). Greasewood communities are often found adjacent to saltbush-dominated communities, growing in deeper, sandier soils and alluvial fans. Antelope and sheep will eat the spiny twigs and leave in the spring and early summer, but greasewood is not considered a very palatable forage.

3.15.2.5.2. Mountain Shrub

Bitterbrush Shrub Steppe

Bitterbrush dominated plant communities exist on sand, sandy and sandy loam soils in the 10 to 14 inch annual precipitation zones. Bitterbrush varies in height depending on soil depth, precipitation and browsing. It may appear as a low spreading shrub about 6 inches tall, or as a tall shrub reaching 6 feet in height.

Bitterbrush is often a co-dominant with mountain or basin big sagebrush, and in the sand hills south of Rawlins it is intermixed with silver sagebrush in deep sandy soils. At higher elevations and higher precipitation levels, it occurs in mixtures with sagebrush, snowberry, serviceberry, mountain mahogany, and occasional chokecherry. Herbaceous plants associated with bitterbrush include grasses such as needle-and-thread, Indian ricegrass, sand dropseed, thick spike wheatgrass; and forbs such as lupine, penstemon, sego lily, wild onion, larkspur, and prickly pear cactus.

Bitterbrush is likely the most important winter browse species for deer in the region. Elk and cattle use it as well in the fall and spring. It responds well to sagebrush killing fires when burns occur in the fall and spring, however hot summer fires will kill it.

Mesic Upland Shrub Steppe

Either serviceberry or chokecherry or a combination of both dominates this community, often in conjunction with snowberry, currant and Wood rose. Good examples of this plant community occur on the mid elevations of Battle Mountain near Savery. These shrubs may reach 10 to 15 feet high, occurring in dense stands or in scattered patches often adjacent to aspen or willow. Understory grasses include basin wildrye, green needlegrass, Columbia needlegrass, Kentucky blue grass, and forbs include bluebell, columbine, aster, violet, elkweed, chickweed, and stinging nettle.

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.

Xeric Upland Shrub Steppe

True mountain mahogany dominates this plant community on dry rocky slopes, or in very shallow, undeveloped soils in the 10-14 inch precipitation zone. It occurs as both the dominant shrub or as an understory of Utah juniper, at higher elevations mixing with bitterbrush, snowberry, serviceberry, green rabbitbrush, broom snakeweed and Wyoming big sagebrush. Common associated herbaceous plants include bluebunch wheatgrass, Indian ricegrass, Sandberg bluegrass, and mat forming forbs such as phlox, buckwheat, locoweed, and milkvetch.

True mountain mahogany may reach 5 to 7 feet tall, depending on the amount of browsing and soil depth. Typical mountain mahogany communities occur in Telephone Canyon along I-80 east of Laramie, and Chalk Mountain near the Shirley Mountains. Fire generally lessens the density of the shrub stands, allowing grasses and other herbaceous plants to increase, while still providing wildlife browse. Mountain mahogany is an important wildlife fall and winter forage. A notable characteristic is the hedging growth pattern exhibited by mountain mahogany plants after they have been browsed by mule deer and elk.

3.15.2.5.3. Sagebrush

The GAP data represent sagebrush as black sagebrush, mountain sagebrush, and Wyoming sagebrush plant cover types, which are mapped collectively as sagebrush on Figure 3.15-2. These three categories cannot readily be partitioned into the species of sagebrush actually found in the Rawlins RMPPA, which are discussed below.

Wyoming Big Sagebrush/Grassland

The Wyoming big sagebrush/grassland is the most common vegetative cover type in south central Wyoming. It occurs on shallow to moderately deep soil at lower elevations, giving way to basin big sagebrush on deeper soils and to mountain big sagebrush above 6,500 feet in elevation and within the 9-16 inch annual precipitation zones (Knight 1994). Shrub height varies from as little as eight inches tall on shallow sites to around thirty inches tall on deeper soils. Canopy cover is not as extensive as for either basin or mountain big sagebrush, usually topping out between thirty and forty percent.

Wyoming big sagebrush often appears as the dominant plant in mosaic communities intermixed with Gardener saltbush and open grasslands. On shallow, rocky to gravelly soils, Wyoming big sagebrush may be co-dominant with black sagebrush, green rabbitbrush and sometimes winter fat. Grass and forb species vary depending on soil texture, aspect and slope. Common grass and grass-like species include bluebunch and thickspike wheatgrass, Sandberg and mutton bluegrass, Indian ricegrass, needle and thread, threadleaf sedge and bottlebrush squirrel tail. Common forbs include phlox, hooker sandwort, buckwheat, penstemon, Indian paintbrush, globe mallow and prickly pear cactus.

Wyoming big sagebrush is the most frequently eaten sagebrush and is a staple for pronghorn antelope and sage grouse. It is also one of the dominant species found on antelope and mule deer crucial winter ranges. Fire is an important component of all sagebrush dominated plant communities. Depending on the nature of the site, fire return interval can be between 25 and 100 years (Knight 1994).

Basin Big Sagebrush Shrubland

Basin big sagebrush shrubland is found on moderately deep, to deep soils of all soil textures in precipitation zones of 10 to 16 inches of annual precipitation (Beetle 1960). It occurs as pockets within Wyoming big sagebrush and Gardener saltbush communities, as the dominant plant type along valley bottoms and canyons, as well as along isolated ephemeral washes. This sub-species of big sagebrush may reach 12 feet in height, with canopy cover reaching seventy percent.

Basin big sagebrush mixes with service berry, green and rubber rabbit brush, snowberry, bitterbrush, silver sagebrush, and mountain mahogany depending on the soil depth, annual precipitation and elevation. Grasses occurring in these communities include basin wildrye, green needlegrass, Idaho fescue, thickspike wheatgrass, Kentucky and mutton bluegrass, alkali sacatoon, and bottlebrush squirrel tail. Common forbs include bluebells, hooker sandwort, buckwheat, penstemon, Indian paintbrush, globe mallow, and prickly pear cactus.

Basin big sagebrush is not a very palatable forage, usually showing little or no use, even on extreme winters when use levels on other plants are severe. It is important, however, as hiding cover for mule deer and elk, as well as habitat of other wildlife species. It often increases in density and cover with poor livestock management and interruptions in the fire cycle. To increase diversity in basin big sagebrush shrublands, prescribed fires, and chemical and mechanical treatments are employed, resulting in increases of grasses and other understory plants.

Mountain Big Sagebrush/Grassland

Mountain big sagebrush is located on shallow to moderately deep soils above 6,500 feet elevation, in annual precipitation zones of 12 to 20 inches. It is the dominant plant community on the Brown's Hill to Miller Hill plateau south of Rawlins. This is one of the largest homogeneous communities of this sagebrush type in the United States. It also occurs as smaller plant communities at the lower mountain elevations, and enters into small and larger mountain ranges intermixed with aspen and conifer woodlands. Shrub height will vary from 10-30 inches, with canopy cover reaching 50-60 percent.

Mountain big sagebrush is usually the dominant shrub in foothill and mountain sage communities, with bitterbrush, serviceberry, snowberry and mountain mahogany providing sub-dominant brush diversity. Grasses include Idaho fescue, king spike fescue, green and Colombian needle grass, Kentucky, mutton and big bluegrass and Ross' sedge. Common forbs found in these areas include Indian paintbrush, globemallow, lupine, larkspur, penstemon, and Oregon grape.

Mountain big sagebrush is palatable to wildlife, although browsing is limited to winter use. Following fire, mountain big sagebrush reestablishes as the dominant species quicker than other sagebrush types, often resuming dense canopy cover after only 20 to 30 years. The natural fire recurrence interval in this sagebrush type is 25-75 years.

Silver Sagebrush/Grasslands

Silver sagebrush/grasslands consist of two sub-types with very different habitats. The most common is found on deep, sandy soils, with silver sage as the dominant species, and associated with basin big sage, green rabbitbrush, serviceberry. chokecherry, and Wood rose. Herbaceous species include needle and thread, Indian ricegrass, prairie sandreed, sand dropseed, scurfpea, and prickly pear cactus.

The second type is located in riparian habitat along streams above the wet sedge and willow riparian zone. The second riparian terrace is also habitat for basin wildrye, Kentucky bluegrass, streambank wheatgrass, redtop, Baltic rush, clover, checkermallow, aster, and, occasionally, cottonwood and willow.

Silver sagebrush is desirable forage for both livestock and wildlife, and provides important habitat for big game and non-game species. These areas respond well to prescribed fire as a management tool when they are dry enough to burn.

Low Sages – Alkali, Birdsfoot and Wyoming Three-Tip Sagebrush/Grassland

Alkali sagebrush is found growing on clay soils and, as its name implies, can withstand higher alkaline soils than other sagebrushes (Beetle and Johnson 1982; Knight 1994). It occurs in relatively pure communities due to the high clay content and high cation exchange capacity in the soils in areas below 7,500 feet elevation. Understory grasses include bluebunch wheatgrass, western wheatgrass, mutton bluegrass, bottlebrush squirreltail, and alkali sacatoon. Forbs noted at this site include wild buckwheat, biscuitroot, and wild onion. Browsing on this sage is light.

Birdsfoot sagebrush is found on alkaline soils where pH ranges from 8.5 to 11 and below 7,500 feet. At lower pH levels, birdsfoot sage mixes with Gardener saltbush and it appears with a mixture of grasses and forbs on wind swept ridges and hills. At higher pH levels birdsfoot sagebrush occurs as a monoculture.

Wyoming three-tip sagebrush occurs above 7,000 feet in the foothills and the higher elevations of the mountain ranges. It normally grows between 10 inches and 30 inches tall in moderately deep, well-drained soils (Beetle and Johnson 1982). It is often found intermixed with mountain big sagebrush and black sagebrush. Understory grasses and forbs include Idaho fescue, king spike fescue, Colombian needlegrass, elk sedge, Ross' sedge, Indian paintbrush, mountain pea, larkspur, balsamroot, phlox and buckwheat. Wyoming three-tip sagebrush dominated areas are often used as forage for wildlife. These areas rarely burn they are cool and moist areas.

3.15.2.5.4. Saltbush

Salt desert shrubland is perhaps the most arid vegetation type in the intermountain west (Knight 1994). Gardener saltbush dominates the salt desert shrub community type and in some instances occurs as up to 90 percent of the vegetation cover. These areas are characterized by accumulations of salt in poorly developed soils. Soils of this area usually have a pH of 8 or higher, which restricts the uptake of water by all but the most salt tolerant plants (halophytes). Soil textures can be sandy loam, sandy clay loam, or loam and clay (Knight et al. 1987). Salts accumulate around these plants each year with leaf fall. Halophytes function essentially to redistribute salts from the soil depths to the surface, thereby concentrating salts around the perimeter of the plant. This enables the plant to eliminate competition for scarce water and nutrients with other less salt tolerant plants (Goodin and Mozafar 1972).

Gardener saltbush normally grows no higher that 12 inches, and may grow along the ground forming a mat. Sub-dominant shrubs include birdfoot sage, bud sage, spiny hopsage, greasewood, broom snakeweed, shadscale, basin big sagebrush, and rubber rabbitbrush. Grasses associated with these sites are alkali sacaton, western wheatgrass and needle and thread. Forbs found in these areas include winterfat, globemallow, halogeton, and prickly pear cactus.

Salt desert shrublands occur between 6000 and 7600 feet elevation within the lowest precipitation areas in the Rawlins RMPPA. These areas are typically flat or rolling hills. Excellent examples of this type exist in the Separation Flats area west of Rawlins. Gardener saltbush is a valuable forage species on winter and spring ranges. In the spring when green, Gardener saltbush has higher protein concentrations than late season alfalfa, and is a preferred livestock forage for lambing sheep and calving cattle.

3.15.2.6. Sand

The sand vegetation zone is mapped as a combination of active sand dune type and sand dune complex type. A band of sand dunes stretches across the northern portion of the Rawlins RMPPA. Some dunes may become vegetated for a while, only to suffer a blowout from atypical wind speeds or directions. Once such a blowout starts to enlarge, the destabilized dune becomes active again. These dunes provide habitat for unique plant species, such as blowout penstemon. In addition, snowdrifts that become insulated by a blanket of overblown sand serve as a source of water for dunal ponds. Such ponds are an important source of water for wildlife in the midst of the sandy dunes.

3.15.2.7. Wetland and Riparian Communities

The GAP data use three plant cover types to depict wetland and riparian communities: graminoid/forb dominated wetlands, graminoid/forb dominated riparian areas, and shrub dominated riparian type. These types provide the best reflection of wetland and riparian communities in smaller drainages where agriculture has not extensively modified the vegetation. As noted above, forest dominated riparian communities have been mapped as part of the agriculture/town zone because of its extensive modification. It is no longer available as a substantive habitat, particularly in the eastern portion of the Rawlins RMPPA.

Wetland and riparian vegetation communities in arid and semi-arid environments often are key sites for the local ecosystem. Most terrestrial animal and insect life depend on riparian or wetland areas for a source of water, forage, and cover. Riparian and wetland areas in good health maintain water quality and aquifers, control erosion, diminish the impact of floods, and act as a stabilizing force in western landscapes subject to frequent drought and dynamic precipitation cycles.

3.15.2.7.1. Wetlands

Wetland vegetation is dependent upon the hydrologic network of the watershed, the duration of water availability, soil and geologic conditions, soil types and depth, climate, and management history. Sedges, rushes, cattails, and other wetland obligates dominate the environment. As water availability decreases, herbaceous vegetation shifts from sedges (wetland obligates) to grasses and wetland facultative (plants that usually occur in wetlands but are occasionally found in other habitats).

Wetlands are a valuable natural resource and impacts to these areas should be avoided wherever possible. Wetlands in the plan area are represented by:

- Shoreline vegetation around open water bodies,
- Riparian vegetation along streams,
- Open meadows that accumulate moisture in the winter and spring,
- Dunal ponds associated with the Great Basin Divide Closed Basin.

Based on GAP data, there are 87,445 acres in the plan area that can be classified as wetlands. Many of these areas are seasonally dry and inundated with water infrequently. Vegetation in these areas varies according to the frequency, depth, and duration of inundation. From an ecosystem perspective, unique to the wetland areas in the Rawlins

RMPPA are the dunal ponds, which are seasonally supported by precipitation that is trapped in the Great Basin sand deposits. The variety of shrubs, grasses, and forbs present depends upon the degree and duration of wetness and exposure at each location.

In most cases, salt accumulation is not excessive in the wetland areas. This is due to the leaching effect of water, which can dissolve and remove the salts. Where drainage is limited, alkali conditions can occur and subsequently affect the types of plants that can be sustained. Wetland and riparian vegetation moderates stream water temperatures, adds structure to the river network, provides habitat for fish, birds and wildlife, and provides organic material for insect production. Vegetated wetlands and floodplains dissipate stream energy, store water for later release, provide areas of infiltration for groundwater, support the hyporheic zone of the river, and provide rearing areas for fish and animal species.

Public lands within the project boundaries provides potential habitat for obligate and facultative wetland and riparian plants (Table 3.15-2). Wetland vegetation can form nearly monotypic stands of vegetation (e.g., sedges or cattails) to diversified assemblages of plants. The determining factors appear to be availability of water, soils and management actions on the surrounding lands. Meadows typically have a wider variety of plants likely due to the more gradual transition from dry to wet conditions. Wetlands that are isolated by location and distance from other vegetation types typically are more likely to have a monotypic plant assemblage.

Three primary drainages occur within the project area, the Colorado River watershed in the western portion, the Platte River watershed in the eastern portion, and the Great Divide Closed Basin in the northwest. Each of these basins has unique soil, geologic and hydrologic characteristics which impact the potential for wetland development.

3.15.2.7.2. Riparian Areas

Desert Riparian

Many different types of desert riparian occur in the Rawlins RMPPA, depending on the timing and duration of soil wetting, soil type and depth, and the topography of the area.

These usually occur on alluvial material, either of sand, sandy loam, loam, or an unconsolidated mixture of soil and cobble material. Soils are usually well drained and higher in organic matter than the surrounding uplands. Streams are often ephemeral or intermittent; therefore, vegetation depends on spring or storm flow.

The wettest areas in the desert commonly support Baltic rush, Nebraska sedge, water sedge and tufted hairgrass, with mountain iris, sandbar willow and narrowleaf cottonwood occasionally along the fringes. Seasonally wet areas in the desert and steppe communities commonly contain Kentucky bluegrass, tufted hairgrass, foxtail barley, orchard grass, smooth brome, slender wheatgrass, basin wildrye, field horsetail, Wood rose, shrubby cinquefoil, silver sage, basin big sagebrush, greasewood, and a variety of willow species.

Desert ephemeral washes may lie on saltier soils and therefore support salt tolerant species. Iinland saltgrass and western wheatgrass dominate this herbaceous community, while greasewood and basin big sagebrush are the dominant shrubs.

Irrigated lands along the major streams and rivers in the desert have limited the extent of native vegetation in most riparian areas. Where topography and soils restrict farming, however, native vegetation persists. These areas sustain riparian woodlands that support trees and shrubs such as plains cottonwood, narrowleaf cottonwood, Fremont cottonwood, geyer willow, sandbar willow, and yellow willow. Often the trees and shrubs give way to herbaceous communities where soils are shallow. Herbaceous plants and lower shrubs dominating these areas would be part of the understory in the riparian tree communities. Vegetation includes slender wheatgrass, thickspike wheatgrass, smooth brome, tufted hairgrass, meadow foxtail, timothy, mountain iris, horsetail, snowberry, gooseberry, currant, buffalo berry, and basin big sagebrush. Such communities are located along the fringes of the riparian areas or in the rockier areas.

Riparian areas are associated with the highest production of grasses and other very palatable herbaceous species in the desert, as well as the greatest plant diversity. Often open water is also present. These characteristics draw both livestock and wildlife and also provide critical habitat to many species depending on water for survival. Desert riparian communities are normally less than 1 percent of the total area in the desert. This places additional pressure on the management of riparian sites for ecological and hydrological sustainability. Management of BLM livestock allotments is often focused on limiting grazing on the desert riparian areas to preserve their valuable diversity and productivity.

Foothills and Mountain Riparian

Riparian areas in the foothills and mountains are generally more moist for longer periods of time and support plants that need to be in wet or saturated soils throughout the growing season. In addition, the stream gradients are steeper, and the streambed material is much larger. Riparian areas in the foothills and mountains receive snowmelt and spring discharges that provide perennial flow and cooler water. The soils are usually more coarse, with higher organic matter and increased soil development than in lower elevations. These areas range in elevation from 7,500 to 10,000 feet and may include alpine tundra characteristics in the upper reaches of the watersheds.

Willow is often the dominant species in these environments. Willows frequently observed are sandbar willow, Geyer willow, yellow willow, whiplash willow, Wolf willow, Booth willow, Bebb's willow, and plain leaf willow. Species prominent in the composition of the willow understory include beaked sedge, Nebraska sedge, water sedge, field sedge, Baltic rush, bull rush, spike rush, tufted hairgrass, Kentucky bluegrass, meadow foxtail and reedgrass. These understory plants dominate in the open meadows and marshes. Other shrubs and trees that occur are water birch, shrubby cinquefoil, redosier dogwood, snowberry, skunkbrush sumac, narrow leaf cottonwood, aspen, Engleman spruce, and lodgepole pine (Knight 1994).

As in the desert riparian, mountain riparian vegetation is more diverse and higher in productivity than the surrounding uplands, causing livestock and game to concentrate there. The forage also stays lush and more palatable into the late summer (when upland grasses have cured), adding to the attractiveness of the areas. Livestock management strategies often include limiting grazing on these areas.

3.15.2.7.3. Riparian Proper Functioning Condition

Proper Functioning Condition (PFC) is the monitoring tool the Rawlins RMPPA uses to determine the relative health of stream hydrology, riparian vegetation, and the aquatic fauna and flora of creeks in the Rawlins RMPPA. Wetlands are also evaluated. A wetland system that exhibits high integrity and proper functioning has a mosaic of well-connected, high quality water, and habitats that support a wide assemblage of native and desired nonnative species, the full expression of life histories, dispersal and connection mechanisms, and the genetic diversity necessary for long-term persistence and adaptation in a variable environment. Wetlands exhibiting the greatest level of these characteristics were rated high and those exhibiting the least were rated low.

The PFC surveys are collected by watershed and the Rawlins RMPPA is currently in the third year of a seven-year effort to collect PFC data throughout the Rawlins RMPPA. Vegetation parameters collected during PFC inspections include photos from established photo points, ocular assessment of vegetation cover (noting species successional status, presence of weeds, invasive upland species, woody species age class diversity), and the ability for riparian vegetation to stabilize the soil and stream banks. The PFC data collected will establish a baseline for future studies and determine the level of effort needed to improve or maintain the water and natural resources of each watershed.

3.15.3. WEED MANAGEMENT

Noxious weeds are established and have been identified as a major threat to native ecosystems. Noxious weed invasion contributes to the loss of rangeland productivity, increased soil erosion, reduced species and structural diversity, loss of wildlife habitat, and, in some instances, is hazardous to human health and welfare (Federal Noxious Weed Act, Public Law 93-629).

Three general classes of noxious weed species exist: (1) weeds that pose a known economic threat and occur in infestations small enough to make eradication or containment possible; (2) weeds that pose an economic threat and whose regional abundance limits control techniques primarily to biological methods; and, (3) weeds for which the State of Wyoming will implement a statewide management plan.

The weed management program in the Rawlins RMPPA operates under a Noxious Weed Prevention Plan. This plan was mandated by the Federal Weed Executive Order 13112 of February 3,1999. The Noxious Weed Prevention Plan outlines measures to reduce the occurrence and dispersion of weeds, and noxious weeds in the Rawlins RMPPA. It takes into consideration different activities such as livestock grazing, surface disturbance and recreation.

The Rawlins Field Office works with three State weed management area offices where BLM-managed lands are the most concentrated. These weed management areas are part of the State of Wyoming weed control effort. Weed management efforts of the Rawlins Field Office are coordinated with these weed management areas.

Weed suppression areas of BLM focus- are the oil and gas development areas, roads and recreation areas. The Rawlins Field Office weed staff spends a majority of their time identifying weed infestations within the RMPPA. The Wyoming Weed and Pest Control Act designated noxious weeds to include the following:

- Leafy spurge,
- Spotted knapweed,
- Diffuse knapweed,
- Russian knapweed,
- Musk thistle,
- Scotch thistle,
- Plumeless thistle,
- Canada thistle,
- Field bindweed,
- Dyers woad,
- Hoary cress,
- Perennial pepperweed,
- Dalmatian toadflax,
- Yellow toadflax,
- Skeletonleaf bursage,
- Houndstongue,
- Common burdock,
- Quack grass,
- Perennial sowthistle,
- Oxeye daisy,
- Purple loosetrife,
- Salt cedar.

The Rawlins Field Office weed management staff and the State of Wyoming Weed and Pest Control focus their efforts on the noxious weeds; however, they are actively involved in eliminating all invasive and non-native species that cause management problems to livestock, wildlife, and human activities.

3.15.4. LISTED AND SPECIAL STATUS PLANT SPECIES

Section 68.40 of the BLM Manual sets the guidelines for special status plant species (BLM–sensitive plant species). The list of BLM sensitive plant species includes species that are of concern in addition to Federal and State threatened and endangered species. These selected species receive priority attention for inventories, research, monitoring, and for management decisions regarding land-disturbing activities. Consultation with Federal, State, and non-governmental agencies assists in directing the plants' protection and management. The BLM performs special status plant surveys before any land exchanges, range and wildlife projects, other surface-disturbing activities, or proposed energy development operations take place.

Federal regulations, state laws, and BLM policy mandates the following actions:

- Maintain and improve critical or essential habitat to prevent deterioration and provide recovery (Table 3.15-3 lists current threatened and endangered species),
- Maintain, restore, or enhance the habitat of candidate, state-listed, and other sensitive species to maintain the populations at a level that will avoid endangering the species and the need to list the species by either state or Federal government (Table 3.15-4 lists current BLM sensitive species),
- Ensure that BLM-authorized actions within the plan area do not result in the need to list special status species or jeopardize the continued existence of listed species,
- Increase BLM's knowledge about the status and distribution of special status species.

Special status plant species occur in a variety of plant associations and on a variety of physical habitats, many of which have distinctive soil types. Often several special status plant species occur together in plant communities that may exhibit fidelity to specific locations and substrates and ultimately result in development of unique subspecies.

3.16. VISUAL RESOURCES

Visual resources within the Rawlins RMPPA are influenced by a wide variety of different topographic, hydrological, vegetative, and other characteristics of the region. Landforms range from relatively flat land used for activities such as grazing; to low mountains, low rolling or flat-topped hills, and isolated hills; to higher elevations near the Medicine Bow National Forest containing mountain shrub vegetation with alpine forest atop the highest areas. Elevation and precipitation determine the dominant vegetation; elevation and precipitation amounts vary widely within the Rawlins RMPPA. With the widely diverse vegetation patterns that result from varying topographic and precipitation characteristics come changes to color, form, line, and contrast. These four elements form the basis for analysis of the visual resources of the area.

Protection of visual resources is often associated with recreational opportunities, as discussed in Section 3.11. The highest quality recreational experiences in the area depend on natural settings and scenic views.

3.16.1. NATURAL SETTINGS AND SCENIC VIEWS

Much of the Rawlins RMPPA contains natural settings with limited development, open spaces with panoramic vistas, and scenic views. In the non-mountainous, lower elevations of the area, summer views are characterized by scrubby low-growing gray-green vegetation, heat waves, mirages, distant mountains, and an intense blue sky. In contrast, winter views are monochromatic gray, with clear skies and an apparently lifeless gray-brown foreground backed by distant snow-capped mountain peaks. Different combinations of plant communities create subtle changes in mosaics of textures and colors. Larger views that encompass several viewsheds are available from high points. The sky/land interface is a significant aspect of all distant views.

Several areas within the Rawlins RMPPA exhibiting high degrees of scenic quality are easily accessible to tourists and other recreationists. The highest quality scenic views in the planning area are the WSAs, particularly the Ferris Mountain and Adobe Town WSAs due to their very unique geological formations. Both are quite rugged and untrammeled by man (Clair 2002).

3.16.2. VISIBILITY

Visibility can be defined as the distance one can see and the accompanying ability to perceive color, contrast and detail. The Rawlins RMPPA is essentially rural in character, and the Wyoming Air Quality Division has designated the area as in attainment of all of the Environmental Protection Agency's (EPA's) national pollution and ambient air quality standards. As discussed in Section 3.1, the Savage Run Wilderness and Rocky Mountain National Park have been designated as Prevention of Significant Deterioration (PSD) Class I areas. PSD Class I areas receive the highest degree of protection from air pollution within an area's viewshed, and allow only small amounts of particulate, SO_2, and NO_2 air pollutants. Visibility trend analysis of Rocky Mountain National Park (to the south and southeast of the Rawlins RMPPA) reveals no significant trend of worsening visibility from 1989 through 1998. Thus, the air quality of the Rawlins RMPPA is generally excellent, and pollutants do not obscure visibility.

3.16.3. VISUAL RESOURCE MANAGEMENT SYSTEM

The Rawlins RMPPA has been inventoried using the BLM Visual Resource Management (VRM) classification system. Using the VRM system, the Rawlins RMPPA was classified into four BLM visual management classifications (I through IV), based on scenic quality, visual sensitivity levels, and viewer distance zones. Each VRM classification has a management objective, as described below:

- **Class I** – The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activities. The level of change to the characteristic landscape should be very low and should 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 landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes to the landscape must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
- **Class III** – The objective of this class is to partially retain the existing character of the landscape. The level of change to the landscape should be moderate. Management activities may attract the attention of the casual observer, but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
- **Class IV** – The objective of this class is to provide for management activities that require major modifications to the existing character of the landscape. The level of

change to the landscape can be high. The management activities may dominate the view and may be the major focus of viewer attention. Every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repetition of the basic visual elements of form, line, color, and texture (BLM 1986).

The established VRM classes for the Rawlins RMPPA are depicted in Figure 3.16-1. The acreages for each VRM class within the Rawlins RMPPA are depicted in Table 3.16-1, Visual Resource Management Classifications and Acreage (BLM 1988). About 90 percent of the lands within the Rawlins RMPPA are categorized as visual class III. Class II lands are primarily associated with areas around the Pathfinder and Seminoe Reservoirs, and with the close-range viewsheds of the Medicine Bow National Forest. Only the WSAs are rated as VRM Class I. Generally, the VRM classifications given to lands are appropriate to their visual quality (Clair 2002).

The present objective of VRM within the Rawlins RMPPA is to minimize adverse effects on visual resources while maintaining the effectiveness of other land use allocations. The Rawlins RMPPA is managed according to the VRM classes assigned to the land.

3.16.4. VISUAL RESOURCE TRENDS AND ISSUES

There are several visual resource trends in the Rawlins RMPPA, including (Clair 2002):

- The existing Rawlins RMP describes those areas that have been designated for OHV use. OHV use is not yet highly popular in the Rawlins RMPPA; however, an increase in unmanaged, unmonitored OHV use within the area for both recreation and access to the surrounding Forest Service-managed lands in the Medicine Bow National Forest and to the dunes area is creating direct, negative visual impacts in certain parts of the area. Additionally, OHV use has impacted certain vegetative communities more than others.
- The widespread development of petroleum and natural gas exploration, coal, and coalbed methane in the Rawlins RMPPA is creating direct, negative visual impacts within the Rawlins RMPPA. Currently, visual mitigation of this activity is preventing mineral development activities from exceeding the established Visual Resource Management (VRM) objectives within these areas. The trend toward continued expansion of natural resource development is creating areas of potential conflict between this activity and the established VRM class objectives (Section 3.16.3).
- Utilities are also having an increasing visual impact in the Rawlins RMPPA. Even buried fiber optic lines leave obvious visual effects.
- While visual sensitivity is not the highest priority for many residents and visitors, as increasing numbers of sightseers and those seeking various types of recreational

opportunities pass through the Rawlins RMPPA, a heightened awareness of scenic values and of the existing scenic quality for some residents and visitors has occurred.

Emerging visual resource issues include (Clair 2002):

- Degradation of visual resources within the coalbed methane project on Seminoe Road. The road is a Back Country Byway, and portions of the project area are in the Class II VRM area. Efforts are needed to hide the roads, use the topsoil as berms to hide the well pads, and paint the fixtures to match natural conditions. However, there is no control over what effects occur within the private portion of the land ownership checkerboard,
- More effective mitigation on seismic projects,
- More effective mitigation within the transportation corridors (such as I-80) even if they are Class IV lands; since the transportation corridors are also the utility corridors, the existing impacts or VRM re-classifications are difficult to change,
- More effective mitigation on all wells, but it has proven difficult to change existing mitigation precedents.

3.17. WATERSHED AND WATER QUALITY

The Rawlins RMPPA lies on the headwaters of rivers that supply water to millions of people in downstream states. In addition water, in the intermountain west is less abundant than in most of the Untied States. Therefore, proper and cautious management of water is essential to the economy of this region. Conservation of water is evident throughout the Rawlins RMPPA. Stock reservoirs restrict water from leaving the upper portions of watersheds and provide drinking water for livestock and wildlife. Farmers irrigate their crops using gated pipe and sprinklers thereby reducing waste water. Large reservoirs on the Platte and Laramie Rivers hold spring and early summer runoff for use by farmers, and municipalities later in the year. The Rawlins Field Office works to ensure quality water is running off the BLM-managed lands by maintaining good range condition and riparian areas.

3.17.1. WATERSHEDS

There are twenty forth order watersheds in the Rawlins RMPPA, which are shown on Figure 3.17-1 along with the major rivers, lakes and reservoirs. The acreage for each of these watersheds is provided in Table 3.17-1. The Rawlins RMPPA is divided by the Continental Divide, meaning streams on the southwestern portion of the Rawlins RMPPA and drained by the Little Snake River flow into the Gulf of California while streams east of Rawlins and drained by the North Platte River flow into the Gulf of Mexico. Streams rising north and west of Rawlins lay in the Great Divide Basin, which has no surface discharge point. The rivers that convey the most water within the Rawlins RMPPA are the Platte River, Encampment River, Medicine Bow River, Laramie River and Little Snake River. Table 3.17-2 provides the discharge data for these rivers at USGS gauging stations.

Watersheds in the desert and range areas of the Rawlins RMPPA are in a water balance deficit, meaning the annual potential evapotranspiration exceeds the annual precipitation. Therefore, there is limited runoff from watersheds on the desert areas and most streams originating in these areas are ephemeral. Areas above 8,500 to 9,000 feet are in a water balance surplus meaning annual precipitation exceeds annual potential evapotranspiration. Most of the stream flows are perennial and most of the rivers originate in these higher elevation areas. Most watersheds in the Rawlins RMPPA are shrub-dominated rangelands below 8,500 feet.

Watersheds originating in the mountains receive flow from melting snow. Discharge in these streams typically peaks in May and June and slowly tapers off to a base flow in the fall. Streams originating in the desert areas respond to snow melt as well; however the peak flow from these streams occurs in April and May and desert streams may go dry by early June. Following spring runoff, these streams only flow as a response to rain showers and thunderstorms. Perennial streams that flow into sandy substrates may disappear or become intermittent due to water entering the sands.

The many dams and diversions along streams and rivers dampen the peak flows of these streams, and enable higher flows though the summer when irrigators need the water for their crops. This has altered the normal seasonal flow patterns of these streams and rivers, and has prompted changes in the hydrologic integrity of the region. Dams have altered the movement of sediment down the river, and discharge cold, clean water during the hot months. This has enabled prime trout fisheries below the dams.

The Great Divide Basin lies in the northwestern portion of the Rawlins RMPPA. This is a large closed basin, which splits the Continental Divide. None of the precipitation falling within the basin leaves through surface flow, as there is no discharge from the basin. This is a unique geological and hydrologic feature, as the Continental Divide does not split anywhere else in the United States.

3.17.2. WATER MANAGEMENT

Water management within the boundaries of the Rawlins RMPPA is primarily done by the Wyoming State Engineers Office, which administers State held water rights, and the U.S. Bureau of Reclamation, which administers dam and reservoir systems along the North Platte River. The BLM manages watersheds that supply a substantial portion of irrigation water and water for other uses. Therefore it is the Rawlins Field Office's responsibility to manage these lands in a way that maintains water quality and quantity. Other agencies involved in managing water resources of the area are the Army Corps of Engineers (ACE), the Environmental Protection Agency (EPA), the Wyoming Department of Environmental Quality (WYDEQ), and the Wyoming Game and Fish Department (WGFD).

The Bureau of Reclamation manages the system of dams, beginning with Seminoe Reservoir, to meet the downstream requirements of irrigators, municipalities, industrial uses, and the States of Wyoming and Nebraska. The Bureau of Reclamation allocates water according to decrees with Wyoming, Nebraska, and Colorado, and other judgments. In 1945, the Supreme Court ruled that Wyoming could irrigate up to 168,000 acres and split the natural flow at the state line 25 percent to Wyoming and 75 percent to Nebraska.

The Wyoming State Engineers Office administers water rights within the State of Wyoming. This includes domestic, municipal, industrial, agricultural, recreational, and in-stream flow. The Wyoming Board of Control issues all water permits and decides all State water rights issues. Nearly all of the Rawlins RMPPA is in Division One of the Wyoming Board of Control. Water rights in Wyoming are managed under the Prior Appropriation Doctrine meaning "first in time, first in right".

As stated before, water is allocated on the Platte River under the 1945 Supreme Court Decree. Other interstate agreements, degrees and treaties concerning water within the Rawlins RMPPA, include the following:

- Colorado River Compact, 1922 – Divides the basin at Lee Ferry, AZ. Provides that the upper basin states may use 7.5 million acre feet annually.
- Upper Colorado River, 1948 – Apportions 14 percent of the water allocated in the Colorado River Compact to Wyoming.
- Colorado River Salinity Control Act, 1974 – Limits the amount of total dissolved salts flowing into Mexico to one ton per day or 115 ppm over the salinity level at Imperial Dam California. This was a result of Minute No. 242 (1973), an amendment to the 1944 treaty between Mexico and the United States.
- Laramie River Compact, 1911, 1922 – Allows Colorado to divert up to 39,750 acre feet per year into the Cache La Poude River.

The WYDEQ identifies water bodies that are water quality impaired. The 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 (TMDL) allocation of pollutants. The streams that the WYDEQ 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 nine streams within the boundaries of the Rawlins RMPPA, although only four of theses streams flow through BLM administered lands. The BLM is developing measures to manage and monitor streams on the 303(d) list flowing through land it administers. Streams on the 303(d) list can be found on the WYDEQ web page (Internet: 01452 2002).

3.17.3. WATER QUALITY

The primary water quality concerns in the Rawlins RMPPA are salinity in the Little Snake River basin and turbidity in the North Platte River Basin. The Little Snake River is part of the Upper Colorado River Basin and, therefore, is part of the Colorado Salinity Control Act. Many of the watersheds discharging water from the Rawlins RMPPA administered lands are on highly erodible soils, notably Muddy Creek flowing into the Little Snake River and Sage Creek flowing into the North Platte River. Elevated dissolved salt loading has been documented in Muddy Creek, and elevated suspended sediment loading has been documented in both Muddy and Sage Creeks. Both of these streams are on the State 303(d) list.

Stream bank degradation and erosion due to poor vegetation cover within the watersheds are the predominate sources of sediment and salt found in the streams. Management of livestock grazing, road construction, oil and gas activity and recreation within the Rawlins RMPPA mitigates the impacts of these activities.

3.17.4. GROUND WATER

Aquifers providing usable water in the Rawlins RMPPA are primarily found along streams and rivers in the unconsolidated alluvium. These aquifers are termed unconfined or water table aquifers. Wells emanating from these aquifers supply water to ranches and farms, as well as municipalities. Deeper confined aquifers supply water to artisan wells. Artesian wells may be flowing or not depending on the potentiometric surface of the aquifer. Artesian wells used for domestic and irrigation water are usually found were limestone or sandstone geologic formations are within 2,000 feet of the surface.

Water from most artesian and water table wells in the Rawlins RMPPA have very good water quality. Ground water quality depends on the geology where the aquifer is located. Many aquifers produce water with high concentrations of salts and heavy metals. Oil and gas wells may produce water from these aquifers, and the drilling companies are required to contain this water in tanks and treat it.

3.17.5. COAL BED METHANE WATER PRODUCTION

Underground coal seams act as aquifers and often contain varying amounts of dissolved methane. When the water is pumped off of these coal beds, the water pressure on the coal is removed and methane is released from the coal seam. The methane will not release to the atmosphere unless the water is removed. Therefore, pumping water to the surface is necessary to produce coal bed methane.

Often water produced from coal bed methane wells has high concentrations of salt, which cannot be discharged into the surface stream network. Produced water needs to be managed so as to avoid elevating the salinity in the surface streams. The WYDEQ issues National Pollution Discharge Elimination System (NPDES) permits to coal bed methane well owners and operators, which require management of the well effluent water. Waters with elevated salt levels need to be discharged into evaporation ponds or treated before it enters natural streams. The NPDES permits issued by the WYDEQ are listed on their web page (Internet: wqd 2002). The BLM administers impacts to the streams and watersheds. Water emanating from coal bed methane wells must not interfere with other surface water uses and must be managed to avoid increased erosion.

3.17.6. WATER RESOURCE MONITORING

The foundation of water resource monitoring efforts in the Rawlins RMPPA is the Proper Functioning Condition (PFC) assessment. The PFC surveys determine whether the stream and riparian areas are meeting minimum requirements for proper functioning condition. The assessments include the following items:

- Frequency of flow out of the stream banks and across the floodplain,
- Past and present beaver activity,
- Channel morphology balance with landscape setting,
- Unnatural changes in riparian and wetland occurrence,
- Upland condition effects on riparian and stream channel,
- Age structure variability of plants,
- Presence or absence of key riparian species,
- Maintenance of riparian soil moisture,
- Adequacy of stream bank vegetation root systems to resist high flows,
- Vigor of key riparian and wetland species,
- Adequacy of water energy dissipation and stream armoring by vegetative cover,
- Maintenance of organic matter in riparian and wetland areas,
- Adequacy of stream channel roughness to resist elevated erosion,
- Presence of revegetation based on point bar measurement,
- Lateral channel movement rate,
- Stream channel vertical stability,
- Stream sediment and water discharge balance with watershed type.

The PFC surveys are competed in conjunctions with macro-invertebrate and vertebrate sampling, stream/riparian cross-section surveys, upland vegetation cover analysis and an assessment of the watershed and riparian area management.

These assessments are helpful in providing information use to adjust management within the watersheds and along the riparian areas. Information is also shared with the WYDEQ for listing or delisting waterbodies on the 303(d) list. The BLM Standards and Guideline criteria for riparian and stream health and water quality are assessed during PFC surveys as well.

3.18. WILD HORSES

Wild horses are important in the Rawlins RMPPA, providing a historic resource that is of particular interest to the public. This species is also of importance because it interacts with other species forage within its range. Most of the wild horse herds are found on lands managed by the BLM, which manages the size and distribution of these herds. Thus, the emphasis in the discussion below is on the number and distribution of wild horses within the Rawlins RMPPA and the interaction of this species with other grazing livestock and with wildlife.

3.18.1. HISTORY OF WILD HORSES

Ancestors of current populations of wild horses first arrived in North America in 1493, brought by Columbus on his second voyage. They were also commonly brought by succeeding Spanish explorers, and ultimately escaped to the wild, spreading across the American West. It is estimated that by the 1800s, 2 to 5 million wild horses were present in America, particularly in the Southwest (Internet: 2002 wildhorserescue). Ranchers, hunters, and "mustangers" gathered these horses for commercial purposes. By the 1950s populations were thought to have dropped below 20,000 (Internet: 2002 biodv-33). Citizen concern, largely initiated in the 1950s, resulted first in the passage of Public Law 86-234 (which prohibited use or motorized vehicles during roundups) in 1959, and finally the passage of Public Law 92-195 (which provided for the necessary management, protection and control of wild horses and burros) in 1971 (Internet: 2002 wildhorseandburro). In the 1971 Act, Congress declared "that wild free-roaming horses and burrows are living symbols of the historic and pioneer spirit of the West; that they contribute to the diversity of life forms within the Nation and enrich the lives of the American people; and that these horses and burros are fast disappearing from the American scene….". With this Act, the BLM through the Secretary of the Interior and the Forest Service through the Secretary of Agriculture were given the authority to manage wild horses and burros on public lands of the United States. Wild horses that stray onto private lands of their own volition may stay there so long as they are protected and not sold or transferred (Internet: 2002 wildhorseandburro). Alternatively, the private landowner may ask the BLM to remove the horses.

Early efforts of the BLM to comply with the inventory requirements of the Act focused on identifying areas of use and population levels (BLM 1994) and in establishing the ownership of horses found running wild on public land (Reed 2002). Burro populations were not found within the Rawlins RMPPA. The wild horse herds in the Rawlins RMPPA were concentrated in the western half of the area, but scattered individuals were also found in the eastern half of the area as well (Figure 3.18-1a). Discussion with private landowners in the eastern half of the Rawlins RMPPA, where public lands administered by BLM are widely scattered, identified horses that were claimed by the landowners. Unclaimed horses on the scattered public lands in the east could not be managed effectively because the acreage on public parcels was insufficient to support a horse herd and surrounding landowners were unwilling to support wild horses without claiming ownership (Reed 2002).

By 1978, policies and regulations were established that enabled BLM to manage specific populations in specific areas. The Public Rangelands Improvement Act of 1978 (Public Law 95-514) tied removal actions to restoration of "a thriving natural ecological balance to the range…" and protection of "the range from deterioration associated with overpopulation…." Agency efforts between 1978 and 1984 focused on identifying suitable habitat areas, establishing population objectives, and developing Herd Management Area Plans (HMAPs). Three HMAs (Stewart Creek, Lost Creek, and Adobe Town) were established in the Rawlins RMPPA and managed until 1988 to maintain the population objectives. In 1988, legal action by advocacy groups impeded the control of horse populations by BLM and resulted in changes in wild horse management policies culminating in the 1992 *Strategic Plan for Management of Wild Horses and Burros on Public Lands* (BLM 1994). Updates to this plan were made most recently in 1997 in response to an evaluation of the BLM's wild horse management program by an emergency evaluation team convened in response to a severe drought in 1996. The team made over 20 recommendations, including the establishment of a national advisory board, adoption program review, and greater focus on the long-term health of the land (Internet: 2002 WHB_contents, Internet: 2002 pr970211). These reforms continue to guide BLM's management of wild horses in the Rawlins RMPPA as they strive to "protect, maintain, and control a viable, healthy herd of wild horses while retaining their free-roaming nature and to provide adequate habitat for free-roaming wild horses through management consistent with environmental protection and enhancement policies…" (BLM 1990).

3.18.2. DISTRIBUTION AND STATUS OF WILD HORSES

Wild horses are currently found in the western portion of the Rawlins RMPPA in an area bounded on the south by the Colorado state line, on the east by Wyoming State Highway 789 (SH-789), on the north by the Rawlins/Lander Field Office boundary, and on the west by the Rawlins/Rock Springs Field Office boundary. Over two million acres of public and private lands are within this area, 24 percent of which are included within HMAs and 21 percent of which are in adjacent areas potentially affected by wild horse management.

Wild horses in the Rawlins RMPPA are currently concentrated in the three HMAs—Stewart Creek, Lost Creek, and Adobe Town (Figure 3.18-1b). Populations outside these HMAs are also monitored in I-80 South (an area outside of Adobe Town, south of I-80 and west of SH-789) and I-80 North (an area outside Stewart Creek and Lost Creek, north of I-80 and west of SH-789) and to some extent in the Bairoil Pasture of the Ferris In-Common Allotment. These three areas, with outside populations, are adjacent to the HMAs and are potentially affected by wild horse management within the HMAs. For each of the HMAs, an Appropriate Management Level (AML) has been established (Table 3.18-1) and horses exceeding the AML are considered excess, as are all horses outside the HMAs. BLM's goal is to adjust wild horse populations in each HMA to the AML and then monitor the herds and their habitat so that the AML can be reevaluated and adjusted if necessary (Reed 2002).

Current wild horse populations are also shown in Table 3.18-1. All areas for which there are data, except I-80 North, have increasing populations. The Adobe Town HMA 2002 population is more than double the 1999 population, while the Stewart Creek HMA 2002 population is 10 times the 1999 levels. The ability of wild horse populations to increase (and decrease) rapidly is shown in Figure 3.18-2. Population fluctuations are influenced not just by the fecundity of horse populations, but also by their contact with other horse herds outside the Rawlins RMPPA HMAs (Table 3.18-2), the presence of other grazing livestock within the HMAs (Table 3.18-3), the presence of grazing wildlife, and natural climatic variability. For example, there is interchange between the Adobe Town Herd and herds in the Rock Springs Salt Wells Creek HMA are south of I-80, since the Kinney Rim and Delaney Rim topographic features are all that separates these herds. These factors plus the mandate to keep the wild horse herds and their habitat in healthy ecological condition make the task of wild horse management complex.

The mandate for healthy ecological condition has resulted in BLM's careful consideration of herd genetics, age class balance, herd structure, and the least stressful methods and times for population control, as well as their collection of data on HMA habitat condition. Herd genetics are important from two perspectives, population viability/health, and heritage. A genetic pool of 150 individuals is considered the minimum to maintain population viability/health (BLM 1999), yet the AML for two of the HMAs is below this number because of limited carrying capacity of the land. This makes the introduction of new individuals from the metapopulation of particular importance. Heritage is important because genetic testing of the Lost Creek herd has revealed an unusually strong resemblance to early Spanish herds and resulted in a goal of maintaining the genetic uniqueness of this herd. This herd is a genetically viable unit that is isolated from and does not mix with other herds.

Age classes must be balanced to maintain herd viability and health, with care taken that the mean age of the herd does not become too young, resulting in loss of historic memory and wisdom that might guide the herd during times of such stress as severe drought, and that the herd does not become too old, resulting in the loss of fecundity and resilience during times of stress. An additional factor is the extra desirability of young animals as candidates for adoption by the public, since this is the preferred method of population control. The variability of age classes in the herd censused in I-80 South (Table 3.18-4) shows the rapid loss of younger age classes and the continuing attenuation of age class numbers with time. Foal survival until weaning during two years of field study was 91.4 percent. In addition, the absence of some age classes likely reflects how strongly severe natural conditions can affect a herd (BLM 2001).

Wild horse herds have a complex social structure. The horses within a given HMA do not exist in one large herd, but rather are distributed as individual local populations. For example, in the Adobe Town HMA there are eight local populations (Corson Springs, Espitalier Spring, Greasewood Flats, Sand Creek, Willow Creek, Cedar Breaks, Hangout, and Continental) and the Stewart Creek HMA has five local populations (Bull Springs, Stewart Creek, Ferris, A&M, and West Side), while the Lost Creek HMA has only one local population (Lost Creek) (BLM 1999). Even these local populations may be further subdivided, with small bands of two to four horses existing in equilibrium with local water and forage supplies (Reed 2002).

Population levels on the HMAs are typically controlled, as needed, through gathering of individuals considered suitable for adoption, but selected so as not to disrupt the social fabric of the herd. Such gathers are important because wild horses have few natural predators. Foals may succumb during particularly harsh environmental conditions and stallions may injure or even kill each other in battles for control of mares or territory, but mountain lions are the only predator expected to prey even occasionally on healthy wild horses. During gathers, helicopters are often used, together with drovers on horse back, to urge the horses toward a holding pen at the small end of a wide funnel. Horses are held at adoption facilities in Riverton, Rock Springs, or north of Cheyenne until an adoption is scheduled. Meanwhile, the horses may be trained to some degree, particularly at the facilities in Riverton and north of Cheyenne.

The wild horse habitat in the HMAs can be characterized as follows (BLM 1999):

- **Adobe Town HMA**--Plant communities are very diverse in this large area. The most abundant plant community in this HMA is sagebrush/bunchgrass. Other plant communities present are: desert shrub, grassland, mountain shrub, lentic riparian grass/sedge, limber pine woodlands, juniper woodlands, and a very few aspen woodlands. Needle and thread, Indian ricegrass, bluebunch wheatgrass, western wheatgrass, junegrass, and mutton bluegrass are the predominate grasses. Wyoming sagebrush, black sagebrush, bud sage, Gardner salt bush, fourwing salt bush, greasewood, bitterbrush, and mountain mahogany are important shrub species. There is both antelope and mule deer crucial winter range located within the Adobe Town HMA. A small but locally important elk population has become established in the southwestern portion of the HMA. There are 16 known sage grouse leks and associated nesting habitat within and adjacent to the HMA; however, there may be more leks in the area that have not yet been identified. In addition, there are numerous raptors that have historically nested, or may nest in the future, in the area which include: kestrels, ferruginous hawks, golden eagles, red-tailed hawks, great-horned owls, prairie falcons, and burrowing owls.

- **Stewart Creek HMA**--The most abundant plant community in this HMA is sagebrush/bunchgrass. Other communites present are: desert shrub and grassland, with limited lentic riparian grass/sedge, juniper woodland, mountain shrub and desert willow riparian types. Needle and thread, Indian ricegrass, bluebunch wheatgrass, western wheatgrass, junegrass, and mutton bluegrass are the predominate grasses. Wyoming sagebrush, black sagebrush, bud sage, Gardner salt bush, fourwing salt bush, and greasewood are important shrub species. There is antelope crucial winter range located in the Stewart Creek HMA. There are 14 known sage grouse leks and associated nesting habitat within and adjacent to the HMA; however, there may be more leks in the area that have not yet been identified. Raptors that may use the area for foraging and/or nesting include northern harriers, ferruginous hawks, golden eagles, red-tailed hawks, and burrowing owls. A small but locally important elk population utilizes the HMA.
- **Lost Creek HMA**--The most abundant plant community in this HMA is sagebrush/bunchgrass. Other communities present are: desert shrub, grassland, and lentic riparian grass/sedge primarily associated with desert wetland areas. Needle and thread, Indian ricegrass, bluebunch wheatgrass, western wheatgrass, junegrass, and mutton bluegrass are the predominate grasses. Wyoming sagebrush, black sagebrush, bud sage, Gardner salt bush, fourwing salt bush, and greasewood are important shrub species. There is no big game crucial winter range located within the Lost Creek HMA. There are 18 known sage grouse leks and associated nesting habitat within and adjacent to the HMA; however, there may be more leks in the area that have not yet been identified. Raptor species that may use the area for foraging and/or nesting include northern harriers, golden eagles, and ferruginous hawks.

In addition to the above characterization of wild horse habitat in terms of those resources that are most likely to interact with horses, data on riparian areas is particularly reflective of wild horse habitat health. Surveys of stream (lotic) and pond (lentic) health have been completed on 9.5 miles of stream and 41.4 acres of ponds within the HMAs using the PFC protocol. The results of these surveys are presented in Table 3.18-5. It can be seen that the surveyed streams in the Stewart Creek HMA are in good condition, but less so in the Adobe Town HMA, whereas the surveyed ponds are not faring well in any of the three HMAs, except for a few acres in Adobe Town.

It is also of note that privately owned or controlled lands comprise six percent or more of each individual HMA and thus a proportionate contribution to the forage and space requirements of animals using the HMAs. In addition, a disproportionately high share of the reliable water sources in the HMAs occur on these lands. This is particularly important during summer, when the range of wild horses is limited due to water, even though they will travel further to water than cattle will. During winter, wild horses eat snow for at least part of their water supply and are, thus, better dispersed during that season.

3.19. WILDLIFE AND FISH

This section focuses on those wildlife and fish species in the Rawlins RMPPA that are of particular interest or importance to the public or the ecosystem because they are used in some way (hunted, observed, photographed, etc.) or because they have populations that are at potential risk (threatened, endangered, of special concern, or top food chain status). The millions of acres of extensive and varied BLM-managed lands within the Rawlins RMPPA provide important habitat for wildlife and fish species, especially where such lands and the waters they contain occur in large unfragmented tracts and reaches.

3.19.1. TERRESTRIAL WILDLIFE

Terrestrial wildlife species, to the extent they are managed, are overseen by State and Federal game management agencies. The Wyoming Game and Fish Department is responsible for oversight of big game species and small game species that are nonmigratory. The U.S. Fish and Wildlife Service has oversight of migratory bird species whether they are hunted (e.g., waterfowl) or not (e.g., passerine species such as warblers and sparrows), as well as of all Federally threatened or endangered species. The BLM, however, manages millions of acres of habitat that support these wildlife species, and thus has an integral role in their ecological health and viability.

Wildlife habitat is best characterized by the vegetation types discussed in Section 3.15 and the water discussed in Section 3.17, although the air (Section 3.1), geology and topography (Section 3.5), and soils (Section 3.13) are also important contributors to habitat character. Such factors as fire forestry, rights-of-way, livestock grazing, OHV use and other recreation, and wild horses also influence the quality of habitat, as do management action applied throughout BLM-administered lands and in special management areas. Most wildlife species utilize vegetation on the basis of its physiognomy (e.g., structure (height and spacing) and growth form (gross morphology and growth aspect) of the predominant species, and leaf characteristics of the dominant or component plants). This means that a given species may use a shrub of a particular height and growth form, irrespective of its species. Therefore, the mapping of vegetation zones (Figure 3.15-2) serves to characterize wildlife habitat in general terms.

As is apparent from the vegetation map, the habitat diversity within the Rawlins RMPPA is extreme, ranging from alpine barren areas in the Sierra Madre Mountains and Snowy Range in the south central portion of the Rawlins RMPPA to desert barren areas in the Red Desert in the southwestern portion, with extensive grassland, shrub, and forest/woodland communities in between. The most important of these habitat types on the basis of total species, number of breeders, number of rare species, and availability are: open aquatic, riparian (grassland, willow-waterbirch, aspen, and cottonwood), mountain shrub, juniper, aspen, aspen/conifer, ponderosa pine, Douglas fir, rockland in the Laramie Peak and Platte Valley, and wet forested meadow (BLM 1987). Within the vegetation zones, similar wildlife species will be found, although individual species will tend to prefer vegetation of a particular height, and density. Within this preferred area, individual plants of a particular age or life stage may also be preferred. Thus, it is important to manage each vegetation zone for the maximum diversity in terms of age, height, and density so that the biodiversity (and ecological health and resilience) of the plant communities and their wildlife inhabitants. At the same time excessive fragmentation of vegetation zones is to be avoided so that wildlife species requiring large tracts of a similar physiognomic type can complete their life cycles successfully.

More than 374 vertebrate have been documented in the Rawlins RMPPA west of the North Platte River (BLM 1987). The vertebrate wildlife species that occur represent all major vertebrate classes: reptiles, birds, and mammals. Fishes and amphibians, the remaining vertebrate classes, will be discussed in section 3.19-2. Data are available primarily for birds and mammals, because of particular interest in them by the hunting and recreational public, as well as by natural resource specialists. The most important of these species will be discussed below under the primary headings of game species (big game, waterfowl, furbearers, and upland game birds), nongame species (raptors and other migratory birds), and species of special concern (threatened, endangered, and sensitive species).

3.19.1.1. Game Species

Because game species are hunted or trapped and their populations are monitored to track the harvest they can support, there are considerable data available regarding not only their population levels but also their habitat. This is particularly true for big game species, but also for small game species.

3.19.1.1.1. Big Game

Big game species in the Rawlins RMPPA include pronghorn, deer (mule deer and small numbers of white-tailed deer), elk, moose, black bear, mountain lion, and bighorn sheep. These species are either herbivores (pronghorn, deer, elk, moose, bighorn) and compete to some degree with other herbivorous wildlife, livestock and wild horses, carnivores (mountain lion) and compete with other wildlife predators, or omnivores (black bear) and have characteristics of both preceding groups. Harvest data for these species are provided annually by the Wyoming Game and Fish Department on the basis of species (or group) specific management areas. These data are discussed below for the most important of the big game species.

Pronghorn

Pronghorn are a unique feature of the Western plains, and are the only living species in their taxonomic family (Antilocapridae). Herds of up to 1000 individuals once inhabited the plains, but herds now range up to 50 or 100 individuals. During winter, herds undertake local migrations to areas that are more protected or that have more available forage. During the breeding season, herds break up and bucks oversee a harem of one to perhaps 15 females (Cochrum 1962). Wyoming is the center of the pronghorn's range and the Rawlins RMPPA is thought to have the highest density of pronghorn in the world (Kotter 2002). Pronghorn inhabit a wide variety of open rangeland habitat types throughout the Rawlins RMPPA and forage primarily on shrubs, and especially on sage species.

The harvest of pronghorn in Wyoming declined between 1991 and 2000 except for an increase in 1992. Within major herd management areas (HMAs) in the Rawlins RMPPA, this same trend is apparent (Figure 3.19-1). The HMAs for pronghorn are provided in Figure 3.19-2. Of the 18 HMAs within the Rawlins RMPPA, 13 are primarily within the Rawlins RMPPA (Table 3.19-1) and were used to develop the depicted graph based on data in Table 3.19-2. Except for 1995, 1996, and 1997, there has been a gradual decline in hunter success within the Rawlins RMPPA. The Medicine Bow, Bitter Creek, Centennial, Baggs, and Red Desert HMAs had the highest harvests early in the decade, while Medicine Bow, Iron Mountain, Centennial, Bitter Creek, Iron Springs, and Red Desert HMAs had the highest harvests later in the decade (Figure 3.19-3). While harvest data are not population data, they are highly correlated and representative of population trends.

Figure 3.19-2 also shows the 3,860,667 acres of crucial winter range for pronghorn within the Rawlins RMPPA. These areas are found especially in the open flatlands in locations like the eastern side of the Great Divide Basin, close along the Wyoming/Colorado state line west of Baggs, the Shirley Basin south to Medicine Bow, and north of Saratoga in the rolling topography east of the North Platte River.

Deer

Both mule deer and white-tailed deer occur in the Rawlins RMPPA, although mule deer are by far the more abundant. Mule deer are distributed throughout the seasonal ranges in the Rawlins RMPPA 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 types provide adequate forage areas with succulent vegetation for lactating females and adequate cover for security and fawning. During winter, mule deer move to lower elevations to avoid deep snow that covers their forage. They are often found in juniper and limber pine woodlands, big sagebrush/rabbitbrush, bitterbrush/sagebrush steppe, and riparian habitat types (BLM 1987). White-tailed deer use woody riparian habitats (willow, waterbirch, and cottonwood) along the major creeks and rivers for both forage and cover.

The harvest of mule deer in Wyoming declined between 1991 and 1997 except for a slight increase in 1992. Following 1997, the harvest began to increase. Within the major HMAs of the Rawlins RMPPA, this same pattern is apparent (Figure 3.19-4). The management areas for deer are provided in Figure 3.19-5. Of the 15 herd management areas within the Rawlins RMPPA, eight are primarily within the Rawlins RMPPA and have been used to develop the depicted graph from data in Table 3.19-3. Except for 1992, hunter success has been lower than 1991 throughout the 1991 to 2000 decade in the Rawlins RMPPA. The herd management areas with the greatest harvest throughout the decade are Baggs, Platte Valley, Laramie Peak, and Iron Mountain (Figure 3.19-6). White-tailed deer harvest has typically ranged from 13 to 26 percent of the mule deer harvest, but has not been subject to as much fluctuation during the decade.

Figure 3.19-5 also shows the 1,468,885 acres of crucial winter range for mule deer within the Rawlins RMPPA. These areas are generally found in three types of places—on the flanks of mountains (e.g., Sierra Madre, Snowy, Laramie, Seminoe, Shirley, and Ferris Mountains), along the drainages (e.g., North Platte and Medicine Bow Rivers), and in the badlands along the Wyoming/Colorado border and centered on Baggs.

Elk

Elk are distributed throughout the Rawlins RMPPA, especially adjacent to and in areas of higher elevation that have woody cover. In summer, elk use aspen and conifer woodlands for security and thermal cover, ranging out into upland meadows, sagebrush/mixed grass, and mountain shrub habitat types to forage. In winter, elk move to lower elevations, foraging especially in sagebrush/mixed grass, big sagebrush/rabbitbrush, and mountain shrub habitat types, especially on windswept area where snow depth is less. During severe weather, elk concentrate in crucial winter range, areas within their normal winter range that are most likely to provide thermal cover and forage. For parturition, elk move into areas that provide particularly good security cover and succulent forage. Elk occur in herds to a greater extent than the other big game mammals. Areas of particular importance to specific elk herds are in the vicinity of Baggs, the Ferris Mountains and Seminoe Reservoir, Shirley Mountain, Encampment, the Saratoga Valley, Laramie Peak, Jelm Mountain, Wick, and Pennock Mountain (BLM 1987). Particularly important characteristics of these areas are as follows:

- Baggs-provides summer, winter/yearlong, calving and crucial winter range habitat for a herd of about 3,200 elk that migrate[2] from summer range in Miller Hill, the Sierra Madre, and Medicine Bow National Forest on the East and from Colorado on the south to crucial winter range in the vicinity of Baggs. Most of the calving area for this herd is on Medicine Bow National Forest (BLM 1987). Part of this area is within the Jep Canyon ACEC (BLM 1990).
- Ferris Mountains/Seminoe Reservoir-provides summer, winter/yearlong, and crucial winter range for a herd of about 424 elk that migrate from summer range in the Ferris Mountains to crucial winter range on the north side of the mountains as well as from summer range in the vicinity of Bradley Peak (south of the Ferris Mountains) to crucial winter range southwest of the lower portions of Pathfinder Reservoir. Calving areas have not been identified.
- Shirley Mountain-provides summer, yearlong, winter, and crucial winter range for about 500 elk that migrate from summer ranges on Shirley Mountain and the Freezeout Mountains to crucial winter range around Chalk Mountain, on the south side of the Freezeout Mountains, and southeast of the Miracle Mile.
- Encampment-provides winter/yearlong and crucial winter range for about 200 elk.
- Saratoga Valley-provides calving areas, summer, yearlong, and crucial winter range for about 4230 elk.
- Laramie Peak-provides summer, winter/yearlong, and crucial winter range for about 1700 elk.
- Jelm Mountain provides primarily crucial winter range for about 1615 elk that summer on Medicine Bow National Forest.
- Wick-reserves grazing use for elk and other wildlife on 320 acres of BLM-managed public land in association with the WGFD Wick Elk Winter Area through a memorandum of understanding between BLM and the WGFD.
- Pennock Mountain-reserves grazing preference for elk and other wildlife (including 1,530 AUMs of forage for wintering elk) on 6,284 acres of BLM-managed land in association with the 9,806 acre WGFD Pennock Mountain Elk Winter Range (BLM 1987).

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[2] *The migrations noted here are the most extreme and may not occur every year, with some portions of the summer range serving as yearlong range, etc. See Figure 3.19-8.*

The harvest of elk in Wyoming has held relatively steady over the past decade, with a brief increase in 1994 and gradual increases after 1995. Within major herd management areas of the Rawlins RMPPA the pattern has been somewhat different, with a gradual increase until 1993, a gradual decline until 1995, and a gradual increase thereafter (Figure 3.19-7). The management areas for elk are provided in Figure 3.19-8. Of the nine herd management areas within the Rawlins RMPPA, seven are primarily within the Rawlins RMPPA and have been used to develop the depicted graph from data in Table 3.19-4. Hunter success in hunting elk has been fairly consistent over the decade, ranging up and down slightly every one to two years within overall bounds of 32 and 43 percent. The herd management areas with the greatest harvest throughout the decade have been Sierra Madre, Snowy Peak, and Laramie Peak/Muddy Gap (Figure 3.19-9).

Figure 3.19-8 also shows crucial winter range and calving areas for elk within the Rawlins RMPPA. The 604,758 acres of crucial winter range, and 200,912 acres of parturition areas mapped in Figure 3.19-8 reflect the above areas of importance. North of I-80, winter range is identified on the northeast flanks of the Shirley Mountains, while south of I-80, winter range is identified on the west slopes of the Sierra Madre, in the North Platte River Valley between and north of the Sierra Madre and the Snowy Range, on the northeast flanks of the Snowy Range, and east of Laramie on the east side of the Laramie Mountains. Crucial winter range is often an area within the general winter range that has the best thermal cover and most available forage even in the most extreme weather conditions. Areas identified on Figure 3.19-8 are in the Ferris Mountains, Seminoe Mountains, the Shirley Mountains, and the Snowy Range, in each case on the lower slopes where microclimates provide conditions needed for survival. Partuition areas are similarly in microclimates where hiding cover and moist, succulent forage provide shelter and adequate moisture for nursing mothers and young elk calves. Such areas are identified in Figure 3.19-8 around the flanks of the Snowy Range and on the east side of the Sierra Madre.

<u>Other Big Game Species</u>

Within the Rawlins RMPPA, there are management areas for moose (Snowy Range), black bear (Laramie Peak, Snowy Range, and Sierra Madre), mountain lion (Iron

Mountain, Laramie Peak, Snowy Range, Seminoe, Sierra Madre, and Haystacks), and Big Horn Sheep (Douglas Creek, and Laramie Peak). These represent areas where populations of these species are sufficient to support hunting and warrant hunting management. Except for mountain lions, the harvest of these species in Wyoming has remained relatively constant throughout the decade. The harvest of mountain lions has been increasing (Figure 3.19-10). Moose are the most abundant of this group of big game species, judging from their harvested numbers. Data are not readily available to characterize the individual management areas for these species.

Because of public interest in them, bighorn sheep are particularly well characterized in the Rawlins RMPPA. They prefer open grassy ridge tops, slopes, or benches within 100 meters of rocky outcrops, precipitous cliffs, or steep rocky slopes. They most commonly use rockland, upland meadow, sagebrush/mixed grass, big sagebrush/rabbitbrush, and mountain shrub habitat types, foraging on forbs and grasses from early summer to late fall when they begin browsing on sagebrush, rabbitbrush, and bitterbrush as snows cover their other forage. Bighorn sheep have been reintroduced into the Ferris Mountains/Seminoe Reservoir area, near Encampment, the Saratoga Valley, and Laramie Peak (BLM 1987).

3.19.1.1.2 Small Game

Small game include: waterfowl (ducks and geese) and other water birds (rails, coots, snipe), upland game birds (cranes, pheasants, partridges, grouse, doves, and turkeys), small game mammals (rabbits, hares, and squirrels), and furbearers. Most of the data on these species come from harvest statistics kept by the WGFD for management areas within the State.

Waterfowl and Other Water Birds

Ducks and geese occur in aquatic areas throughout the Rawlins RMPPA. Some individuals or species breed, winter, or remain yearlong in the State, while larger numbers pass through the Rawlins RMPPA on spring or fall migration. The Rawlins RMPPA includes the Central Flyway (east of the Continental Divide except for the Great

Divide Basin) and the Pacific Flyway (west of the Continental Divide and the Great Divide Basin). Most of these species are dependant on wetlands or open water that is sufficiently shallow to support rooted vegetation and feed on the biotic communities developed in such habitats. Many species feed on insects and small fish or amphibians in addition to, or instead of, plant foods in these aquatic areas. Species that primarily eat fish may feed in deeper water where there is insufficient light to support rooted vegetation. In addition, some species feed frequently on upland grasses and forbs in grassy fields and meadows where such vegetation is succulent and sufficiently open to enable rapid flight and avoid harboring predators. Such habitats support waterfowl and other water birds year round. Species that breed in the Rawlins RMPPA additionally require security cover that is sufficiently close to water so that their precocial young can reach its relative safety and ready food supply.

The various natural lakes, constructed reservoirs, and streams within the Rawlins RMPPA provide important habitat for waterfowl and other water birds. The most important of the lakes and reservoirs are Seminoe Reservoir, Pathfinder Reservoir, Bucklin Reservoir, Shirley Basin Reservoir, Teton Reservoir, Little Sage Creek Reservoir, Flowing Well Reservoir, Wheatland Reservoir, Lake Hartie, Cooper Lake, and James Lake, but the myriad small ponds and pools that are sufficiently stable in their water levels to have wetlands developed around their shores are important, as well. In addition, pools in the numerous streams tabulated in Table 3.17-1 and their tributaries provide important habitat. It is of note that on Figure 3.15-2, the wetland areas from the GAP data have been overlain by data from the National Wetlands Inventory to better depict the distribution of true wetland habitat. The acreage of such habitat is provided in Table 3.15-1. It is also of note that only some of these aquatic resources are on BLM-managed public land.

The number of various types of waterfowl and other water birds harvested within Wyoming is given in Figure 3.19-11. It can be seen that far more ducks and geese are harvested than coots, snipe, rails or cranes and also that harvests over the past ten years have been relatively consistent except for coot and snipe harvests. These trends should be reflective of populations of these species, as well. Hunting seasons for waterfowl and other water birds are set by U.S. Fish and Wildlife Service since these are migratory birds. Seasons vary for some species between the Central and Pacific Flyways, and may be split into fall and late winter open periods to enable some individuals to pass through unhunted. Bag limits are revisited annually and are highest for mallards, followed by scaup, redheads, and canvasback and pintails, again reflecting the relative abundance of these species.

Waterfowl management areas 2B, 3A, and 5I best reflect the east, central and western portions of the Rawlins RMPPA (Figure 3.19-12). The relative number of waterfowl and other water birds harvested in these three waterfowl management areas is shown in Figure 3.19-13. These trends should be somewhat reflective of populations of these species, at least in relative terms; annual variations in harvest are affected by a number of factors, including the coincidence of fall migration with the hunting season. Eden Reservoir in Sweetwater County is closed to hunting.

Upland Game Birds

Upland game birds in Wyoming are pheasant, chukar, gray partridge, blue grouse, ruffed grouse, sage grouse, sharp-tailed grouse, mourning doves and turkeys. Sage grouse are the most important of these species, especially on BLM-managed lands. Figure 3.19-14 shows the general locations of sage grouse leks, or dancing grounds, and adjacent nesting areas within the Rawlins RMPPA. During the spring, grouse concentrate for courtship and breeding in these areas, which are typically in openings surrounded by sagebrush with an average canopy density of 32 percent. Most nests are on drier sites under sagebrush and within a two-mile radius of the lek, although these sites are not too far from water, since meadow riparian areas are used by hens with broods. During warm dry summer periods, grouse tend to stay within 1.5 miles of intermittent and perennial streams. Wintering areas for sage grouse typically contain tall sagebrush that is available above the snow for cover and food (BLM 1987). Next most important in the Rawlins RMPPA, particularly on BLM-managed lands are the sharp-tailed grouse and the blue grouse. The only Wyoming population of the sharp-tailed grouse (Columbian subspecies) is found within the Rawlins RMPPA. Populations in 1986 were estimated at fewer than 400 birds. In spring, this species also concentrates on traditional dancing grounds for courtship and breeding. These dancing grounds are typically found in mixed shrub habitat of antelope bitterbrush, snowberry, and big sagebrush evenly mixed with grasses and forbs. Habitat for broods frequently includes a higher density of snowberry, with nesting and brood rearing typically occurring within 0.6 miles of the dancing ground. Birds move to ridges and knolls in mountain shrub habitat during fall, and then in winter to riparian areas and exposed mixed shrub communities at all elevations, where they feed on buds, berries, and catkins (BLM 1987). Blue grouse are found only in the eastern portion of the Rawlins RMPPA, primarily in the Ferris and Seminoe Mountains, the Laramie Peaks area, and throughout forest fringes associated with the Medicine Bow National Forest. They tend to use mountain shrubland, aspen/conifer woodland, aspen woodland, ponderosa pine/Douglas-fir forest, limber pine woodland, and lodgepole pine forest, especially occupying the edges between these types and small interspersed riparian areas for breeding, nesting, and brood rearing (BLM 1987).

The relative abundance of these species in Wyoming, as reflected in their harvest data, is shown in Figure 3.19-11. Through the past five years, all of these species increased slightly between 1995 and 1999, with a slight decline in 2000, with the pattern being most pronounced in pheasants. Figure 3.19-15 shows the Wyoming management areas for small game, upland game (including sage grouse), and furbearers. Harvest trends over the past decade in management areas 3, 10, 22, 24, 25, 28, 30, and 45, which best reflect the Rawlins RMPPA, are shown in Figure 3.19-16. Table 3.19-5 gives an indication of those management areas within the Rawlins RMPPA where each species of upland game bird is sufficiently abundant to have been harvested in 2000. Typically, grouse are hunted in the fall, except that sharp-tailed grouse are hunted through the end of the year, while chukar and gray partridge are hunted from fall through winter. Portions of Laramie and Albany County (Management Area 2) are closed to the taking of sage grouse and Sweetwater County is closed to the taking of chukar. Mourning doves are hunted earlier in the fall, because they migrate south earlier. Eden Reservoir in Sweetwater County is closed to mourning dove hunting within 300 yards of the normal high water line. Wild turkeys are hunted during both spring and fall in northern and southwestern Albany County, but only in spring in eastern Laramie County.

Mammals

Small Game Mammals

The small game mammals are cottontails, snowshoe hares, and squirrels. Table 3.19-5 gives an indication of those management areas within the Rawlins RMPPA where each species of small game mammal is sufficiently abundant to have been harvested in 2000. All of these species are hunted during both fall and late winter, with snowshoe hares having a smaller bag limit than cottontails or squirrels.

Furbearers

The species of furbearers are: badger, bobcat, marten, weasel, coyote, raccoon, red fox, skunk, beaver, mink, and muskrat. Table 3.19-5 gives an indication of those management areas within the Rawlins RMPPA where each species of furbearer is sufficiently abundant to have been harvested in 2000. Furbearer trapping seasons vary. Some species may be trapped year round (badger), others are typically trapped in the late winter and late fall (mink, weasel, bobcat, muskrat, marten, and beaver), although the specific dates may vary for marten and beaver in portions of the Laramie Mountains, and Beaver Creek and South Fork Hog Park Creek in the vicinity of Encampment are closed to the taking of beaver as are South Fork Lake Creek and Goetze Creek drainages on the Pennock Mountain Wildlife Habitat Management Area.

3.19.1.2. Non-game Species

Non-game species include all those species or groups not discussed above. Such species are numerous and diverse, especially given the range of habitats present in the Rawlins RMPPA. Due to limitations of knowledge, space, time, and general interest, only a few of these species or groups will be addressed below. These are raptors, the long-billed curlew and the white pelican. Each has an important association with the Rawlins RMPPA.

3.19.1.2.1. Raptors

Raptors (birds of prey) found in the Rawlins RMPPA include eagles, falcons, hawks, harriers, and owls. These species occupy an ecological position at the top of the food chain and, therefore, act as biological indicators of environmental quality because they are fewer in number, have longer reproductive cycles, and more prone to bioaccumulation. Most of these species are also sensitive to disturbance, especially during their nesting cycle. Raptors often concentrate their nests on suitable strata along cliffs or other formations and use such sites year after year unless disturbed.

In the Rawlins RMPPA, concentrations of ferruginous hawks or golden eagles and prairie falcons, depending on the nesting substrate, have in the past been identified at Shamrock Hills, Brown Canyon Rim, Seminoe, Red Rim, Atlantic Rim, Cherokee, Muddy Creek, Doty Mountain, Delaney Rim, Bolton Rim, Hanna and Platte-Divide (BLM 1987). The identification of these nesting concentrations was based in part on a raptor study that began in 1975[3] and has continued through the present, resulting in a monumental documentation of raptor nesting in the Rawlins RMPPA. The database from this study contains 12,467 records, representing 3972 nest locations. Areas of raptor nest concentrations based on these data are shown in Figure 3.19-17. Data on each nest location includes species, township/range/section, quarter section, quarter quarter section, elevation, USGS quadrangle name, land ownership, date first observed, nest substrate, height of substrate, nest height, exposure, and vegetative type (Apple 2002a).

The intensity of this study has varied in response to proposals for development in the Rawlins RMPPA. Extensive data were collected in the Shamrock Hills area beginning in 1988 in response to potential development of coal bed methane. These efforts were renewed in 1997 through 2001 and are ongoing (Apple 2002b). In addition, beginning in 1998, extensive data collection was initiated in an area about 25 miles west of Rawlins and extending both north and south of I-80 in the vicinity of Wamsutter (Apple 2002b), where natural gas development is proposed (BLM 1995). Also associated are a study of the use of artificial nest sites, a project begun in 1988, and a ferruginous hawk banding program, a project begun in 1993.

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[3] *Only three records in the database predate this year.*

The long-term database on nest locations does a very effective job of characterizing the raptor species that nest in the Rawlins RMPPA and their nests. These data are summarized in Table 3.19-6, which shows not only the relative number of nests of each species but their height and the height and type of substrate on which they are built (Apple 2002). With 3972 nest sites in this database, this is well-documented information for many of the species, especially for the ferruginous hawk, which has been the primary focus of this effort. Of the total nests, 54.3 percent were on BLM-managed public land and 37.4 percent were on private land, with the remainder on Forest Service, State, other, or unrecorded land ownership types. The more focused portions of this overall study provide extensive additional data. For example, between 1998 and 2001, active ferruginous hawk nests were more often successful on artificial nest sites (81 %) than on natural nest sites (65 %). Overall nesting success for active nests of all species was 85.5 percent based on 2001 data, while in the Shamrock Hills Study Area, Continental Divide/Wamsutter II-North of I-80, Continental Divide/Wamsutter II-South of I-80 (Northern Segment), Continental Divide/Wamsutter II-South of I-80 (Southern Segment), and other incidental areas, success of active nests was 92 percent, 80 percent, 80 percent, 93.9 percent, and 78.3 percent (Apple 2002b). These areas were undergoing varying degrees of development at the time these data were collected. The Jep Canyon ACEC was established in part to maintain the productivity of nesting raptor pairs (BLM 1990), as was the Shamrock Hills ACEC.

Data have also been collected on prey items noted in ferruginous hawk nests between 1993 and 2001 (Apple 2002). Wyoming ground squirrels are by far the predominant prey species. Other prey species recorded at least once on the basis of prey remains were 13-lined ground squirrel, vole, sagebrush vole, cottontail rabbit, least chipmunk, prairie dog, western harvest mouse, short-tailed weasel, white-tailed prairie dog, northern pocket gopher, small mammal, sage grouse, horned lark, songbird, sparrow. Voles, cottontails, and prairie dogs were regular if not frequent prey items. The remaining prey species appear to be incidental food items.

3.19.1.2.2. Long-billed Curlew

The long-billed curlew was once abundant in suitable habitat in Wyoming and in the Rawlins RMPPA. Its populations have been in decline since the 1930s and it is now very scarce in all parts of the State except near Merna (out of the Rawlins RMPPA in the west central portion of Wyoming). It is known to breed in Wyoming only near Pass Creek in the Saratoga Valley, which is within the Rawlins RMPPA (BLM 1987). Curlews nest on higher ground with more dense grass cover but feed on wetter than average ground in meadows that are hayed or grazed. Summer grazing provides preferred vegetation profiles and less intensive hay production provides disturbance refugia. Direct disturbances from humans or flooding, not the availability of suitably structured habitat, correlates strongly with both nest failures (which can be over 60%) and population differences (Internet: http://uwadmnweb.uwyo.edu/fish_wild/abstracts/cochrane_j/). The importance of this species in the Rawlins RMPPA derives from its spectacular size (for a shorebird), its marked decline in abundance, and its known breeding within the Rawlins RMPPA. This species is also mentioned below as being on BLM's list of sensitive species in Wyoming.

3.19.1.2.3. White Pelican

For white pelicans, the Rawlins RMPPA provides one of the only two known nesting locales within Wyoming. This colony was first discovered in 1984 on an island in Pathfinder Reservoir. The 12- to 13-acre island slopes gradually to the water and is covered with clumped silver sagebrush and rabbitbrush. The pelicans nest in the open areas between the shrubs (BLM 1987). White pelicans at Pathfinder forage in a variety of wetland habitats and frequently switched from one macroforaging habitat to another, using rivers proportionately more than their relative abundance and reservoirs less often than expected based on their availability. At Pathfinder Reservoir, white pelicans primarily foraged at shallow water sites near shore feeding on a wide variety of species, but especially bottom-dwelling prey found in water less than one meter deep or prey near the surface of deep water (e.g., common carp, white suckers, and tiger salamanders) (Internet: http://uwadmnweb.uwyo.edu/fish_wild/abstracts/findholt_s/).

The white pelican is listed by BLM as a priority bird population within the Wyoming Basin, which includes much of the Rawlins RMPPA (Internet: http://www.blm.gov/wildlife/pl_86sum.htm), and Pelican Island is one of five locations in Wyoming listed by the National Audubon Society as a Global IBA (Important Bird Area) candidate site (http://www.audubon.org/news/release/iba_list.html). This nesting locale is somewhat vulnerable due to variations in the management of water levels in Pathfinder Reservoir.

3.19.1.3. Threatened, Endangered and Sensitive Wildlife Species

BLM is responsible for managing a wide array of wildlife habitat in the project area. In general, Wyoming Department of Game and Fish is responsible for managing the wildlife populations and the BLM manages the habitats. Numerous species of wildlife occur in the RMPPA. Listed and BLM Sensitive species and their associated habitats are discussed in this section. These animals are recognized as being of particular interest to the public and are the focus for management.

There are nine mammal and bird species that are Federally listed and must be taken into consideration in the RMPPA (Table 3.19-7). The BLM has also identified an additional eight State sensitive mammal species and thirteen bird species that should be considered in any planning effort (Table 3.19-8). The BLM has identified wildlife resource concerns existing in the plan area:

- Raptor nesting,
- Crucial Big Game Winter Range,
- Elk Calving Areas,
- Riparian Areas,
- Migratory Bird Treaty Act species.

With priority habitat and listed and sensitive wildlife taxa identified, the alternatives section will outline the various actions, in addition to those included in the current management direction, that could be implemented to maintain, improve or expand the habitat conditions for the various animal species.

The Rawlins RMPPA includes priority habitats where the BLM generally focuses most management efforts. These habitats are the major plant communities or terrestrial features within the review area that are important to wildlife. Priority wildlife habitats include streamside riparian, springs, seeps, wet meadows, seasonal wetlands, playas and lakebeds, cliffs, caves, talus slopes, dry meadows, dryland shrubs, juniper woodlands, ponderosa pine forests, mixed conifer forests and quaking aspen groves.

Ongoing changes to these important vegetation communities, many of them caused by humans, have resulted in alterations to the animal habitat within the Rawlins RMPPA. For example, wet meadows may be converted to dry meadows as a result of a water table being lowered due to pumping or water diversion. Juniper encroachment is converting shrublands to woodlands, primarily due to changes in fire regimes. Aspen groves are not regenerating themselves and are diminishing in size and numbers.

3.19.1.3.1 Species and Habitat

Black-Footed Ferret

Black-footed ferrets are associated with prairie dog communities in the plan area. Prairie dog burrows provide retreats for ferrets and the prairie dogs themselves provide a supply of food. Black-footed ferret numbers have been shown to be directly linked to the prairie dog population fluctuations. In the plan area, both the black-tailed prairie dog (*Cynomys ludovicianus*) and the white-tailed prairie dog (*Cynomys leucurus*) are present. Any disturbance to prairie dog towns may affect the black-footed ferret populations. Primary concerns besides direct loss of the food base is the potential from distemper transmission from domestic canines to the prairie dogs.

Canada Lynx

Canada lynx is a secretive, forest-dwelling cat that inhabits northern latitudes and high mountains. The lynx feeds primarily on small mammals and birds, particularly snowshoe hares. Habitats utilized by the Canada lynx include old growth forests and their home range can be significant as they forage for food. The plan area has limited direct habitat for the lynx, however, it may provide corridors for movement and habitat for forage.

The primary limits to Canada lynx recovery are adequate habitat areas, fragmentation of habitats, lack of forage and human intervention.

3.19.X.1.3. Bald Eagle

Bald Eagles appear to be recovering range-wide in the lower 48 states; however, they are still listed on the Endangered Species Act and require special consideration when evaluating project impacts. In the RMPPA, the Bald Eagle is generally a winter migrant and has not developed a nesting population. Useable nesting habitats do exist in the RMPPA and, as forage is available, there is the potential for nesting Bald Eagles to occur.

Bald eagles are believed to live for over 30 years in the wild and even longer in captivity. Bald eagles mate for life and often re-use old nests from previous years. Their preferred nesting locations are close to rivers, lakes, marshes and wetland areas. Primary concerns for bald eagles include disease, lack of food, bad weather and human interference.

Preble's Meadow Jumping Mouse

The Preble's meadow jumping mouse is a small rodent with big feet that is adapted to jumping. The Preble's meadow jumping mouse is closely related to other subspecies of meadow mice. The diet of the Preble's meadow jumping mouse consists of seeds, fruits, fungi, and insects. Hibernation occurs from October through May in small underground burrows that it excavates. Nests are made of grass, leaves, or woody material excavated several centimeters below ground level. Preble's meadow jumping mouse are primarily nocturnal or crepuscular and are occasionally observed during the day. The preferred habitat is low undergrowth consisting of grasses, forbs or a mix of both in wet meadows and riparian corridors, or where tall shrubs and low trees provide adequate cover. The Preble's meadow jumping mouse exhibit a preference for lush vegetation along streams and herbaceous understories in wooded areas in close proximity to water.

Threats to the Preble's meadow jumping mouse are the loss of riparian habitat, fragmentation of habitat, and reduction in preferred forage.

Yellow-billed Cuckoo

The yellow-billed cuckoo was designated as a candidate species for listing by the FWS on July 25, 2001. The yellow-billed cuckoo utilizes riparian and woodland habitats along rivers and streams in the western United States. The primary forage for the yellow-billed cuckoo is large insects and occasionally small frogs and lizards. The predominant impact to the yellow-billed cuckoo is the loss of large blocks of riparian habitat due to fragmentation, overgrazing, exotic plant community changes, river management and agricultural conversion of native vegetation. In the Rocky Mountains, the yellow-billed cuckoo is considered a Distinct Population Segment.

Whooping Crane

The whooping crane is a typically considered a migratory species in the plan area that seasonally utilizes habitats in the plan area. The majority of the sightings have occurred predominantly in the Platte River drainage. Whooping crane populations within Wyoming are considered part of the nonessential experimental population. The whooping crane is Federally listed and is protected under the Endangered Species Act with management focused on areas outside of the plan area. Cranes typically feed in meadow and marsh area in small numbers, foraging on insects, minnows, crabs, crayfish, frogs, rodents, small birds and berries.

Whooping cranes are very sensitive to human disturbance. The primary threat in the plan area would be encroachment on feeding and resting locations and direct harassment by dogs and humans.

Mountain Plover

Mountain plover does exist and breed in the plan area. The plover typically utilizes habitats characterized as mixed grass and short-grass prairie, cushion plant communities, shrub-steppe, plains, alkali flats, agricultural lands, cultivated lands, sod farms and prairie dog towns. Plovers may nest on sites where vegetation is sparse or absent, or near closely cropped areas or rocky substrate. Mountain plovers are rarely found near water and show a preference for previously disturbed or modified habitats. The primary forage for the Mountain plover is insects, grass seeds and berries.

The nesting period appears to be the most critical time for the mountain plover. Predation, disturbance, abandonment of the nest and direct destruction of the nest are potential impacts.

Migratory Birds

The Migratory Bird Treaty Act of 1918 protects waterfowl, eagles, raptors and other avian species that migrate through the plan area. Specific concerns include harassment, collection, molestation, disturbance or killing. Impacting nesting migratory birds, collection of eggs, nests or birds, and harassment of nesting birds are all considered activities that violate the Migratory Bird Treaty Act. Concerns have been raised in the plan area that proposed coal bed methane development in the dunal pond area may impact the amount of water in the ponds, which would impact the migratory birds and rare vegetation and wildlife communities associated with these unique habitats.

Sage Grouse

Sage grouse are declining throughout much of their historic range. Concern for sage grouse populations has increased and it is likely that they will be petitioned for listing soon. Sage grouse populations appear to be affected by activities associated with oil and gas development and grazing. This includes fragmentation of the habitat, disturbance of breeding cycles, loss of nesting and rearing habitats, and increased predation by the increased number of predators who utilize the disturbed areas.

Sage grouse typically are seasonally affiliated with sage vegetation communities. Grass seeds and insects provide the primary forage for the sage grouse. Seasonal access to water and moist areas is essential to the survival to young birds.

3.19.1.3.2. Special Status Species

The BLM State of Wyoming Sensitive Species list includes eight additional mammals, four raptors, and nine shore, migratory, local, and Neotropical birds (Table 3.19-8).

Mammals

The sensitive mammals include three bat species: Long-eared mytosis, Fringed mytosis, and Townsend's Big-eared bat. These species utilize coniferous forests, woodland habitats, caves, and mines to support their life history functions. The remaining BLM sensitive mammals includes:

- Dwarf shrew – utilizes mountain foothill shrub and grassland habitats,
- White-tailed prairie dog – utilizes basin-prairie shrub and grasslands,
- Wyoming pocket gopher – utilizes meadows with loose soil,
- Swift fox – utilizes grasslands.

Raptors and Owls

The BLM Sensitive raptors include species that feed on rodents and avifauna found in the plan area:

- Northern Goshawk - utilizes conifers and deciduous forests,
- Ferruginous hawk – utilizes basin-prairie shrub, grasslands and outcroppings,
- Peregrine falcon – utilizes tall cliffs ,
- Burrowing owl – utilizes grasslands, basin–prairie shrub and prairie dog towns,
- Loggerhead shrike – utilizes basin-prairie and mountain foothill shrub.

Other Avifauna

Other avifauna for which there are populational concerns, in many cases due to habitat loss or fragmentation are:

- White-faced ibis – utilizes marshes and wet meadows (shorebird),
- Trumpeter swan – utilizes lakes, ponds and rivers (migratory),
- Greater sage grouse – utilizes basin-prairie and mountain foothill shrub,
- Columbian sharp tailed grouse – utilizes grasslands,
- Long-billed curlew – utilizes grasslands, plains and wet meadows,
- Brewer's sparrow – utilizes basin-prairie shrub,
- Sage thrasher – utilizes basin-prairie and mountain foothill shrub,
- Sage sparrow – utilizes basin-prairie and mountain foothill shrub,
- Baird's sparrow – grasslands and weedy fields.

3.19.2. FISHERIES

Fisheries habitat includes perennial and intermittent streams, springs, and flatwater (lakes and reservoirs) that support fish through at least a portion of the year. The condition of the fisheries habitat is related to hydrologic conditions of the upland and riparian areas associated with, or contributing to, a specific stream or waterbody, and to stream channel characteristics. Aquatic habitat quality varies by location and orientation to geographic landforms and vegetation.

Riparian vegetation moderates water temperatures, adds structure to the banks to reduce erosion, provides instream habitat for fish, and provides organic material for aquatic macroinvertebrates. Vegetated floodplains dissipate stream energy, store water for later release, provide areas of infiltration for groundwater, support the hyporheic zone of the river, and provide rearing areas for juvenile fish. The quality of the physical aquatic habitat is refined further by water quality. Specifically, water temperature, turbidity and dissolved oxygen determine the amount of habitat useable by different fish species.

Public lands within the project boundaries provides habitat for eight fish families which include 27 fish species (Table 3.19-9), of which five are Federally listed under the Endangered Species Act, 15 are native and 12 are introduced (non-native). Three drainages occur within the RMPPA: the Colorado River watershed in the western portion, the Platte River watershed in the eastern portion and the Great Divide Closed Basin in the northwest.

The BLM has rated the aquatic integrity of the subbasins in the project area using the concept of Proper Functioning Condition. An aquatic system that exhibits high integrity and proper functioning has a mosaic of well-connected, high quality water and habitats that support a wide assemblage of native and desired nonnative species, the full expression of life histories, dispersal and connection mechanisms, and the genetic diversity necessary for long-term persistence and adaptation in a variable environment. Subbasins exhibiting the greatest level of these characteristics were rated high and those exhibiting the least were rated low. Within these habitats are a number of species of special concern.

3.19.2.1. Trout

Colorado River cutthroat trout inhabit high elevation streams of the Colorado River drainage portion of the project area. The Colorado River cutthroat is one of ten native cutthroat trout species that evolved in the streams and lakes during the Pleistocene Period and subsequently moved into high-elevation streams as the climate became drier and the lakes desiccated.

Non-native rainbow, brown and brook trout have been planted into the stream habitats to augment salmonid recreational fishing opportunities. The introduction of these non-native species of trout have directly impacted the ability of the native Colorado River cutthroat to ecologically sustain itself due to direct predation, hybridization, and competition for food and habitat.

3.19.2.2. Colorado River Fishes

The humpback chub, Colorado pikeminnow, bonytail chub, and razorback sucker are endemic species to the Colorado River drainage including the Green River and all the tributaries that support it. The four Colorado River fish are Federally listed as endangered and are directly impacted by activities that may deplete water from the Colorado River watershed. The FWS has determined that Federal actions that result in water depletions to the Colorado River system may affect these fish species and would require consultation.

Depletions include evaporative losses and/or consumptive use of surface or groundwater within the affected basin, often characterized as diverstions less return flows. Project elements that could be associated with depletions include, but are not limited to, ponds (detention, recreation, irrigation storage and stock watering), lakes (recreation, irrigation storage, municipal storage and power generation), pipelines, wells, diversion structures, and water treatment facilities.

A recovery plan and resulting Recovery Implementation Program for the four Colorado River fishes has been approved (USFWS, 1993). The recovery plan includes life history descriptions, distribution, reason for decline, current conservation efforts and the recovery strategy for the species. The Recovery Implementation Plan includes the actions that must be taken to remove the species from Federal listing.

3.19.2.3. Pallid Sturgeon

The Pallid sturgeon occurs in the Platte River and is affected by activities in the upstream portion of the project area. The Pallid sturgeon is Federally listed as threatened. The primary impact to the Pallid sturgeon occurs from upstream water depletions and loss of ecosystem integrity. Activities that may impact the Pallid sturgeon are primarily water depletion oriented and include evaporative losses, consumptive use including diversions from the Platte River or its tributaries less the volume of water provided by return flows. Annual and seasonal diversions and depletions impact the ability for the Pallid sturgeon to sustain itself in the Platte River drainage.

3.19.2.4. Other Aquatic Species

Other fish of concern in the project area are impacted by limited habitat, reduced water quality, competition and resulting range reduction. These fish species are listed by the BLM as Sensitive Species, including: the Roundtail chub (*gila robusta*) and Flannelmouth sucker(*Catostomus latipinnis*) in the Colorado River drainage, Leatherside chub (*Gila copei*) and Bluehead sucker (*Catostomus discobolus*) in the Green River drainage. A rangewide Conservation Agreement and Strategy is being prepared to address the protection of these species.

3.19.2.5. Amphibians

The Northern Leopard Frog (*Rana sp.)* and Great Basin Spadefoot Toad have been identified as sensitive species by the BLM and occur in marshes and wetlands in the project area. There is a region wide decline in these species that has caused several amphibian recovery efforts to be initiated by Federal and State entities.

The southern Rocky Mountain population of the boreal toad (*Bufo boreas*) has suffered drastic population reductions since the early 1980's in the southern Rockies and declines in the Sierra Madres. The Western boreal toad is currently a candidate species for listing under the Endangered Species Act of 1973, as amended, and has been identified as Native Species Status 1 by the State of Wyoming. Causes for decline are being investigated and include impacts from the occurrence of the chytrid fungus

(*Batrachochytrium dendrobatidis*). Habitats utilized by this species includes wet meadows and marshes including riparian areas and pond margins. A Conservation Plan and Agreement for the management and recovery of the Southern Rocky Mountain population of the Boreal Toad was completed in February 2001.

3.20. SPECIAL MANAGEMENT AREAS

Special management areas are designated to protect or preserve certain qualities or uses in areas that best provide them. The environment in these areas is unique in some regard, making it desirable for different management than applied to the surrounding public lands. This section identifies the various special management areas within the Rawlins RMPPA and addresses the qualities or uses that have resulted in their designation. The types of special management designation addressed in this section are: Wilderness Study Areas (WSA), Areas of Critical Environmental Concern (ACEC), Wild and Scenic Rivers (W&S Rivers), and Special Recreation Management Areas (SRMA).

3.20.1. WILDERNESS STUDY AREAS

There are no designated wilderness areas in the Rawlins RMPPA. There are five WSAs located within the RMPPA (Figure 3.20-1). These include the following:

- Adobe Town WSA,
- Ferris Mountains WSA,
- Encampment River Canyon WSA,
- Prospect Mountain WSA,
- Bennett Mountains WSA.

Since these lands are designated as WSAs, their environment is assumed to be one of minimal disturbance and near pristine condition. Unless otherwise noted, all information for this section was obtained from the Wyoming Statewide Wilderness Study Report (BLM 1991).

3.20.1.1. Adobe Town WSA

The Adobe Town WSA consists of a single study area within the Rawlins and Rock Springs Field Office administrative boundaries. This WSA includes 34,134 acres of

BLM-managed lands within the Rawlins RMPPA. The WSA is located in southeastern Sweetwater County, 25 miles south of Wamsutter, Wyoming. It is bounded on the north by the checkerboard land pattern and the Manual Gap Road, on the west by the Adobe Town Rim Road, on the south by the Shell Creek Road, and on the east by the Willow Creek Road.

The WSA was studied under Section 603 of FLPMA and was included in the Final Adobe Town – Ferris Mountains Wilderness EIS filed in January 1988. Based on information from that document, the BLM Wyoming State Office recommends that 10,920 acres of the original 82,350 be recommended for wilderness. The recommended portions include most of the core of the Washakie Basin, an ancient inland sea. This portion of the WSA is a very colorful and rugged desert badland area virtually untouched by human activity. Skull Creek Rim, in the core of the area recommended for wilderness, contains some of the most unique and extensive badlands formations in Wyoming.

Since consideration of the Adobe Town WSA in the 1988 EIS, additional information has been submitted to the BLM concerning adjacent lands that also potentially contain wilderness characteristics. Pursuant to regulations, the BLM ground checked this information and has determined that portions of the proposal do indeed contain wilderness quality lands. Figure 3.20-1 shows the results of the BLM ground survey of this proposal.

3.20.1.2. Ferris Mountains WSA

The Ferris Mountains WSA includes 22,245 acres of BLM-managed public lands and one privately owned inholding of 160 acres. The WSA is located in northwestern Carbon County, about 40 miles north of Rawlins, Wyoming. The Ferris Mountains are a small mountain range, rising abruptly from the gently rolling plains that surround the WSA. The WSA is bounded on the north by the rolling plains of the Sweetwater Valley, on the south by the level expanses of Separation Flat, on the west by State land and Whisky Gap, and on the east by Miners Canyon.

The Ferris Mountains WSA is extremely steep and rugged, providing unusual and spectacular scenery. Along the southern flank, a formation of limestone outcrops forms a prominent white band twelve miles long, which is visible for up to 50 miles under the proper light conditions. At 10,037 feet, Ferris Peak is the highest point in the Great Divide Basin and rises some 3,000 feet from the valley floor. Vegetation consists of coniferous trees, shrubby plants, grasses and forbs. The WSA also contains grassy meadows and riparian areas.

The WSA was studied under Section 603 of FLPMA and was included in the Adobe Town – Ferris Mountains Wilderness EIS filed in January 1988. It is the recommendation of the BLM's Wyoming State Office that all 22,245 acres be designated wilderness.

3.20.1.3. Encampment River Canyon WSA

The Encampment River Canyon WSA includes 4,547 acres of BLM-managed lands with no inholdings or split estate lands. The WSA is located in southern Carbon County, approximately 2 miles south of Encampment, Wyoming and one mile north of the Forest Service Encampment River Wilderness. It lies in a foothill of the Sierra Madre Mountains.

The WSA is bounded on the north by private lands, fences and roads; on the east by roads and a powerline; on the south by private and State lands, roads, and mineral exploration activity; and on the west by roads.

The topography of the entire unit is mountainous. Steep canyons and rocky slopes dominate the vistas. The Encampment River and a major tributary, Miner Creek, add scenic features to the WSA. Elevations range from 7,500 feet along the Encampment River to 8,545 feet on the high ridges.

Approximately 10 percent of the WSA is forested. Tree species present include limber pine, lodgepole pine, Douglas-fir, subalpine fir, cottonwood, and aspen. They occur in pure and mixed stands scattered throughout the WSA. Lower elevations and drainages are characterized by narrow belts of deciduous trees (cottonwoods, willows, alders), coniferous trees (Douglas-fir, true firs), grasses, and forbs bordering the Encampment River.

Vegetation in the middle and upper elevations and on rocky slopes is influenced by differing aspects of the canyon, with a mosaic of bunchgrass and small shrubs on steep canyon slopes and small fingers of trees in draws and gullies. This mosaic of vegetation has been influenced by wildfires.

The WSA was studied under Section 202 of FLPMA and was included in the Final Great Divide Resource Area Wilderness EIS filed in August 1990. The recommendation of the BLM's Wyoming State Office was that all 4,547 acres be designated wilderness.

3.20.1.4. Prospect Mountain WSA

The Prospect Mountain WSA includes 1,145 acres of BLM-managed public lands with no inholdings or split estate lands. The WSA is located in southern Carbon County approximately 16 miles southeast of Encampment, Wyoming and 8 miles north of the Colorado-Wyoming border. It is along the southwestern flank of the Snowy Range in the Medicine Bow Mountains. The WSA is bounded on the north by the Prospect Creek Road and the North Platte River, on the east by the U.S. Forest Service Platte River Wilderness, on the south by a two-track road and fenceline, and on the west by a fenceline.

The WSA contains the western half of Prospect Mountain. Elevations range from 7,400 feet along the North Platte River to 8,430 feet on Prospect Mountain. The WSA is 70 percent forested, with lodgepole pine and aspen as the major species, and contains riparian areas and beaver ponds.

The WSA was studied under Section 202 of FLPMA and included in the Final Great Divide Resource Area Wilderness EIS filed in August 1990. The BLM's Wyoming State Office recommended that all 1,145 acres of this WSA be wilderness.

3.20.1.5. Bennett Mountains WSA

The Bennett Mountains WSA includes 6,003 acres of BLM-managed public lands with no inholdings or split estate lands. The WSA is located in north central Carbon County east of Seminoe Dam and lies about 35 miles northeast of Rawlins, Wyoming. The WSA is part of the Seminoe Mountain range, a small rugged range that rises abruptly from the surrounding lowlands. The WSA is bounded on the north and east by private and State lands, on the south by a powerline road, and on the west by the Bennett Mountain Road.

The Bennett Mountains WSA contains three basic types of topography: the mountain plateau/ridges; the steep rock ledges; and the many tributary draws. Elevations range from 6,600 feet to 8,000 feet. The mountain, which is approximately four miles long within the WSA, has distinct rocky ledges and walls along the entire southern exposure. In many places, these rocky walls are vertical outcrops that create the appearance of a fortress. The northern portion is traversed with numerous tree-filled drainages. Most portions of the WSA are vegetated with interspersed grasses, sagebrush, and other shrubs, and with pockets of pine, aspen and willows. The higher elevations have considerably less vegetation and more rugged rocky features.

The WSA was studied under Section 603 of FLPMA and was included in the Final Great Divide Resource Area Wilderness EIS filed in August 1990. The BLM's Wyoming State Office recommended that none of the WSA be designated as wilderness. This decision was based on the relative quality of the area's wilderness values. Although the wilderness inventory notes that outstanding opportunities for solitude and primitive recreation exist in the WSA, these values are not found throughout the study area.

3.20.1.6. Additional Information

Additional information was received concerning what is referred to as the Kinney Rim South area, and suggesting that the land in this area may contain wilderness quality. As it did for the suggested Adobe Town WSA expansion, BLM will ground check this information to determine whether or not the land does contain wilderness characteristics.

3.20.2. AREAS OF CRITICAL ENVIRONMENTAL CONCERN

There are four ACECs in the Rawlins RMPPA: Como Bluff ACEC, Sand Hills ACEC, Jep Canyon ACEC, and Shamrock Hills ACEC (Figure 3.20-2). Since ACECs are management designations to protect and prevent irreparable damage to specific resources, this section addresses the specific resources and management purposes of each of the Rawlins RMPPA ACECs. Unless otherwise noted, this section is derived from a synthesis of information from the Great Divide Resource Area Record of Decision and Approved Resource Management Plan (BLM 1990).

3.20.2.1. Como Bluff ACEC

Como Bluff ACEC protects 1,760 acres of public land located in the geologic Morrison formation (a fossil-bearing formation) for its paleontological resources and historical values. Over the years, excavations have removed a wide array of fossilized material, including fossilized bones of dinosaurs such as *Apatosaurus* and *Diplodocus* (Internet: Morrison 2002). In addition to the rich collection of paleontological resources, Como Bluff ACEC preserves a portion of the period in American History known as the "Bone Wars". Beginning for Como Bluff in the late 1870s, this period was marked by extremely competitive fossil hunting by paleontologists, including stories of espionage and sabotage (Internet: BLM 2002).

Como Bluff ACEC is part of the Como Bluff Historic District, also known as the Como Bluff Historic-Paleontologic Site, which is listed on the National Register of Historic Places (Internet: National Register 2002). In addition to this, the Como Bluff area is a National Natural Landmark.

3.20.2.2. Sand Hills ACEC

The Sand Hills ACEC protects about 8,300 acres of public land for its unique vegetation complex, wildlife habitat values, and recreational opportunities. This area provides crucial winter range for deer, elk, and antelope, as well as nesting and foraging habitat for raptors (Section 3.19). As a result of this range, there are excellent big-game hunting opportunities in this ACEC.

3.20.2.3. Jep Canyon ACEC

Jep Canyon ACEC protects about 13,320 acres of public land for its crucial elk winter range, as well as for raptor nesting habitat.

3.20.2.4. Shamrock Hills ACEC

Shamrock Hills ACEC protects about 17,280 acres of public land for its habitat and productivity of nesting raptor pairs. Shamrock Hills ACEC is recognized as a Raptor Concentration Area (RCA), with one of the highest known nesting populations of ferruginous hawks in Wyoming. These populations are further discussed in Section 3.19.

3.20.3. WILD AND SCENIC RIVERS

There are currently no designated Wild, Scenic, or Recreational Rivers in the Rawlins RMPPA. As part of the RMP planning effort, the Rawlins Field Office is conducting eligibility and suitability reviews that precede any Wild, Scenic, or Recreational River designations by Congress.

3.20.4. SPECIAL RECREATION MANAGEMENT AREAS

Special Recreation Management Areas are locations that are managed for significant or unique recreational resources. There are three such areas within the Rawlins RMPPA: Continental Divide National Scenic Trail SRMA, North Platte River SRMA, and Shirley Mountain SRMA (Figure 3.11-1). Table 3.20-1 summarizes Recreation Management Information System (RMIS) data for these areas over the past three fiscal years (FY99, FY00, FY01). In addition to these data, each area is summarized briefly below. Unless otherwise noted, this section is derived from a synthesis of information from the Great Divide Resource Area Record of Decision and Approved Resource Management Plan (BLM 1990), the Recreation Management Information System (BLM 2002), and personal conversations with the Rawlins Field Office Recreation Planner (Clair 2002).

3.20.4.1. Continental Divide National Scenic Trail SRMA

This SRMA covers 80 miles of trail through BLM-administered public land. Its key uses include camping, hiking, and driving. The exact trail route has not yet been fully identified.

3.20.4.2. North Platte River SRMA

By far, this SRMA receives the heaviest use of the three SRMAs in the Rawlins RMPPA. It is a 3,550-acre SRMA that follows the North Platte River from Seminoe Reservoir south to the Colorado/Wyoming border. Recreational activities requiring water receive heavy participation. The largest number of participants, just over 81,000, fished the river. Well over 72,000 participants viewed wildlife. Other important activities within this SRMA include row/float/raft activities and camping. Picnicking and trail related activities were participated in frequently, as well.

3.20.4.3. Shirley Mountain SRMA

Shirley Mountain SRMA was designated to protect recreationally popular forest and geological resources. Most people drive cars, trucks, or SUVs to this area and view wildlife. Located in the Shirley Mountains, this SRMA contains some excellent elk habitat and thereby provides an opportunity for wildlife viewing. Likewise, this SRMA attracts more big game hunters than the other SRMAs.

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Glossary

Acronyms

Tables/Figures

Chapter 4

Table 3.1-1. National and Wyoming Air Quality Standards.

Pollutant	Averaging Time	NAAQS ($\mu g/m^3$)	WAAQS ($\mu g/m^3$)
Carbon Monoxide—CO	1 hour	40,000	40,000
	8 hour	10,000	10,000
Nitrogen Dioxide—NO_2	Annual	100	100
Sulfur Dioxide—SO_2	3 hour	1300	695
	24 hour	365	260
	Annual	80	60
Ozone—O_3	1 hour	235	235
	8 hour	157	157
Particulate Matter—PM10	24 hour	150	150
	Annual	50	50
Fine Particulate Matter—PM2.5	24 hour	65	65
	Annual	15	15

Table 3.1-2. PSD Increments.

Pollutant	Averaging Time	PSD Increment ($\mu g/m^3$)	
		Class I	Class II
Nitrogen Dioxide—NO_2	Annual	2.5	25
Sulfur Dioxide—SO_2	3 hour	25	512
	24 hour	5	91
	Annual	2	20
Particulate Matter—PM_{10}	24 hour	8	30
	Annual	4	17

Table 3.1-3. Concentrations of Criteria Air Pollutants.

Pollutant	Averaging Time	Monitored Concentration ($\mu g/m^3$)	Percent NAAQS (%)	Percent WAAQS (%)
Carbon Monoxide CO	8 hour	1500	15	15
	1 hour	3500	9	9
Nitrogen Dioxide NO_2	Annual	9	9	9
Sulfur Dioxide SO_2	Annual	9	11	15
	24 hour	43	12	17
	3 hour	132	10	19
Ozone O_3	8 hour	139	89	89
	1 hour	144	61	61
Particulate Matter PM_{10}	Annual	12	24	24
	24 hour	20	13	13
Fine Particulate Matter $PM_{2.5}$	Annual	6	40	40
	24 hour	10	15	14

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Table 3.1-4. Summary of Air Quality in the Vicinity of the Rawlins RMPPA.

Air Quality Component	Comment
Air Pollutant Concentrations	
Criteria Air Pollutants	Concentrations are in compliance with NAAQS and WAAQS.
Nitrogen Compounds	• Nitric acid (HNO_3) concentrations in Centennial and Rocky Mountain National Park are slightly higher than concentrations in other remote areas. • Concentrations of nitrate (NO3) and ammonium (NH4) are consistent with other remote areas
Sulfur Compounds	• Sulfur dioxide (SO_2) and sulfate (SO_4^{--}) concentrations in Centennial and Rocky Mountain National Park are consistent with concentrations in remote areas
Visibility	
Rocky Mountain National Park	• 10% cleanest: 130-160 miles • average: 80-100 miles • 10% haziest: 50-60 miles
Atmospheric Deposition	
Precipitation pH	• Precipitation acidification from 1987 through 1989 (pH: 4.7 – 4.9) • Precipitation near natural from 1990 through 2000 (pH: 4.9 – 5.1)
Total Deposition	• Centennial: nitrogen deposition from ammonium (NH4+) and nitrate (NO3-) is less than 9.8 kg/ha.)[1]. Sulfur deposition from sulfate (SO4--) and sulfur dioxide (SO2) is less than 3.7 kg/ha. [2]

[1]Proposed acceptable level of total nitrogen deposition is 3 to 5 kg/ha/year (USFS, 1989)
[2]Proposed acceptable sulfur deposition is 5 kg/ha/year (USFS, 1989)

Table 3.2-1. Prehistoric Time Periods.

Cultural Chronology	Site Types
Paleo-Indian (10,000-6,000 B.C.)	Bison kills, Lithic scatters, Rock shelters, Lithic quarries
Early Plains Archaic (6,000-3,000 B.C.)	Lithic scatters, Tipi ring sites, Hearths, Lithic quarries, Rock shelters
Middle Plains Archaic (3,000 to 1,000 B.C.)	Lithic scatters, Hearths, Tipi rings, Lithic quarries, Rock shelters
Late Plains Archaic (1,000 B.C. to 500 A.D.)	Bison kills, Rock alignments, Tipi rings, Lithic scatters, Hearths, Cairns
Late Prehistoric Period (500 - 1800 A.D.)	Bison kills, Tipi rings, Rock alignments, Prehistoric cairn trails, Lithic scatters, Lithic quarries, Rock art, Hearths

Table 3.5-1. Rawlins Planning Area CBM Methane Unit Agreements.

Unit Name	Operator	Size (acres)	Date Received	Date Approved
Blue Sky	Pet. Dev. Corp.	24,878.60	05/13/2001	
Hanna Draw	Williams Prod. RMT	25,576.43	06/17/1999	02/09/2000
Magic	Yates Pet. Corp.	15,980.29	02/25/2002	
Muddy Mountain	Pet. Dev. Corp.	23,464.41	05/13/2001	
Point Rocky	Pet. Dev. Corp.	19,030.06	05/13/2001	
Sand Hills	Pet. Dev. Corp.	14,485.48	05/13/2001	
Smiley Draw	Pet. Dev. Corp.	19,576.15	05/13/2001	
Sun Dog	Pet. Dev. Corp.	23,468.74	05/13/2001	12/22/2001
	Total Acres	166,460.16		

Table 3.5-2. Locatable Minerals Deposits in the Rawlins RMPPA.

Commodity	Location	Geologic Description	Deposit Type	Production History	Future Potential
Sedimentary Uranium					
Shirely Basin Deposits (USGS PP 745)	T27-28N, R 77-80W Shirley Basin 30 x 60	Sandstone uranium deposits hosted in the Tertiary Wind River Fm.	Epigenetic redox/roll front uranium deposits.	Major mines: Petrotomics, Pathfinder, Jenkins. Est. production about 10 to 20 million pounds of U3O8.	Major district with considerable future potential for uranium. Est. resource of 50 million pounds.
Red Desert Deposits (USGS Bull. 1030-I) (USGS Bull. 1099-B)	T18-21N, R99-101W Red Desert 30 x 60	Lignite coal uranium. Low grade uranium mineralization in lignite beds of the Wasatch and Green River formations.	Disseminated uranium in lignite beds. Grades range from 0.003 to 0.007 percent U3O8.	No production of uranium. Estimated resources are 24,000 tons of uranium in coal. Coal estimated at 20 percent stripable.	Grades too low for future production except as byproduct of lignite coal production.
Great Divide Basin (WGA Guidebook, 25th field conference)	T24-26N, R93096W Red Desert 30 x 60	Sandstone and evaporative uranium prospects hosted in Tertiary Battle Spring and Bridger Fms.	Epigenetic redox/roll front uranium deposits. Also evaporative uranium deposits near Lost Creek mine.	Lost Creek Schroeckinite Deposit(T26N: R94W). Grades are 0.013 to about 0.28 percent U3O8.	Limited future potential. No major deposits.
Poison Buttes (Baggs) (Ore Deposits Western US)	T12-13N, R92W Baggs area Saratoga 30 x 60	Sandstone uranium deposits hosted in Tertiary Browns Park Fm.	Disseminated and epigenetic redox/roll front uranium deposits.	Urangesellschaft proposed mine at2,000 tpd production.	Considerable future potential at higher uranium prices. Estimated resource of 8 to 15 million pounds.
Ketchum Buttes (USGS Bull. 1046-M) (USGS PP 538)	T15N, R89W Northeast of Encampment Saratoga 30 x 60	Sandstone uranium prospects hosted in Tertiary Browns Park Fm.	Disseminated and epigenetic redox/roll front uranium deposits.	Prospects only	
Desert Rose area (USGS PP 538) (USGS MR-21)	T13N, R76W Southwest of Laramie Laramie 30 x 60	Sandstone uraium prospects hosted in Cretaceous Clovery Fm.	Disseminated and epigenetic redox/roll front uranium deposits.	Prospects only	
Miller Hill area	T18N, R88W Rawlins 30 x 60	Sandstone uranium prospects hosted in Tertiary Browns Park Fm.	Disseminated and epigenetic redox/roll front uranium deposits.	Prospects only	

Table 3.5-2. Locatable Minerals Deposits in the Rawlins RMPPA.

Commodity	Location	Geologic Description	Deposit Type	Production History	Future Potential
Encampment/Riverside	T15-16N, R84-85W Saratoga 30 x 60	Sandstone uranium prospects hosted in Tertiary Browns Park Fm.	Disseminated and epigenetic redox/roll front uranium deposits.	Prospects only	
Magmatic Uranium					
Pedro Hills	T26N, R81W West side of Shirley Basin Shirley Basin 30 x 60	Veins in Precambrian rocks	Magmatic-hydrothermal uranium veins along fissures	Little Man Mine - no production history	Limited future potential - this type of deposit is difficult to develop.
Titaniferous Magnetite					
Iron Mountain District (WGS Bull. 31) (Ore Deposits of US)	T18-19N, R71W Rock River 30 x 60	Lenses, masses, and beds of titaniferous magnetite and Ilmenite with spinel in Precambrian Laramie Anorthosite.	Magmatic segregations and/or possible replacments within layered mass of feldspar and olivine called Laramie Anorthosite. Deposits follow anticlinal axis of anorthosite.	Main mines are Shanton, Iron Mountain, and Sybille Pit. Past production about1.1 million tons to 1968. Past operators were Union Pacific Railroad and Anaconda.	Estimated 30 million tons of massive ore at 45% Fe and 20% TiO2. Disseminated ore estimated at148 million tons at 20% Fe and9.7% TiO2.
Sheep Mountain (WGS OFR 90-7)	T15N, R77W Medicine Bow 30 x 60	Titaniferous magnetite black sand deposit in the Mesaverde Formation.	Paleo-beach sand deposit 4,300 feet long and about 50 feet x 17 feet. Grades are 15.6 % TiO2. No identified resource.	No production.	Uncertain
Rare Earths And Yttrium, Including Columbite And Tantalite					
Big Creek District (USGS Bull. 1046-M)	T13N, R81-82W Saratoga 30 x 60	Veins and pegmatites in Precambrian granite intrusives.	Hydrothermal veins and pegmatites in granites	Prospects only.	
Tie Siding Area (WGA Guidebook 42)	T12N, R71-72W Laramie 30x60	Pegmatites in Sherman Granite	Radioactive pegmatites	Prospects only.	
Red Mountain Syenite (WGA Guidebook 42)	T22N, R71W Laramie 30 x 60	Disseminated allanite in Precambrian syenite intrusive mass.	Disseminated REE deposit	No Production.	
Fox Creek Pegmatites (WGA Guidebook 42)	T13N, R78W Laramie 30 x 60	Pegmatites with columbite and tantalite	High-grade pegmatites	Past production of 85 pounds of columbite and tantalite	
Stratabound Gold					
Ferris Mountains (USGS Bull. 811)	T27N, R87-88W Bairoil 30 x 60	Vein-like deposits and beds in Precambrian metasediments and	Exhalative iron-formation gold and copper deposits and	Spanish Trail Mine. No recorded past production.	Deposit type known to host major gold

Table 3.5-2. Locatable Minerals Deposits in the Rawlins RMPPA.

Commodity	Location	Geologic Description	Deposit Type	Production History	Future Potential
		granites	associated intrusives with veins. Gold and copper associated with jasperoid beds.		deposits worldwide.
Seminoe Mountains (WGS OFR 82-2) (Klein, 1981: CSM Thesis) (WGS Prelim Rpt 6)	T25-26N, R84-86W Bairoil 30 x 60	Vein-like deposits and beds in Precambrian metasediments and granites	Exhalative iron-formation gold and copper deposits and associated intrusives with veins. Gold and copper associated with jasperoid beds in hornblende schist.	Penn Mine at Bradley Peak. Three adits with limited production. Estimated past production of about 530 oz Au.	Estimated 100 million tons of Fe ore at 28 to 68% Fe. Gold values to 2.7 opt Au. Nephrite jade present in Seminoe area.
Copper-Gold Deposits					
Jelm Mountain District (WGS RI-23) (WGS Bull. 50)	T12-13N, R76-77W Laramie 30 x 60 Saratoga 30 x 60	Copper-gold-silver-arsenic-bismuth "veins" in Precambrian amphibolite schist.	Oxidized quartz veins and mineralized shears in Precambrian metasediments and associated with mineralized pegmatites.	Annie Mine has 3-30% Cu and 0.1 opt Au. Wyoming Queen has 3 shafts to depths of 250 feet. No data on past production histories.	Deposits similar to major gold deposits of Canada. Veins may be folded beds, as they are in Canada.
Cooper Hill District (WGS RI-23)	T18N, R78W Medicine Bow 30 x 60	Copper and gold veins in Precambrian schist.	Vein and shear-zone sulfide mineralization in folded Precambrian schists.	Charlie, Emma G, and Albion mines. Grades to 0.7 opt Au and 12.2 opt Ag. No recorded production history.	Deposits similar to major gold deposits of Canada. Veins may be folded beds, as they are in Canada.
Silver Crown District (WGS OFR 82-4) (WGS Prelim. Rpt 14)	T13-14N, R69-70W Laramie 30 x 60	Precambrian quartz monzonite intrusive related to Nash Fork - Mullen Creek Shear Zone.	Disseminated copper and gold deposit related to Precambrian island-arc volcanism and intrusive igneous rocks.	Copper King Deposit: 35 million tons at 0.2% copper and 0.02 opt gold.	Copper King is only drilled reserve in area. May become economic at higher copper and gold prices.
Kimberlite/Diamonds					
Iron Mountain District (Smith, 1977: CSU Thesis) (Hausel and Roberts, 1984)	T19-20N, R70W Rock River 3 0x 60	Devonian kimberlite intrusives into Precambrian Laramie Anorthosite.	Kimberlite pipes with diamonds.	No production history.	Diamonds small and mainly of industrial quality.
Stateline District (WGS OFR82-1) (WGS Prelim Rpt 18)	T12N, R72W Laramie 30 x 60	Devonian kimberlite intrusives into Precambrian granites and metamorphics.	Kimberlite pipes with diamonds.	No past production. Diamond grades in range of 0.5 to 1.0 carat/100 tonnes. Industrial grade diamonds.	Diamonds small and mainly of industrial quality. Potential for more discoveries considered high.

Table 3.6-1. List of Hazardous Constituents Potentially Used or Produced by Coalbed Methane or Natural Gas Operations. Page 1 of 3

List of Hazardous Constituents Potentially Used or Produced During Construction, Drilling, Production, and Reclamation Operations Associated with Coalbed Methane and Natural Gas		
Use	**Material**	**Hazardous Constituents**
Drilling Material	Barite	Barium compounds, Fine mineral fibers
	Bentonite	Fine mineral fibers
	Caustic Soda	Sodium hydroxide
	Glutaraldehyde	Isopropyl alcohol
	Lime	Calcium hydroxide
	Mica	Fine material fibers
	Modified Tannin	Ferrous sulfate, Fine material fibers
	Phosphate Esters	Mehanol
	Polyacrylamides	Acrylamide, Polycyclic aromatic hydrocarbons (PAHs), Petroleum distillates, Polycyclic organic matter (POM), Fine mineral fibers
	Retarders	Fine mineral fibers
	Anionic Polyacrylamide	Acrylamide
	Polyanionic Cellulose	Fine mineral fibers
Cement/Plug	Anti-foamer	Glycol ethers
	Bentonite	Fine mineral fibers
	Calcium Chloride Flake	Fine mineral fibers
	Cellophane Flake	Fine mineral fibers
	Cements	Aluminum oxide, Fine mineral fibers
	Chemical Wash	Ammonium oxide, Glycol ethers
	Diatomaceous Earth	Fine mineral fibers
	Extenders	Aluminum oxide, Fine mineral fibers
	Fluid Loss Additive	Acrylamide, Fine mineral fibers, Naphthalene
	Friction Reducer	Fine mineral fibers, Naphthalene, PAHs, POM
	Mud Flash	Fine mineral fibers
	Retarder	Fine mineral fibers
	Salt	Fine mineral fibers
	Silica Flour	Fine mineral fibers
Fracturing Material	Biocides	Fine mineral fibers, PAHs, POM
	Breakers	Ammonium persulphate, Ammonium sulphate, Copper compounds, Ethylene glycol, Fine mineral fibers, Glycol ethers
	Clay Stabilizer	Fine mineral fibers, Glycol ethers, Isopropyl alcohol, Methanol, PAHs, POM
	Crosslinkers	Ammonium chloride, Methanol, Potassium hydroxide, Zirconium nitrate, Zirconium sulfate
	Foaming Agent	Glycol ethers
	Gelling Agent	Benzene, Ethylbenzene, Methyl tert-butyl ether (MTBE), Naphthalene, PAHs, POM, Sodium hydroxide, m-Xylene, o-Xylene, p-Xylene
	pH Buffers	Acetic acid, Benzoic acid, Fumeric acid, Hydrochloric acid, Sodium hydroxide
	Sands	Fine mineral fibers
	Solvents	Glycol ethers

Table 3.6-1. List of Hazardous Constituents Potentially Used or Produced by Coalbed Methane or Natural Gas Operations.

List of Hazardous Constituents Potentially Used or Produced During Construction, Drilling, Production, and Reclamation Operations Associated with Coalbed Methane and Natural Gas		
Use	**Material**	**Hazardous Constituents**
	Surfactants	Glycol ethers, Isopropyl alcohol, Methanol, PAHs, POM
Production Product/Fuel	Natural Gas	n-Hexane, PAHs, POM
Production Product	Produced water/drill cuttings	Barium, Cadmium, Chromium, Lead, Manganese, Radium 226, Uranium, Other radionuclides
	Liquid hydrocarbons	Benzene, Ethyl benzene, n-Hexane, PAHs, POM, Toluene, m-Xylene, o-Xylene, p-Xylene
Fuel	Diesel fuel	Benzene, Cumene, Ethylbenzene, MTBE, Naphthalene, PAHs, POM, Toluene, m-Xylene, o-Xylene, p-Xylene
	Gasoline	Benzene, Cumene, Cyclohexane, Ethylbenzene, n-Hexane, MTBE, Naphthalene, PAHs, POM, Tetraethyl lead, Toluene, m-Xylene, o-Xylene, p-Xylene
	Jet A	Benzene, Cumene, Cyclohexane, Ethylbenzene, n-Hexane, MTBE, Naphthalene, PAHs, POM, Toluene, m-Xylene, o-Xylene, p-Xylene
	Propane	Propylene
Geophysical Survey Materials	Explosives, fuses, detonators, boosters, fuels	Aluminum, Ammonium nitrate, Benzene, Cumene, Ethylbenzene, Ethylene glycol, Lead compounds, MTBE, Naphthalene, Nitric acid, Nitroglycerine, PAHs, POM, Toluene, m-Xylene, o-Xylene, p-Xylene
Pipeline Material	Coating	Aluminum oxide
	Cupric sulfate solution	Cupric sulfate, Sulfuric acid
	Diethanolamine	Diethanolamine
	LP Gas	Benzene, n-Hexane, Propylene
	Molecular sieves	Aluminum oxide
	Pipeline primer	Naphthalene, toluene
	Potassium hydroxide solution	Potassium hydroxide
	Rubber resin coatings	Acetone, Coal tar pitch, Ethyl acetate, Methyl ethyl ketone (MEK), Toluene, Xylene
Emissions	Gases	Formaldehyde, Nitrogen dioxide, Ozone, Sulfur dioxide, Sulfur trioxide
	Hydrocarbons	Benzene, Ethylbenzene, n-Hexane, PAHs, Toluene, m-Xylene, o-Xylene, p-Xylene
	Particulate Matter	Barium, Cadmium, Copper, Fine mineral fibers, Lead, Manganese, Nickel, POM, Zinc
Miscellaneous	Acids	Acetic anhydride, Formic acid, Sodium chromate, Sulfuric acid
	Antifreeze, Heat Control, and Dehydration Agents	Acrolein, Cupric sulfate, Ethylene glycol, Freon, Phosphoric acid, Potassium hydroxide, Sodium hydroxide, Triethylene glycol
	Batteries	Cadmium, Cadmium oxide, Lead, Nickel hydroxide, Potassium hydroxide, Sulfuric acid

Table 3.6-1. List of Hazardous Constituents Potentially Used or Produced by Coalbed Methane or Natural Gas Operations.

List of Hazardous Constituents Potentially Used or Produced During Construction, Drilling, Production, and Reclamation Operations Associated with Coalbed Methane and Natural Gas		
Use	**Material**	**Hazardous Constituents**
	Biocides	Formaldehyde, Isopropyl alcohol, Methanol
	Cleaners	Hydrochloric acid
	Corrosion Inhibitors	4-4' Methylene dianiline, Acetic acid, Ammonium bisulfite, Basic zinc carbonate, Diethylamine, Dodecylbenzenesulfonic acid, Ethylene glycol, Isobutyl alcohol, Isopropyl alcohol, Methanol, Naphthalene, Sodium nitrite, Toluene, Xylene
	Emulsion Breakers	Acetic acid, Acetone, Ammonium chloride, Benzoic acid, Isopropyl Alcohol, Methanol, Naphthalene, Toluene, Xylene, Zinc chloride
	Fertilizers	Unknown
	Herbicides	Unknown
	Lead-free thread compound	Copper, Zinc
	Lubricants	1,2,4-Trimethylbenzene, Barium, Cadmium, Copper, n-Hexane, Lead, Manganese, Nickel, PAHs, POM, Zinc
	Methanol	Methanol
	Motor oil	Zinc compounds
	Paints	Aluminum, Barium, n-Butyl alcohol, Cobalt, Lead, Manganese, PAHs, POM, Sulfuric acid, Toluene, Triethylamine, Xylene
	Paraffin Control	Carbon disulfide, Ethylbenzene, Methanol, Toluene, Xylene
	Photoreceptors	Selenium
	Scale inhibitors	Acetic acid, Ethylene diamine tetra, Ethylene glycol, Formaldehyde, Hydrochloric acid, Isopropyl alcohol, Methanol, Nitrilotriacetic acid
	Sealants	1,1,1-Trichloroethane, n-Hexane, PAHs, POM
	Solvents	1,1,1-Trichloroethane, Acetone, t-Butyl alcohol, Carbontetrachloride, Isopropyl alcohol, MEK, Methanol, PAHs, POM, Toluene, Xylene
	Starting Fluid	Ethyl ether
	Surfactants	Ethylene diamine, Isopropyl alcohol, Petroleum naptha

Source: Modified from: BLM 2001 and BLM 1999

Table 3.7-1. Acreages Associated with Surface Ownership Acreages within the Rawlins RMPPA.

Acres	Land Owner
11,211,202.03	Total Area Within RMPPA
3,548,304.64	Bureau of Land Management
32,930.68	Bureau of Reclamation
6,025.40	Department of Defense
5,822,262.65	Private
737,251.71	State
6,559.72	U.S. Fish &Wildlife
997,701.61	USDA-Forest Service
60,165.61	Water

Table 3.7-2. Well Pad Sizes for Oil and Gas or Coal Bed Methane Development Proposed in the RMPPA.

DRILLING WELL PAD SIZE AND PRODUCING WELL PAD SIZE					
DEPTH	**Drilling Well Pad (acres)**	**Producing Well Pad (acres)**	**EA/EIS**	**Formation**	**Remarks**
2400	2.01	1.43	South Baggs EIS	Wasatch	Gas well
2700	1.25	0.25	Blue Sky Pod EA	Measaverde Group	Shallow CBM
5000	1.2	0.3	Hanna Draw EA	Hanna	Deep CBM
6000	2.5	1	Seminoe road EA	Mesaverde	Deep CBM
7000	3.21	1.43	South Baggs EIS	Mesaverde/Lewis	Intermediate gas well - large fracs
9000	2.5	1.5	Creston/Blue Gap EIS	Mesaverde	Intermediate gas well - large fracs
10500	3.67	2.1	Greater Wamsutter II	Mesaverde	Intermediate gas well - large fracs
11000	2.6		Contiental Divide		
11000	3.5	2.5	Hay Reservoir Unit EA	Lewis	Intermediate gas well - large fracs
14000	3.25	1.5	Mulligan Draw EIS	Almond	Deep - Long term well and large fracs
14500	4	1.43	Desolation Flats EIS	Mesaverde	Deep - Long term well and large fracs

Table 3.8-1. Cattle and Sheep Numbers in Albany, Carbon, and Laramie Counties from 1905 to 2000.

Year	Cattle Numbers	Sheep Numbers	Total Numbers	Percent Cattle
1905	750,000	NA		
1910	746,000	NA		
1915	887,000	NA		
1920	950,000	3,000,000	3,950,000	24.1%
1925	795,000	2,700,000	3,495,000	22.7%
1930	790,000	3,540,000	4,330,000	18.2%
1935	858,000	3,599,000	4,457,000	19.3%
1940	811,000	3,778,000	4,589,000	17.7%
1945	1,043,000	3,040,000	4,083,000	25.5%
1950	991,000	1,924,000	2,915,000	34.0%
1955	1,096,000	2,036,000	3,132,000	35.0%
1960	1,175,000	2,360,000	3,535,000	33.2%
1965	1,352,000	2,092,000	3,444,000	39.3%
1970	1,476,000	1,883,000	3,359,000	43.9%
1975	1,690,000	1,386,000	3,076,000	54.9%
1980	1,340,000	1,050,000	2,390,000	56.1%
1985	1,365,000	860,000	2,225,000	61.3%
1990	1,220,000	805,000	2,025,000	60.2%
1995	1,470,000	790,000	2,260,000	65.0%
2000	1,580,000	570,000	2,150,000	73.5%

T11_3.8-1_Lvstck_numbers.xls

Table 3.8-2. Livestock Actual Use in Animal Unit Months (AUMs) for the Rawlins RMPPA from 1991 to 2000.

Year	Cattle Actual Use (AUMs)	Sheep Actual Use (AUMs)	Total Actual Use (AUMs)	Percent Cattle Use (AUMs)
1991	158,670	29,085	187,755	84.5%
1992	173,422	29,015	202,437	85.7%
1993	212,129	37,496	249,625	85.0%
1994	224,270	32,503	256,773	87.3%
1995	228,893	31,172	260,065	88.0%
1996	280,655	31,433	312,088	89.9%
1997	278,748	30,977	309,725	90.0%
1998	273,561	26,591	300,152	91.1%
1999	318,098	26,474	344,572	92.3%
2000	294,329	21,855	316,184	93.1%
Mean Actual Use	244,278	29,660	273,938	89.2%

T12_3.8-2_Lvstck_actuse.xls

Table 3.8-3 Table of Range Allotment Information for the Rawlins RMPPA.

Allotment Number	Allotment Name	Public Acres	Other Fed Acres	State Acres	Total Acres	Public Aums	Private Aums	Other Fed Aums	State Aums	Suspended AUMs	Calc.Total AUMs	Class of Livestock	On Date	Off Date	Grazing Management System
00301	PATHFINDER	9335	2701	1920	13956	1081	837	425	384		2727	CATTLE	1-May-02	31-Jan	DEFERRED ROTATION
00302	LITTLE CANYON CREEK	1424			1424	165	104				269	CATTLE	1-May	30-Oct	DEFERRED ROTATION
00303	CANYON CREEK	5340		3400	8740	857	696		618		2171	CATTLE/HORSE	1-May	30-Nov	PERMIT LONG
00304	WAGON TONGUE	775		640	1415	123	1		123		247	CATTLE	1-Jun	7-Jul	PERMIT LONG
00305	CAMP CREEK	3217		1440	4657	706	825		294		1825	CATTLE	1-Jun	30-Nov	PERMIT LONG
00306	KIRK RANCH	3395		1306	4701	365	44		146		555	CATTLE	1-Mar	6-Mar	PERMIT LONG
00307	BATES HOLE	14381		1722	16103	2085	1079		242		3406	CATTLE	1-May	31-Oct	DEFERRED ROTATION
00309	MOSS AGATE	6355		548	6903	986	113		49		1148	CATTLE/SHEEP	1-Jun	10-Oct	PERMIT LONG
00310	ANTELOPE SPRINGS	2977			2977	380	2				382	SHEEP	1-Jun	30-Sep	PERMIT LONG
00311	BATES BENCHMARK	4262		1360	5622	611	132		251		994	CATTLE/SHEEP	1-Jun	10-Oct	PERMIT LONG
00312	7E RANCH	8845		640	9485	1370	711		105		2186	CATTLE/SHEEP	1-May	30-Nov	YEAR LONG PERMIT
00313	WEST LITTLE MEDICINE	6922		640	7562	1267	9		82		1358	CATTLE	1-May	31-Oct	PERMIT LONG
00314	MINE	4050		130	4180	679	987		29		1695	CATTLE	1-May	31-Oct	PERMIT LONG
00315	INDIAN SPRINGS	2851			2851	433	347				780	CATTLE	1-Jun	15-Oct	DEFERRED ROTATION
00316	DRY CREEK RIM	25750		4200	29950	4346	2865		784		7995	CATTLE	15-May	31-Oct	PERMIT LONG
00317	UPPER DRY CREEK	5712		580	6292	1095	282		83		1460	CATTLE	1-Jun	5-Oct	PERMIT LONG
00318	SHIRLEY RIDGE	7693		640	8333	1048	46		102		1196	CATTLE/HORSE	11-May	30-Sep	PERMIT LONG
00319	EAST LITTLE MEDICINE	10017		1120	11137	1784	2841		228		4853	CATTLE/SHEEP	1-May	31-Oct	PERMIT LONG
00320	LEO	9121	2327	640	12088	659	422	243	80	1983	3387	CATTLE	15-Apr	14-Nov	DEFERRED ROTATION
00321	DRY CREEK	9861		640	10501	1259	904		128		2291	CATTLE	1-Mar	28-Feb	DEFERRED ROTATION
00322	SPRING CREEK	10387		640	11027	1912	883		153		2948	CATTLE	1-Mar	31-Oct	REST ROTATION
00323	BLACK CANYON	11067	3288	1082	15437	1814	547	292	318		2971	CATTLE	26-Apr	25-Nov	DEFERRED ROTATION
00324	PALMER-NELSON	4241		680	4921	898	426		76		1400	CATTLE	1-Jun	31-Oct	PERMIT LONG
00325	CADY	185			185	20	30				50	CATTLE	1-May	31-Oct	PERMIT LONG
00326	BEAVER CREEK	2385		358	2743	395	512		59		966	CATTLE	15-Jul	10-Oct	DEFERRED ROTATION
00327	SCHOOL SECTION	816		609	1425	125					125	CATTLE	1-Jul	31-Dec	PERMIT LONG
00328	SULLIVAN	108640		14738	123378	18491	8626		2199		29316	CATTLE	1-May	15-Oct	DEFERRED ROTATION
00329	LOST CREEK	2895		43	2938	450			9		459	CATTLE	1-May	1-Sep	DEFERRED ROTATION
00330	HOUSE GULCH	2395		481	2876	631	289		96		1016	CATTLE	1-Mar	15-Oct	DEFERRED ROTATION
00331	UPPER LOST CR.	589			589	103	32				135	CATTLE	1-May	2-Oct	PERMIT LONG
00332	THORNTON PLACE	2852			2852	374					374	CATTLE	1-Jun	30-Sep	PERMIT LONG
00333	SOUTH BENNETT (NO.)	3466	1059		4525	297		113			410	CATTLE/SHEEP	1-Jun	30-Nov	PERMIT LONG
00334	CORRAL CREEK	5710		1120	6830	1193	290		328		1811	CATTLE/SHEEP	1-May	30-Nov	PERMIT LONG
00335	SHIRLEY MOUNTAIN	18308		1920	20228	3655	2451		384		6490	CATTLE/SHEEP	1-May	31-Oct	PERMIT LONG
00336	MUD SPRINGS	1193		95	1288	466	255		16		737	CATTLE	11-May	30-Sep	PERMIT LONG
00338	ANDA	9184		624	9808	1691	523		130		2344	CATTLE	1-Jun	15-Oct	DEFERRED ROTATION
00339	GRASSHOPPER	40			40	10					10	CATTLE	1-May	31-Oct	PERMIT LONG
00340	HORSE SPRINGS	5228		2919	8147	1056	719		518		2293	CATTLE	1-May	31-Oct	DEFERRED ROTATION
00349	PEDRO MOUNTAINS	3405			3405	359					359	CATTLE			PERMIT LONG
00350	LOST CREEK RANCH	166			166	18	162				180	CATTLE	1-Mar	28-Feb	DEFERRED ROTATION
00401	AIRPORT	840		640	1480	249			94		343	CATTLE	15-May	15-Nov	DEFERRED ROTATION
00402	ANTELOPE	1394		80	1474	319	2302		13		2634	CATTLE	1-Jun	5-Oct	PERMIT LONG
00403	BAGGS SUB UNIT	3985			3985	315	632				947	CATTLE	1-Apr	15-Jun	ROTATION
00404	ANTELOPE DRAW	3986			3986	333				487	820	CATTLE	1-Apr	30-Sep	PERMIT LONG
00405	BEAVER DAMS	3565		1342	4907	682	71		211		964	CATTLE/SHEEP	1-Jun	30-Sep	DEFERRED ROTATION
00406	BODEN	1452		330	1782	189	56		64		309	CATTLE	1-Jun	30-Sep	PERMIT LONG
00407	CENTENNIAL CR.	2776		598	3374	233	8		50	270	561	CATTLE	15-Jun	30-Sep	PERMIT LONG

Table 3.8-3 Table of Range Allotment Information for the Rawlins RMPPA.

Allotment Number	Allotment Name	Public Acres	Other Fed Acres	State Acres	Total Acres	Public Aums	Private Aums	Other Fed Aums	State Aums	Suspended AUMs	Calc.Total AUMs	Class of Livestock	On Date	Off Date	Grazing Management System
00408	CHEROKEE	64871		972	65843	9685	310		593		10588	CATTLE/SHEEP	15-Apr	15-Dec	PERMIT LONG
00409	COTTONWOOD DRAW	2111		640	2751	360	72		67		499	CATTLE	1-Jun	18-Sep	PERMIT LONG
00410	COYOTE DRAW	4376			4376	472	6				478	CATTLE	1-Jun	15-Sep	DEFERRED ROTATION
00411	CUSHING	5653		84	5737	1278			16		1294	CATTLE	10-May	23-Jun	PERMIT LONG
00412	DEEP GULCH	25031	126	4330	29487	3336	666	22	558		4582	CATTLE/SHEEP	15-May	27-Nov	DEFERRED ROTATION
00413	DIRTY MAN	228			228	20	50				70	CATTLE	25-Jun	4-Oct	DEFERRED ROTATION
00414	DISH	15700		2330	18030	4262	695		658		5615	CATTLE	25-May	25-Oct	PERMIT LONG
00415	DOTY MOUNTAIN	59504		1600	61104	7503	2396		703		10602	CATTLE	1-Apr	1-Dec	DEFERRED ROTATION
00417	GRIZZLY	27533		9332	36865	6112	162		441		6715	CATTLE/SHEEP	1-Mar	30-Oct	ROTATION
00418	HARTT CREEK	3067		920	3987	940	981		192		2113	CATTLE	1-Jun	30-Sep	DEFERRED ROTATION
00419	JACK CREEK	1030		1811	2841	416	823		270		1509	CATTLE	1-Mar	28-Feb	DEFERRED ROTATION
00420	LITTLE JACK CREEK	2244		975	3219	307	200		191		698	CATTLE/SHEEP	1-Jun	7-Sep	PERMIT LONG
00421	MCCARTY CANYON	3104		5081	8185	465	237		1045		1747	CATTLE	15-May	25-Sep	DEFERRED ROTATION
00422	METHODIST	4591		1095	5686	1476	199		257		1932	CATTLE	15-Jun	20-Oct	SPLIT SEASON
00423	MIDDLEWOOD HILL	14347		3072	17419	1184	28		872		2084	CATTLE	15-Sep	20-Oct	DEFERRED ROTATION
00425	MORGAN CREEK	4060		1715	5775	1331	1033		359		2723	CATTLE	30-May	1-Oct	DEFERRED ROTATION
00426	MORGAN RANCH	1695		236	1931	263	212		42		517	CATTLE/SHEEP	30-May	8-Nov	DEFERRED ROTATION
00427	NORTH SPRING CREEK	227			227	25	177				202	CATTLE	1-Mar	28-Feb	PERMIT LONG
00428	CHEROKEE CREEK	866		665	1531	137	377		82		596	CATTLE	1-Mar	28-Feb	PERMIT LONG
00429	RICH	5875			5875	1158	24				1182	CATTLE	1-May	30-Jun	PERMIT LONG
00430	SAGE CREEK	13763		6946	20709	4552	2953		3198		10703	CATTLE	10-May	25-Sep	DEFERRED ROTATION
00431	SAVERY CREEK	2821		1035	3856	436	1816		457		2709	CATTLE	10-May	15-Oct	PERMIT LONG
00432	SNOW CREEK	5249			5249	1278					1278	CATTLE/SHEEP	1-Jun	30-Sep	PERMIT LONG
00433	SULPHUR SPRINGS	12832		640	13472	2096	1511		88		3695	CATTLE	1-May	4-Oct	DEFERRED ROTATION
00434	TWIN GROVES	200		965	1165	20	1098		180	20	1318	CATTLE	1-Mar	28-Feb	PERMIT LONG
00435	WILD COW	7359		813	8172	1760	132		138		2030	CATTLE	16-Jun	30-Nov	DEFERRED ROTATION
00436	WINDMILL	3264		520	3784	661			79		740	CATTLE	10-May	13-Jul	PERMIT LONG
00437	HILL ISO TR	140			140	30					30	CATTLE	1-Mar	28-Feb	PERMIT LONG
00438	SPRING CR ISO TR	200			200	30					30	CATTLE	1-Oct	28-Feb	PERMIT LONG
00440	BARTLETT ISO TR	425			425	71					71	CATTLE	1-Mar	28-Feb	PERMIT LONG
00441	NORTH PASTURE	400			400	57	23				80	CATTLE	15-Sep	14-Nov	PERMIT LONG
00442	DAD	433			433	63					63	CATTLE	1-Jun	15-Jun	ROTATION
00443	EAST MUDDY	5562			5562	610	129			31	770	SHEEP	1-Mar	10-Apr	ROTATION
00444	TRUCK DRIVERS CREEK	170			170	30					30	CATTLE	15-May	14-Oct	PERMIT LONG
00446	ANTELOPE ISOLATED TR	120			120	23					23	CATTLE	1-May	31-Oct	PERMIT LONG
00448	J O PASTURES	1271			1271	399	1028				1427	CATTLE/SHEEP	1-Sep	31-Dec	DEFERRED ROTATION
00449	SIERRA MADRE RANCH	40			40	5					5	CATTLE	1-Jun	31-Oct	PERMIT LONG
00450	STANDARD	11626		640	12266	3530	135		52		3717	CATTLE/SHEEP	1-Mar	31-Oct	PERMIT LONG
00451	JIM BERGER	657			657	91					91	CATTLE	10-May	10-Aug	PERMIT LONG
00453	THOMAS RYAN	371			371	53					53	CATTLE	25-May	30-Sep	PERMIT LONG
00456	DEEP CREEK PASTURE	2659		390	3049	365	602		28		995	CATTLE/SHEEP	1-May	31-Oct	DEFERRED ROTATION
00457	WEST WILD COW	3502		333	3835	437			37		474	CATTLE	16-Jun	30-Nov	DEFERRED ROTATION
00505	CHEROKEE TRAIL	11176			11176	1338				121	1459	CATTLE/SHEEP	1-Mar	31-Dec	DEFERRED ROTATION
00514	LITTLE ROBBER	480			480	250					250	CATTLE	1-May	30-Sep	ROTATION
00605	DALEY RANCH	11305		1280	12585	930	2768		232	236	4166	CATTLE	1-May	31-Oct	DEFERRED ROTATION
00606	DOOLITTLE	280			280	90	90				180	CATTLE/SHEEP	1-May	31-Oct	DEFERRED ROTATION
00630	CANAL	160			160	42					42	CATTLE	1-May	15-Oct	PERMIT LONG

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Allotment Number	Allotment Name	Public Acres	Other Fed Acres	State Acres	Total Acres	Public Aums	Private Aums	Other Fed Aums	State Aums	Suspended AUMs	Calc.Total AUMs	Class of Livestock	On Date	Off Date	Grazing Management System
00687	SMILEY DRAW	1345			1345	226	279				505	CATTLE			DEFERRED ROTATION
00688	UPPER SAVERY CREEK	340			340	41	120				161	CATTLE			ROTATION
00689	WEST LOCO	120		40	160	30	180		10		220	CATTLE			PERMIT LONG
00690	COTTONWOOD CREEK	200			200	34	1056				1090	CATTLE			ROTATION
00701	BELL SPRINGS	4506			4506	346	376				722	CATTLE	1-Mar	31-Dec	ROTATION
00703	EAST CITY LIMITS	5350			5350	140	1100				1240	CATTLE			PERMIT LONG
00704	EAST SINCLAIR	900			900	83	352				435	CATTLE	1-Mar	28-Feb	DEFERRED ROTATION
00705	RED DESERT ALLOTMENT	22580		640	23220	1960	2046		69		4075	CATTLE	1-Mar	31-May	ROTATION
00706	G.L.	9426			9426	1268	1283				2551	CATTLE	1-Mar	30-Nov	DEFERRED ROTATION
00707	HAYSTACK	36339		1920	38259	3783	3814		202		7799	CATTLE	1-Mar	28-Feb	PERMIT LONG
00708	HAYSTACK RIVER PAST	840		640	1480	78			103		181	CATTLE	1-Mar	28-Feb	YEAR LONG PERMIT
00709	JAWBONE	11560			11560	1326	1244				2570	CATTLE	16-May	31-Oct	ROTATION
00710	MONUMENT DRAW	15417			15417	1834				200	2034	CATTLE	15-Apr	31-Dec	DEFERRED ROTATION
00711	MONUMENT LAKE	57483		1850	59333	6757	7251		196		14204	CATTLE	1-Mar	28-Feb	ROTATION
00712	THAYER	286			286	29	200				229	CATTLE	1-Jan	15-Jun	WINTER PERMIT LONG
00713	NORTH CRESTON-WEST	10871			10871	1938					1938	CATTLE	15-Mar	15-Jun	DEFERRED ROTATION
00714	LATHAM	19580		640	20220	2492	2552		72		5116	CATTLE	1-Mar	28-Feb	DEFERRED ROTATION
00715	NORTH TIPTON	12256		640	12896	1334	1555		83		2972	CATTLE	1-Mar	30-Apr	WINTER PERMIT LONG
00716	NORTH WAMSUTTER	28143		640	28783	2935	3256		105		6296	CATTLE	20-Apr	2-Oct	DEFERRED ROTATION
00717	RUBY KNOLLS	15355			15355	1625	1534				3159	CATTLE	1-Jun	30-Sep	PERMIT LONG
00718	SANDSTONE	38074		1881	39955	4072	6471		269		10812	CATTLE	1-Mar	31-Oct	PERMIT LONG
00719	SEPARATION FLATS	49606		640	50246	5176	4976		26		10178	CATTLE	1-Mar	28-Feb	DEFERRED ROTATION
00723	SHAMROCK PASTURE	61		483	544	2	113		34		149	CATTLE	1-Mar	28-Feb	ROTATION
00800	DIFFICULTY	8000			8000	1242	1200				2442	CATTLE	1-May	31-Oct	PERMIT LONG
00801	LARSON KNOLLS	5117			5117	616	671				1287	CATTLE	16-May	31-Oct	ROTATION
00802	TENNANT PLACE	130			130	18	65				83	CATTLE	1-Jun	15-Oct	PERMIT LONG
00803	WEST ANSCHUTZ	8248		2040	10288	1428	2292		463		4183	CATTLE	1-May	31-Oct	DEFERRED ROTATION
00805	EAST SEMINOE	1207	699		1906	95		73			168	CATTLE	5-Jul	31-Oct	PERMIT LONG
00806	SCHNEIDER RIDGE	2867			2867	212	112				324	CATTLE	1-May	15-Oct	PERMIT LONG
00807	SOUTH LEO	16295	2497	1049	19841	1866	3522	310	175		5873	CATTLE/SHEEP	1-Mar	1-Oct	PERMIT LONG
00808	T. E. RANCH	1608		246	1854	268	551		18		837	CATTLE	11-May	1-Oct	PERMIT LONG
00809	MEDICINE BOW	794		620	1414	49	668		47		764	CATTLE	20-Jun	15-Sep	PERMIT LONG
00811	ELLIS BLOCK	13830		1011	14841	1591	1983		119		3693	CATTLE	1-May	4-Dec	DEFERRED ROTATION
00812	FREEZEOUT	520			520	73	73				146	CATTLE	1-Jul	30-Nov	PERMIT LONG
00813	VANDIVER DITCH	1297			1297	165	204				369	CATTLE	1-May	31-Oct	DEFERRED ROTATION
00814	T B FLATS D.M.	1000			1000	162	390				552	CATTLE	16-Apr	30-May	PERMIT LONG
00816	FT STEELE BREAKS	9419		80	9499	790	806		7		1603	CATTLE/SHEEP	1-Mar	28-Feb	DEFERRED ROTATION
00817	LITTLE MEDICINE	1472		640	2112	341	3507		120		3968	CATTLE	10-May	9-Nov	DEFERRED ROTATION
00819	NORTH WALCOTT	31768	655	1360	33783	3088	3687	50	113		6938	CATTLE/SHEEP	1-Mar	28-Feb	PERMIT LONG
00820	QUEALEY BLOCK	23681	3067	560	27308	3558	4492	290	93		8433	CATTLE/SHEEP	1-Mar	28-Feb	PERMIT LONG
00821	SOUTH SEMINOE	1900	390		2290	527	299	32			858	CATTLE/SHEEP	1-Mar	28-Feb	PERMIT LONG
00822	DANA BLOCK NORTH	26713	3067	1280	31060	4520	7115	290	256		12181	CATTLE/SHEEP	1-Mar	10-Nov	PERMIT LONG
00824	NORTH AREA	12605		640	13245	1629	3145		88		4862	CATTLE	1-Mar	30-Nov	DEFERRED ROTATION
00825	SLATE RIDGE	4931		640	5571	723	1417		111		2251	CATTLE	1-May	31-Oct	DEFERRED ROTATION
00826	ROBBERS ROOST	2027		640	2667	333	1126		60		1519	CATTLE	15-May	31-Oct	DEFERRED ROTATION
00827	PASS CREEK RIDGE	26308		360	26668	4833	5490		60		10383	CATTLE	15-Apr	31-Oct	PERMIT LONG
00828	WILSON PASTURE	320			320	65	367				432	CATTLE	1-May	31-Oct	PERMIT LONG

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00829	DANA MEADOWS SOUTH	13864		1920	15784	2334	3614		307		6255	CATTLE	1-May	10-Dec	DEFERRED ROTATION
00830	CHACE BLOCK	14996		5546	20542	2123	6701		841		9665	CATTLE	1-Apr	11-Jan	DEFERRED ROTATION
00831	COAD MOUNTAIN	7012			7012	888	2477				3365	CATTLE	25-May	27-Sep	DEFERRED ROTATION
00832	NORTH ANSCHUTZ	4479			4479	765	894				1659	CATTLE	1-May	31-Oct	DEFERRED ROTATION
00833	T.B. NORTH AREA	530			530	76	184				260	CATTLE	1-May	31-Dec	ROTATION
00834	FOOTE CREEK PASTURE	6466		1280	7746	1134	2506		255		3895	CATTLE	1-May	31-Oct	DEFERRED ROTATION
00835	PETES GAP	2560			2560	287	350				637	CATTLE	1-Jul	30-Sep	DEFERRED ROTATION
00838	SOUTH WALCOTT	2413		320	2733	281	372		43		696	SHEEP	1-Mar	28-Feb	DEFERRED ROTATION
00839	LONE TREE ALLOTMENT	2559			2559	470	250				720	CATTLE	16-May	31-Oct	PERMIT LONG
00840	SOIL BANK PASTURE	160			160	27	135				162	CATTLE	1-May	31-Oct	PERMIT LONG
00841	SCHROEDER	120			120	7					7	CATTLE	15-May	1-Nov	PERMIT LONG
00842	WOLFE	1250			1250	139	29				168	CATTLE	21-May	31-Oct	PERMIT LONG
00843	MEADS	640			640	120	630				750	CATTLE	1-May	31-Oct	PERMIT LONG
00844	PASS CREEK FLATS	3238		640	3878	327	715		107		1149	CATTLE	1-May	31-Oct	PERMIT LONG
00845	T.A.RANCH	858	2085	517	3460	120	487	261	86		954	CATTLE	15-May	25-Jun	ROTATION
00846	COYOTE DITCH	80		640	720	14					14	CATTLE	1-May	31-Oct	PERMIT LONG
00847	HOME PASTURE	80			80	13					13	CATTLE	1-May	31-Oct	PERMIT LONG
00848	RATTLESNAKE	950			950	202	438				640	CATTLE	1-May	31-Oct	PERMIT LONG
00849	MIDLAND	661			661	159					159	CATTLE	1-Jun	31-Aug	PERMIT LONG
00850	HOME RANCH	7152		3360	10512	585	2967		560		4112	BISON/CATTLE	20-May	30-Sep	DEFERRED ROTATION
00851	WEST ELK MOUNTAIN	790			790	127					127	CATTLE	15-May	30-Sep	ROTATION
00852	UPPER ROBBERS ROOST	2880			2880	447	1961				2408	CATTLE	15-May	31-Oct	PERMIT LONG
00853	U.L.ALLOTMENT	640		640	1280	132	640		160		932	CATTLE	15-May	31-Oct	DEFERRED ROTATION
00854	SOUTH ANSCHUTZ BLOC	2280		2080	4360	345	2235		416		2996	CATTLE	1-May	31-Oct	DEFERRED ROTATION
00855	ARLINGTON ALLOTMENT	841			841	142	240				382	CATTLE	1-Jul	29-Aug	DEFERRED ROTATION
00856	PINE RIDGE	880		640	1520	168	1028		165		1361	CATTLE	1-Jun	30-Sep	DEFERRED ROTATION
00857	DIAMOND DOME	2331		1743	4074	603	1455		280		2338	CATTLE	16-May	30-Sep	PERMIT LONG
00858	THREE MILE TRACT	40			40	8					8	CATTLE	1-Apr	28-Feb	YEAR LONG PERMIT
00859	COALBANK MINE	1120		640	1760	294	251				545	CATTLE	1-May	30-Jun	DEFERRED ROTATION
00860	UPPER BEAR CREEK	652		1280	1932	66	235		95		396	CATTLE	1-May	31-Oct	PERMIT LONG
00861	CORPENING	2503		320	2823	327			47		374	CATTLE	18-Apr	31-May	ROTATION
00862	LAKE CREEK FLATS	3770			3770	329	440				769	ON/CATTLE/SHE	1-Mar	28-Feb	DEFERRED ROTATION
00863	NORTH LAKE CREEK	160			160	19					19	CATTLE	1-Jun	28-Aug	PERMIT LONG
00864	SIXMILE HILL	147		120	267	18	69		13		100	CATTLE	1-Mar	30-Dec	DEFERRED ROTATION
00865	LAKE CREEK	1280			1280	136	35				171	CATTLE			PERMIT LONG
00866	BUCK SPRINGS DRAW	1440		320	1760	188	70		35		293	CATTLE	15-May	15-Nov	DEFERRED ROTATION
00867	DUMP	1280			1280	192	133				325	CATTLE	25-May	30-Sep	PERMIT LONG
00868	V U	2647			2647	357				34	391	CATTLE	1-May	15-Oct	DEFERRED ROTATION
00869	CEDAR CR	120			120	10					10	CATTLE	1-Apr	30-Nov	PERMIT LONG
00870	EAST COAD MTN ALLOT	190			190	40					40	CATTLE	1-May	31-Aug	PERMIT LONG
00871	BASIN RANCH	760		2320	3080	127	3430		580		4137	CATTLE	20-Jun	15-Sep	DEFERRED ROTATION
00872	OVERLAND TRAIL	120		640	760	24	281		128		433	CATTLE	1-Jul	16-Sep	DEFERRED ROTATION
00873	DIXON BLOCK	637			637	38	129				167	CATTLE	1-Jul	30-Sep	PERMIT LONG
00875	COOPER HILL	840			840	118					118	CATTLE	20-Jun	15-Sep	PERMIT LONG
00876	SEVEN MILE	400			400	60					60	CATTLE	1-Jun	31-Aug	PERMIT LONG
00877	WILLS	298			298	54					54	CATTLE	1-May	20-Sep	PERMIT LONG
00878	COUNTY LINE	320		160	480	58	408		32		498	CATTLE	15-May	12-Sep	PERMIT LONG

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00879	LONESOME FOX	100			100	18	120				138	CATTLE	1-Jul	31-Dec	PERMIT LONG
01009	CHEROKEE CREEK	953			953	122					122	CATTLE	1-Jul	6-Sep	PERMIT LONG
01021	BEAVER HILLS	960			960	183					183	CATTLE	1-Jun	15-Jul	DEFERRED ROTATION
01022	ROMIOS RANCH	2120			2120	265	55				320	CATTLE	15-Jun	31-Aug	PERMIT LONG
01030	HEATHER CREEK	2047		44	2091	205	7		4		216	CATTLE	15-Jun	15-Oct	DEFERRED ROTATION
01045	CHAD	2527			2527	295					295	CATTLE	1-May	31-Oct	DEFERRED ROTATION
01063	COYOTE HILL	137			137	41					41	CATTLE	1-Jun	15-Jul	PERMIT LONG
01101	AIRHEART PASTURE	520		640	1160	45	201		68		314	CATTLE	16-Mar	15-Jul	ROTATION
01102	BIG GULCH	120			120	30	576				606	CATTLE/SHEEP	3-Jun	1-Oct	DEFERRED ROTATION
01103	WEST BROWNS HILL	635		640	1275	162	543		193		898	CATTLE	22-Jun	28-Aug	DEFERRED ROTATION
01104	CEDAR RIDGE	821			821	164	10				174	CATTLE	16-Apr	31-Oct	PERMIT LONG
01106	CUSHING	280			280	51	180				231	CATTLE	16-Jun	15-Sep	PERMIT LONG
01107	DOLAN	240		320	560	60			145		205	CATTLE	1-May	30-Nov	ROTATION
01108	ETHERINGTON	80			80	16					16	CATTLE	10-Jun	30-Oct	PERMIT LONG
01109	FLY CREEK	529			529	100					100	CATTLE	1-May	30-Jun	DR
01110	HELL CANYON	1051			1051	193	253				446	CATTLE	1-Jun	30-Sep	DEFERRED ROTATION
01111	HILL PASTURE	325			325	31	147				178	CATTLE	1-May	31-Oct	ROTATION
01112	LITTLE HORSE MTN	630			630	220	9				229	CATTLE	1-May	24-Jun	ROTATION
01113	LITTLE SANDSTONE	1340		460	1800	162	71		96		329	CATTLE/SHEEP	1-Jun	12-Oct	ROTATION
01115	MCCARY	395			395	71					71	CATTLE	15-Jun	31-Oct	PERMIT LONG
01117	MEXICAN MEADOWS	320		2880	3200	69	30		1250		1349	CATTLE	1-May	15-Oct	DEFERRED ROTATION
01118	MORGAN-BOYER SUBUNI	8260		643	8903	1866	625		227		2718	CATTLE/SHEEP	15-May	30-Oct	ROTATION
01119	NORTH RASMUSSEN	882			882	248					248	CATTLE	1-Jun	30-Oct	DEFERRED ROTATION
01121	PIONEER DRAW	190			190	68					68	SHEEP	1-May	20-Jul	PERMIT LONG
01122	POLING ISO TRACT	135			135	20	89				109	CATTLE	10-May	31-Aug	PERMIT LONG
01123	RASMUSSEN SUB UNIT	4751		2503	7254	931	2687		589		4207	CATTLE	15-Jun	30-Nov	DEFERRED ROTATION
01124	READER	205			205	30					30	CATTLE	1-May	31-May	PERMIT LONG
01125	READER BASIN PASTURE	2276		2078	4354	466	1480		574		2520	CATTLE	1-May	15-Oct	ROTATION
01126	ROAD GULCH	975			975	213					213	CATTLE/SHEEP	1-Mar	28-Feb	PERMIT LONG
01127	SHEEP MOUNTAIN	303			303	53					53	CATTLE	16-May	15-Sep	PERMIT LONG
01128	SHORT	995			995	240					240	CATTLE	1-May	30-Jun	ROTATION
01129	SOUTH BAGGS	280			280	30					30	CATTLE/SHEEP	1-May	31-Oct	PERMIT LONG
01130	SOUTH PASTURE	497			497	89	813				902	CATTLE	1-Apr	30-Sep	ROTATION
01132	SPRING GULCH	471			471	110					110	CATTLE	1-May	29-Sep	DEFERRED ROTATION
01133	STANDARD	330			330	92					92	CATTLE	15-Jun	30-Sep	PERMIT LONG
01134	STATE LINE 40	40			40	4					4	CATTLE	1-May	31-May	PERMIT LONG
01135	CEDARS	160			160	12					12	CATTLE	1-May	31-Oct	ROTATION
01136	BATTLE MTN ISO TRACT	92			92	13					13	CATTLE	1-May	18-Jun	ROTATION
01138	M.J. ANDERSON ISO #1	40			40	9	114				123	CATTLE	1-Jun	15-Oct	DEFERRED ROTATION
01139	COBB CAT CO ISO TR	160			160	34					34	CATTLE	16-May	18-Sep	DEFERRED ROTATION
01140	GRIEVE RESERVOIR PAS	124			124	31					31	CATTLE	10-Oct	15-Nov	ROTATION
01141	M.J. ANDERSON ISO #2	35			35	8	35				43	CATTLE	1-Jun	30-Sep	DEFERRED ROTATION
01142	EAST BROWNS HILL	493		608	1101	106	372		131		609	CATTLE	1-Jun	31-Oct	DEFERRED ROTATION
01143	L U GRIEVE PASTURE	200			200	49					49	CATTLE	1-Mar	30-Apr	ROTATION
01144	COAL BANK DRAW	240			240	64	175				239	CATTLE	1-May	2-Jul	ROTATION
01145	WALTERS HOMESTEAD	160			160	36	134				170	CATTLE	1-May	30-Jun	ROTATION
01200	TIMNATH FARMS	40			40	10					10	CATTLE	15-May	30-Dec	PERMIT LONG

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01201	GASPAR	160			160	58					58	CATTLE	1-Jun	25-Oct	PERMIT LONG
01202	SPRING CREEK	200			200	52	129				181	CATTLE	21-Jun	20-Sep	PERMIT LONG
01203	FARTHING RANCH	650			650	75					75	CATTLE	1-Jun	31-Oct	PERMIT LONG
01204	FERGUSON RANCH "A"	360			360	52					52	CATTLE	15-May	20-Oct	PERMIT LONG
01205	ARMADILLO	160			160	18					18	CATTLE	15-May	29-Sep	PERMIT LONG
01207	A. E. HODGSON	40			40	11					11	CATTLE	10-Jun	30-Sep	PERMIT LONG
01208	SAND CREEK	40		320	360	8					8	CATTLE	1-Jul	1-Nov	PERMIT LONG
01209	LAZY D	61			61	35					35	CATTLE	10-May	30-Oct	PERMIT LONG
01210	N. CROW CREEK	3134			3134	633					633	CATTLE	22-Jun	30-Sep	PERMIT LONG
01211	MCINTYRE DRAW	320			320	64					64	CATTLE	10-Jun	30-Sep	PERMIT LONG
01212	J.D.MCLEES	1160			1160	135					135	CATTLE	10-May	31-Oct	PERMIT LONG
01213	BRUSH CREEK	404			404	80					80	CATTLE	1-Jun	30-Sep	PERMIT LONG
01214	HOCKERSMITH	320			320	80					80	CATTLE	10-May	30-Sep	PERMIT LONG
01215	SOAPSTONE GR. ASSN.	40			40	10					10	CATTLE	15-Apr	31-Oct	PERMIT LONG
01216	SWITZER	40			40	8					8	CATTLE	10-May	30-Sep	PERMIT LONG
01218	LODGEPOLE CR.	480			480	120					120	CATTLE	1-Jul	30-Nov	PERMIT LONG
01219	ANDRES WILLADSEN	40			40	8					8	CATTLE	1-Jun	30-Sep	PERMIT LONG
01220	S OF HAPPY JACK	77			77	13					13	CATTLE			PERMIT LONG
01221	THREEMILE	724		320	1044	172					172	CATTLE	1-Jun	30-Nov	PERMIT LONG
01222	LONG	320			320	60					60	CATTLE	1-Jun	15-Sep	PERMIT LONG
01639	ORDWAY POCKET	2049			2049	592	1382				1974	CATTLE	1-Mar	31-May	NA
01642	DEVILS GATE	25139		4552	29691	5571	9570		745		15886	CATTLE	1-Mar	28-Feb	NA
01643	RAWLINS DRAW	6367		413	6780	1627			108		1735	CATTLE	1-Mar	28-Feb	NA
01644	TURKEY TRACK	9057		1249	10306	1832	5474		192		7498	CATTLE	1-Mar	28-Feb	NA
02026	LITTLE CAMP CREEK	2242			2242	311	118				429	CATTLE	1-May	31-Oct	NA
02027	MUDDY CREEK PASTURE	73			73	21	53				74	CATTLE	1-Apr	10-May	NA
09001	ANCHOR RANCH	160			160	72					72	CATTLE	1-May	30-Sep	PERMIT LONG
09002	ANDERSON	240		560	800	60					60	CATTLE	1-Jun	30-Sep	PERMIT LONG
09003	HAY DRAW	280		100	380	26					26	CATTLE	10-May	30-Sep	PERMIT LONG
09004	ROGERS CREEK	960		180	1140	108					108	CATTLE	10-May	30-Sep	PERMIT LONG
09005	BAILEY ATKINSON	2190			2190	375					375	CATTLE	1-Aug	6-Feb	PERMIT LONG
09006	KEN ATKINSON	2081		721	2802	359	402		162		923	CATTLE	1-May	30-Nov	PERMIT LONG
09007	DALE CREEK	40			40	12					12	CATTLE	1-May	15-Jul	PERMIT LONG
09008	DUTTON CREEK SOUTH	320			320	74					74	CATTLE	1-May	30-Sep	PERMIT LONG
09009	WLX	3536			3536	501					501	CATTLE	15-May	30-Sep	PERMIT LONG
09010	SQUAW RANCH	40			40	10					10	CATTLE	15-Jul	1-Nov	PERMIT LONG
09011	BESSIE BATH	785			785	168					168	CATTLE	10-May	31-Oct	PERMIT LONG
09012	BATH BROTHERS	1240			1240	310					310	CATTLE	1-May	10-Oct	PERMIT LONG
09013	IRON MOUNTAIN	4272			4272	762					762	CATTLE	1-Jul	30-Sep	PERMIT LONG
09014	BELL-OTTE RANCH	1715		1640	3355	115					115	CATTLE	1-Jun	30-Sep	PERMIT LONG
09015	SQUAW CREEK	40			40	4					4	CATTLE	15-Apr	10-Nov	ROTATION
09016	DUNN ALLOTMENT	80			80	13					13	CATTLE	15-Apr	10-Nov	ROTATION
09017	THE BUTTES	320			320	48					48	CATTLE	25-May	30-Aug	PERMIT LONG
09018	N. LODGEPOLE CR.	160			160	37					37	CATTLE	1-Jun	31-Oct	PERMIT LONG
09019	ANTELOPE CREEK	1237			1237	260					260	CATTLE	1-Jun	31-Aug	PERMIT LONG
09020	BOVEE HORSE PASTURE	80			80	13					13	HORSE			YEAR LONG PERMIT
09021	BOVEE	2710			2710	379					379	CATTLE	20-May	21-Sep	PERMIT LONG

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Allotment Number	Allotment Name	Public Acres	Other Fed Acres	State Acres	Total Acres	Public Aums	Private Aums	Other Fed Aums	State Aums	Suspended AUMs	Calc.Total AUMs	Class of Livestock	On Date	Off Date	Grazing Management System
09022	GIBBS PLACE	1664		160	1824	282					282	CATTLE	1-Jun	30-Sep	PERMIT LONG
09023	WHEATLAND TUNNEL	2091		10	2101	352					352	CATTLE	1-Jun	30-Nov	PERMIT LONG
09024	WHEATLAND RES #2	800			800	132					132	CATTLE	1-Jun	30-Sep	DEFERRED ROTATION
09025	JAMES LAKE	4538			4538	676					676	CATTLE	1-Jun	15-Sep	PERMIT LONG
09026	WAECHTER CANYON	917			917	206					206	CATTLE	10-May	30-Sep	PERMIT LONG
09027	WOODROW BROW	1680		1116	2796	165	13		64		242	CATTLE	1-May	28-Nov	PERMIT LONG
09028	BEAR HEAD MOUNTAIN	80		640	720	8					8	CATTLE	1-May	31-Dec	PERMIT LONG
09029	INDIAN ROCK	680			680	79					79	CATTLE	10-May	15-Oct	PERMIT LONG
09030	BURNETT CREEK	3071		720	3791	371	974		125		1470	CATTLE/SHEEP	15-Apr	1-Oct	PERMIT LONG
09031	PINTO ROCKS	849		640	1489	81					81	CATTLE	1-Apr	15-Nov	DEFERRED ROTATION
09032	J.H.BUTLER	41			41	7					7	CATTLE	1-May	1-Nov	ROTATION
09033	CARLIN RANCH	1948			1948	300					300	CATTLE	1-May	31-Oct	DEFERRED ROTATION
09034	PALMER CANYON	280			280	71					71	CATTLE	1-May	31-Dec	PERMIT LONG
09035	CHALKHILLSDRYCR	18682		1922	20604	2865	2696		212		5773	CATTLE/SHEEP	15-May	14-Nov	DEFERRED ROTATION
09036	PINE RIDGE	240		640	880	55					55	CATTLE	1-May	31-Oct	PERMIT LONG
09037	BULL CAMP PEAK	4274		1280	5554	678					678	CATTLE	15-May	15-Sep	DEFERRED ROTATION
09038	ERVIN CORL	40			40	7					7	CATTLE	1-Jun	1-Oct	PERMIT LONG
09039	CROONBERG RANCH	1440			1440	215					215	CATTLE	1-Jun	30-Sep	PERMIT LONG
09040	PARSONS CREEK	1680			1680	93					93	CATTLE	1-Jun	31-Oct	PERMIT LONG
09041	DAVIDSON CREEK	6005		720	6725	882	748		123		1753	CATTLE	1-Jun	30-Oct	PERMIT LONG
09042	CROSS ISOLATED TRACT	120			120	18					18	CATTLE	1-Jun	15-Oct	PERMIT LONG
09043	OWEN CREEK	395		600	995	66					66	CATTLE	1-May	31-Dec	PERMIT LONG
09044	WHEATLAND NO 3	4745		1280	6025	1218	4854		377	242	6691	CATTLE	10-May	10-Oct	DEFERRED ROTATION
09045	NORTH FORK	320			320	54					54	CATTLE	10-Jun	20-Sep	DEFERRED ROTATION
09046	DALE CREEK	240			240	60					60	CATTLE			PERMIT LONG
09047	JUNCTION	840		840	1680	178	282		163		623	CATTLE	1-Jun	30-Nov	ROTATION
09048	CARROLL	520			520	138					138	CATTLE	10-May	30-Sep	PERMIT LONG
09049	DOUBLE K RANCH	798			798	181					181	CATTLE	1-Apr	30-Nov	ROTATION
09050	DUMBELL RANCH CO.	80		1190	1270	8					8	CATTLE	10-Apr	30-Sep	PERMIT LONG
09051	MULE-ROGERS CR.	7292		1920	9212	1683	759		450		2892	CATTLE	15-May	15-Nov	PERMIT LONG
09052	SPRING CREEK	1462			1462	298	516				814	CATTLE	1-May	30-Sep	PERMIT LONG
09053	STRAIN	155			155	13					13	CATTLE	1-May	31-Oct	PERMIT LONG
09054	WOODS LANDING	238			238	40	144				184	CATTLE	1-Aug	31-Oct	PERMIT LONG
09055	FERGUSON RANCH "C"	258			258	44					44	CATTLE	15-May	31-Oct	PERMIT LONG
09056	PR5 RANCH	1001		760	1761	148					148	CATTLE	1-Mar	31-May	ROTATION
09057	SOUTH FORK	1033		640	1673	167					167	CATTLE	15-Jun	15-Oct	PERMIT LONG
09058	40 MILE CREEK	80		360	440	16					16	CATTLE	1-Jun	31-Oct	PERMIT LONG
09059	CHARLES GARRETT	640			640	67					67	CATTLE	1-Jun	15-Jul	ROTATION
09060	SYBILLE CR.	1124		965	2089	169					169	CATTLE	15-May	15-Sep	PERMIT LONG
09061	WARREN GEORGE	4781		718	5499	554	718		58		1330	CATTLE	1-Jun	22-Nov	PERMIT LONG
09062	WILLIAM GOODRICH	1522			1522	174					174	CATTLE	1-May	14-Oct	PERMIT LONG
09063	JMS RANCH	160			160	40					40	CATTLE	10-May	30-Sep	PERMIT LONG
09064	MENTER-RATTLESNAKE	719			719	46					46	CATTLE	1-Apr	31-Dec	PERMIT LONG
09065	THE BOWL	240			240	42					42	CATTLE	1-Mar	20-Sep	ROTATION
09066	WEST FORK	1680		1280	2960	290					290	CATTLE	1-May	20-Sep	PERMIT LONG
09067	ANTELOPE BASIN	1655		1391	3046	325					325	CATTLE	25-Jun	18-Oct	DEFERRED ROTATION
09068	ROCK CREEK	1888		640	2528	286					286	CATTLE	1-Apr	19-Nov	DEFERRED ROTATION

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09069	COOPER LAKE	3990		1205	5195	880					880	CATTLE	1-May	20-Sep	PERMIT LONG
09070	CANYON CREEK	80		1040	1120	8					8	CATTLE	1-Mar	31-Oct	WINTER LONG PERMIT
09071	SLATE CREEK	477			477	46					46	CATTLE	1-May	31-Oct	PERMIT LONG
09072	HARRIS RANCH	2603			2603	465					465	CATTLE	10-May	30-Sep	PERMIT LONG
09073	WEBB LAKE	520			520	85					85	CATTLE	1-May	31-Oct	PERMIT LONG
09074	ELK HORN	5093		639	5732	1110	1311		104		2525	CATTLE	15-May	15-Sep	PERMIT LONG
09075	SCHICK	160			160	43					43	CATTLE	10-May	30-Sep	PERMIT LONG
09076	DOWNEY LAKES SOUTH	160			160	48					48	CATTLE	15-May	15-Sep	PERMIT LONG
09078	TIMBER CANYON	1162		160	1322	185					185	CATTLE	1-Mar	30-Nov	YEAR LONG PERMIT
09079	COLE	120			120	30					30	CATTLE/SHEEP	1-May	1-Nov	DEFERRED ROTATION
09080	MILLER	40			40	6	3				9	HORSE			PERMIT LONG
09081	COALBANK	40		840	880	10					10	CATTLE	1-Jun	31-Aug	PERMIT LONG
09082	GOVERNMENT CREEK	160			160	48					48	CATTLE	1-May	Sep-31	PERMIT LONG
09083	BAMFORD	393		1600	1993	85					85	CATTLE	1-Jun	30-Nov	PERMIT LONG
09084	HAMILTON SPRINGS	2283			2283	570	358				928	CATTLE	1-Jun	31-Oct	PERMIT LONG
09085	NORTH SYBILLE CREEK	80			80	3					3	CATTLE	10-Apr	30-Sep	PERMIT LONG
09086	BAR M MOUNTAIN	635			635	45	175				220	CATTLE	1-Jun	30-Nov	PERMIT LONG
09087	KENNEDY	648			648	60					60	CATTLE	1-May	30-Sep	PERMIT LONG
09089	RIVER BASIN	3077		917	3994	205					205	CATTLE	1-Mar	31SEP	WINTER LONG PERMIT
09090	DODGE CREEK RANCH	318		640	958	88					88	CATTLE	15-May	15-Nov	PERMIT LONG
09091	LEAZENBY LAKE	40			40	10					10	CATTLE	1-Jun	1-Dec	PERMIT LONG
09092	STEAMBOAT ROCK	4792			4792	872					872	CATTLE	15-Jun	10-Sep	PERMIT LONG
09093	W.J.LOGAN	40			40	11					11	CATTLE			PERMIT LONG
09094	IRVINE JE AND GA	2002			2002	438					438	CATTLE	1-May	31-Oct	PERMIT LONG
09095	JAMES ATKINSON	120			120	15	167				182	CATTLE	20-May	1-Jul	PERMIT LONG
09096	BOSWELL RANCH	2243		680	2923	305	197		89		591	CATTLE	15-May	15-Oct	PERMIT LONG
09098	ROCK CREEK LAKES	320		1600	1920	34					34	CATTLE	1-May	31-Oct	PERMIT LONG
09099	MCGILL	797			797	77					77	CATTLE	10-May	30-Sep	PERMIT LONG
09100	PARADISE CREEK	80			80	7					7	CATTLE	1-May	30-Oct	PERMIT LONG
09101	IONE	200		640	840	30					30	CATTLE	1-May	31-Oct	PERMIT LONG
09102	SHEEP ROCK	99		560	659	4					4	CATTLE	10-Aug	31NOV	PERMIT LONG
09103	PINTO CREEK	2840		640	3480	396	1144		180		1720	CATTLE	16-May	31-Oct	PERMIT LONG
09104	NORTH SPRAGUE	640		5128	5768	123					123	CATTLE	1-May	20-Sep	PERMIT LONG
09105	RING MOUNTAIN	9650		2378	12028	1181	443		301		1925	CATTLE	1-Jun	30-Nov	PERMIT LONG
09106	MILL CREEK	253		240	493	58					58	CATTLE			PERMIT LONG
09107	POE MTN-CANYON CREEK	1360		640	2000	161					161	CATTLE	1-Jun	31-Oct	PERMIT LONG
09108	MCKECKNIE MEADOWS	56			56	14					14	CATTLE	1-Jun	31-Oct	PERMIT LONG
09109	STROUSE HILL	11606		5113	16719	2328					2328	CATTLE	1-Mar	20-Sep	DEFERRED ROTATION
09110	PLUMBAGO CANYON	360			360	73					73	CATTLE	15-Jun	15-Aug	PERMIT LONG
09113	SHEEP CREEK	427		407	834	103					103	CATTLE	16-Jun	15-Oct	PERMIT LONG
09114	MORGAN & EDWARDS	160			160	15					15	CATTLE	10-May	30-Oct	PERMIT LONG
09115	NEEDMORE RANCH	1570			1570	151					151	CATTLE	1-Jun	30-Oct	PERMIT LONG
09117	DOWNEY LAKES	380			380	92					92	CATTLE			PERMIT LONG
09118	EAST JELM MOUNTAIN	1534			1534	259					259	CATTLE	15-May	31-Oct	PERMIT LONG
09119	HOLLAND LEASE	440			440	83					83	CATTLE	15-May	15-Oct	PERMIT LONG
09120	SUNRISE CREEK	1020	1020		2040	91		91			182	CATTLE	1-Jun	20-Oct	PERMIT LONG
09121	PALMER	160			160	25					25	CATTLE	1-Jan	28-Feb	WINTER LONG PERMIT

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09122	HECHT	37		117	154	4					4	CATTLE	1-Jun	30-Sep	PERMIT LONG
09123	HALLECK CANYON	1885		1280	3165	236					236	CATTLE	1-May	31-Dec	REST ROTATION
09124	BOSLER CANAL #3	120		640	760	36					36	CATTLE	1-Mar	28-Feb	PERMIT LONG
09126	BONE CREEK	4480		1280	5760	900	1576		262		2738	CATTLE	1-Jun	30-Nov	PERMIT LONG
09127	C U RANCH, INC.	880		241	1121	117					117	CATTLE	17-Jun	31-Dec	ROTATION
09128	R. O.	195		640	835	35					35	CATTLE	15-May	15-Oct	PERMIT LONG
09129	RED MOUNTAIN	78			78	20					20	CATTLE	1-May	31-Oct	DEFERRED ROTATION
09130	BUFORD	110			110	38					38	GOAT	1-Mar	28-Feb	PERMIT LONG
09131	DALE ROBBINS	959			959	184	503				687	CATTLE	15-Jun	30-Sep	PERMIT LONG
09132	ROBBINS	2956			2956	414					414	CATTLE	1-Jun	31-Aug	PERMIT LONG
09133	GREEN CREEK	564			564	40	233		144		417	CATTLE	1-Aug	30-Nov	PERMIT LONG
09134	HOLADAY PLACE	241			241	24	115				139	CATTLE	1-Jun	31-Jul	PERMIT LONG
09135	BADGER CREEK	353			353	23	39		17		79	CATTLE	1-Jul	30-Sep	PERMIT LONG
09136	TWENTYMILE DRAW	4977		1680	6657	940	2419		250		3609	CATTLE	1-Mar	31SEP	PERMIT LONG
09137	CROSS C RANCH	1920			1920	146					146	CATTLE	1-May	31-Oct	PERMIT LONG
09138	LOOKOUT RANCH	3534		1417	4951	648					648	CATTLE	1-May	31SEP	PERMIT LONG
09139	SAND CREEK RANCH	320			320	98					98	CATTLE	1-Jun	31-Oct	PERMIT LONG
09140	SANDERS	77			77	20					20	CATTLE	1-May	10-Sep	NO GRAZING
09141	MULE CREEK	1433		2000	3433	141	997		154		1292	CATTLE	1-May	30-Nov	PERMIT LONG
09142	JW/SHEEP MTN RANCH	5105			5105	831					831	CATTLE	1-May	15-Oct	PERMIT LONG
09143	BREES				0	180					180	CATTLE	1-Jul	30-Oct	PERMIT LONG
09144	MONAGHAN RANCH	600		1080	1680	143					143	CATTLE	1-Jun	31-Oct	PERMIT LONG
09145	BOOT HEEL	1520		640	2160	297	394		115		806	SHEEP	1-Mar	1-Jun	PERMIT LONG
09147	SOMMERS	1824			1824	386	961				1347	CATTLE	1-May	30-Sep	PERMIT LONG
09148	SPRINGFIELD RANCH IN	1040		11	1051	250	397				647	CATTLE	15-May	31-Oct	PERMIT LONG
09149	STERRETT	120			120	24					24	CATTLE/SHEEP	1-Jun	31-Oct	PERMIT LONG
09151	N LARAMIE-N CR.	2242		800	3042	259					259	CATTLE	10-May	30-Sep	PERMIT LONG
09152	COYOTE CANYON	280			280	33					33	CATTLE	10-May	30-Sep	PERMIT LONG
09153	SELLERS MTN.	2840		360	3200	470	444		46		960	CATTLE	1-Mar	28-Feb	YEAR LONG PERMIT
09154	MEISER CREEK	1626			1626	220	142				362	CATTLE	1-Jun	30-Nov	PERMIT LONG
09155	MCFARLANE CREEK	1308		1760	3068	94				35	129	CATTLE	1-Jul	1-Aug	YEAR LONG PERMIT
09156	DUCK CREEK	592			592	43					43	CATTLE	1-Jul	1-Aug	DEFERRED ROTATION
09157	T-K RANCH	640			640	149					149	CATTLE	15-May	15-Oct	PERMIT LONG
09158	TALBOTT	120			120	18					18	CATTLE	15-May	15-Oct	PERMIT LONG
09159	TATMAN ORIGINAL	1120		2240	3360	338					338	CATTLE	10-May	9-Nov	DEFERRED ROTATION
09160	HIRSIG PLACE	1676		1280	2956	545					545	CATTLE			NA
09161	DIRT FARM	320			320	42					42	CATTLE/SHEEP	1-Jun	28-Aug	PERMIT LONG
09164	THREE D"S & T	1556			1556	232					232	CATTLE	1-Jun	30-Sep	PERMIT LONG
09165	LITTLE LARAMIE RIVER	80			80	8					8	CATTLE	1-Jul	30-Sep	PERMIT LONG
09166	I-80 OVERPASS	178			178	56					56	CATTLE	1-Jun	30-Nov	PERMIT LONG
09167	CANYON CREEK	160		800	960	26					26	CATTLE	1-May	31-Dec	PERMIT LONG
09168	MUD SPRINGS	8471		5788	14259	1528					1528	CATTLE	1-May	31-Dec	PERMIT LONG
09170	WARREN LUSTK"A"	3586			3586	280					280	CATTLE/SHEEP	1-Jun	15-Oct	PERMIT LONG
09171	WARREN LVSTK"B"	200			200	32					32	CATTLE/SHEEP	1-Jun	15-Oct	PERMIT LONG
09173	DUTTON CREEK SOUTH	675		1280	1955	146					146	CATTLE	15-May	31-Oct	PERMIT LONG
09174	MARIUS WILLADSEN	40			40	8					8	CATTLE	1-Jun	15-Oct	PERMIT LONG
09175	BERTHEL LAND & LIVE.	1096			1096	334					334	CATTLE	1-May	31-Oct	PERMIT LONG

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09176	MERRIL DRAW	1401			1401	171					171	CATTLE	1-May	31-Oct	PERMIT LONG
09178	KIRK RANCH NATRONA	1400		400	1800	156	124		45		325	CATTLE	1-Mar	15-Nov	PERMIT LONG
09179	YANKEE DRAW	1777			1777	311	116				427	CATTLE	10-May	30-Sep	PERMIT LONG
09181	RIVER PASTURE	640		960	1600	124	92		219		435	CATTLE	15-May	15-Oct	PERMIT LONG
09182	CHIMNEY ROCK	1023		16868	17891	167		1920			2087	CATTLE	15-May	15-Oct	PERMIT LONG
09183	LARAMIE PEAK BGWR	40			40	6					6	CATTLE			PERMIT LONG
09184	J. KENNEDY'S	1120		800	1920	129					129	CATTLE	1-May	1-Dec	PERMIT LONG
09185	N LARAMIE RIVER	83			83	15					15	CATTLE	1-May	30-Sep	DEFERRED ROTATION
09186	FLAT TOP ALLOT	600			600	132					132	CATTLE	1-May	30-Oct	PERMIT LONG
09187	CHINA WALL	1040			1040	102					102	CATTLE	15-May	31-Oct	DEFERRED ROTATION
09188	S. MEISER CREEK	1266			1266	112					112	CATTLE	1-May	30-Nov	PERMIT LONG
09189	GEORGE CREEK	40		80	120	5					5	CATTLE	1-May	30-Nov	PERMIT LONG
09192	SECTION 22	640			640	64					64	CATTLE	15-Apr	15-Oct	DEFERRED ROTATION
09194	BLUEGRASS	1551		640	2191	259					259	CATTLE	5-May	5-Oct	PERMIT LONG
09195	SUGAR LOAF	560			560	47		120	1100		1267	CATTLE	1-Mar	31-Jul	PERMIT LONG
09196	HOLMAN	80			80	9					9	CATTLE	1-Apr	31-Jul	PERMIT LONG
09197	DESERT	320			320	45					45	CATTLE	1-Jun	31-Oct	PERMIT LONG
09199	EAST SHELDON	160			160	42					42	CATTLE	1-May	31-Oct	WINTER LONG PERMIT
09201	IRON MOUNTAIN CR.	1680		357	2037	338					338	CATTLE	16-May	15-Oct	PERMIT LONG
09202	LOOKOUT PEAK	2831			2831	595					595	CATTLE	1-Mar	15-Oct	DEFERRED ROTATION
09203	UPPER PINE RIDGE	3366			3366	1040					1040	CATTLE	1-May	30-Sep	PERMIT LONG
09205	GOAT MOUNTAIN	680			680	48					48	CATTLE	1-Jun	30-Nov	PERMIT LONG
09206	INDIAN HEAD ROCK	464		40	504	37					37	CATTLE	15-Jun	31-Dec	PERMIT LONG
09207	MOUNTAIN INCOMMON	1407		10	1417	103	49		1		153	CATTLE	1-Jun	30-Sep	PERMIT LONG
09208	PLUMBAGO	410		120	530	36					36	CATTLE	1-Mar	31-Oct	ROTATION
09209	SQUAW MOUNTAIN	121			121	10					10	CATTLE	1-Mar	3-Jul	ROTATION
09210	TWENTYTWO MILE	3151			3151	697					697	CATTLE	15-May	15-Oct	PERMIT LONG
09212	COW CREEK	102			102	10					10	CATTLE	1-May	30-Sep	ROTATION
09213	PASCO	1126			1126	189					189	CATTLE	10-May	10-Oct	PERMIT LONG
09214	IONE LAKE	18007		5547	23554	3936					3936	CATTLE	1-May	30-Sep	PERMIT LONG
09215	LARAMIE RIVER	480		640	1120	89					89	CATTLE	1-May	1-Nov	PERMIT LONG
09216	TRAPPER SPRINGS	641			641	128	1048				1176	CATTLE	1-May	1-Nov	PERMIT LONG
09217	MCGILL LAKES	2372			2372	644	771				1415	CATTLE	15-May	15-Oct	PERMIT LONG
09218	MOONSHINE PEAK	870		10	880	146					146	CATTLE	1-Jun	30-Nov	PERMIT LONG
09219	TRISH	3324			3324	554	625				1179	CATTLE	15-May	15-Oct	PERMIT LONG
10102	STEWART CREEK	165025		9152	174177	10472	92		470	2139	13173	CATTLE/SHEEP	1-Mar	30-Dec	ROTATION
10103	CYCLONE RIM	291954		13489	305443	40661	362		1952	4465	47440	CATTLE/SHEEP	1-Mar	15-Dec	ROTATION
10201	BUZZARD	51941	4259	12838	69038	11413	2398	944	2298		17053	CATTLE	1-Mar	30-Sep	ROTATION
10202	BUZZARD RANCH MEADO	526		515	1041	339	8163		103		8605	CATTLE	1-Mar	28-Feb	ROTATION
10203	CHERRY CREEK	30229		4261	34490	4842	904		710		6456	CATTLE	1-May	18-Oct	ROTATION
10204	DESERT CLAIM	360			360	80	44				124	CATTLE	1-Jul	18-Oct	ROTATION
10205	BAR ELEVEN	51570		1051	52621	11419	1317		300		13036	CATTLE	1-Mar	28-Feb	DEFERRED ROTATION
10207	FERRIS MOUNTAIN	35729		3352	39081	4978	2994		479		8451	CATTLE	1-Mar	28-Feb	DEFERRED ROTATION
10209	JUNK CREEK	10366	1133	1139	12638	1841	44	254	216		2355	CATTLE	1-May	31-Oct	PERMIT LONG
10212	LONG CREEK	5744	1243	505	7492	969	733	239	95		2036	CATTLE	1-Mar	20-Dec	DEFERRED ROTATION
10215	POLE CANYON	4985		30	5015	767	43		6		816	CATTLE	10-Jul	9-Oct	ROTATION
10216	SAND CREEK	2309	1074	192	3575	402	30	209	30		671	CATTLE	1-Apr	31-Oct	PERMIT LONG

Table 3.8-3 Table of Range Allotment Information for the Rawlins RMPPA.

Allotment Number	Allotment Name	Public Acres	Other Fed Acres	State Acres	Total Acres	Public Aums	Private Aums	Other Fed Aums	State Aums	Suspended AUMs	Calc.Total AUMs	Class of Livestock	On Date	Off Date	Grazing Management System
10217	SAND CR. RANCH PAST.	796		645	1441	108	1576		242		1926	CATTLE	1-Mar	28-Feb	YEAR LONG PERMIT
10218	SEMINOE	80025	6548	4821	91394	9092	8538	554	585		18769	CATTLE	1-Mar	15-Nov	DEFERRED ROTATION
10219	STATION 8	5570	423		5993	1257		129			1386	CATTLE	21-May	30-Nov	ROTATION
10220	TAPERS	770			770	99	41				140	CATTLE	1-Jun	11-Oct	PERMIT LONG
10221	STONE	77920		6956	84876	12899	5104		1641		19644	CATTLE/SHEEP	1-Mar	30-Oct	YEAR LONG PERMIT
10222	WOOD CREEK	1522			1522	312	96				408	CATTLE	1-May	15-Oct	PERMIT LONG
10400	NORTH SAVERY CREEK	120		2070	2190	31	175		486		692	CATTLE	10-May	25-Sep	ROTATION
10442	HORSE PASTURE	160		160	320	33	4335		27		4395	CATTLE	1-Mar	28-Feb	PERMIT LONG
10501	ADAM"S RANCH	39			39	6	767				773	CATTLE	1-Mar	28-Feb	ROTATION
10502	ADOBE TOWN	31155		400	31555	1820			12	114	1946	CATTLE/SHEEP	1-Oct	28-Feb	PERMIT LONG
10503	BIG ROBBER	16499		960	17459	1623	3		67		1693	CATTLE	15-Apr	31-Oct	PERMIT LONG
10504	BIG ROBBER SPREADERS	1042			1042	114					114	CATTLE	15-Apr	25-May	PERMIT LONG
10506	CONTINENTAL	26228		22	26250	2812	3		2	576	3393	CATTLE	1-May	31-Oct	ROTATION
10507	AVAIL.-FLAT TOP SEC	160			160	19	68			38	125	CATTLE			PERMIT LONG
10508	COTTONWOOD HILL	13794		630	14424	997					997	CATTLE	1-Apr	31-Oct	DEFERRED ROTATION
10509	COW CREEK	64681		1520	66201	2629	108		136		2873	CATTLE/SHEEP	1-Mar	31-Oct	LATE SEASON
10510	CROOKED WASH	7269			7269	754					754	CATTLE	1-Jun	31-Oct	PERMIT LONG
10511	ESPITALIER	23791		323	24114	2755	44		27	286	3112	CATTLE	1-Jun	31-Oct	LATE SEASON
10512	GRINDSTONE SPRINGS	8958		80	9038	413			4	49	466	SHEEP	1-Nov	28-Feb	ROTATION
10513	LITTLE POWDER MTN	16197		640	16837	2042	20		55	234	2351	CATTLE/SHEEP	1-Mar	15-Dec	LATE SEASON
10515	MEXICAN FLATS	15055		669	15724	1695			43		1738	CATTLE/SHEEP	15-Mar	30-Nov	ROTATION
10516	MEXICAN GRAVES	18113		2080	20193	1857	11		186		2054	CATTLE/SHEEP	1-Mar	29-Nov	ROTATION
10517	OPPENHEIMER	12088			12088	1084	141			98	1323	CATTLE	1-May	30-Sep	DEFERRED ROTATION
10518	POISON BUTTES	5815		422	6237	465	22		17		504	CATTLE	1-Apr	31-Oct	DEFERRED ROTATION
10519	POWDER MOUNTAIN	8922		640	9562	855	68		46	68	1037	CATTLE/SHEEP	1-Apr	31-Oct	PERMIT LONG
10520	POWDER RIM ROTATION	46532			46532	6542	102				6644	CATTLE/SHEEP	1-Mar	30-Nov	DEFERRED ROTATION
10521	RED CREEK	31916			31916	3003	33			312	3348	CATTLE/SHEEP	1-Mar	30-Nov	ROTATION
10522	RIVER BOTTOM	333	642		975	163		57		61	281	CATTLE	1-Apr	15-Nov	DEFERRED ROTATION
10523	ROTTEN SPRINGS	20956		40	20996	1439			5	145	1589	CATTLE/SHEEP	1-Mar	17-Oct	PERMIT LONG
10524	SAND CREEK	29421			29421	2839				538	3377	CATTLE/SHEEP	1-Mar	10-Apr	ROTATION
10525	SOUTH BARREL	9311		720	10031	951	18		68		1037	CATTLE/SHEEP	25-Mar	5-Jun	ROTATION
10526	SOUTH FLAT TOP	17727		640	18367	1659	68		44		1771	CATTLE	15-Apr	15-Nov	ROTATION
10527	V SPREADERS	320			320	150				80	230	CATTLE	1-Sep	24-Nov	ROTATION
10528	WILLOW CREEK	76412		1480	77892	5362	4		102	336	5804	CATTLE	1-Nov	28-Feb	PERMIT LONG
10529	HEADQUARTERS RANCH	142		320	462	25	454		533		1012	CATTLE/SHEEP	1-Mar	28-Feb	ROTATION
10530	SOUTH MUDDY	1631			1631	103	15				118	CATTLE	1-Apr	31-Oct	ROTATION
10531	GEORGE DEW	360			360	80	135				215	CATTLE			PERMIT LONG
10532	44 RANCH	888		218	1106	59	129		8		196	CATTLE	1-May	31-Oct	ROTATION
10601	BADWATER	10251		1280	11531	1247	1274		141		2662	SHEEP	15-Apr	30-Nov	DEFERRED ROTATION
10602	BULL CANYON	3076			3076	373	650				1023	CATTLE	15-Apr	31-Oct	PERMIT LONG
10604	COAL BANK WASH	3833			3833	514	539				1053	CATTLE	1-Jun	31-Oct	DEFERRED ROTATION
10607	ECHO SPRINGS	21284		1960	23244	2413	2504		176		5093	CATTLE			NA
10608	EMIGRANT	1285		840	2125	85	681		155		921	CATTLE	1-Mar	28-Feb	DEFERRED ROTATION
10609	FILLMORE	17449		640	18089	2839	3539		44		6422	CATTLE	15-May	20-Sep	DEFERRED ROTATION
10610	SOUTH LACLEDE	27586	7548	38	35172	3531	2327	547	3		6408	SHEEP	1-Mar	30-Nov	ROTATION
10611	NORTH BARREL	28080			28080	2930	3945				6875	CATTLE	1-Mar	30-Apr	WINTER PERMIT LONG
10612	NORTH PINE BUTTE	1316			1316	116	108				224	CATTLE			PERMIT LONG

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10613	NORTH LACLEDE	16934	4028		20962	2000	2168	242			4410	SHEEP	1-Mar	10-Apr	ROTATION
10614	OLSON RANCH PASTURE	240			240	50					50	CATTLE	1-Jun	17-Sep	PERMIT LONG
10615	RINER	21663	5762	1434	28859	2765	3409	639	144		6957	CATTLE	1-Mar	15-Jan	ROTATION
10616	SIXTEEN MILE	37513		1280	38793	3628	4104		158		7890	CATTLE/SHEEP	1-Mar	10-Nov	PERMIT LONG
10619	SOUTH RED DESERT	4992			4992	756	924				1680	CATTLE	1-Mar	28-Feb	PERMIT LONG
10620	SOUTH WAMSUTTER	15188		640	15828	1115	1494		39		2648	CATTLE			NA
10621	TIPTON	30227			30227	4752	4788				9540	CATTLE	1-Mar	28-Feb	DEFERRED ROTATION
10623	PINE GROVE	21606		2329	23935	3313	4839		367		8519	CATTLE	1-Jun	31-Oct	DEFERRED ROTATION
10624	NORTH BAGGS	176		10	186	18	120		0		138	CATTLE	1-Mar	31-Dec	DEFERRED ROTATION
10625	SOUTH PINE BUTTE	257			257	34	183				217	CATTLE			NA
10626	LAZY Y S RANCH	8614			8614	1380	518				1898	CATTLE			NA
10720	SHAMROCK HILLS	19556		160	19716	1678	1634		5		3317	CATTLE	1-Mar	28-Feb	ROTATION
10721	BRIMMER PASTURES	291			291	28	197				225	CATTLE	1-Jun	30-Nov	ROTATION
10722	CHAIN LAKES	30629		640	31269	1380	1530		78		2988	CATTLE			NA
11000	TEDDY CREEK	826			826	36					36	CATTLE	1-Jun	15-Oct	PERMIT LONG
11001	A BAR A RANCH	5788		1270	7058	1101					1101	CATTLE	1-Mar	28-Feb	DEFERRED ROTATION
11002	WARD GULCH	595		640	1235	104					104	CATTLE	1-Jul	30-Sep	PERMIT LONG
11003	CORRAL CREEK	1320			1320	132					132	CATTLE	1-May	31-Oct	PERMIT LONG
11004	BENNETT PEAK	1800			1800	143					143	CATTLE	1-May	31-Oct	PERMIT LONG
11005	WOOD HILL	736			736	116					116	CATTLE	1-May	31-Oct	PERMIT LONG
11006	SILVER SPUR	3075		1280	4355	587					587	CATTLE	15-May	1-Oct	PERMIT LONG
11008	MINER CREEK	3453		640	4093	280	40		55		375	CATTLE	25-May	25-Sep	PERMIT LONG
11011	OTTO CREEK	1266			1266	87					87	CATTLE	1-Jun	15-Oct	PERMIT LONG
11012	SILVER SPUR NORTH	1348			1348	164					164	CATTLE	15-May	1-Jul	PERMIT LONG
11013	TENNANT CREEK	729			729	63					63	CATTLE	15-Jun	2-Oct	SPLIT SEASON
11014	KRAFT RANCH	240			240	12					12	CATTLE	1-Jun	30-Sep	PERMIT LONG
11015	FLYING DIAMOND	1081			1081	220					220	CATTLE	1-Jun	1-Jul	PERMIT LONG
11016	SKYLINE	219			219	42					42	CATTLE	1-Mar	28-Feb	PERMIT LONG
11017	COTTONWOOD	1966			1966	220					220	CATTLE	1-Jun	31-Oct	PERMIT LONG
11018	BEAVER CR HILLS	1626		640	2266	317					317	CATTLE	10-May	10-Sep	PERMIT LONG
11019	ALBERT H. OLDMAN	560			560	48					48	CATTLE	1-Jun	15-Sep	DEFERRED ROTATION
11020	EAST FORK	200		640	840	20					20	CATTLE	1-May	31-Oct	PERMIT LONG
11023	ARTHUR ROUSE	1877			1877	251					251	CATTLE	10-May	30-Sep	PERMIT LONG
11024	BEAVER CR HILLS	960		640	1600	142					142	CATTLE	25-May	31-Oct	PERMIT LONG
11025	ENCAMPMENT RIVER	195			195	22					22	CATTLE	1-Jun	31-Jul	PERMIT LONG
11026	RYAN RANCHES	788			788	78					78	CATTLE	20-May	20-Sep	PERMIT LONG
11027	SANGER	5012			5012	699	1458				2157	CATTLE	1-May	30-Sep	PERMIT LONG
11028	PLATTOGA RANCH	2400			2400	393					393	CATTLE	15-May	15-Sep	PERMIT LONG
11029	SAULCY	3172		588	3760	291			41		332	CATTLE	1-Jun	15-Sep	PERMIT LONG
11031	NORTH FORK	961			961	63					63	CATTLE	1-Jun	29-Aug	PERMIT LONG
11032	COTTON RESERVOIR	1880			1880	270					270	CATTLE	1-Jun	31-Oct	PERMIT LONG
11033	ANTELOPE CREEK	643			643	31					31	CATTLE	1-Jul	15-Sep	PERMIT LONG
11034	WIANT	320			320	27					27	CATTLE	20-May	31-Oct	PERMIT LONG
11036	COTTONWOODCORRAL C	2037			2037	229					229	CATTLE	20-May	15-Sep	PERMIT LONG
11037	RIVER MEADOWS RANCH	320			320	23					23	CATTLE	1-May	31-Oct	PERMIT LONG
11038	PIERSON	35		21	56	8					8	CATTLE	21-Jun	20-Sep	PERMIT LONG
11039	LITTLE BEAVER CREEK	800		640	1440	160					160	CATTLE	1-May	31-Oct	PERMIT LONG

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11041	SO. CEDAR CR.	80		120	200	8					8	CATTLE	1-May	31-Oct	PERMIT LONG
11042	DUFUNNY	240			240	15					15	CATTLE	1-Jun	30-Oct	PERMIT LONG
11043	BEAVER CR SOUTH	80			80	11					11	CATTLE	10-May	10-Sep	PERMIT LONG
11044	SOWDER-MCNANEY	539		728	1267	92					92	CATTLE	1-May	31-Oct	PERMIT LONG
11046	PIERCE	20			20	3					3	CATTLE	1-May	31-Oct	PERMIT LONG
11047	HORN AND MEASON	785			785	67					67	CATTLE	1-May	31-Oct	PERMIT LONG
11048	KENNADAY	1160			1160	137					137	CATTLE	1-May	31-Oct	PERMIT LONG
11049	PROSPECT MTN.	7869		330	8199	1520					1520	CATTLE	1-Jun	15-Oct	DEFERRED ROTATION
11050	PLATT MINE	899			899	226					226	CATTLE	1-Jun	30-Sep	PERMIT LONG
11052	JOHN ROUSE	80			80	2					2	CATTLE	25-May	24-Jun	PERMIT LONG
11059	HERRING RANCH PASTUF	80			80	8					8	CATTLE	1-Mar	28-Feb	PERMIT LONG
11060	COW CAMP	350	9		359	93	285	1			379	CATTLE	1-Jun	25-Sep	PERMIT LONG
11510	NORTH WILLOW CREEK	3469			3469	625	52				677	CATTLE	20-Apr	20-Jun	NA
12019	COOPER CREEK	1402		640	2042	240	620		99		959	CATTLE	1-Jun	30-Dec	NA
12020	COTTONWOOD PASTURE	2023			2023	312	105				417	CATTLE	1-Nov	28-Feb	NA
20223	RANCH PASTURE	56			56	12	449				461	CATTLE	1-Mar	30-Jun	PERMIT LONG
20603	BOLTEN RANCH	103064		5330	108394	7061	9025		408		16494	CATTLE	1-Mar	28-Feb	NA
20613	PLATTE RIVER	8018		1280	9298	1577	1529		217		3323	CATTLE	1-Apr	15-Nov	ROTATION
21051	OWL CREEK	138			138	14					14	CATTLE	1-Mar	28-Feb	PERMIT LONG
21053	RAINBOW CANYON	622			622	134	9				143	CATTLE	1-Jun	1-Sep	PERMIT LONG
21054	HEATHER CR LAND CO	40			40	4					4	CATTLE	10-May	31-Oct	PERMIT LONG
22001	CAROLYNS RANCH	66721		2600	69321	6009	7694		169		13872	CATTLE	1-Mar	30-Nov	ROTATION
	TOTALS	3613253	55650	365025	4033928	484619	326067	8347	48707	13198	880938				
	PERCENTAGES	89.6%	1.4%	9.0%	100.0%	55.0%	37.0%	0.9%	5.5%	1.5%	100.0%				

Table 3.9-1. Participants and Visitor Days Associated with OHV Use in the RMPPA.

OHV Use: Participants and Visitor Days Rawlins Field Office[1]						
	Fiscal Year 1999		Fiscal Year 2000		Fiscal Year 2001	
	Number of Participants	# Visitor Days	Number of Participants	# Visitor Days	Number of Participants	# Visitor Days
OHV – ATV	3,350	1,117	3,350	1,117	4,800	1,600
OHV – Cars/Trucks/SUVs	46,611	31,068	46,618	31,068	33,984	16,838
OHV – Motorcycle	1,600	1,067	1,600	1,067	0	0
Gather Non-Commercial Products	3,700	2,467	3,700	2,467	2,400	800
Snowmobiling	1,760	1,147	1,760	1,147	1,200	600

Source: BLM Recreation Management Information System, BLM Rawlins Field Office

1 - Changes to the RMIS system of data collection and estimation were made after Fiscal Year 2000. Recreation estimates prior to Fiscal Year 2001 were believed to be overestimates, so methodology for FY 2001 was improved and visitation estimates are significantly lower for the Rawlins Field Office in 2001. Large declines in visitation estimates between 2000 and 2001 should not be interpreted as an actual decrease in visits, but rather a change in estimation methodology.

Table 3.10-1. Paleontological Classification Descriptions and Procedures.

Class	Description	Procedure
I. (Critical)	Any locality from which holotype or critical reference material has been collected. Any type geologic reference section which is critical for future reference	No action will be allowed which will damage the fossil resource or alter the contextural relationships of fossil materials. Materials may be removed, but by special permit only to qualified professionals.
II. (Significant)	Any locatlity which contains rare, exceptionally well preserved or critical materials for stratigraphic or paleoenvironmnetal interpretation	Depending on the size of the deposit, approved mitigation may include total salvage or may be limited to a statistically valid sample of all forms present
III. (Important)	Any locality which has produced plentiful (relatively common in the locality and elsewhere) fossil materials which are useful for stratigraphic and variability studies	A statistically valid sample will be obtained to mitigate any adverse impact on the resource
IV. (Insignificant)	Any locality which produces poorly preserved, common elsewhere or stratigraphically unimportant material	Mitigation is optional
V. (Unimportant)	Any locality which has been intensively surveyed and determined to be of minimal scientific interest. This can include any outcrop of geological formations described as unfossiliferous in technical journals or publications	No mitigation necessary.

Source: (BLM 1987)

Table 3.10-2. Paleontological Significance of Units and Formations.

Unit Symbol[1]	Unit	Paleontological Class
	Quaternary	
Qa	Alluvium and Colluvium	V
Qt	Gravel, Pediment, and fan deposits	V
Ql	Playa and Lacustrine	V
Qls	Lanslide Deposits	V
Qs	Dune and Loess	V
Qg	Glacial Deposits	V
Qtc	Conglomerate	V
	Tertiary	
Tm	Miocene Rocks	III
Tmu	Upper Miocene Rocks	III
Tn	North Park Formation	II
Tbp	Browns Park Formation	II
Twr	White River Formation	II
Twrb	Brule Member	III
Twru	Upper Conglomerate Member	III
Twre	Chadron Member	III
Toe	Oligocene and Upper and Middle Geocene Rocks	III
Tip	Ice Point Conglomerate	III
Twa	Washakie Formation	II
Twb	Wagon Bed Formation	II
Tb	Bridger Formation	II
	Green River Formation	
Tgl	Laney Member	II
Tgt	Tipton Shale Member	II
Tglu	Luman Tongue	II
Tgw	Wilkens Peak	II
Tw	Wasatch Formation	II
Twc	Cathedral Bluffs Tongue	II
Twn	Niland Tongue	II
Twm	Main Body	II
Tbs	Battle Springs Formation	IV
Tbw	Transitional Unit between Battle Springs Formation and Wasatch Formation	IV
Tfu	Fort Union Formation	II
Twdr	Wind River Formation	II
Tkf	Ferris Formation	II
Tco	Coalmont Formation	III

Table 3.10-2. Paleontological Significance of Units and Formations.

Unit Symbol[1]	Unit	Paleontological Class
Tha	Hanna Formation	II
Tbf	Basal Flows and Intrusive Rocks	V
Tml	Lower Miocene Rocks	III
Tmo	Lower Miocene and Upper Oligocene Rocks	III
	Cretaceous	
Kl	Lance Formation	IV
Kmb	Medicine Bow Formation	IV
Kle	Lewis Shale	IV
Kmv	Mesaverde Group	III
Ks	Steele Shale	IV
Ksn	Steele Shale and Niobrara Formation	IV
Kn	Niobrara Formation	IV
Knt	Niobrara, Frontier, Mowry, Thermopolis	IV
Kf	Frontier Formation	IV
Kmt	Frontier, Mowry, Thermopolis	IV
Kmt	Mowry, Thermopolis	IV
Kj	Cloverly, Morrison Formations	II
Kjs	Cloverly, Morrison, Sundance Formations	II
Kp	Pierre Shale	IV
	Jurassic	
Js	Sundance Formation	IV
	Triassic	
TrPg	Goose Egg Formation	IV
TrPcg	Chugwater, Goose Egg Formation	IV
Trc	Chugwater Formation	IV
TrPjs	Jeim, Chugwater, Forelle, Satanka	IV
MzPz	Mesozoic and Paleozoic Rocks	IV
	Pennsylvanian	
Pfg	Forelle Limestone, Satanka Shale	IV
PPc	Casper Formation	IV
PPcf	Casper, Fountain Formations	IV
PPM	Casper Formation and Madison Limestone	IV
PM	Tensleep and Amsden	IV
Pzr	Madison Limestone and Cambrian Rocks	IV
	Mississippian	
Mda	Guernsey Formation	
Mm	Madison Limestone	IV

Table 3.10-2. Paleontological Significance of Units and Formations.

Unit Symbol[1]	Unit	Paleontological Class
Cr	Cambrian Rocks	V
	Precambrain Rocks	
Xsv	Medasedimentary and Metavolcanic Rocks	V
Xcl	Libby Creek Group	V
Xdl	Deep Lake Group	V
MVsw	Metasedimentary and Metavolcanic Rocks	V
Ws	Metasedimentary Rocks	V
Wmu	Metamorphosed Mafic and Ultramafic Rocks	V
Wgn	Granite Gneiss	V
Ys	Sherman Granite	V
Yls	Pyroxene and hornblende syenite	V
Yla	Anorthosite and Norite	V
Xqd	Quartz Diorite	V
Xgy	Granitic Rocks of 1,700-Ma Age Group	V
Xm	Mafic Intrusive Rocks	V
Wg	Granitic Rocks of 2,600-Ma Age Group	V
Pw	Mafic Intrusive Rocks	V

[1]Geologic unit symbols can be correlated with Geologic Map of Wyoming
[2]Ma = million years (approximately)
[3]Source: (BLM 1987)

Table 3.11-1. Recreational Management System Information on Recreation Participants and Visitor Days in the RMPPA.

Recreation Participants and Visitor Days Rawlins Field Office[1]						
	Fiscal Year 1999		Fiscal Year 2000		Fiscal Year 2001	
	Number of Participants	# Visitor Days	Number of Participants	# Visitor Days	Number of Participants	# Visitor Days
Backpacking	1,935	6,440	1,935	6,440	156	747
Bicycling – Mountain	4,865	1,633	4,865	1,633	1,334	447
Camping	14,658	43,371	16,044	47,797	12,661	31,144
Canoe/Kayaking	0	0	0	0	8	5
Caving	50	25	50	25	0	0
Driving for Pleasure	122,552	61,275	122,550	61,275	24,000	12,000
Environmental Education	1,950	1,267	2,025	1,100	42	56
Fishing – Freshwater	99,541	59,095	98,959	58,988	49,279	19,457
Gather Non-Commercial Products	3,700	2,467	3,700	2,467	2,400	800
Hiking/Walking/Running	16,078	9,089	16,075	9,088	14,600	5,350
Horseback Riding	5,191	2,205	5,535	2,732	2,770	1,387
Hunting – Big Game	73,603	248,184	74,180	251,754	30,997	59,453
Hunting – Small Game	1,650	1,100	1,650	1,100	0	0
Hunting – Upland Bird	1,600	1,067	1,600	1,067	0	0
Hunting – Waterfowl	2,600	1,733	1,040	1,360	500	333
Nature Study	2,600	967	2,600	967	300	25
OHV – ATV	3,350	1,117	3,350	1,117	4,800	1,600
OHV – Cars/Trucks/SUVs	46,611	31,068	46,618	31,068	33,984	16,838
OHV – Motorcycle	1,600	1,067	1,600	1,067	0	0
Photography	2,250	1,283	2,950	1,517	0	0
Picnicking	22,601	3,892	21,050	3,629	11,878	973
Power Boating	1,235	823	1,235	823	0	0
Rockhounding/Mineral Collection	1,890	1,212	1,910	1,222	0	0
Row/Float/Raft	14,492	5,309	11,109	4,296	7,180	2,409
Skiing – Cross Country	1,600	1,067	1,600	1,067	0	0
Snow Play – General	1,600	533	1,600	533	0	0
Snowmobiling	1,760	1,147	1,760	1,147	1,200	600
Target Practice	4,850	1,608	4,850	1,608	3,600	300
Trapping	1,800	1,167	1,644	1,089	0	0
Viewing – Wild Horses	1,600	1,067	1,600	1,067	0	0
Viewing – Wildlife	181,228	25,509	181,025	25,408	86,601	8,100

Source: BLM Recreation Management Information System, BLM Rawlins Field Office

1 - Changes to the RMIS system of data collection and estimation were made after Fiscal Year 2000. Recreation estimates prior to Fiscal Year 2001 were believed to be overestimates, so methodology for FY 2001 was improved and visitation estimates are significantly lower for the Rawlins Field Office in 2001. Large declines in visitation estimates between 2000 and 2001 should not be interpreted as an actual decrease in visits, but rather a change in estimation methodology.

T3.11-2. Recreation Visits by Location in the RMPPA.

Recreation Visits by Location: October 1998 – September 2001 Rawlins RMP Planning Area		
	Visits	**Visitor Days**
Dispersed Recreation	522,761	992,227
Developed/Undeveloped Recreation Sites	127,085	212,029

Source: BLM Recreation Management Information System, BLM Rawlins Field Office

Table 3.12-1. Geographic Characteristics of Socioeconomic Study Area.

	Socioeconomic Study Area					
	County				Wyoming	U.S.
Geographic Characteristic	Albany	Carbon	Laramie	Sweetwater		
Land Area (Million Acres)	2.7	5.1	1.7	6.7	62.1	2,200
Land Area (Sq. Miles)	4,273	7,896	2,686	10,425	97,100	3.5 Million
Persons Per Square Mile	7.5	2.0	30.4	3.6	5.1	79.6

Table 3.12-2. Population Centers in the Rawlins Socioeconomic Study Area.

Population Centers				
County	City	Population		
		1990	2000	% Change
Albany	Laramie	26,687	27,204	1.9
Carbon	Rawlins	9,380	8,538	-9.0
	Saratoga	1,969	1,726	-12
Laramie	Cheyenne	50,008	53,011	6
	Pine Bluffs	1,054	1,153	9.4
Sweetwater	Green River	12,711	11,808	-7.1
	Rock Springs	19,050	18,708	-1.8

Table 3.12-3. Components of Population Change in the Socioeconomic Study Area.

COMPONENTS OF POPULATION CHANGE 1980 – 1999 COUNTIES IN STUDY AREA

1990 – 1999

County	1990 Population	1999 Population	Numeric Change in Population 1990-1999	Percentage Change in Total Population 1990-1999	Cumulative Births	Cumulative Deaths	Natural Change in Population	Natural Percentage Change in Population	Net Migration	Percentage Change in Population Due to Net Migration
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Albany, WY	30,797	29,060	-1,737	-5.64%	3,596	1,487	2,109	6.8%	-3,846	-12.49%
Carbon, WY	16,602	15,437	-1,165	-7.02%	1,715	1,205	510	3.1%	-1,675	-10.09%
Laramie, WY	73,142	78,877	5,735	7.84%	11,110	5,330	5,780	7.9%	-45	-0.06%
Sweetwater, WY	38,823	39,322	499	1.29%	5,245	2,085	3,160	8.1%	-2,661	-6.85%
Study Area	159,364	162,696	3,332	2.09%	21,666	10,107	11,559	7.3%	-8,227	-5.16%
Wyoming	469,557	453,589	-15,968	-3.40%	91,165	32,059	59,106	6.00%	-1,382	-0.30%

1980-1990

County	1980 Population	1990 Population	Numeric Change in Population 1980-1990	Percentage Change in Total Population 1980-1990	Cumulative Births	Cumulative Deaths	Natural Change in Population	Natural Percentage Change in Population	Net Migration	Percentage Change in Population Due to Net Migration
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Albany, WY	29,062	30,797	1,735	5.97%	4,664	1,526	3,138	10.80%	-1,403	-4.83%
Carbon, WY	21,896	16,659	-5,237	-23.92%	3,589	1,406	2,183	9.97%	-7,420	-33.89%
Laramie, WY	68,649	73,142	4,493	6.54%	13,342	5,064	8,278	12.06%	-3,785	-5.51%
Sweetwater, WY	41,723	38,823	-2,900	-6.95%	8,823	2,022	6,801	16.30%	-9,701	-23.25%
Study Area	161,330	159,421	-1,909	-1.18%	8,253	2,932	5,321	3.30%	-22,309	-13.83%
Wyoming	453,589	479,602	26,013	5.70%	60,099	32,704	27,395	12.60%	-1,382	-16.00%

Sources: U.S. Census Bureau

Table 3.12-4. Personal Income in the Socioeconomic Study Area.

Personal Income 1979, 1989 and 1999 for Economic Study Area			
	Real Dollars (2001$)		
	1979	**1989**	**1999**
Total Personal Income (1,000$)	$3,444,385	$3,447,162	$4,435,341
Labor Income	$2,704,076	$2,395,632	$2,892,684
Investment Income	$489,972	$687,741	$1,037,285
Transfer Payments	$250,336	$363,789	$505,372
Population	157,881	160,738	162,696
Per Capita Personal Income ($)	$21,816	$21,446	$27,262
Per Capita Labor Earnings ($)	$17,127	$14,904	$17,780
Per Capita Transfer Payments ($)	$1,586	$2,263	$3,106
Percentage of Total Personal Income			
Labor Income	78.5%	69.5%	65.2%
Investment Income	14.2%	20.0%	23.4%
Transfer Payments	7.3%	10.6%	11.4%
	100.0%	100.0%	100.0%
Personal Income Growth	**1979-1999**	**1979-1989**	**1989-1999**
Total Personal Income	28.8%	0.1%	28.7%
Labor Income	7.0%	-11.4%	20.7%
Investment Income	111.7%	40.4%	50.8%
Transfer Payments	101.9%	45.3%	38.9%
Per Capita Personal Income	25.0%	-1.7%	27.1%
Per Capita Labor Earnings ($)	3.8%	-13.0%	19.3%
Per Capita Transfer Payments ($)	95.9%	42.7%	37.2%

[A] *Includes Albany, Carbon, Lincoln and Sweetwater Counties in Wyoming.*

1. Personal contributions for social insurance are included in earnings by type but they are excluded from personal income. An adjustment for residence is calculated as the net inflow of earnings from inter-area commuters.
2. Labor income includes wages, salaries and self-employment income.
3. Investment income includes rents, dividends and interest earnings.
4. Transfer payments are largely derived from Social Security benefits, Medicare and Medicaid benefits and other income support assistance.

Source: Data derived from the U.S. Department of Commerce, Bureau of Economic Analysis, Table CA05 - Personal Income by Major Source and Earnings by Industry, 1979-1999.

Table 3.12-5. Estimated Poverty Rates in the Socioeconomic Study Area.

Estimated Poverty Rates		
Location	**1989**	**1998**
Albany, Co.	19.8%	14%
Carbon, Co.	10.0%	11.8%
Laramie, Co.	10.6%	10.7%
Sweetwater, Co.	8.0%	8.1%
Wyoming	11.9%	11.4%
West	12.5%	14.6%
U.S.	12.8%	13.3%

Source: U.S. Census Bureau, State Model Estimates of the Percentage of Persons of All Ages in Poverty

Table 3.12-6. Change in Civilian Labor Force in the Socioeconomic Study Area.

CHANGE IN CIVILIAN LABOR FORCE 1991-2000		
Location	**Change in Civilian Labor Force Between 1991-2000**	**Percentage Change in Civilian Labor Force Between 1991-2000**
Albany County, WY	2,516	15.6
Carbon County, WY	-278	-3.2%
Laramie County, WY	582	9.7%
Sweetwater County, WY	-550	-2.71%
Economic Study Area	7,084	8.7%
Wyoming	32,810	14.0%

Source: U.S. Department of Labor, Bureau of Labor Statistics, Local Area Unemployment Statistics

Table 3.12-7. Economic Diversity in the Socioeconomic Study Area.

Measure of Economic Diversity Using Sources of Personal Income (2001$) Albany, Carbon, Laramie and Sweetwater Counties, Wyoming							
	Income Source	Personal Income by Source (1,000$)			Percentage of Total Personal Income from Outside Sources		
		1979	1989	1999	1979	1989	1999
Labor Income	Agriculture	$41,115	$29,010	$43,793	1%	1%	1%
	Construction	$333,761	$138,645	$196,167	10%	4%	4%
	Mining	$573,533	$382,010	$317,154	17%	11%	7%
	Manufacturing	$138,933	$119,805	$220,108	4%	3%	5%
	Federal and State Government	$492,348	$621,270	$640,878	14%	18%	14%
Non-Labor Income	Transfer payments	$250,336	$363,789	$505,372	7%	11%	11%
	Investment Income	$146,992	$206,322	$311,185	4%	6%	7%
	Total Personal Income	$3,444,385	$3,447,162	$4,435,341	57.4%	54.0%	50.4%

Table 3.12-8. Estimated Value of Grazing Activities on BLM Lands within the Rawlins RMPPA for 1997.

Estimated Value of Grazing Activities on BLM Lands within the Rawlins Field Office for 1997				
Total Annual Cattle AUMs Attributable to Grazing within Rawlins Field Office - 1997	Total Annual Sheep AUMs Attributable to Grazing within Rawlins Field Office -1997	Value of Cattle Grazing – 1997 ($1,000)[a]	Value of Sheep Grazing - 1997 ($1,000)[b]	Total Value of Grazing on BLM Lands ($1,000)
309,725	30,977	$9,851	$850	$10,701

[a] Cattle Grazing was valued per AUM at $31.80/AUM based on data from the Wyoming Agriculture Statistical Service

[b] Cattle Grazing was valued per AUM at $27.44/AUM based on data from the Wyoming Agriculture Statistical Service

Table 3.12-9. Percentage of Agricultural Sales in the Socioeconomic Study Area Attributed to Grazing on BLM Lands in the Rawlins RMPPA for 1997.

Percentage of Agricultural Sales in Study Area Attributed to Grazing on BLM Lands in Rawlins Field Office for 1997				
Total Agricultural Sales - Study Area ($1,000)	Total Livestock Sales Study Area ($1,000)	Estimated Value of Grazing on BLM Lands - Rawlins Field Office ($1,000)	Percentage of Total Livestock Sales	Percentage of Total Agricultural Sales
$180,575	$155,117	$10,701	6.9%	5.9%

Source: U.S. Department of Agriculture, National Agriculture Statistical Service, *Census of Agriculture, 1997.*

Table 3.12-10. Assessed Property Valuations within the Socioeconomic Study Area.

Assessed Property Valuations by County for 2001									
	Valuation of State- Assessed Property			Valuation of Locally Assessed Property					
County	Non-Minerals	Minerals	Total State Assessed Property	Agricultural Land	Residential Land, Improvements and Personal Property	Commercial Land, Improvements and Personal Property	Industrial Property	Total Locally Assessed Property	Total State and Locally Assessed Property
Albany	$23,792,281	$3,324,167	$27,116,448	$5,636,217	$107,891,145	$34,425,664	$6,475,411	$154,428,437	$181,544,885
Carbon	$41,628,203	$426,289,238	$467,917,441	$6,262,236	$37,701,960	$14,333,269	$27,848,535	$86,146,000	$554,063,441
Laramie	$44,719,001	$17,992,517	$62,711,518	$9,790,261	$265,897,775	$98,510,417	$28,210,102	$402,408,555	$465,120,073
Sweetwater	$122,849,306	$980,185,196	$1,103,034,502	$3,105,344	$110,041,844	$32,191,664	$158,602,935	$303,941,787	$1,406,976,289
Total - Study Area	$232,988,791	$1,427,791,118	$1,660,779,909	$24,794,058	$521,532,724	$179,461,014	$221,136,983	$946,924,779	$2,607,704,688

Table 3.12-11. Value of Oil and Gas Production in the Socioeconomic Study Area.

Assessed Value of Oil and Gas Production and Property in Study Area for Fiscal Year 2001					
County	**Oil and Gas Valuation - Production**	**Oil and Gas Valuation as Percentage of Total Mineral Valuation**	**Oil and Gas Extraction and Refining Property Valuation**	**Oil and Gas Property as a Percentage of Total Property Valuation**	**Oil and Gas Valuation as Percentage of Total State and Local Assessed Property Valuation**
Albany	$1,866,033	56.14%	$104,284	0.07%	1%
Carbon	$393,684,237	92.35%	$25,146,585	29.19%	76%
Laramie	$10,676,916	59.34%	$8,756,014	2.18%	4%
Sweetwater	$670,371,775	68.39%	$42,161,137	13.87%	51%
Total Study Area	**$1,076,598,961**	**75.40%**	**$25,250,869**	**2.67%**	**42%**

Table 3.12-12. Mineral Ad Valorem Tax Revenues in the Socioeconomic Study Area.

Estimated Mineral Ad Valorem Tax Revenues - Fiscal Year 2001									
County	**Natural Gas**	**Crude Oil**	**Coal**	**Trona**	**Granite Ballast**	**Sand and Gravel**	**Total**	**Property Tax Levy**[a]	**Mineral Tax Levy as Percentage of County Tax Levy**
Albany	$0	$117,446	$0	$0	$0	$5,094	$122,541	$12,481,661	1%
Carbon	$22,455,265	$1,927,568	$2,001,986	$0	$0	$17,404	$26,402,224	$34,927,573	76%
Laramie	$21,974	$710,730	$0	$0	$438,322	$58,908	$1,229,933	$34,322,378	4%
Sweetwater	$35,541,587	$6,989,927	$6,544,036	$13,083,494	$0	$28,479	$62,187,523	$89,145,656	70%
Total Study Area	$58,018,826	$9,745,670	$8,546,023	$13,083,494	$438,322	$109,886	$89,942,220	$170,877,268	53%

Table 3.12-13. Ad Valorem Tax Revenues on Oil and Gas and Coal in the Socioeconomic Study Area.

Estimated Ad Valorem Tax Revenues on Oil and Gas and Coal Property - FY 2001				
County	**Oil and Gas Property Assessment**	**Coal Property Assessment**	**Average Tax Levy**	**Total Estimated Ad Valorem - Property**
Albany	$104,284	$0	62.94	$6,564
Carbon	$13,557,345	$1,459,743	61.94	$930,158
Laramie	$813,889	$0	68.63	$55,857
Sweetwater	$42,161,137	$3,944,703	63.44	$2,924,954
Total Study Area	**$56,636,655**	**$5,404,446**	**124.88**	**$3,917,534**

Table 3.12-14. Oil and Gas Tax Revenues as a Percentage of County Property Tax.

Table 3.12-12 Oil and Gas Tax Revenues as Percentage of Total County Property Taxes - Fiscal Year 2001			
County	**Total Ad Valorem Tax Revenue - Oil and Gas**	**Property Tax Levy[a]**	**Oil and Gas Tax Revenue as Percentage of County Tax Levy**
Albany	$124,010	$12,481,661	1%
Carbon	$25,222,507	$34,927,573	72%
Laramie	$788,556	$34,322,378	2%
Sweetwater	$45,206,413	$89,145,656	51%
Total Study Area	$71,341,487	$170,877,268	42%

[a] Wyoming Taxpayers Association, *Wyoming Property Taxation, 2001.*

Table 3.12-15. Severance Tax Distribution for Government Entities in the Socioeconomic Study Area.

Total Severance Tax Distributions for Government Entities in the Study Area, FY 2001	
Area	**Severance Tax Distributions**
Counties in Study Area	$4,801,380
Total Severance Taxes Distributed to All Counties in WY	$13,843,706
Percentage Distributed to Study Area Counties	35%
Cities and Towns in Study Area	$13,638,594
Total Severance Taxes Distributed to All Cities/ Towns in WY	$35,370,306
Percentage Distributed to Study Area Cities/Towns	39%

Source: Annual Report of the Treasurer of the State of Wyoming, June 30, 2001.

Table 3.12-16. Severence Tax by Product in the Socioeconomic Study Area.

Severance Taxes Generated by Product										
County	Natural Gas	Crude Oil	Stripper Oil	Coal - Surface	Coal - Underground	Granite Ballast	Trona	Sand and Gravel	Total	Percentage of Total Severance Taxes Generated in Each County
Albany	$0	$77,664	$20,140	$0	$0	$0	$0	$1,619	$99,423	0.1%
Carbon	$21,028,585	$1,566,690	$145,466	$623,286	$878,246	$0	$0	$5,620	$24,247,893	30.6%
Laramie	$18,572	$462,391	$89,784	$0	$0	$127,744	$0	$17,168	$715,658	0.9%
Sweetwater	$32,491,495	$6,233,244	$32,737	$7,220,190	$0	$0	$8,248,759	$8,978	$54,235,402	68.4%
Total - Study Area	$53,538,651	$8,339,989	$288,127	$7,843,476	$878,246	$127,744	$8,248,759	$33,385	$79,298,377	100.0%
Percentage of Severance Taxes Generated from Each Product	67.5%	10.5%	0.4%	9.9%	1.1%	0.2%	10.4%	0.04%	100.0%	0.0%

Table 3.12-17. Estimated Ad Valorem Tax Production.

Estimated Ad Valorem Tax - Production - Rawlins Field Office (Federal Lands)					
Product	**Total Annual Production**	**Taxable Valuation Per Unit**[a]	**Assessed Valuation**	**Average Tax Levy**[a]	**Total Estimated Ad Valorem**
(1)	**(2)**	**(3)**	**(4) = (2)*(3)**	**(5)**	**(6) = (4)/1000*(5)**
Oil (BBLs)	1,557,123	$24.47	$38,102,800	58.849	$2,242,312
Natural Gas (MCF)	81,540,962	$2.60	$212,006,501	58.849	$12,476,371
Coal (Underground)	1,409,233	$16.62	$23,421,452	61.935	$1,450,608
Coal (Surface)	705,958	$3.91	$2,760,296	61.935	$170,959
Total			**$276,291,049**		**$16,340,249**

[a] Source: Wyoming Department of Revenue Annual Report - Fiscal Year 2001, Cheyenne, WY.
[b] Source: Wyoming Taxpayers Association, "Wyoming Property Taxation 2001, Cheyenne, WY.

Table 3.12-18. Estimated Severance Tax Production.

Estimated Severance Tax - Production - Rawlins Field Office (Federal Lands)					
Product	**Total Annual Production (BBLs/MCF)**	**Taxable Valuation Per Unit[a]**	**Assessed Valuation**	**Average Severence Tax Per Unit of Production[a]**	**Total Estimated Severance Tax**
(1)	**(2)**	**(3)**	**(4) = (2)*(3)**	**(5)**	**(6) = (4)*(5)**
Oil	1,557,123	$24.47	$38,102,800	0.060	$2,286,168
Natural Gas	81,540,962	$2.60	$212,006,501	0.060	$12,720,390
Coal (Underground)	1,409,233	$16.62	$23,421,452	0.070	$1,639,502
Coal (Surface)	705,958	$3.91	$2,760,296	0.0375	$103,511
Total			**$276,291,049**		**$16,749,571**

[a] Source: Wyoming Department of Revenue Annual Report - Fiscal Year 2001, Cheyenne, WY.

Table 3.12-19. Estimated Federal Royalties Production.

Estimated Federal Royalties - Production - Rawlins Field Office (Federal Lands)					
Product	**Total Annual Production (BBLs/MCF)**	**Taxable Valuation Per Unit[a,b]**	**Assessed Valuation**	**Federal Royalty Rate**	**Total Estimated Federal Royalties**
(1)	**(2)**	**(3)**	**(4) = (2)*(3)**	**(5)**	**(6) = (4)*(5)**
Oil	1,557,123	$22.92	$35,687,082	0.125	$4,460,885
Natural Gas	81,540,962	$2.10	$171,619,263	0.125	$21,452,408
Total			**$207,306,345**		**$25,913,293**

[a] Source: Wyoming Department of Revenue Annual Report - Fiscal Year 2001, Cheyenne, WY.
[b] The taxable valuation for oil and gas was decreased to account for allowable cost deductions taken by operators prior to paying federal royalties. Therefore, the taxable valuation per barrel of oil is 93.66% of total valuation and 80.95% of total value.

Table 3.12-20. Lodging Tax Distributions in the Socioeconomic Study Area.

Lodging Tax Distributions			
County	**FY 1999**	**FY 2000**	**FY 2001**
Albany	$176,937	$278,992	$296,795
Carbon	$176,051	$202,998	$197,689
Laramie	$333,245	$379,875	$408,164
Sweetwater	$247,099	$270,368	$307,111
Total	**$933,332**	**$1,132,233**	**$1,209,759**

Source: Wyoming Department Revenue Annual Report - FY 2001

Table 3.12-21. Sales and Use Tax Distributions in the Socioeconomic Study Area.

Sales and Use Tax Distributions, 2000			
Jurisdiction	**FY 1999**	**FY 2000**	**FY 2001**
Albany[a]	$11,184,686	$12,638,203	$12,638,203
Carbon[a]	$8,127,805	$10,151,339	$10,151,399
Laramie[a]	$22,630,054	$29,173,211	$29,173,211
Sweetwater[a]	$19,190,295	$22,413,185	$22,413,185
Total	**$61,132,840**	**$74,375,938**	**$74,375,998**

Source: Wyoming Department Revenue Annual Report - FY 2001
[a] Includes distribution to county and cities and town within each county.

Table 3.12-22. Population Distribution by Race and Hispanic Status in the Socioeconomic Study Area of the RMPPA.

Population Distribution (Percentage) by Race and Hispanic by County: 2000								
County	White	Black or African American	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race	Two or More Races	Hispanic or Latino (of any race)
Albany	91.3	1.1	1.0	1.7	0.1	2.6	2.2	7.5
Carbon	90.1	0.7	1.3	0.7	0.1	5.2	2.1	13.8
Laramie	88.9	2.6	0.8	1.0	0.1	4.0	2.6	10.9
Sweetwater	91.6	0.7	1	0.6	0.0	3.6	2.4	9.4
Wyoming	92.1	0.8	2.3	0.6	0.1	2.5	1.8	6.4

Source: U.S. Bureau of Census

Percentages may not add to 100 because of individuals may report ethnicity under more than one category.

Table 3.13-1. Statewide Soil Zones and the Soil Descriptions Occurring Within them in the RMPPA.

Soil Zone and Soil Descriptions Within Each Zone
Zone 3 (Middle Rocky Mountains)
• WY06: Typic Haplocryalfs, Typic Dystrocryepts and Typic Haplocryolls, loamy-skeletal and Histic Cryaquepts, fine-loamy over sandy or sandy-skeletal. On stable slopes which are older than Pinedale (Late Wisconsin), the predominate soils are Haplocryalfs. Dystrocryepts occur on slopes greater than 40%, and on Pinedale and younger surfaces (Pinedale tills and holocene surfaces). Haplocryolls occur under mountain meadow vegetation and are most common on south facing slopes. Cryaquepts are found along narrow riparian areas (Munn & Arneson 1998).
Zone 4 (Bighorn Basin/Intermountain Basin)
• WY09: Typic Haplargids and Typic Haplocalcids, fine-loamy over sandy or sandy-skeletal, mesic and Typic Torriorthents, fine-loamy and coarse-loamy, mesic. Aridisols occur on colluvial and alluvial landscapes while Entisols occur on residual landscapes.
• WY10: Typic Torripsamments, mesic. These soils are on stabilized dunes. They show little horizon development; thin A horizons are the most apparent change from the parent material (stabilized dune sand).
• • WY11: Calcic Haplosalids, fine, mesic. These soils are associated with marine shales and occur in topographic depressions where run off water from the surrounding landscape accumulates and evaporates concentrating salt (Munn & Arneson 1998).
Zone 5 (Powder River Basin/Northern Great Plains)
• WY17: Typic Torriorthents, loamy-skeletal, mesic and Rock Outcrop. These stony soils occupy ridge crests where coal bed fires have created clinker. The soils tend to be much coarser than the soils on the adjacent lower slopes, and contain hard clasts.
Zone 7 (Southeast Wyoming/Northern Great Plains)
• WY10: Typic Torripsamments as in Zone 4, except soil temperature regime is frigid.
• WY23: Typic Argiustolls, fine-loamy and Typic Argiustolls fine-loamy over sandy or sandy-skeletal, mixed, frigid. These soils occur on Tertiary and Pleistocene parent materials (mostly alluvial fan deposits of Tertiary age, or local alluvium of Pleistocene age.)
• WY24: Ustic Haplocambids and Ustic Torriorthents, fine, frigid. These moderately and weakly developed soils occur on gentle to steep slopes over the Tertiary White River formation. Profile development is shallow or moderately deep.
• WY25: Ustic Torriorthents and Aridic Ustochrepts, loamy-skeletal, frigid. These soils occur along the front of the Laramie Range and the Hartville uplift. The

Table 3.13-1. Statewide Soil Zones and the Soil Descriptions Occurring Within them in the RMPPA.

Soil Zone and Soil Descriptions Within Each Zone
Ustochrepts support scattered stands of Ponderosa Pine. Soils are shallow or moderately deep and coarse textured.
• WY26: Ustic Torriorthents and Ustic Haplocambids, fine, frigid. These soils have developed on Cretaceous age bedrock (shale) and are moderately deep or shallow. The Haplocambids are on low gradient fans and slopes; Torriorthents occur on steeper slopes (greater than 15%).
• WY27: Typic Torrifluvents and Typic Haplaquolls, fine-loamy over sandy or sandy-skeletal, mixed, frigid These soils occur along riparian areas with the Torrifluvents developing along channels scoured by flooding and the Haplaquolls developing on low gradient channel sections where vegetation is well established and high water tables occur during most of the year.
• WY44: Ustic Haplargids and Ustic Torrifluvents, fine-loamy over sandy or sandy-skeletal, mixed, mesic. These soils occur on alluvium and slopes of Pleistocene and Holocene age over a variety of bedrocks. The Torrifluvents occur on the active floodplain; Haplargids occur on more stable landscape segments (Munn & Arneson 1998).
Zone 8 (Medicine Bow and Laramie Mountains/ Mountains)
• WY28: Typic Haplocryalfs and Typic Dystrocryepts, loamy-skeletal, mixed and Typic Haplocryolls, fine-loamy, mixed. Haplocryalfs occur under forest on till parent materials older than Pinedale (140,000 years old and older) and on nonglaciated landforms where the slope gradient is less than approximately 10%. Dystrocryepts occur under forest on till of Pinedale age and on slopes (>10%) that were unstable during the Pinedale glaciation. Haplocryolls occur under grasses and shrubs on west and south aspects and in dry parks on Tertiary age parent materials.
• WY29: Histic Cryaquepts and Typic Cryaquolls, fine-loamy over sandy or sandy-skeletal, mixed. These are poorly drained soils along riparian areas. Only A horizon thickness is different between the two soils (thicker in the Mollisols). Depth to water table in the profile varies from 0 to 50 cm over the course of the summer.
• WY30: Typic Dystrocryepts and Lithic Cryorthents, loamy skeletal, mixed and Rock Outcrop. These soils are found at high elevation and on very resistant parent materials. They are on eroding slopes, or the youngest tills in the region (Neoglacial).
• WY31: Typic Dystrocryepts and Typic Cryorthents, loamy skeletal, mixed. This unit occurs on Triassic, Permian and Cretaceous sedimentary rock along the flanks of the mountain range. The soils are moderately deep or shallow.
• WY32: Typic Dystrocryepts, loamy-skeletal, mixed and Rock Outcrop. These soils occur on Precambrian granitic parent materials. The Inceptisols are mostly moderately deep with less than 12% clay in their thin B horizons (Bw). The rock outcrops take the form of rounded boulders and sheets of rock.

Soil Zone and Soil Descriptions Within Each Zone
• WY45: Typic Hapludalfs and Aridic Haplustepts, loamy-skeletal, mixed, frigid. These soils occur along the base of the mountain ranges in the region and support open stands of Ponderosa pine as well as other conifers. The Hapludalfs are on low relief slopes and nearly level surfaces. The Haplustepts are on slopes greater than 15% and on the narrow valley floors of canyons (Munn & Arneson 1998).
Zone 9 (Laramie and Wind River Basins/Intermountain basins)
• WY09: Ustic Haplargids and Ustic Haplocalcids, fine-loamy over sandy or sandy-skeletal, frigid and Ustic Torriorthents, fine-loamy and coarse-loamy, frigid. In this region, the soils in this unit have frigid temperature regimes. These soils occur on old alluvial terraces along major rivers. Soils younger than mid-Pleistocene age are an association of Haplargids and Haplocalcids. On older landscapes, Haplocalcids predominate. Torriorthents occur along south facing terrace scarps; textural family is determined by underlying bedrock.
• WY10: Typic Torripsamments, frigid. These soils on stabilized dunes show little profile development, but are quite productive under native rangeland.
• WY33: Lithic Torriorthents, loamy-skeletal, frigid and Rock Outcrop. These soils occur along both sides of bedrock outcrops that form ridges along the flanks of the basins. The rock outcrop is usually sandstone or limestone.
• WY34: Ustic Haplargids and Ustic Natrargids, fine-loamy, frigid. These soils occur as an association on residual landscapes and in local colluvium derived from Tertiary age parent materials. Natrargids show less productivity under sagebrush and grass than Haplargids.
• WY35: Typic Natrargids and Typic Torriorthents, fine, frigid. These soils occur on landscapes underlain by Triassic and Cretaceous bedrock (shales). The Torriorthents occur in a badlands type topography, while the Natrargids occur on small, local alluvial fans at the foot of badland scarps, and on low gradient slopes.
• WY36: Ustic Torriorthents and Ustic Haplocalcids, coarse-loamy, frigid. These soils occur on calcareous sandstone of Permian age (redbeds). Haplocalcids occur on low gradient slopes; Torriorthents on slopes greater than 10%.
• WY37: Typic Petrocalcids and Ustic Calciargids, fine-loamy over sandy or sandy-skeletal, frigid. These soils occur on the highest terraces along major streams where the surfaces are mid Pleistocene age or older. On some surfaces, the petrocalcic horizon of the Palecalcids is nearly continuous; on other surfaces, Palecalcids and Haplocalcids occur as a complex.
• WY38: Ustic Haplocambids and Ustic Haplargids, coarse-loamy, frigid. These soils occur as a complex on late Pleistocene age terraces along major streams, and on slopes of less than 15% gradient of the same age.
• WY44: Ustic Haplargids and Typic Torrifluvents, fine-loamy over sandy or sandy-

Table 3.13-1. Statewide Soil Zones and the Soil Descriptions Occurring Within them in the RMPPA.

Soil Zone and Soil Descriptions Within Each Zone
•
• skeletal, mixed, mesic. These soils occur below 5,000 feet in elevation in a relatively small area in the Wind River Basin. The Haplargids occur on alluvial terraces; the Torriorthents occur along the scarp slopes (Munn & Arneson 1998).
Zone 10 (Green River Basin/Intermountain basin)
• WY06: Typic Haplocryalfs, Typic Dystrocryepts and Typic Haplocryolls, loamy-skeletal, mixed and Histic Cryaquepts, fine-loamy over sandy or sandy-skeletal, mixed. These soils are similar to those in the same unit in Soil Zone 3. They are confined to the highest elevations of this region.
• WY10: Typic Torripsamments, frigid. These soils are very similar to Torripsamments in other areas of the state, except that they are intermingled with active dunes.
• WY11: Typic Haplosalids, fine, frigid. These Haplosalids occur in saline playas and are similar to those of this unit in Zone 4, except that they are frigid.
• WY17: Rock Outcrop and Typic Torriorthents, loamy-skeletal, mixed, frigid. These soils are similar to those in Soil Zone 5 except that the coarse fraction of the soil consists of clasts of the local bedrock, rather than clinker.
• WY39: Ustic Haplargids, Ustic Haplocambids and Ustic Natrargids, fine-loamy, mixed, frigid. On Tertiary parent materials along the flank of the Wyoming Range uplift, the soils are found in an association reflecting slope position and parent material sodium content. The Haplargids occur on stable, low gradient slopes. Haplocambids are on steeper slopes and Natrargids occur on fans where erosional processes have accumulated high sodium materials.
• WY40: Ustic Haplocambids and Ustic Torriorthents, coarse-loamy, mixed and Typic Torrifluvents, loamy-skeletal, mixed, frigid. This landscape has shallow and moderately deep Haplocambids and Torriorthents occurring on slopes along ephemeral channels and Torrifluvents along gully bottoms.
• WY41: Aridic Haplustolls and Ustic Haplocambids, fine-loamy, frigid. These soils are on Tertiary age parent materials along the edges of the basins under sagebrush-grasslands. The Haplustolls are on sites with extra moisture which promotes greater productivity (Munn & Arneson 1998).

Table 3.15-1. RMPPA Vegetation Zones Mapped from Plant Community Classes Developed from GAP Satellite Imagery, Including Zone Total Area and Description.

Vegetation Types and Map Zones	GAP Plant Community Classes	Area (Acres)	Description
Agriculture/Town		1,055,429	areas modified for crop growing, intensive agriculture, municipal and industrial uses
	human settlement type		
	irrigated crop type		
	dry-land crop type		
	forest dominated riparian		primarily hayfields with linear cottonwood stands
	mining operation type		
Barren Communities		255,251	unproductive lands—either exposed rock, badlands, or playas
	open water		large, deep lakes and reservoirs
	alpine exposed type		
	basin exposed rock/soil type		including badland shale interspersed with sand dunes
	unvegetated playa type		
Forest and Woodland Communities			
Broadleaf Communities		220,355	aspen dominated foothills and desert ridges
	aspen forest type		
Conifer Communities			
Juniper Woodland		78,999	juniper dominated foothills and desert mesas, especially on rocky escarpments
	juniper woodland type		
Other Conifer		1,198,762	forests dominated by pine, fir, and spruce; mid- to upper mountain elevations
	limber pine woodland and scrub type		shrub understory
	lodgepole pine intact type		
	ponderosa pine intact type		
	spruce-fir intact type*		
	subalpine meadow type*		
	douglas fir type*		
	logged conifer type*		
Grassland Communities		2,656,896	grass dominated prairie
	short grass prairie type		including desert grassland
	mixed grass prairie type		
Shrub Communities			
Greasewood		478,440	greasewood dominated desert
	greasewood fans and flats type		

Table 3.15-1. RMPPA Vegetation Zones Mapped from Plant Community Classes Developed from GAP Satellite Imagery, Including Zone Total Area and Description.

Vegetation Types and Map Zones	GAP Plant Community Classes	Area (Acres)	Description
Mountain Shrub		733,199	mountain mahogany or other shrub dominated foothills region
	bitterbrush shrub steppe		
	mesic upland shrub steppe		serviceberry, choke cherry
	xeric upland shrub steppe		mountain mahogany
Sagebrush**		4,194,383	communities frequently dominated by big sage in the desert to mountain foothills
	black sagebrush		Wyoming big sagebrush type
	mountain sagebrush		basin big sagebrush
	Wyoming sagebrush		mountain big sagebrush/grassland
			silver-sagebrush/grasslands
			alkali sagebrush
			birdsfoot sagebrush
			Wyoming three tip sagebrush
Saltbush		634,776	saltbush dominated plant communities of the saline desert
	desert shrub		hopsage and shadscale
	saltbush fans and flats type		
Sand		63,307	sand dune areas with plant communities of grasses and small shrubs
	active sand dune type		
	sand dune complex type		
Wetland and Riparian Areas		87,445	
	graminoid / forb dominated wetland type		
	graminoid / forb dominated riparian type		
	shrub		

*These coniferous types occur within the RMPPA but primarily on USDA Forest Service ground.

**The GAP plant community classes and the descriptions associated with the sagebrush zone are not associated. The species of sagebrush actually found cannot readily be partitioned among the GAP classes.

Table 3.15-2. Plant Species Typical of Wetlands and Wet Meadows in Wyoming.

Species	Scientific Name
Forbs	
Horsetail	*Equisetum spp.*
Iris	*Iris missouriensis*
Grasses	
Western wheatgrass	*Agropyron smithii*
Timothy	*Phleum pratense*
Thickspike wheatgrass	*Agropyron dasystachyum*
Smooth brome	*Bromus inermis*
Saltgrass	*Distichlis stricta*
Orchard grass	*Dactylis glomerata*
Meadow barley	*Hordeum brachyantherum*
Kentucky bluegrass	Poa pratensis
Foxtail barley	*Hordeum jubatum*
Basin wildrye	*Elymus cinereus*
Alkaligrass	*Puccinellia nuttalliana*
Alkali sacaton	*Sporobolus airoides*
Alkali cordgrass	*Spartina gracilis*
Shrubs	
Wood rose	*Rosa woodsii*
Silver sagebrush	*Artemisia cana*
Silver buffaloberry	*Shepherdia argentea*
Shrubby cinquefoil	*Potentilla fruticosa*
Saltcedar	*Tamarix chinensis*
Rubber rabbitbrush	*Chrysothamnus nauseosus*
Greasewood	*Sarcobatus vermiculatus*
Common snowberry	*Symphoricarpos albus*
Sedges	
Cattail	*Typha sp.*
Water sedge	*Carex aquatilis*
Beaked sedge	*Carex rostrata*
Nebraska sedge	*Carex nebrascensis*

Table 3.15-3. Threatened And Endangered Plants In The RMPPA.

Species Common Name	**Scientific Name**	**Habitat**
Ute Ladies'-Tresses	*Spiranthes diluvialis*	Seasonally moist soils and wet meadows Of drainages below 7,000'
Western Prairie Fringed Orchid	*Platanthera praeclara*	Riparian area – Platte River watershed
Colorado Butterfly Plant	*Gaura neomexicana* ssp. *Coloradensis*	

Table 3.15-4. BLM Sensitive Plant Species in RMPPA.

Sensitive Species Common Name	Scientific Name	Habitat
Laramie Columbine	*Aquilegia taramiensis*	Crevices of granite boulders & cliffs 6,400-8,000 ‘
Nelson’s Milkvetch	*Astragalus nelsonianus –or-Astragalus pectinatus var. platyphylius*	Alkaline clay flats, shale bluffs and gullies, pebbly slopes, in sparsely vegetated sagebrush, juniper & cushion plant communities, 5200 –7600
Cedar Rim Thistle	*Cirsium aridum*	Barren, chalky hills, gravelly slopes & fine textured sand-shaley draws, 6700-7200’
Weber’s Scarlet Gilia	*Ipomopsis aggregata ssp. Weberi*	Openings in coniferous forests & scrub oak woodlands 8,500-9,600’
Gibbens Bearstongue	*Penstomon gibbensii*	Sparsely vegetated shale or sandy-clay slopes 5,500-7,400’
Persistent Stepal Yellowcress	*Rorippa calycina*	Riverbanks & shorelines on sandy soils near high water line
Pale Blue-eyed Grass	*Sisyrinchium pallidum*	Wet meadows, stream banks, roadside ditches & irrigated meadows 7,000-7,900’
Laramie Fuse Sagebrush	*Sphaeromeria simplex*	Cushion plant communities on rocky limestone ridges & gentle slopes 7,500-8,600’

Table 3.16-1. Visual Resource Management Classifications and Acreages in the RMPPA.

Visual Resource Management Classifications and Acreage.	
Classification	**Acres**
I	33,165
II	160,640
III	3,582,195
IV	224,000
TOTAL	**4,000,000**

Source: (BLM 1988)

Table 3.17-1. Watersheds and Their Acreage Within the RMPPA.

Watersheds				
1st Order	2nd Order	3rd Order	4th Order	ACRES
Missouri	North Platte	North Platte	Glendo Reservoir	1,354,118
Missouri	North Platte	North Platte	Horse	1,070,448
Missouri	North Platte	North Platte	Little Medicine Bow	654,576
Missouri	North Platte	North Platte	Lower Laramie	1,528,285
Missouri	North Platte	North Platte	Medicine Bow	920,518
Missouri	North Platte	North Platte	Middle North Platte-Casper	2,210,280
Missouri	North Platte	North Platte	Pathfinder-Seminoe Reservoir:	637,713
Missouri	North Platte	North Platte	Pumpkin	641,775
Missouri	North Platte	North Platte	Sweetwater	1,845,320
Missouri	North Platte	North Platte	Upper Laramie	1,384,875
Missouri	North Platte	North Platte	Upper North Platte	1,849,524
Missouri	South Platte	South Platte	Cache La Poudre	1,207,681
Missouri	South Platte	South Platte	Crow	890,192
Missouri	South Platte	South Platte	Lone Tree-Owl	361,861
Missouri	South Platte	South Platte	Lower Lodgepole	853,707
Missouri	South Platte	South Platte	Sidney Draw	474,460
Missouri	South Platte	South Platte	Upper Lodgepole	726,583
Upper Colorado	Great Divide - Upper Green	Great Divide Closed Basin	Great Divide Closed Basin	2,473,410
Upper Colorado	Great Divide - Upper Green	Upper Green	Bitter	1,413,961
Upper Colorado	Great Divide - Upper Green	Upper Green	Vermilion	609,582
Upper Colorado	White-Yampa	White-Yampa	Little Snake	1,940,746
Upper Colorado	White-Yampa	White-Yampa	Muddy	649,962

Table 3.17-2. Discharge from Selected USGS Gaging Stations in the RMPPA.

Mean yearly and monthly discharge from selected USGS gaging stations throughout the Rawlins Field Office planning area.

Stream and Location	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Peak Flow	Drainage Area (miles$^{2)}$
	Stream Discharge in cubic feet^2														
North Platte River Above Seminoe Reservoir	1,145	318	350	555	1,417	3,163	4,378	1,412	502	314	415	429	352	14,500	4,175
North Platte River Above Northgate Canyon	436	84	89.4	177	753	1,139	1,472	637	265	149	162	153	104	6,740	1,431
Encampment River at the Platte River Confluence	247	62.3	63.1	70.9	149	771	1,184	283	67.9	55.9	79	78.9	69.7	4,510	265
Little Snake River at the Wyoming/Colorado Line	231	31.9	32.8	51.4	263	1,089	946	161	39.8	29.6	39.1	36.5	32.5	4,200	285
Laramie River at the Platte River Confluence	125	77.7	83.9	100	170	357	349	135	73.1	64.5	72.9	81.8	79.1	6,260	4,564
Medicine Bow River at the Platte River Confluence	184	32.5	49.4	143	328	570	670	179	54.2	29.2	43.4	51.3	38.7	6,010	1,942

Table 3.18-1. Wild Horse Management Areas (HMAs), Appropriate Management Levels (AMLs), and Estimated Populations in the RMPPA.

Area	Public Acres	Other Acres	AML	Estimated Population			
				1999*	2000	2001	2002
Adobe Town	441,000	29,000	700	900	1500	1740	2000
Stewart Creek	155,000	11,000	150	350	452		
Lost Creek	235,000	15,000	70	300	380		
I 80 South	359,000	195,000	0	20	133	179	200
I 80 North	333,000	356,000	0	210	111		
Bairoil	6,000	1,000	0				
TOTAL	1,529,000	607,000	920	1790	2,576		

*1971 populations of existing HMAs was 635; 1971 overall populations in the RMPPA, estimated as closely as possible given administrative boundary changes, were 1,235.

Source: BLM 2001

Table 3.18-2. The Association of RMPPA Wild Horse Herds with Regional Metapopulations.

HMA		METAPOPULATION		HMA(S) IN THE METAPOPULATION	TYPE OF INTERACTION	POINTS OF CONTACT
NAME	AML	NAME	AML			
ADOBE TOWN	700	Stateline	1250	Adobe Town Salt Wells Sand Wash (Co)	Male migration, female exchange	Haystacks, Alkali, Sand Creek, Powder Wash
STEWART CREEK	150	Red Desert	950	Stewart Cr Green Mt Crooks Mt Lost Creek Antelope Hills Divide Basin	Male migration, female exchange	Hay Reservoir, Bare ring, Hadsell, Osborne Draw
LOST CREEK	70	Red Desert	950	Stewart Cr Green Mt Crooks Mt Lost Creek Antelope Hills Divide Basin	Male migration, female exchange	Hay Reservoir Bare ring, Hadsell, Osborne Draw

Source: BLM 1999.

Table 3.18-3. Grazing Within the Wild Horse Management Areas (HMAs) of the RMPPA.

HMA	Number of Operators	Number of Allotments	Active Preference (AUMs available)	Types of Grazing	Grazing Seasons
Adobe Town	15	15	29,781 aums	Sheep, cattle	W, Sp, S, F
Stewart Creek	3	2	9,763 aums	Cattle	S, W
Lost Creek	5	1	28,230 aums	Sheep, cattle	W, S

Source: BLM 1999.

Table 3.18-4. Age and Sex Distribution of Wild Horses in the I 80 South Area of the RMPPA in 1999—an Example.

Age	Number of Females	Number of Males	Total Number of Individuals	Percent for Age
0	80	84	164	24.5%
1	42	54	96	14.3%
2	44	56	100	14.9%
3	27	14	41	6.1%
4	29	15	44	6.6%
5	5	7	12	1.8%
6	21	6	27	4.0%
7	15	13	28	4.2%
8	15	16	31	4.6%
9	3	15	18	2.7%
10	10	11	21	3.1%
11	4	20	24	3.6%
12	14	12	26	3.9%
13	3	6	9	1.3%
14	3	4	7	1.0%
15	6	4	10	1.5%
16	1	2	3	0.4%
17		1	1	0.1%
18		2	2	0.3%
19				
20	1	5	6	0.9%
21-30	0	0	0	0

Source: BLM 2001

Table 3.18-5. Status of Riparian Areas Surveyed in HMAs of the RMPPA.

A. Current status of lotic riparian PFC inventory on public land in the Wild Horse and Burro Management areas. 'Negligible' indicates that small isolated areas probably exist on streams in remote areas.

Herd Management Area	**Proper Functioning Condition Rating**				
	Proper Functioning (mi)	**Functioning at Risk Trend Upward (mi)**	**Functioning at Risk Trend not Apparent (mi)**	**Functioning at Risk, Trend Downward (mi)**	**Not Functioning (mi)**
Adobe Town	0.0	0.125	1.125	0.0	0.0
Stewart Creek	7.0	0.0	1.125	0.125	0.0
Lost Creek	0.0	0.0	0.0	Negligible	Negligible

B. Current status of lentic riparian PFC inventory on public land in the Wild Horse and Burro Management areas.

Herd Management Area	**Proper Functioning Condition Rating**				
	Proper Functioning (ac)	**Functioning at Risk Trend Upward (ac)**	**Functioning at Risk Trend not Apparent (ac)**	**Functioning at Risk, Trend Downward (ac)**	**Not Functioning (ac)**
Adobe Town	1.5	5.0	5.0	7.5	2.5
Stewart Creek	0.0	0.0	5.0	5.0	0.0
Lost Creek	0.0	0.0	0.0	5.0	5.0

C. Privately-Owned And Controlled Lands.

HMA	**PRIVATELY CONTROLLED**	**PERCENT OF HMA**
Adobe Town	29,000	6.1%
Stewart Creek	11,000	6.6%
Lost Creek	15,000	6.0%

Source: BLM 1999.

Table 3.19-1. Acreage for Pronghorn Herd Units and Hunt Areas in the RMPPA.

MAJOR HMAs IN RMPPA	HERD UNIT	HUNT AREA	ACRES	TOTAL ACRES IN HMA	PERCENTAGE of TOTAL ACRES IN HMA
Bitter Creek	413	57	1137746.93		
	413	58	699833.71	1837580.64	11.1%
Baggs	438	53	643451.52		
	438	55	245632.32	889083.84	5.4%
Chalk Bluffs	520	111	282823.47	282823.47	1.7%
	521	35	505930.91		
	521	36	536199.74	1324954.12	8.0%
Iron Mountain	523	104	311202.80		
	523	38	304931.39		
	523	39	668441.50		
	523	40	223514.81	1508090.5	9.1%
	524	103	721941.06	721941.06	4.4%
Medicine Bow	525	41	279407.13		
	525	42	431422.83		
	525	46	246394.46		
	525	47	708931.74		
	525	48	583374.13	2249530.29	13.6%
Cooper Lake	526	43	291878.30	291878.3	1.8%
Centennial	527	37	218174.00		
	527	44	275772.52		
	527	45	420115.78	914062.3	5.5%
Elk Mountain	528	50	756518.31	756518.31	4.6%
Big Creek	529	51	203409.05	203409.05	1.2%
Red Desert	615	60	1030972.17		
	615	61	803292.60		
	615	64	333549.11	2167813.88	13.1%
Iron Springs	630	108	118166.80		
	630	52	395588.30		
	630	56	172718.39	1020022.6	6.2%
	633	68	519175.04	519175.04	3.1%
North Ferris	636	63	330188.28	330188.28	2.0%
South Ferris	637	62	467573.96	467573.96	2.8%
	742	30	671860.76	671860.76	4.1%
	744	32	418046.37	418046.37	2.5%
				16574552.77	100.0%

T3.19-1_Wild_PHhmaarea.xls

Table 3.19-2. Pronghorn Harvest in the Primary Herd Management Areas of the RMPPA.

Herd Unit Name-Herd Unit #-Hunt Area #	1991 Buck	1991 Doe	1991 Fawn	1991 Hunter Success	1992 Buck	1992 Doe	1992 Fawn	1992 Hunter Success	1993 Buck	1993 Doe	1993 Fawn	1993 Hunter Success
Bitter Creek-413-57&58	601	672	59	125.7	1506	2446	170	152.2	871	1641	195	138.1
Baggs-438-53&55	703	843	40	129.8	1027	1382	124	153.7	916	1303	118	130.5
Chalk Bluffs-520-111	128	76	14	109.0	116	59	3	94.7	127	75	13	89.6
Iron Mountain-523-38&39&40&104	570	362	51	115.9	719	765	69	124.6	660	694	105	116.4
Medicine Bow-525-41&42&46&47&48	3152	2845	568	144.7	3947	4696	702	168.5	2537	3012	394	139.9
Cooper Lake-526-43	372	273	87	129.8	326	377	56	150.0	144	173	40	115.5
Centennial-527-37&44&45	572	799	96	137.5	769	1523	229	158.7	675	760	133	132.9
Elk Mountain-528-50	512	330	39	124.8	527	451	64	142.2	527	507	66	135.1
Big Creek-529-51	41	55	6	92.7	37	43	2	100.0	34	47	9	89.1
Red Desert-615-60&61&64	1029	819	70	117.6	1193	1216	90	121.1	621	442	59	111.5
Iron Springs-630-108&52&56	599	364	82	114.2	893	786	106	139.8	713	423	71	119.7
North Ferris-636-63	282	72	12	108.0	284	69	6	111.1	182	2	0	95.3
South Ferris-637-62	262	8	1	96.8	420	276	55	131.3	356	82	12	103.0
Total	8823	7518	1125	119.0	11764	14089	1676	134.5	8363	9161	1215	116.7
Grand Total			17466				27529				18739	

Herd Unit Name-Herd Unit #-Hunt Area #	1994 Buck	1994 Doe	1994 Fawn	1994 Hunter Success	1995 Buck	1995 Doe	1995 Fawn	1995 Hunter Success	1996 Buck	1996 Doe	1996 Fawn	1996 Hunter Success	1997 Buck	1997 Doe	1997 Fawn	1997 Hunter Success
Bitter Creek-413-57&58	438	0	0	89.6	425	5	0	89.8	516	33	0	92.2	510	38	0	97.9
Baggs-438-53&55	301	145	24	95.7	326	0	0	86.0	170	18	0	95.4	128	40	7	105.4
Chalk Bluffs-520-111	138	80	7	96.2	115	56	6	83.1	80	84	16	97.8	118	101	7	108.1
Iron Mountain-523-38&39&40&104	625	471	59	102.7	451	322	52	93.3	492	373	33	104.4	705	518	49	107.0
Medicine Bow-525-41&42&46&47&48	1599	1371	224	109.6	889	546	77	90.9	705	133	3	96.7	886	273	19	104.5
Cooper Lake-526-43	144	125	36	109.3	117	28	10	93.4	106	53	10	93.1	130	81	12	106.2
Centennial-527-37&44&45	417	579	100	115.0	317	372	71	106.3	284	236	51	123.1	267	338	15	108.8
Elk Mountain-528-50	458	470	62	116.6	362	288	54	99.6	352	47	16	86.2	366	44	7	84.2
Big Creek-529-51	47	57	11		39	101	9	125.2	40	71	11	127.9	50	79	19	110.4
Red Desert-615-60&61&64	527	463	63	110.3	377	240	21	89.1	390	41	0	91.3	378	10	0	91.1
Iron Springs-630-108&52&56	628	414	93	115.5	602	366	71	106.5	487	168	49	102.9	422	87	30	105.3
North Ferris-636-63	167	4	0	92.4	174	7	0	93.3	164	0	0	82.0	170	3	0	87.8
South Ferris-637-62	259	73	4	104.0	175	1	0	176.0	166	6	0	88.7	175	5	0	87.8
Total	5748	4252	683	96.7	4369	2332	371	102.5	3952	1263	189	98.6	4305	1617	165	100.3
Grand Total			10683				7072				5404				6087	

Herd Unit Name-Herd Unit #-Hunt Area #	1998 Buck	1998 Doe	1998 Fawn	1998 Hunter Success	1999 Buck	1999 Doe	1999 Fawn	1999 Hunter Success	2000 Buck	2000 Doe	2000 Fawn	2000 Hunter Success
Bitter Creek-413-57&58	525	21	0	86.8	561	32	3	93.3	500	14	0	84.0
Baggs-438-53&55	132	41	2	85.8	211	19	2	94.7	273	75	0	89.0
Chalk Bluffs-520-111	113	61	6	115.4	112	43	22	100.6	104	80	13	87.6
Iron Mountain-523-38&39&40&104	805	349	86	106.8	909	551	76	97.3	888	455	84	84.9
Medicine Bow-525-41&42&46&47&48	899	217	27	91.4	1139	279	40	94.4	1321	432	46	94.3
Cooper Lake-526-43	134	110	12	99.2	188	138	34	100.0	251	140	27	93.1
Centennial-527-37&44&45	401	321	36	123.1	509	397	46	103.4	645	367	44	97.7
Elk Mountain-528-50	369	75	5	80.9	309	120	16	79.3	330	118	14	79.7
Big Creek-529-51	47	49	4	78.7	49	66	0	92.7	58	56	3	83.6
Red Desert-615-60&61&64	377	13	0	86.9	377	5	0	88.8	415	183	14	95.0
Iron Springs-630-108&52&56	416	56	22	90.8	407	79	12	90.4	406	76	9	90.6
North Ferris-636-63	248	4	0	99.6	171	2	0	93.0	156	0	3	87.8
South Ferris-637-62	231	5	0	92.9	217	5	0	91.9	203	54	3	92.5
Total	4697	1322	200	95.3	5159	1736	251	93.8	5550	2050	260	89.2
Grand Total			6219				7146				7860	

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Table 3.19-3. Mule Deer Harvest in the Primary Herd Management Areas of the RMPPA.

Herd Unit Name-Herd Unit #-Hunt Area #	1991			Hunter	1992			Hunter	1993			Hunter
	Buck	Doe	Fawn	Success	Buck	Doe	Fawn	Success	Buck	Doe	Fawn	Success
Baggs-427-100&85&84&82	1971	1012	95	70.5	1863	924	103	68.7	1125	1063	153	50.0
Laramie Peak-537-64&73	1089	214	14	60.6	837	579	60	67.5	697	396	24	59.1
Iron Mountain-538-59&60&61&62&63	802	429	30	73.4	900	462	14	77.6	647	362	19	72.6
Sheep Mountain-539-74&75&76&77	819	16	0	32.6	758	498	45	45.2	569	414	40	34.1
Shirley Mountain-540-70	589	204	13	70.1	669	508	54	73.9	509	454	46	61.0
Platte Valley-541-161&78&79&80&81&83	1526	532	69	50.3	1513	819	33	54.0	1036	654	25	36.1
Ferris-647-86&87	329	16	1	52.2	180	140	3	93.9	88	65	4	75.1
Chain Lakes-650-98	47	2	7	43.4	35	9	0	28.2	10	48	0	34.5
	7172	2425	229	56.6	6755	3939	312	63.6	4681	3456	311	52.8
			9826				11006				8448	

Herd Unit Name-Herd Unit #-Hunt Area #	1994			Hunter	1995			Hunter	1996			Hunter	1997			Hunter
	Buck	Doe	Fawn	Success	Buck	Doe	Fawn	Success	Buck	Doe	Fawn	Success	Buck	Doe	Fawn	Success
Baggs-427-100&85&84&82	677	0	0	28.5	981	0	0	38.1					1217	32	0	40.2
Laramie Peak-537-64&73	693	0	0	38.6	542	0	0	40.7					419	0	0	40.2
Iron Mountain-538-59&60&61&62&63	495	194	0	50.9	421	38	5	51.4					306	18	3	46.5
Sheep Mountain-539-74&75&76&77	450	7	0	18.1	374	0	0	18.4					292	0	0	15.2
Shirley Mountain-540-70	295	0	0	30.0	206	0	0	26.8					158	0	0	31.9
Platte Valley-541-161&78&79&80&81&83	818	0	0	24.3	575	0	0	20.9					508	0	0	18.6
Ferris-647-86&87					80	0	0	47.3					126	0	0	64.0
Chain Lakes-650-98					13	0	0	15.1					22	0	0	13.0
	3428	201	0	31.7	3192	38	5	32.3	0	0	0	0.0	3048	50	3	33.7
			3629				3235				0				3101	

Herd Unit Name-Herd Unit #-Hunt Area #	1998			Hunter	1999			Hunter	2000			Hunter
	Buck	Doe	Fawn	Success	Buck	Doe	Fawn	Success	Buck	Doe	Fawn	Success
Baggs-427-100&85&84&82	1282	314	12	48.9	1868	492	70	55.6	2033	255	33	59.8
Laramie Peak-537-64&73	385	0	0	46.2	846	0	0	54.3	665	5	2	48.8
Iron Mountain-538-59&60&61&62&63	505	18	0	71.4	540	12	0	71.6	505	13	0	71.5
Sheep Mountain-539-74&75&76&77	327	0	0	20.2	477	0	0	26.8	594	11	11	30.8
Shirley Mountain-540-70	187	0	0	34.4	346	0	0	48.0	300	0	0	44.3
Platte Valley-541-161&78&79&80&81&83	700	0	0	28.4	1180	0	0	35.3	1866	0	0	47.5
Ferris-647-86&87	110	0	0	52.4	183	0	0	64.7	202	0	0	70.1
Chain Lakes-650-98	17	0	0	20.2	26	0	0	21.3	41	0	0	34.2
	3513	332	12	40.3	5466	504	70	47.2	6206	284	46	
			3857				6040				6536	

Table 3.19-4. Elk Harvest in the Primary Herd Management Areas of the RMPPA.

Herd Unit Name-Herd Unit #-Hunt Area #	1991				Hunter	1992				Hunter
	Bull	Spike	Cow	Calf	Success	Bull	Spike	Cow	Calf	Success
Sierra Madre-425-13&14&15&21&108&124&100&5&6	359	13	529	77	27.6	675	308	633	112	43.0
Iron Mountain-531-5&6	56	12	73	12	50.2	71	13	71	8	51.7
Snowy Range-533-114&110&11&10&9&12&8&125	484	279	459	87	24.3	454	277	604	103	25.4
Shirley Mountain-534-16&17&18	53	18	79	17	55.3	61	28	85	15	44.6
Ferris-639-22&111	22	8	47	6	48.3	29	1	41	8	42.9
Shamrock-643-118	0	0	0	0	0.0	9	0	9	3	75.0
Laramie Pk/Muddy Gap-741-19&7&20	208	68	172	57	50.7	330	81	234	30	57.3
Total	1182	398	1359	256	32.1	1629	708	1677	279	42.5
Grand Total				3195					4293	

Herd Unit Name-Herd Unit #-Hunt Area #	1994				Hunter	1995				Hunter
	Bull	Spike	Cow	Calf	Success	Bull	Spike	Cow	Calf	Success
Sierra Madre-425-13&14&15&21&108&124&100&5&6	761	463	535	126	37.8	482	335	494	90	31.0
Iron Mountain-531-5&6	83	18	97	19	44.7	74	23	103	8	41.2
Snowy Range-533-114&110&11&10&9&12&8&125	474	199	442	113	18.8	422	206	433	118	21.2
Shirley Mountain-534-16&17&18	56	21	54	7	34.6	52	9	76	14	43.8
Ferris-639-22&111	35	10	63	12	48.2	32	1	49	6	34.8
Shamrock-643-118	7	1	6	1	83.3	5	2	6	1	77.8
Laramie Pk/Muddy Gap-741-19&7&20	235	73	330	68	44.3	314	50	252	50	41.3
Total	1651	785	1527	346	39.0	1381	626	1413	287	36.4
Grand Total				4309					3707	

Herd Unit Name-Herd Unit #-Hunt Area #	1998				Hunter	1999				Hunter
	Bull	Spike	Cow	Calf	Success	Bull	Spike	Cow	Calf	Success
Sierra Madre-425-13&14&15&21&108&124&100&5&6	546	271	708	64	39.5	662	392	800	212	37.2
Iron Mountain-531-5&6	91	14	74	6	37.2	87	10	90	18	38.3
Snowy Range-533-114&110&11&10&9&12&8&125	540	158	562	111	25.8	547	203	592	192	23.4
Shirley Mountain-534-16&17&18	59	12	60	13	42.6	63	22	107	23	62.9
Ferris-639-22&111	54	6	72	12	60.8	58	6	72	11	58.1
Shamrock-643-118	21	0	10	15	58.2	20	2	34	3	57.8
Laramie Pk/Muddy Gap-741-19&7&20	342	98	511	121	46.7	385	68	451	78	45.3
Total	1653	559	1997	342	38.9	1822	703	2146	537	40.4
Grand Total				4551					5208	

Table 3.19-4. Elk Harvest in the Primary Herd Management Areas of the RMPPA.

Herd Unit Name-Herd Unit #-Hunt Area #	1993				Hunter					
	Bull	Spike	Cow	Calf	Success					
Sierra Madre-425-13&14&15&21&108&124&100&5&6	538	254	583	102	36.7					
Iron Mountain-531-5&6	61	3	93	27	40.7					
Snowy Range-533-114&110&11&10&9&12&8&125	611	249	901	210	28.8					
Shirley Mountain-534-16&17&18	48	23	79	14	38.4					
Ferris-639-22&111	42	7	64	11	58.5					
Shamrock-643-118	7	1	11	1	80.0					
Laramie Pk/Muddy Gap-741-19&7&20	249	105	266	73	50.7					
Total	1556	642	1997	438	41.7					
Grand Total				4633						
Herd Unit Name-Herd Unit #-Hunt Area #	1996				Hunter	1997				Hunter
	Bull	Spike	Cow	Calf	Success	Bull	Spike	Cow	Calf	Success
Sierra Madre-425-13&14&15&21&108&124&100&5&6	447	7	601	100	30.9					
Iron Mountain-531-5&6	97	13	95	28	45.0					
Snowy Range-533-114&110&11&10&9&12&8&125	363	111	779	126	25.0					
Shirley Mountain-534-16&17&18	63	11	108	8	54.9					
Ferris-639-22&111	46	8	74	10	63.3					
Shamrock-643-118	8	0	14	2	75.0					
Laramie Pk/Muddy Gap-741-19&7&20	328	35	508	65	49.6					
Total	1352	185	2179	339	43.0	0	0	0	0	
Grand Total				4055					0	
Herd Unit Name-Herd Unit #-Hunt Area #	2000				Hunter					
	Bull	Spike	Cow	Calf	Success					
Sierra Madre-425-13&14&15&21&108&124&100&5&6	630	313	936	158	42.8					
Iron Mountain-531-5&6	108	7	113	28	45.8					
Snowy Range-533-114&110&11&10&9&12&8&125	467	117	658	153	24.6					
Shirley Mountain-534-16&17&18	55	11	48	15	38.4					
Ferris-639-22&111	72	1	93	13	69.1					
Shamrock-643-118	12	3	32	8	50.0					
Laramie Pk/Muddy Gap-741-19&7&20	394	112	486	124	50.8					
Total	1738	564	2366	499	40.2					
Grand Total				5167						

Table 3.19-5. Documented Presence of Upland Game Birds, Small Game Mammals, and Furbearers in Management Areas of the RMPPA

	Upland Game Birds									Small Game Mammals		
	Pheasant	Chukar	Gray Partridge	Blue Grouse	Ruffed Grouse	Sage Grouse	Sharp-tailed Grouse	Mourning Dove	Wild Turkey	Cottontail	Snowshoe Hare	Squirrel
Wyoming 2000 Total Harvest	45,946	10,016	16,154	14,864	6,710	20,685	11,676	34,250	3,398	44,207	409	1,388
Management Area												
9 Red Desert						X				X		
10 Bitter Creek						X		X		X		
22 Shirley Mountains			X	X		X				X	X	
24 Snowy Range				X		X				X	X	X
25 Sierra Madre			X	X		X	X	X		X	X	X
(27) Laramie Peak	X	X	X	X		X	X	X	X	X		X
28 Iron Mountain		X		X		X	X	X		X		X
(30) Southeast	X	X	X				X	X		X		X
45 Ferris				X		X		X		X		
Laramie County									X			

	Furbearers										
	Badger	Bobcat	Marten	Weasel	Coyote	Raccoon	Red Fox	Skunk	Beaver	Mink	Muskrat
Wyoming 2000 Total Harvest	1,295	1,239	503	19	8,183	1,218	3,568	47	3,339	128	3,400
Management Area											
9 Red Desert					X						
10 Bitter Creek		X			X						
22 Shirley Mountains											
24 Snowy Range	X				X	X	X	X	X		X
25 Sierra Madre	X		X	X	X	X	X	X	X		X
(27) Laramie Peak	X	X			X	X	X	X	X	X	X
28 Iron Mountain	X	X		X	X	X	X		X		X
(30) Southeast	X	X			X	X	X	X	X	X	X
45 Ferris											
Laramie County											

Documented presence based only on successful hunting or trapping during the 2000 season.
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Table 3.19-6. Characterization of Raptor Nests in the RMPPA.

Species Code	Species	# Nests	Percent of Nests	Height of Substrate	Height of Nest	Primary Nest Substrates*	Number of Nests Considered for Substrate Evaluation
AFH	artificial ferruginous hawk	104	2.6%	8-40	8-40	ANS (38.8%); MMS (56.3%)	103
AGE	artificial golden eagle	13	0.3%	8-28	8-28	MMS (94.1%)	17
BO	burrowing owl	44	1.1%	0	0	ABB (64.3%); GHS (33.3%)	42
CH	Cooper's hawk	112	2.8%	12-65	6-35	ASP (90.1%)	111
FH	ferruginous hawk	1800	45.3%	0-340	0-200	CLF (13.0%); GHS (16.1%); ROK (41.3%); ROP (10.1%)	1687
GE	golden eagle	734	18.5%	0-440	0-300	CLF (66.9%); ROK (12.9%)	652
GH	great horned owl	86	2.2%	12-200	8-150	CLF (28.9%); CTL (23.7%)	76
GS	goshawk	18	0.5%	20-60	2-50	ASP (52.9%); LPP (41.2%)	17
HL	bald eagle	12	0.3%	35-60	2-50	CTL (80.0%)	5
KE	American kestrel	91	2.3%	0-800	8-65	CLF (31.0%); ROK (27.4%)	84
LE	long-eared owl	12	0.3%	15-50	8-40	ASP (72.7%)	11
NH	northern harrier	27	0.7%	0-10	0-9	GHS (72.0%)	25
PF	prairie falcon	260	6.5%	10-300	10-60	CLF (69.4%); ROK (19.8%)	222
RT	red-tailed hawk	414	10.4%	7-450	6-420	ASP (25%); CLF (26.6%); CTL (21.1%)	380
SE	short-eared owl	2	0.1%	12	9	WIL (100%)	1
SH	Swainson's hawk	95	2.4%	6-100	6-75	ASP (30.0%); CTL (36.3%)	80
SO	screech owl	1	0.0%			LIM (100%)	1
SP	osprey	3	0.1%	60-70	60-70	BLS (33.3%); CTD (33.3%); LPP (33.3%)	3
SS	sharp-shinned hawk	1	0.0%	35	12	ASP (100%)	1
UB	unknown buteo	57	1.4%				
UO	unknown owl	1	0.0%				
UR	unknown raptor	85	2.1%				
	TOTALS	3972	100.0%				3518

* ABB=Abandoned Burrow
ANS=Artificial Nesting Structure
ASP=Aspen Tree
BLS=Blue Spruce
CLF=Cliff
CTL=Cottonwood (live)
CTD=Cottonwood (dead)
GHS=Ground/Hillside
LIM=Limber Pine
LPP=Lodgepole Pine
MMS=Manmade Structure
ROK=Rock Outcrop
ROP=Rock Pillar
WIL=Willow

Source: Apple 2002a
T3.19-6_Wild_raptornests.xls

Table 3.19-7. Federally Threatened and Endangered Wildlife Species in the Rawlins RMP Planning Area.

Species	**Scientific Name**	**Habitat**
Mammals		
Black-footed ferret	*Mustela nigripes*	Prairie dog communities
Canada lynx	*Lynx canadensis*	Forest areas
Preble's meadow jumping mouse	*Zapus hudsonius preblei*	Riparian habitats east of Laramie Mountains and south of Douglas
Raptors		
Bald eagle	*Haliaeetus leucocephalus*	Nesting and winter migrant and Platte River drainage
Birds		
Whooping crane	*Grus Americana*	Resident/migrant and Platte River drainage
Mountain plover	*Charadrius montanus*	Grasslands statewide
Yellow-billed cuckoo	*Coccyzus americanus*	Riparian areas west of Continental Divide
Piping plover	*Charadrius melodus*	Platte River drainage
Eskimo curlew	*Numenius borealis*	Platte River drainage

Table 3.19-8. State of Wyoming Sensitive Mammal and Bird Species.

Common Name	**Scientific Name**
Mammals	
Dwarf shrew	Sorex nanus
Long-eared myotis	*Myotis evotis*
Fringed myotis	*Myotis thysanodes*
Spotted bat	*Euderma maculatum*
Townsend's big-eared bat	*Corynarhinus townsendii*
White-tailed prairie dog	*Cynomys leucurus*
Wyoming pocket gopher	*Thomomya chisius*
Swift fox	*Vulpes velox*
Birds	
White-faced ibis	*Plegadis chihi*
Trumpeter swan	*Cygnus buccinator*
Northern goshawk	*Accipeter gentiles*
Peregine falcon	*Falco peragrinus*
Greater sage grouse	*Centrocercus urophasianus*
Columbia sharptailed grouse	*Tymanuchus phasianellus columbianus*
Longbilled curlew	*Numanius americanus*
Burrowing owl	*Athene cunicularia*
Sage thrasher	*Oreoscopies montanus*
Loggerhead shrike	Lanius ludovicanus
Brewer's sparrow	*Spizella breweri*
Sage sparrow	*Amphispetta billineosa*
Baird's sparrow	*Ammodramus bairdii*

Table 3.19-9. Fish species present in the RMPPA.

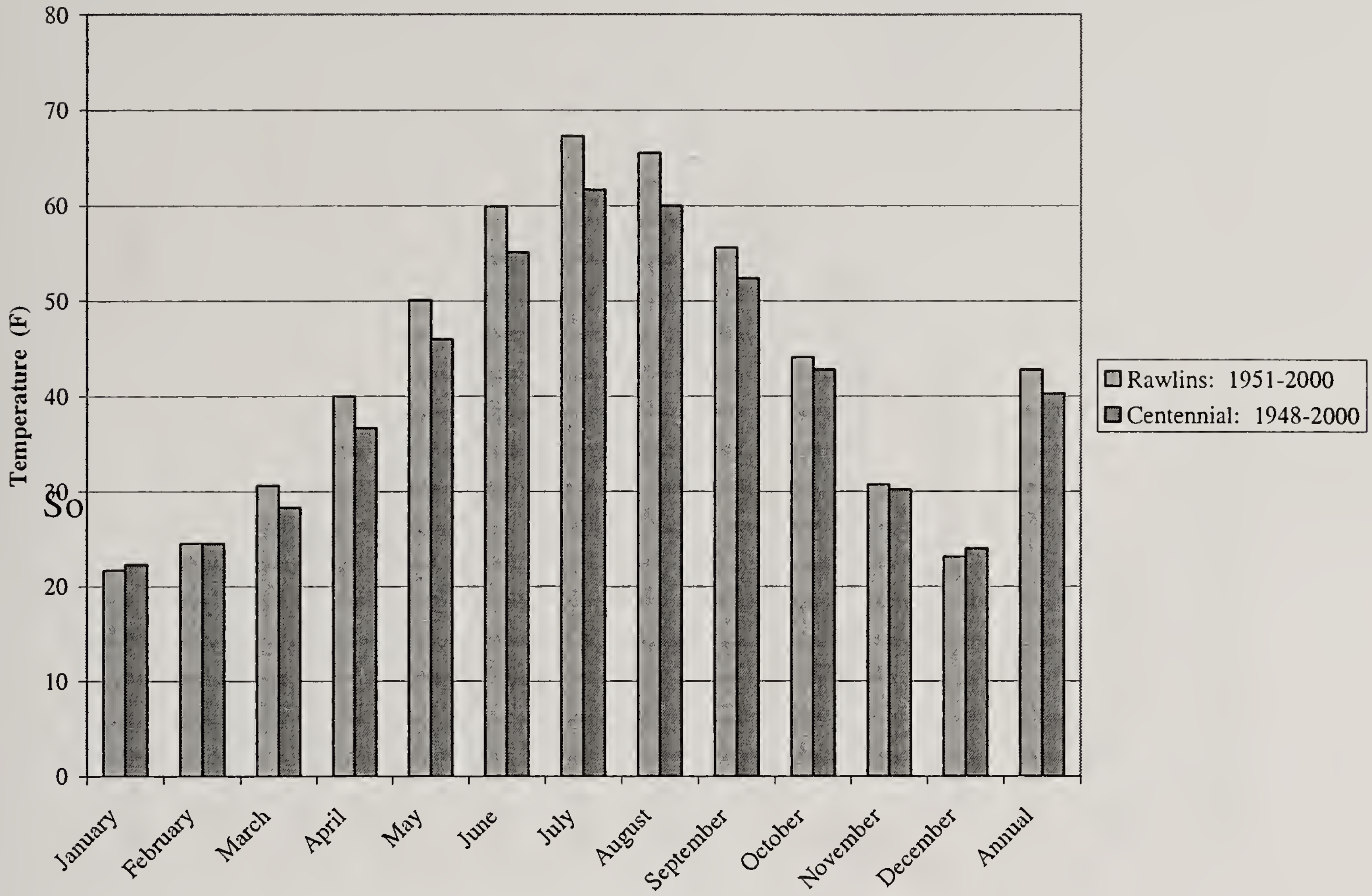
Species	Scientific Name	Native vs Non native
Catastomidae		
Utah sucker	*Catostomus ardens*	Native
White sucker	*Catostomus commersoni*	Non native
Bluehead sucker	*Catostomus discobolus*	Native
Flannelmouth sucker	*Catostomus latipinnis*	Native
Mountain sucker	*Catostomus platyrhynchus*	Native
Centrarchidae		
Smallmouth bass	*Micropterus salmoides*	Non native
Cottidae		
Mottled sculpin	*Cottus bairdi*	Native
Paiute sculpin	*Cottus beldingi*	Native
Cyprinidae		
Lake chub	*Couesius plumeus*	Non native
Common carp	*Cyprinus carpio*	Non native
Utah chub	*Gila atraria*	Native
Leatherside chub	*Gila copei*	Native
Roundtail chub	*Gila robusta*	Native
Sand shiner	*Notropis stramineus*	Non native
Fathead minnow	*Pimephlaes promelas*	Non native
Longnose dace	*Rhinichthys cataractae*	Native
Speckled dace	*Rhinichthys osculus*	Native
Redside shiner	*Richardsonius balteatus*	Native
Creek chub	*Semotilus atromaculatus*	Non native
Colorado pikeminnow	*Ptychocheilus lucius*	Native Colorado River
Humpback chub	*Gila cypha*	Native Colorado River
Bonytail chub	*Gila elegans*	Native Colorado River
Razorback sucker	*Xyrauchen texanus*	Native Colorado River
Ictaluridae		
Channel catfish	*Ictalurus punctatus*	Non native
Percidae		
Iowa darter	*Etheostoma exile*	Non native
Samonidae		
Colorado cutthroat	*Onchorhychus clarki*	Native
Rainbow trout	*Onchorhynchus mykiss*	Non native
Brown trout	*Salmo trutta*	Non native
Brook trout	*Salvelinus fontinalis*	Non native
Mountain whitefish	*Prosopium williamsoni*	Native
Sturgeon		
Pallid Sturgeon	*Scaphirhynchus albus*	Native Platte River

Table 3.20-1. Recreational Management System Information for Special Management Areas Within the RMPPA.

Numbers of Participants and Visitor Days October 1, 1998 – September 30, 2001						
	Continental Divide National Scenic Trail SRMA		North Platte River SRMA		Shirley Mountain Caves SRMA	
	Number of Participants	# Visitor Days	Number of Participants	# Visitor Days	Number of Participants	# Visitor Days
Backpacking	626	3,347				
Bicycling – Mountain	64	32				
Camping	2,525	4,904	12,597	39,834	1,200	4,800
Canoe/Kayaking			8	5		
Caving					100	50
Driving for Pleasure	5,100	2,550	1	0		
Fishing – Freshwater			81,007	38,151	100	50
Gather Non-Commercial Products					1,000	667
Hiking/Walking/Running	3,000	2,000	14,952	7,175		
Horseback Riding	900	450				
Hunting – Big Game	1,227	2,418	6,680	16,280	7,001	19,001
Hunting Small Game					100	67
Hunting – Waterfowl			1,940	1,293		
Nature Study			2,300	358		
OHV – ATV	300	100				
OHV – Cars/Trucks/SUVs	4,210	2,807	402	34	12,601	7,800
Photography			1,500	500	500	167
Picnicking	75	6	26,155	3,979	5,400	850
Rockhounding/Mineral Collection	180	90	420	210		
Row/Float/Raft			29,944	10,680		
Snowmobiling	120	60			200	100
Target Practice					100	17
Trapping			244	122		
Viewing – Wildlife			72,502	23,250	12,601	5,100

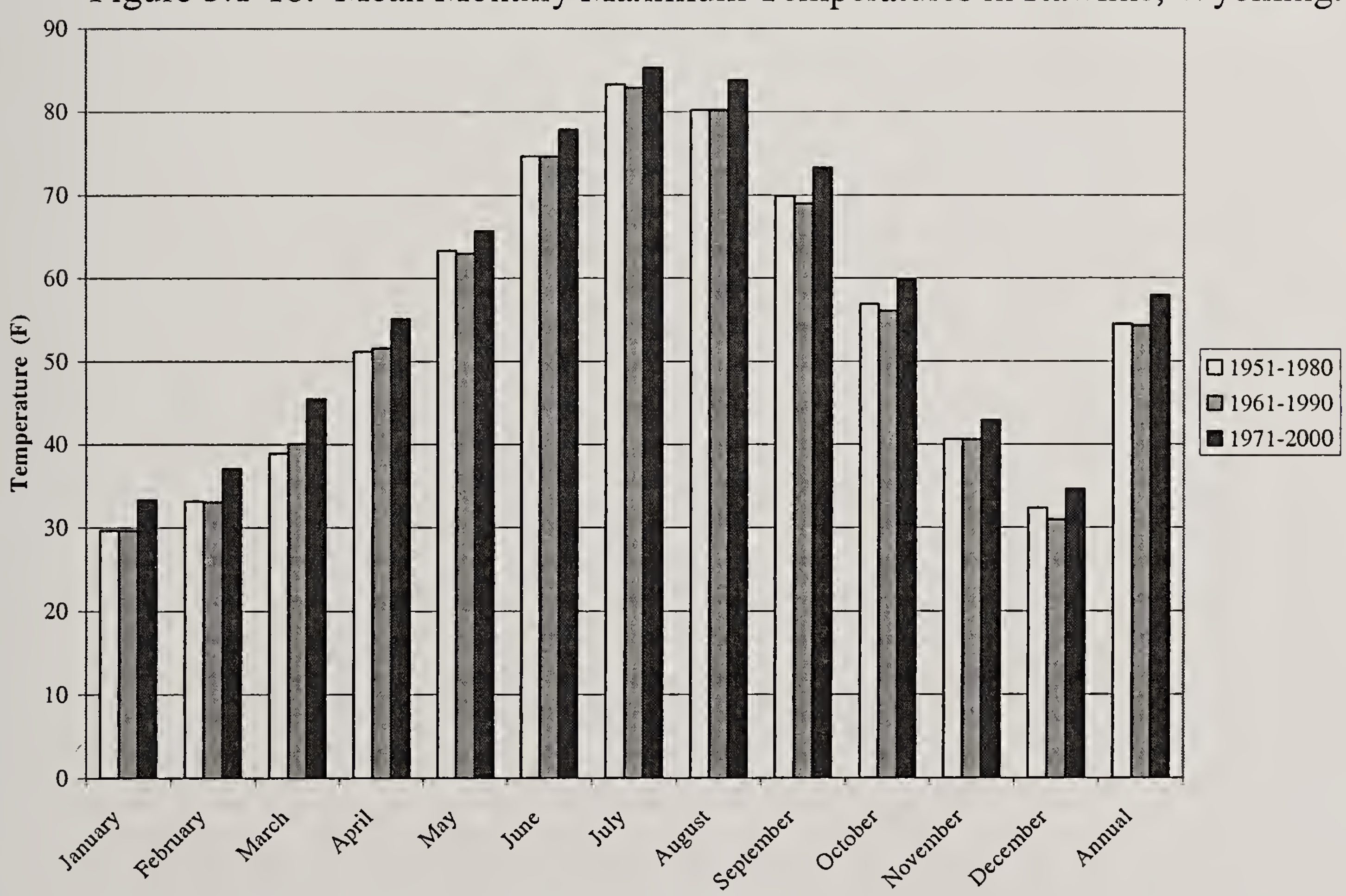
Source: BLM Recreation Management Information System, BLM Rawlins Field Office

Figure 3.1-1a. Mean Monthly Temperatures in the Great Divide Region.



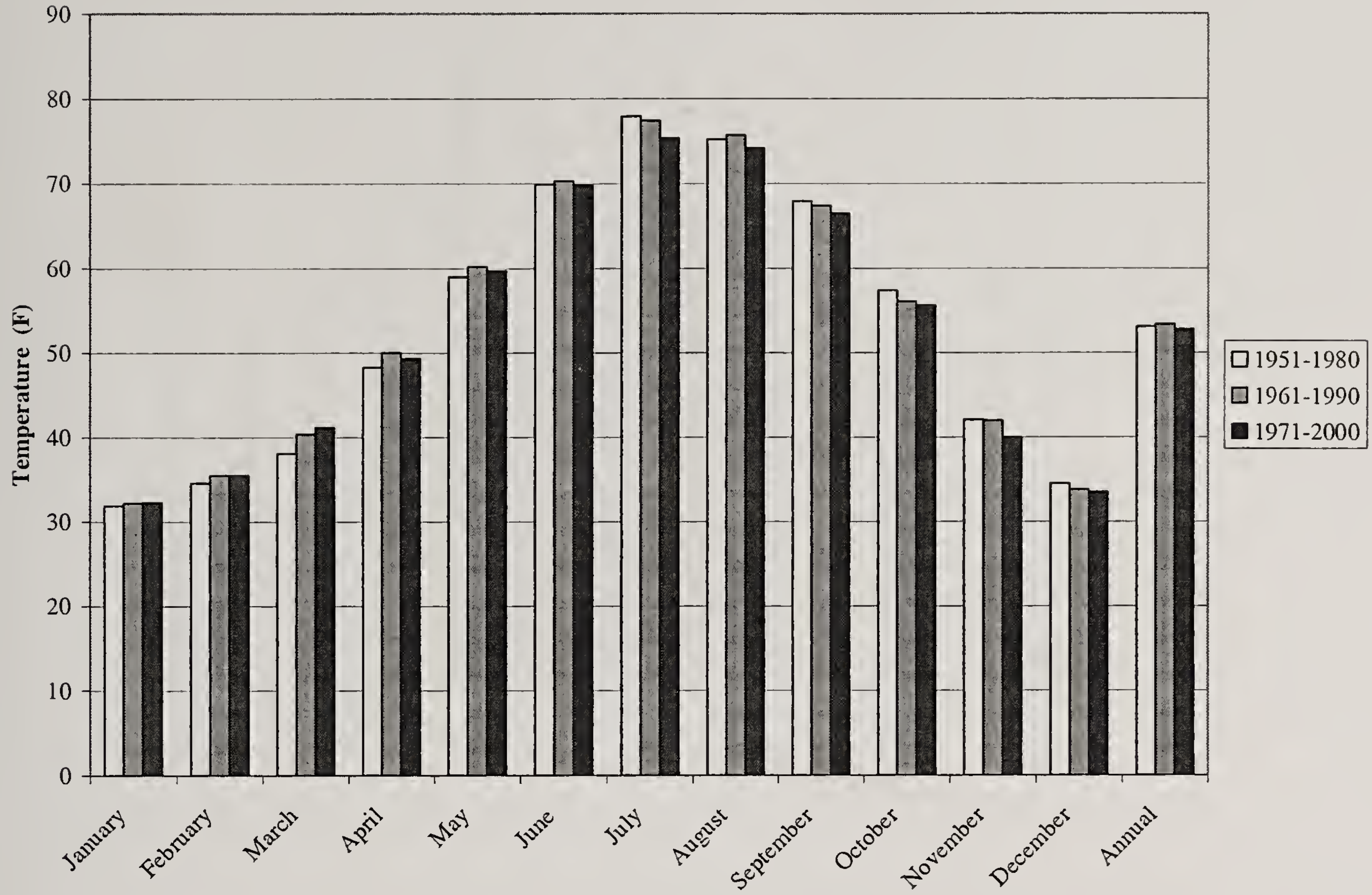
Source: Western Regional Climate Center.

Figure 3.1-1b. Mean Monthly Maximum Temperatures in Rawlins, Wyoming.



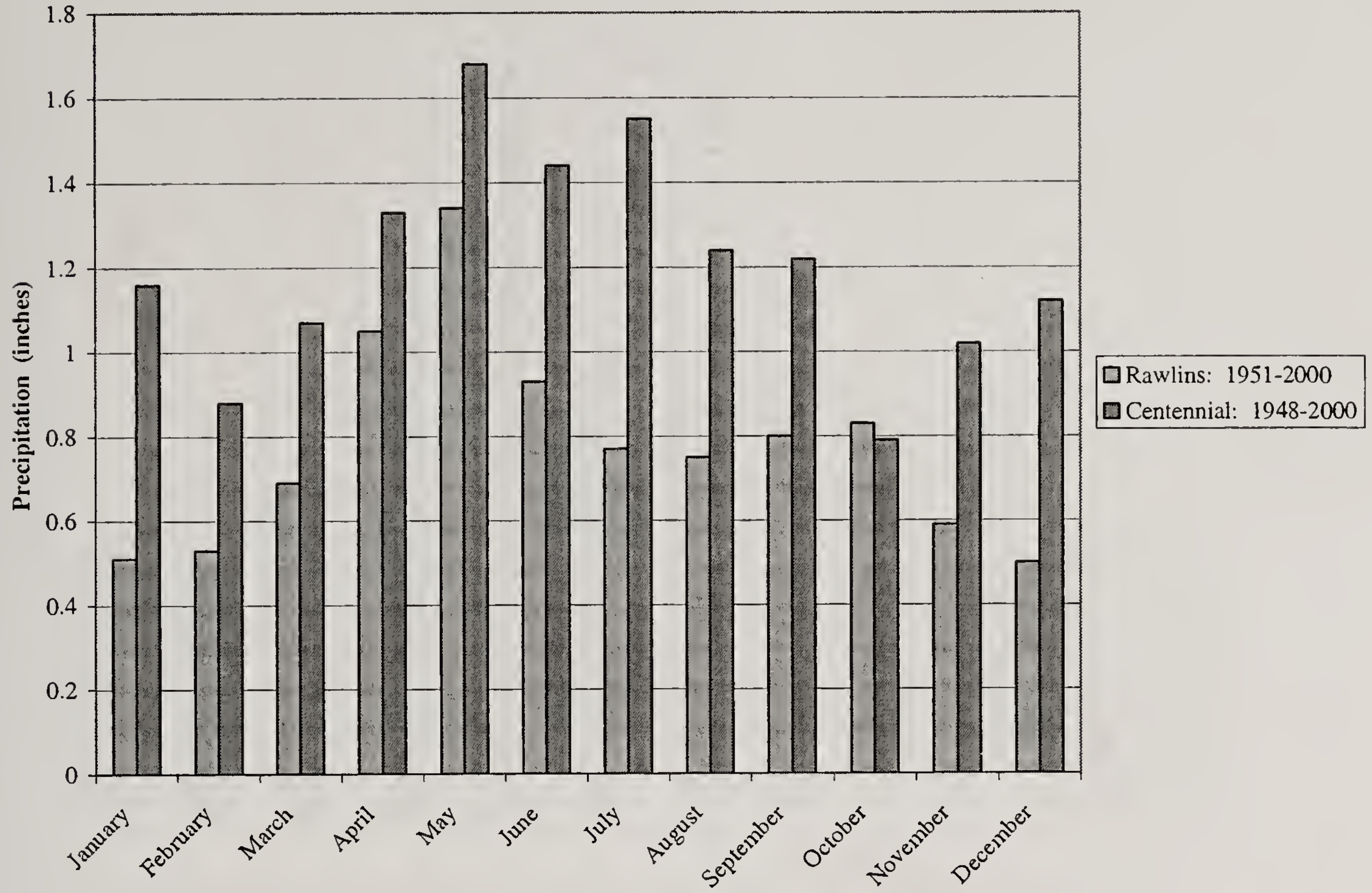
Source: Western Regional Climate Center.

Figure 3.1-1c. Mean Monthly Maximum Temperatures in Centennial, Wyoming.



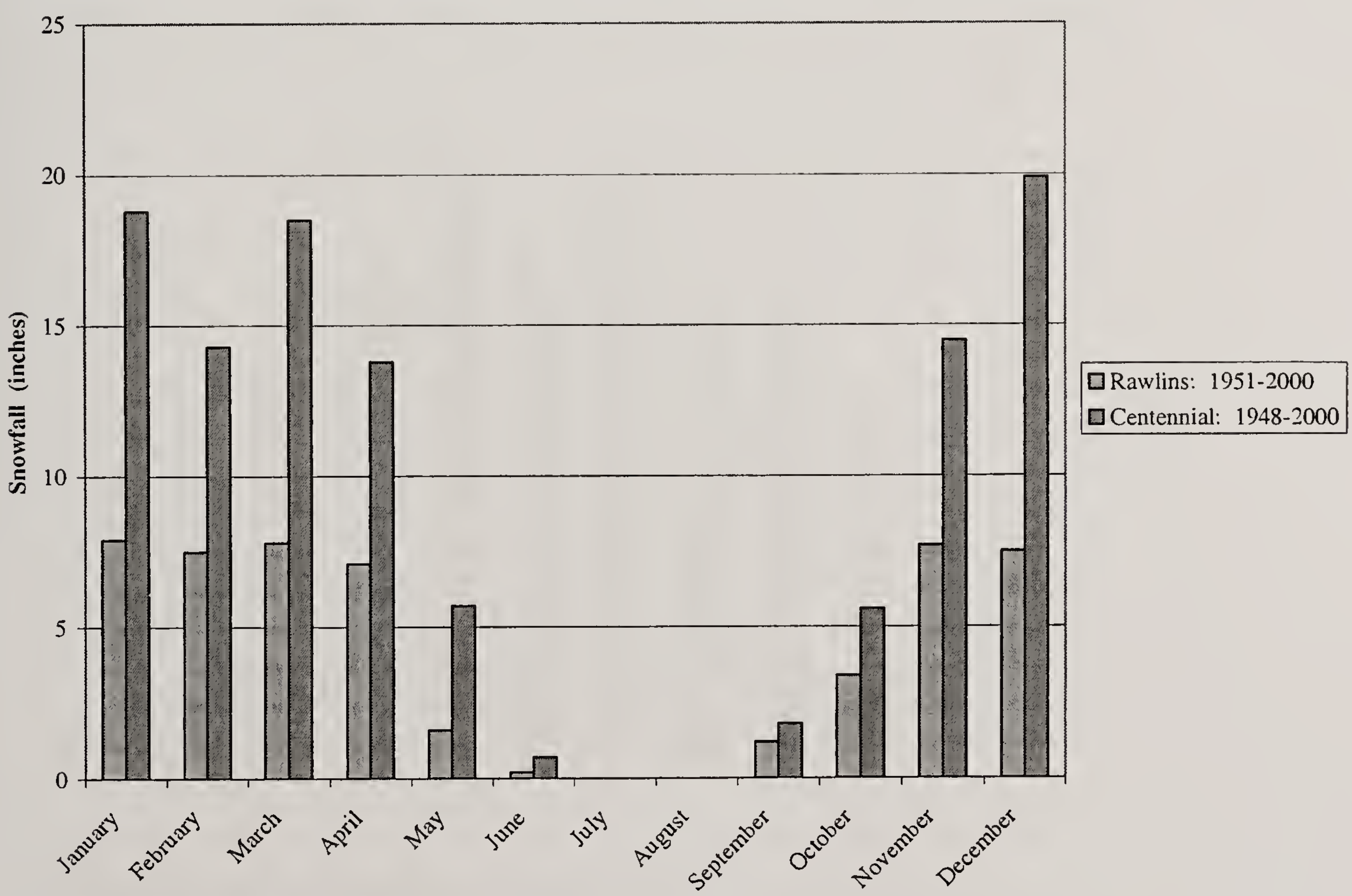
Source: Western Regional Climate Center.

Figure 3.1-2a. Mean Monthly Precipitation in the Great Divide Region.



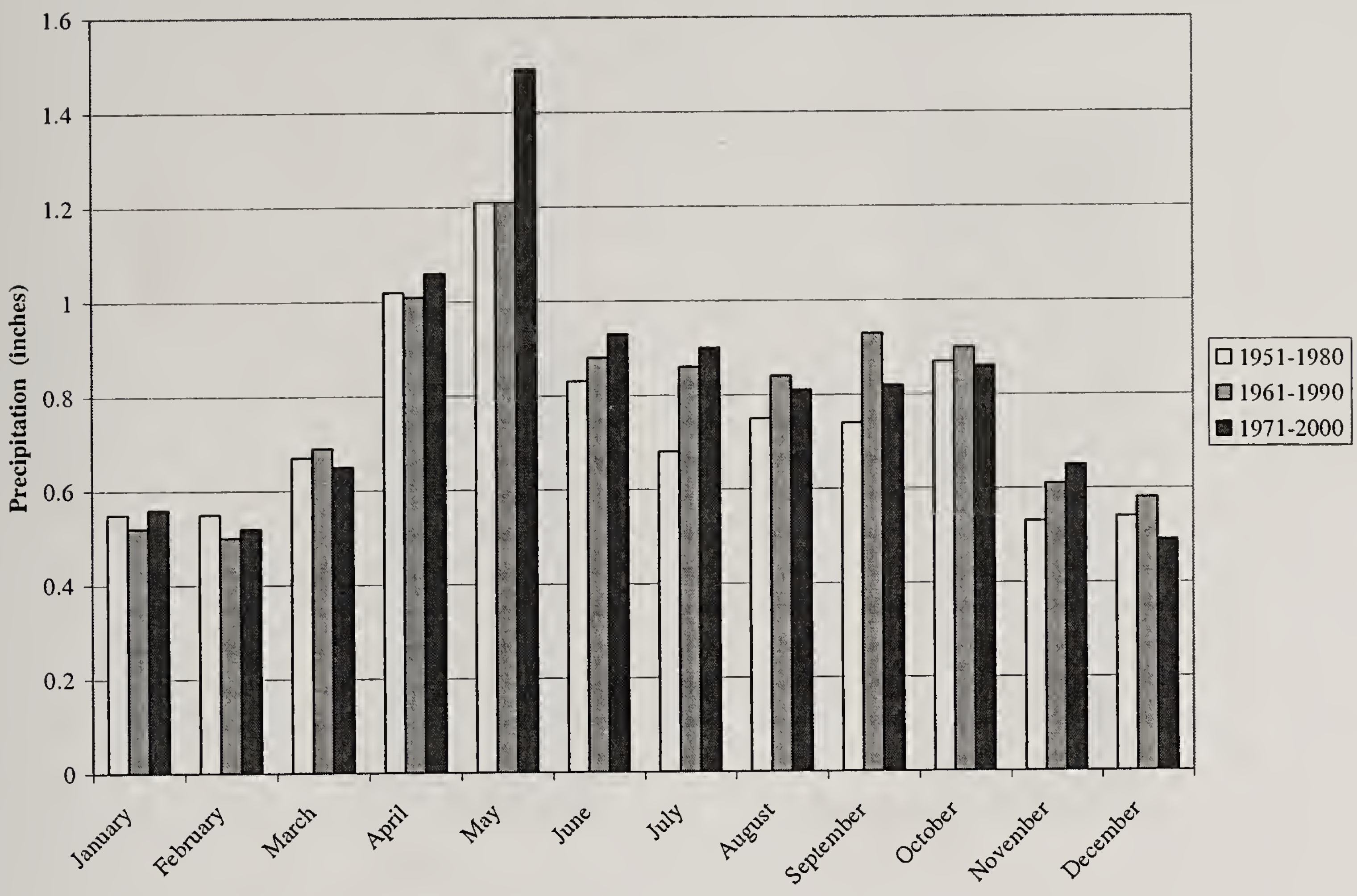
Source: Western Regional Climate Center.

Figure 3.1-2b. Mean Monthly Snowfall in the Great Divide Region.



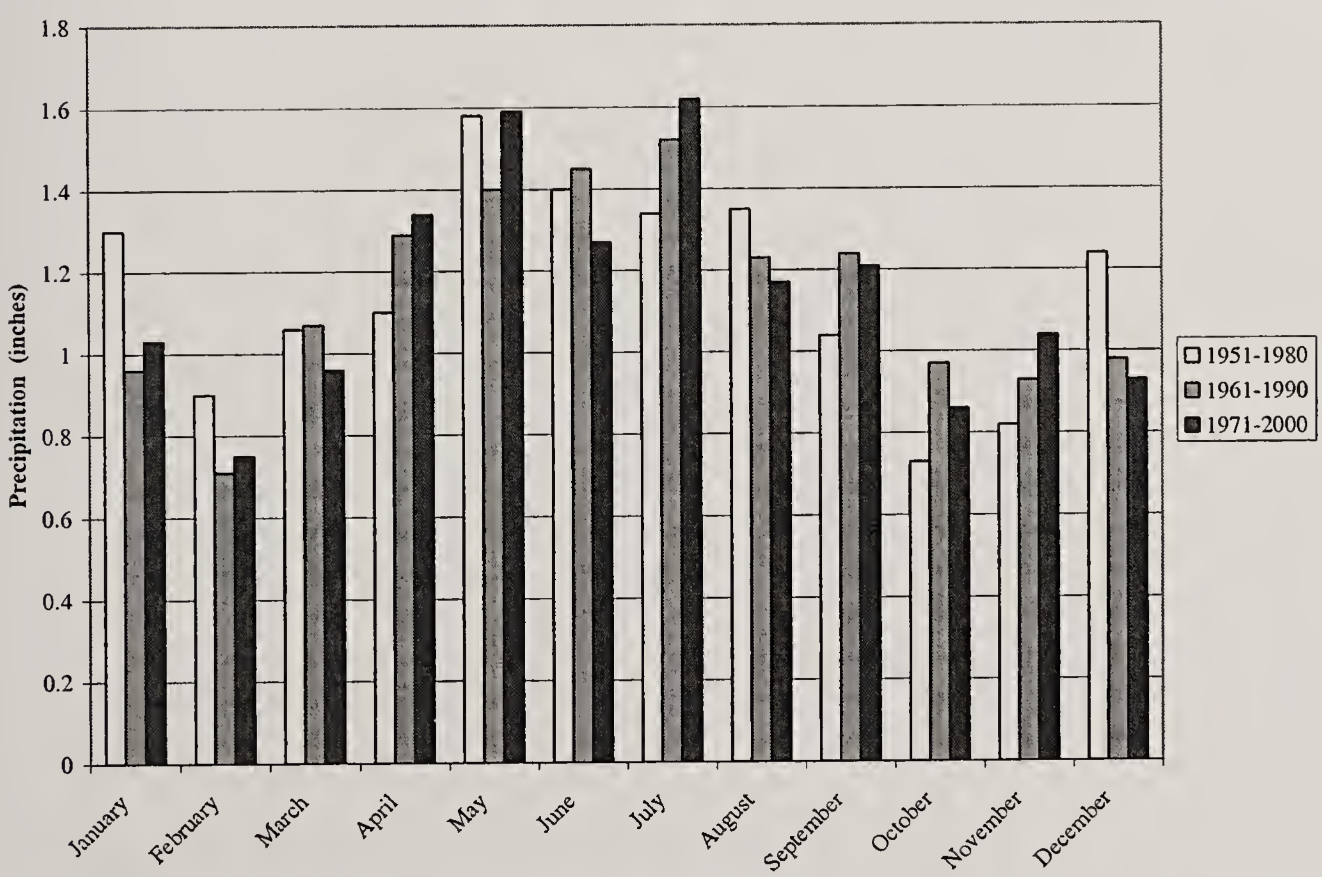
Source: Western Regional Climate Center.

Figure 3.1-2c. Mean Monthly Precipitation Trend in Rawlins, Wyoming.



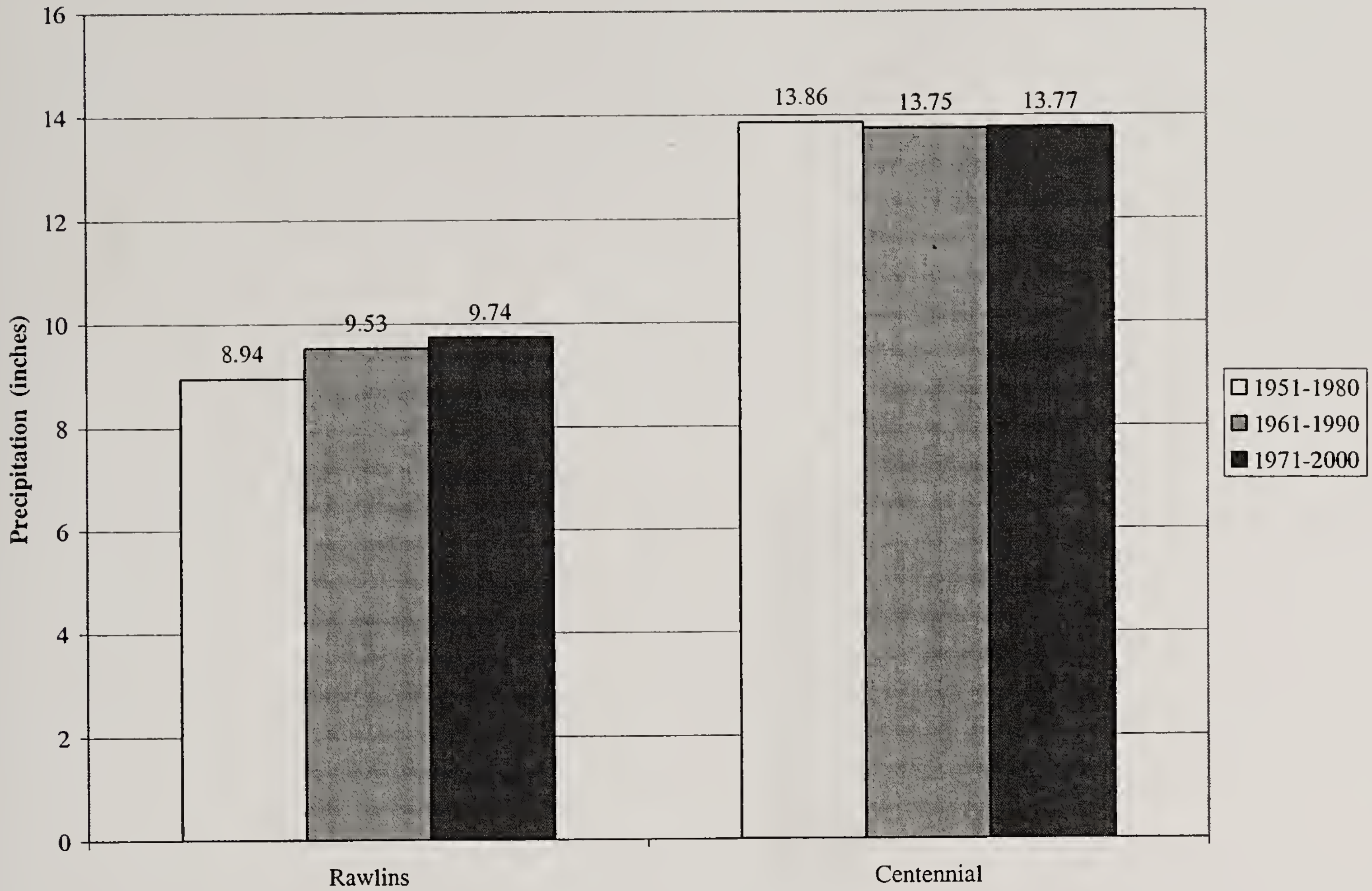
Source: Western Regional Climate Center.

Figure 3.1-2d. Mean Monthly Precipitation in Centennial, Wyoming.



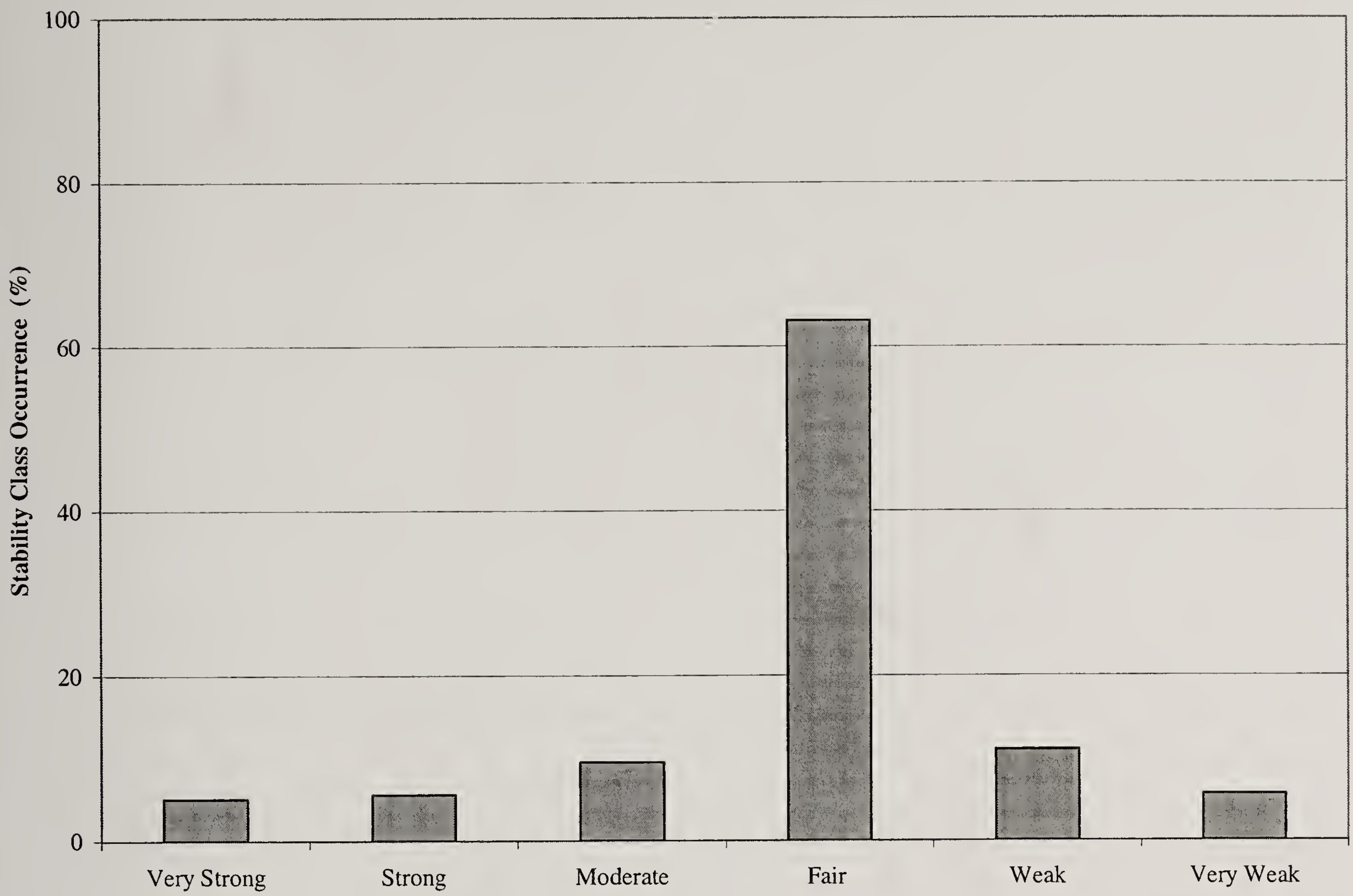
Source: Western Regional Climate Center.

Figure 3.1- 2e. Mean Annual Total Precipitation Trend in the Great Divide Region.



Source: Western Regional Climate Center.

Figure 3.1-3. Capacity to Disperse Air Pollutants in Rock Springs, Wyoming.



Source: Continental Divide EIS.

Figure 3.1-4a. Wind Rose for Rawlins, Wyoming.

(figure to be developed from data provided by BLM State Office).

Source:

Figure 3.1-4b. Wind Rose for Centennial, Wyoming.

(figure to be developed from data provided by BLM State Office).

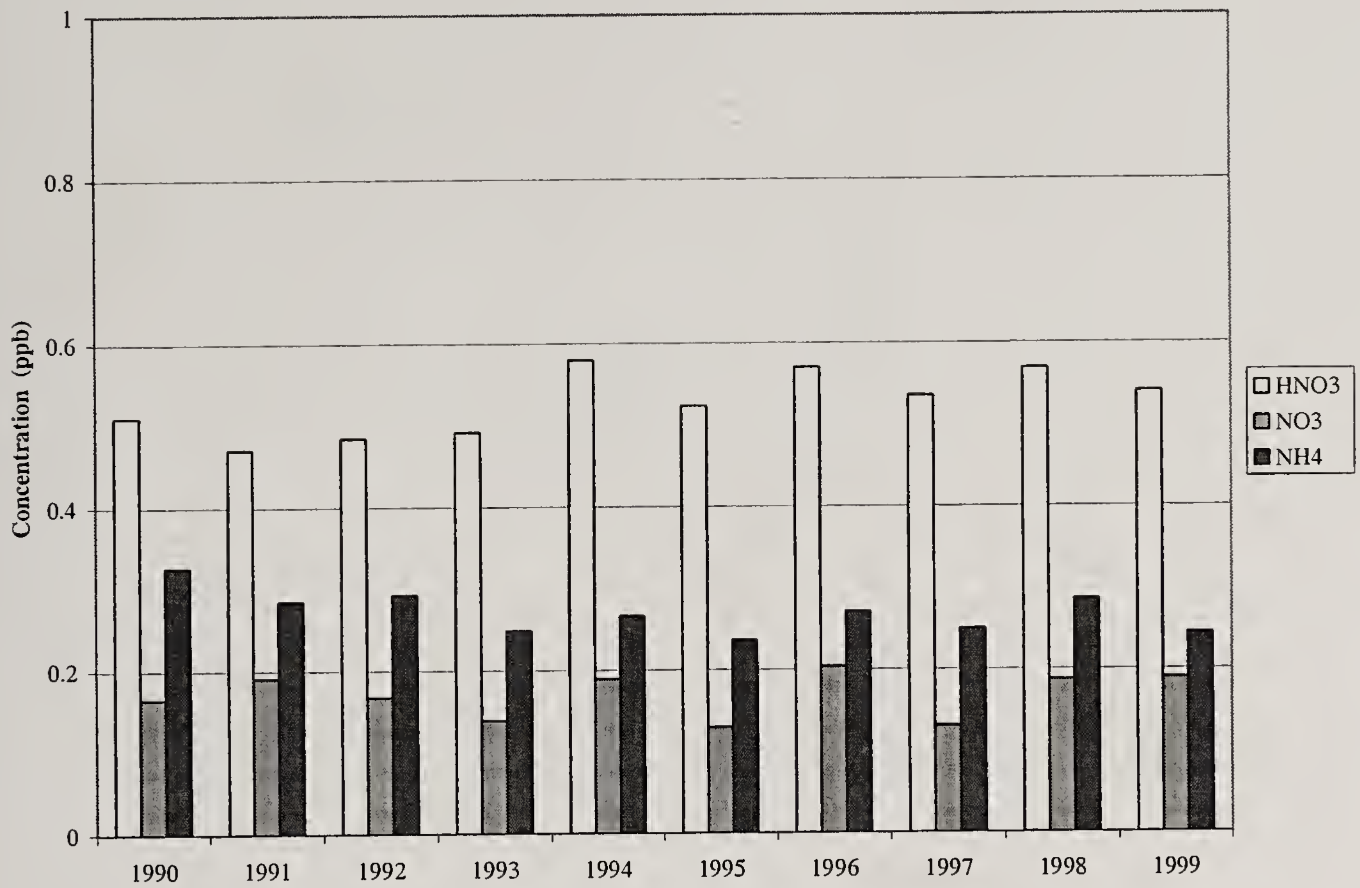
Source:

Figure 3.1-5. Air Quality PSD Class I Areas.

(GIS figure being developed by BLM State Office)

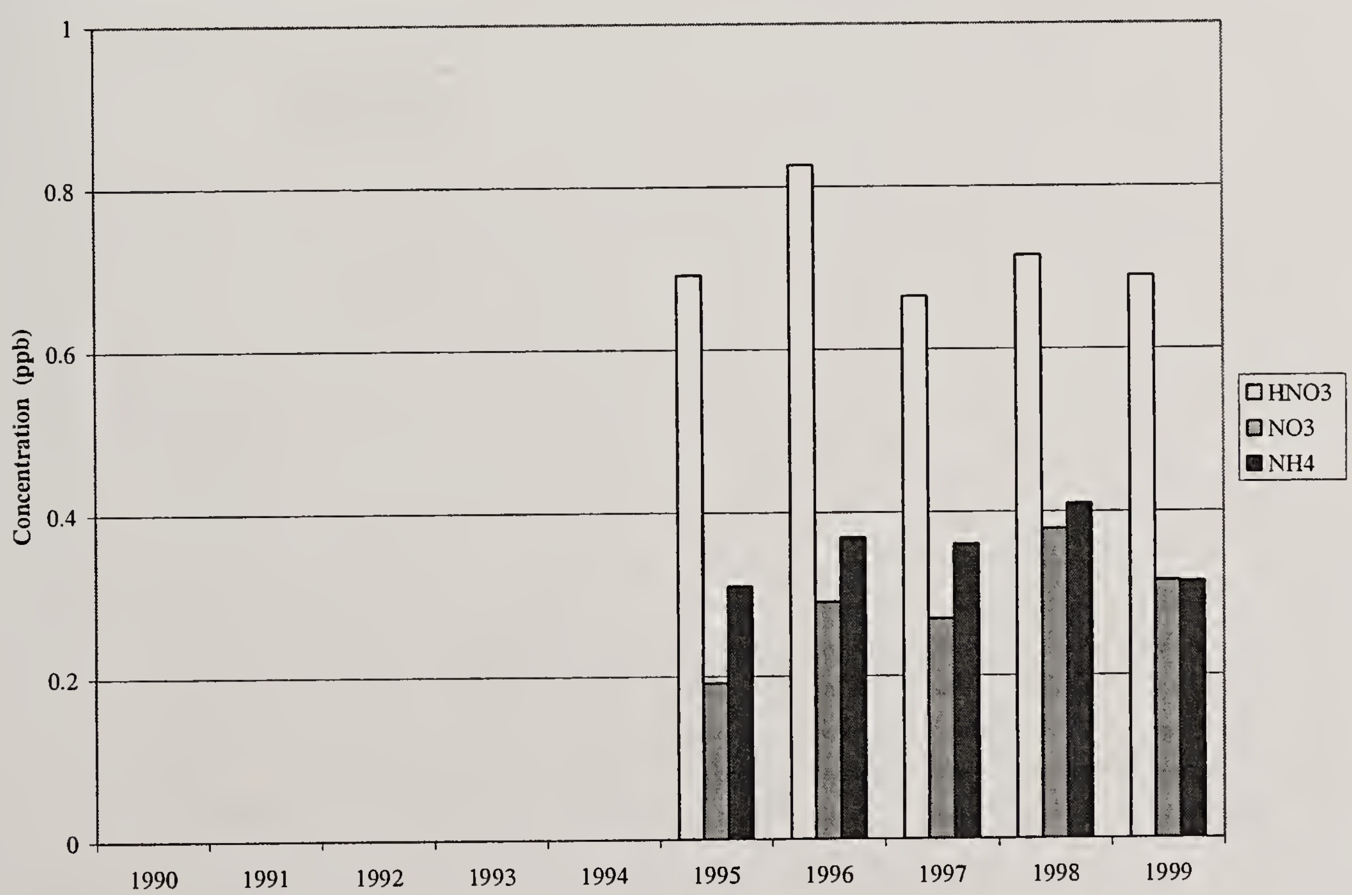
Source:

Figure 3.1-6a. Mean Annual Concentrations of Nitrogen Compounds in Centennial, Wyoming.



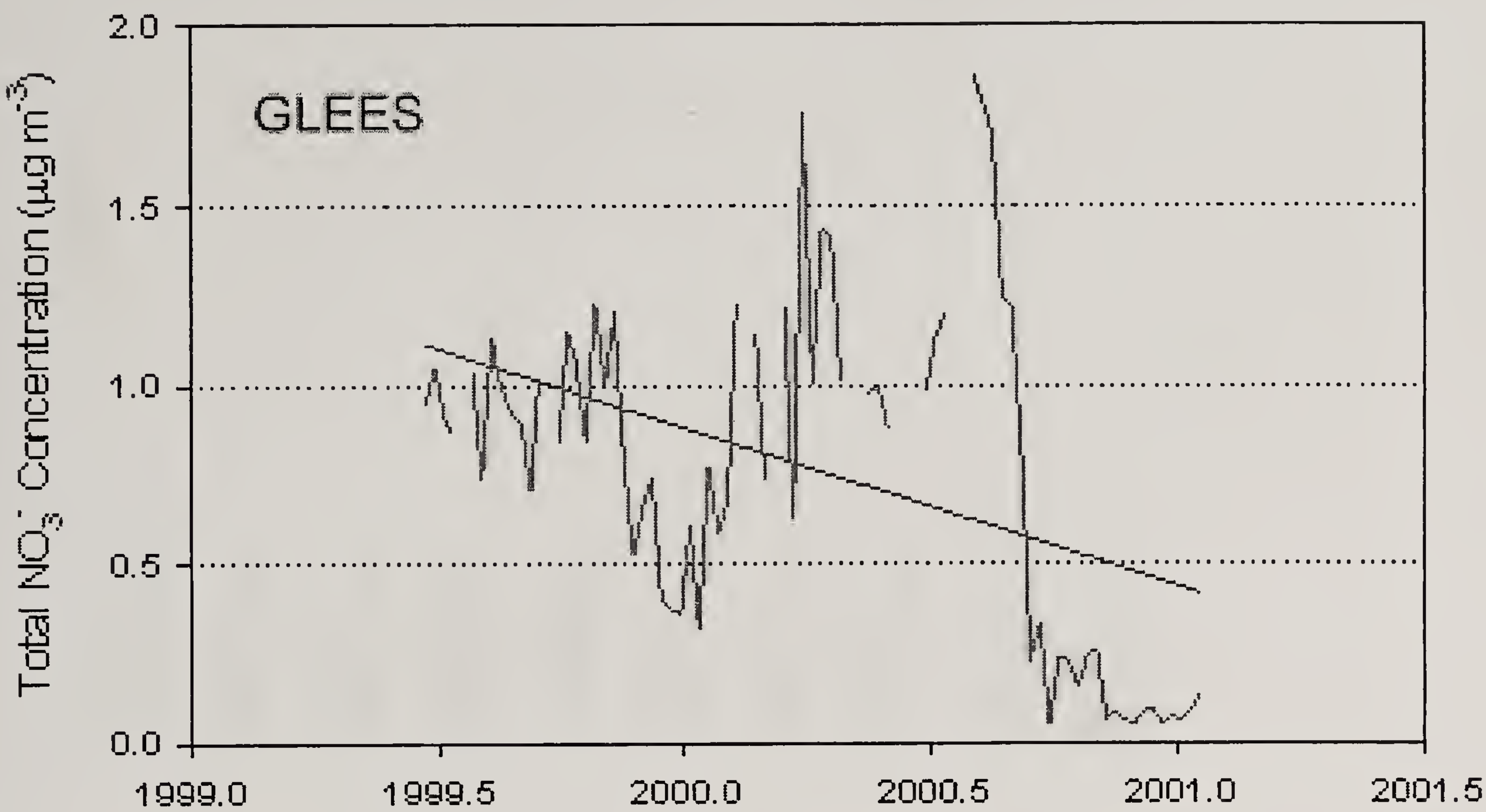
Source: CASTNet.

Figure 3.1-6b. Mean Annual Concentrations of Nitrogen Compounds in Rocky Mountain National Park, Colorado.



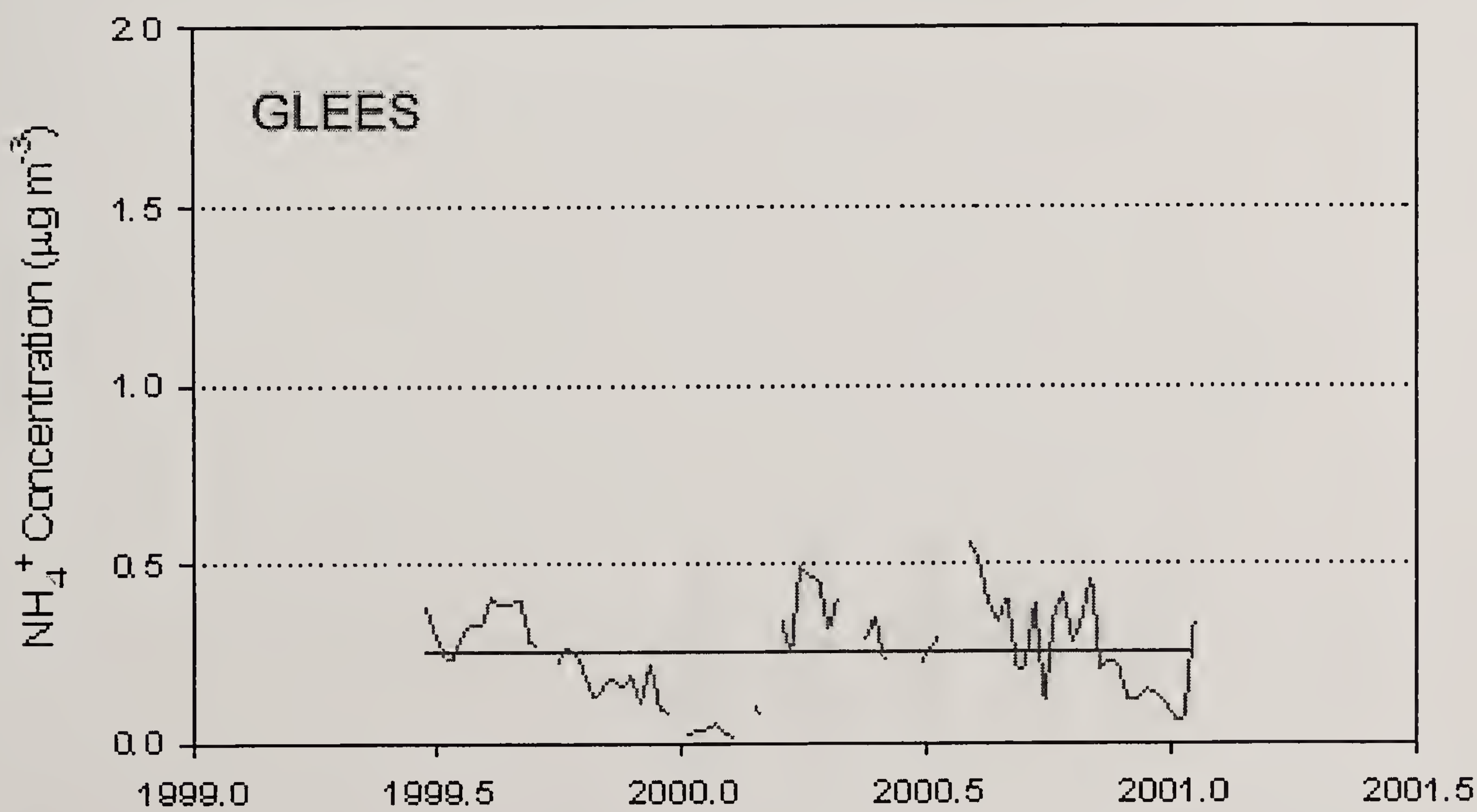
Source: CASTNet.

Figure 3.1-7a. Weekly Concentrations of NO_3 in Centennial, Wyoming.



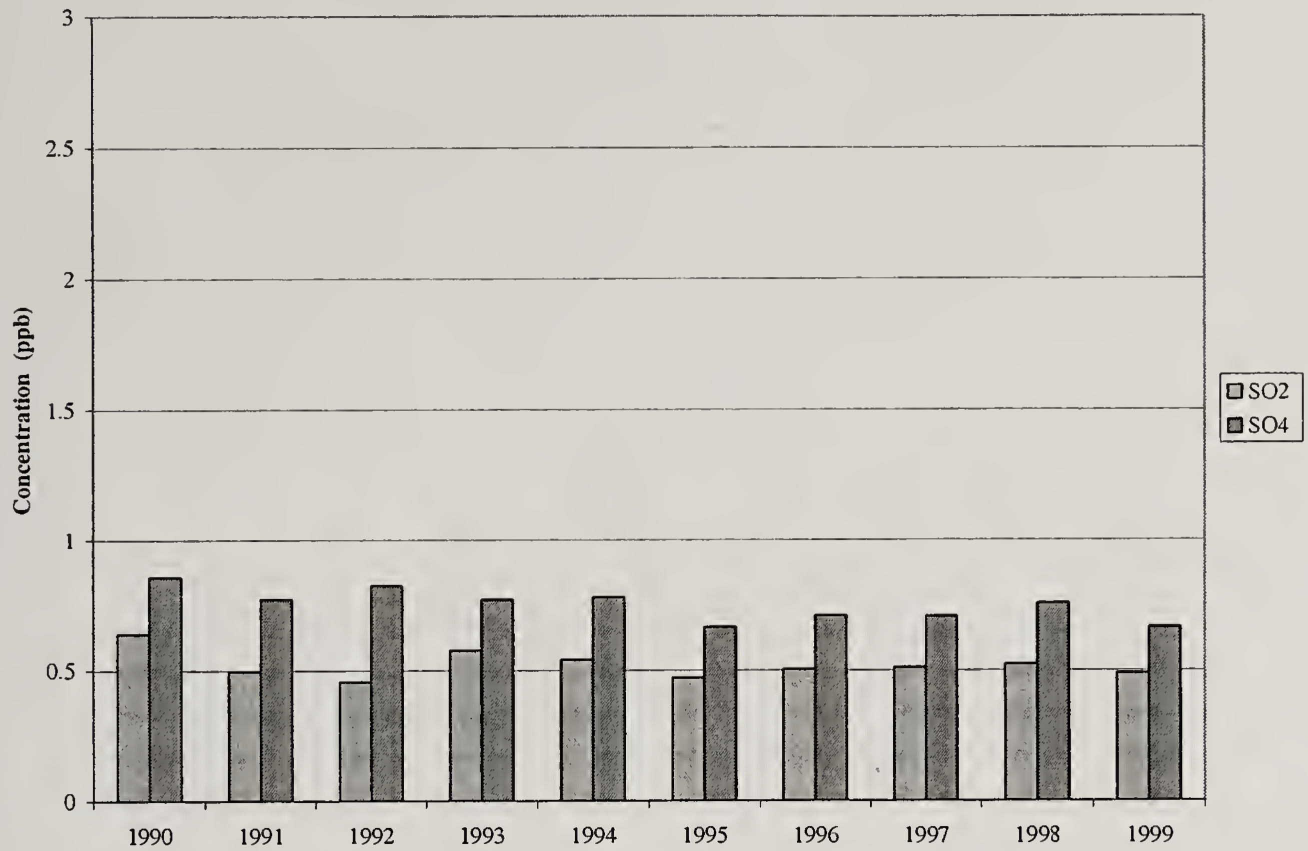
Source: WARMS.

Figure 3.1-7b. Weekly Concentrations of NH_4 in Centennial, Wyoming.



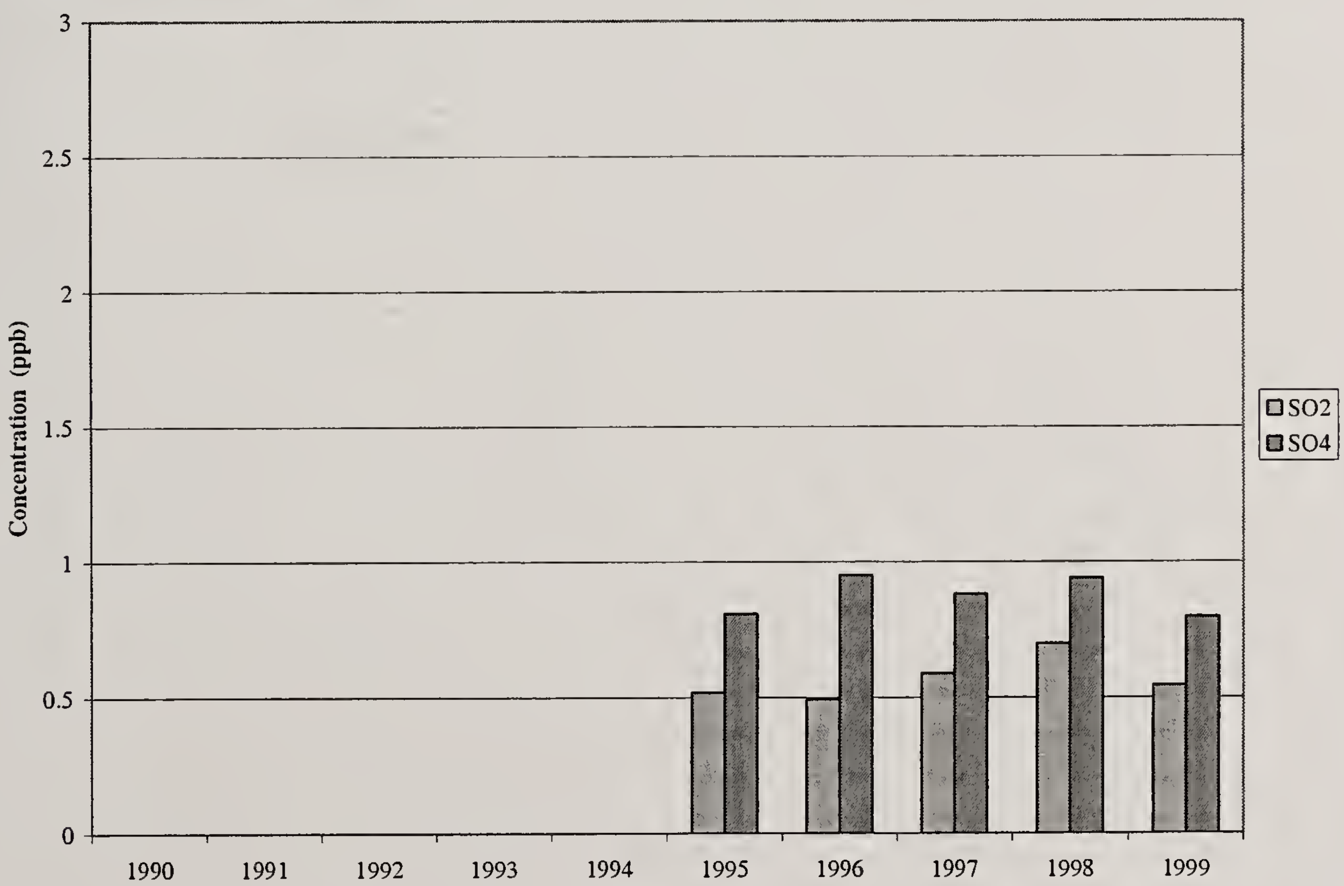
Source: WARMS.

Figure 3.1-8a. Mean Annual Concentrations of Sulphur Compounds in Centennial, Wyoming.



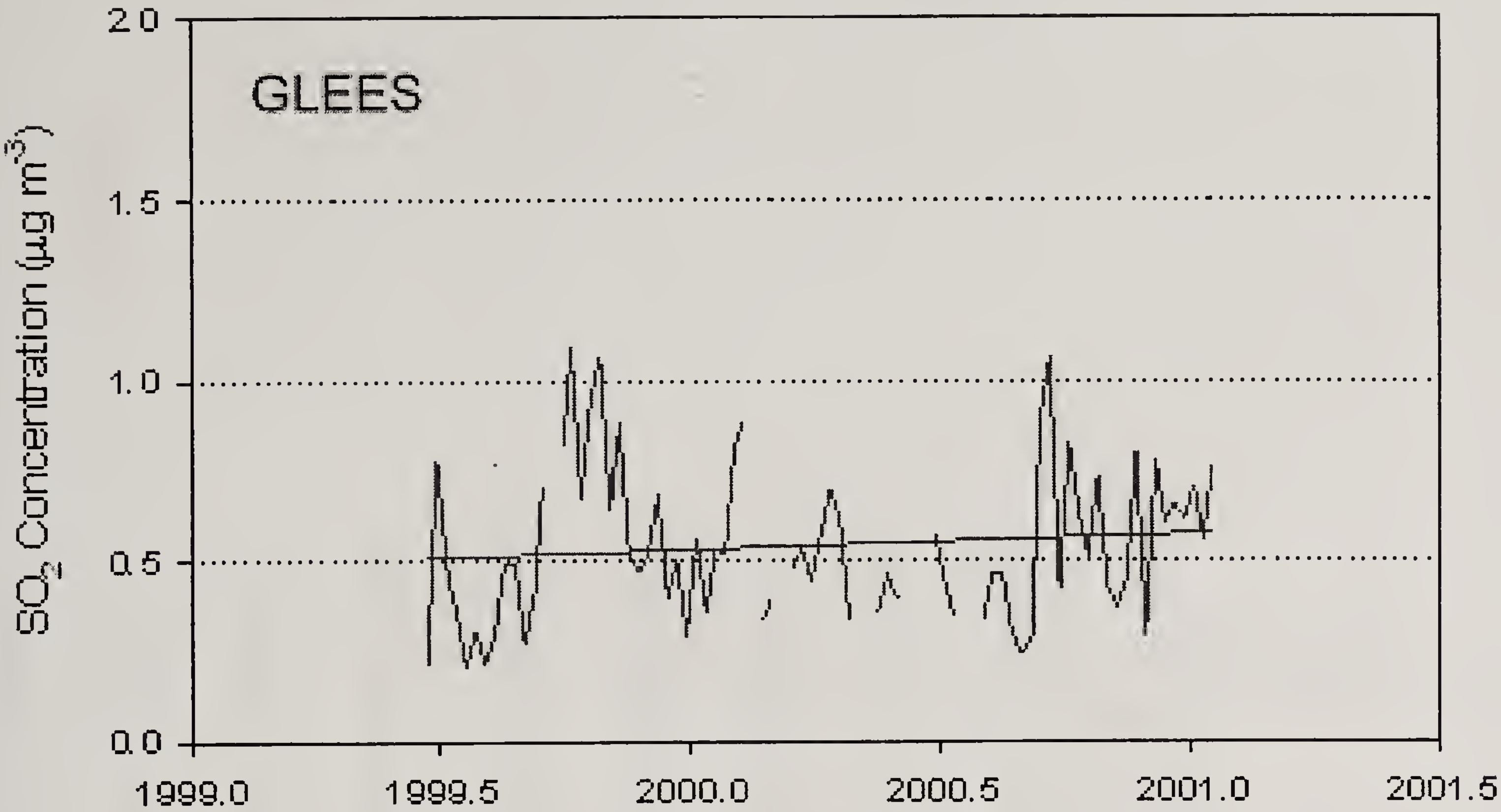
Source: CASTNet.

Figure 3.1-8b. Mean Annual Concentrations of Sulphur Compounds in Rocky Mountain National Park, Colorado.



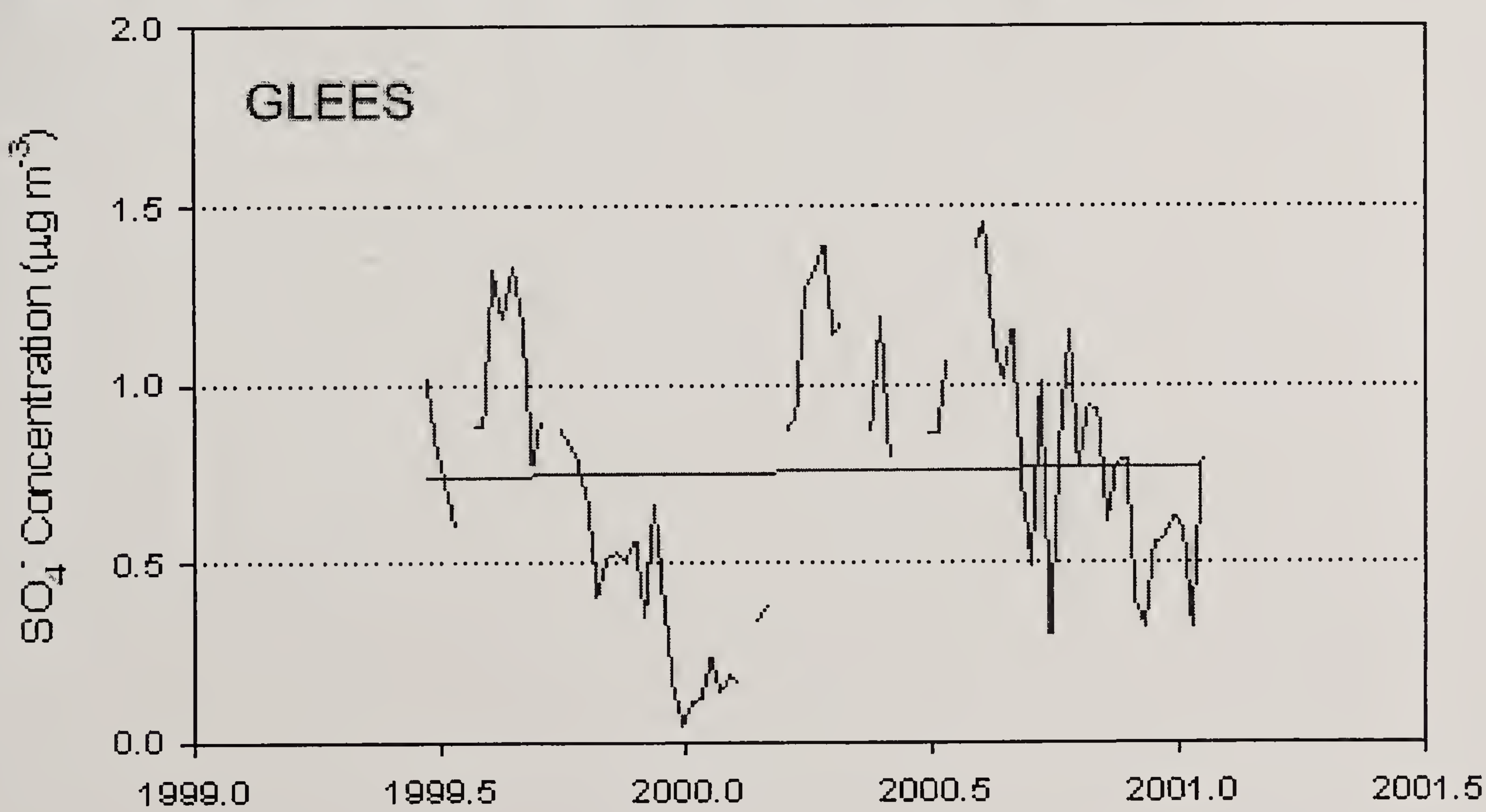
Source: CASTNet.

Figure 3.1-9a. Weekly Concentrations of SO_2 in Centennial, Wyoming.



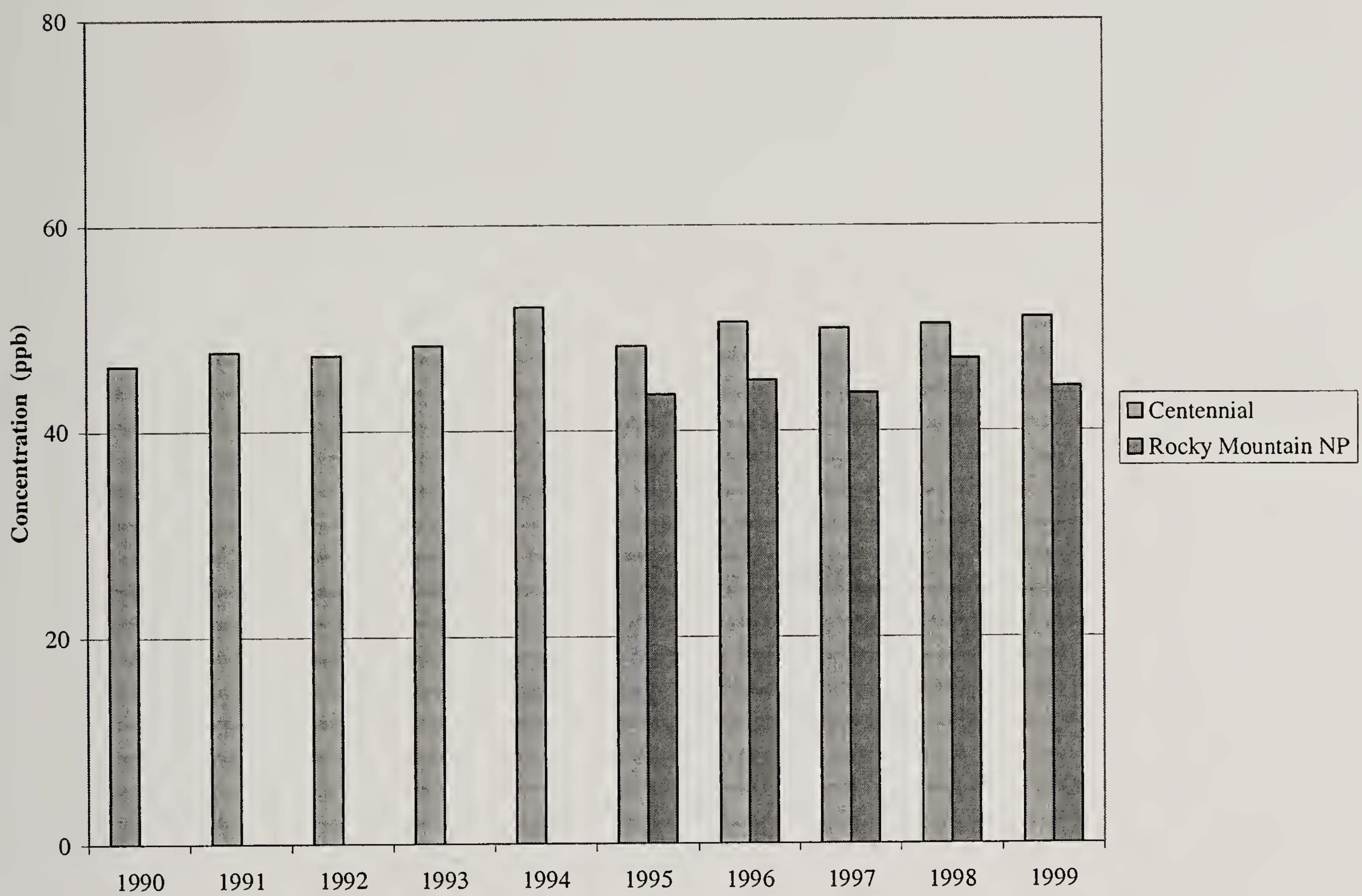
Source: WARMS.

Figure 3.1-9b. Weekly Concentrations of SO_4 in Centennial, Wyoming.



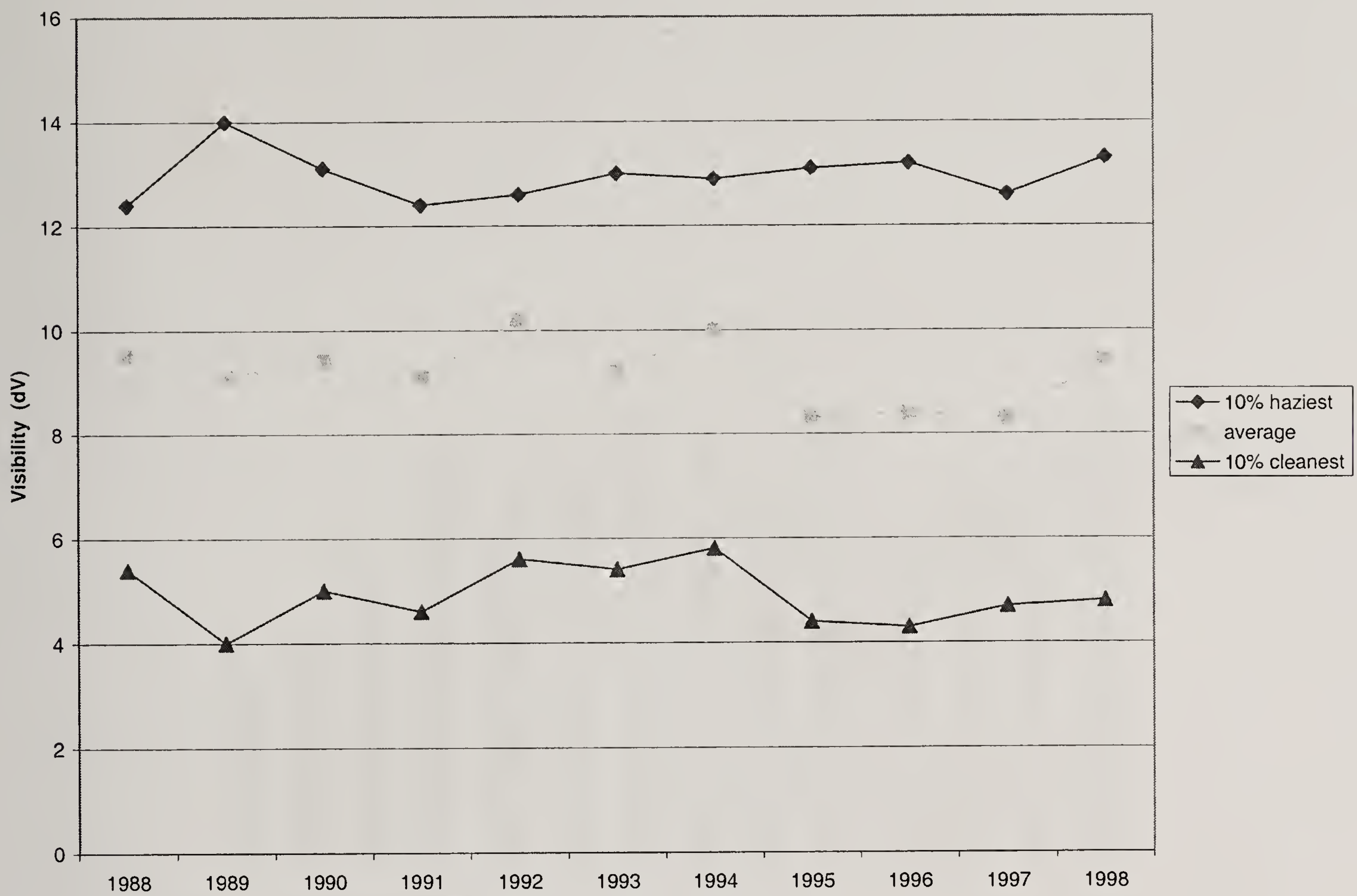
Source: WARMS.

Figure 3.1-10. Mean Annual Ozone Concentrations near the Great Divide Region.



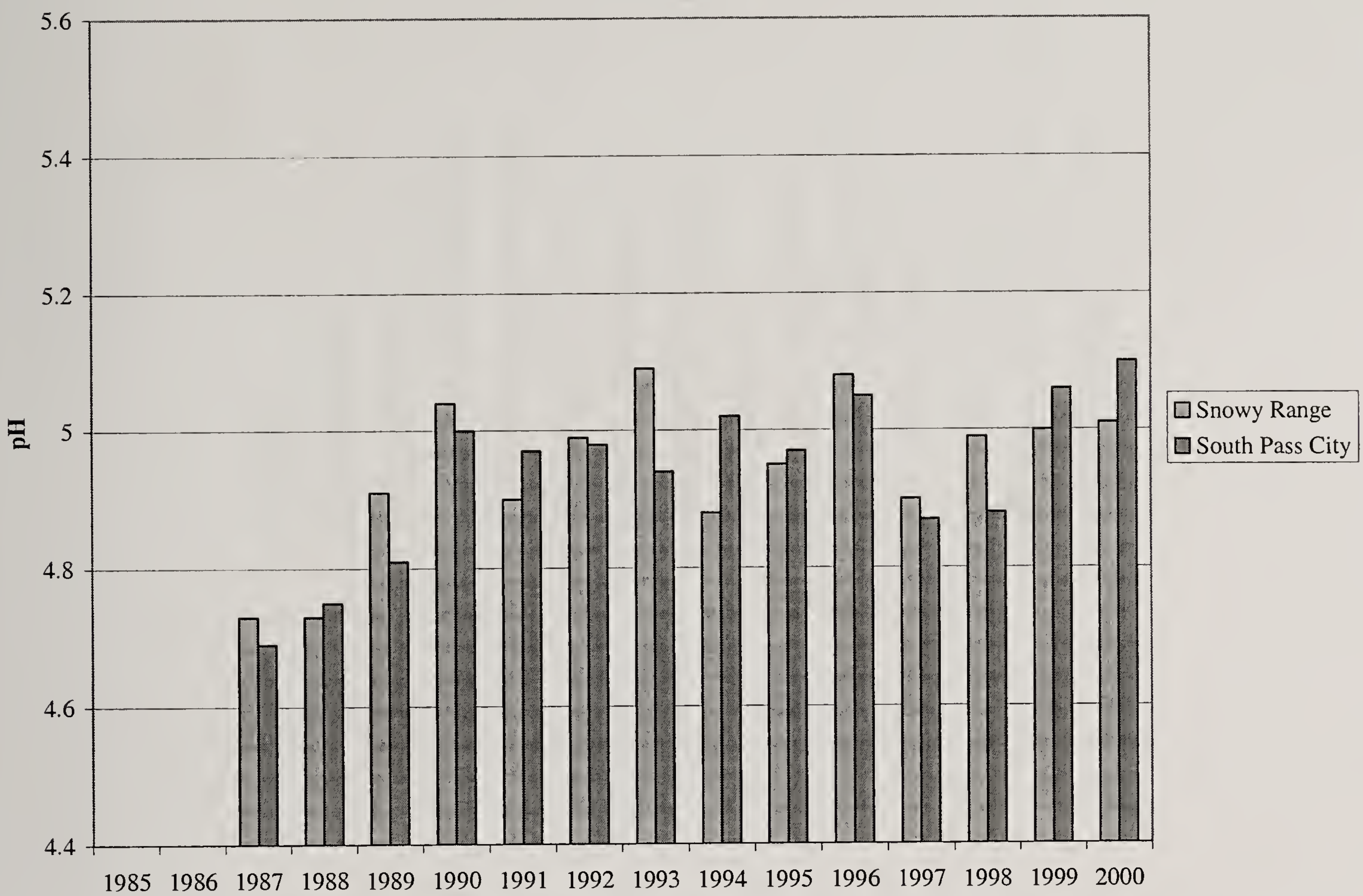
Source: CASTNet.

Figure 3.1-11. Visibility in Rocky Mountain National Park, Colorado.



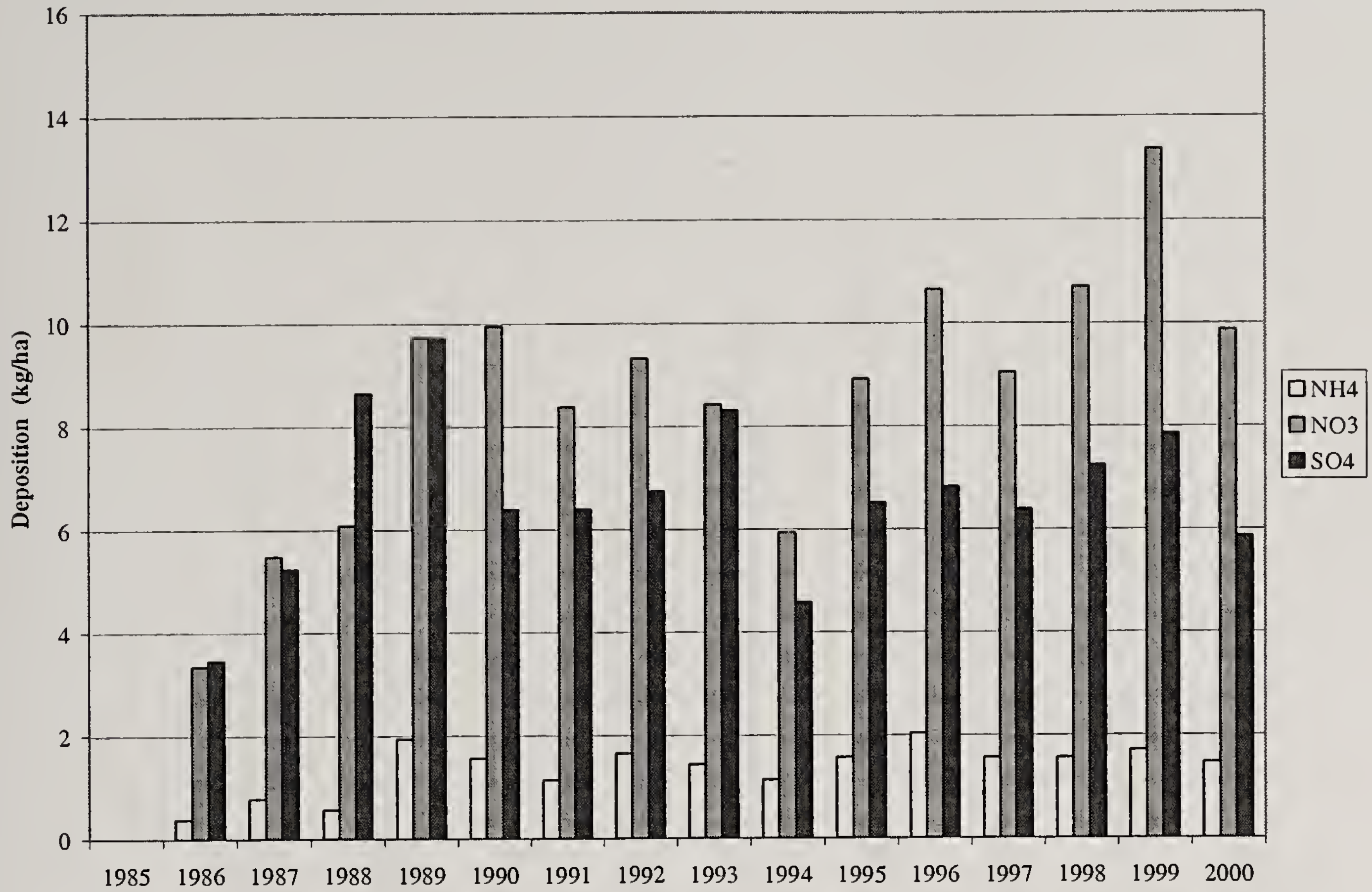
Source: IMPROVE.

Figure 3.1-12. Mean Annual Precipitation pH in the Great Divide Region.



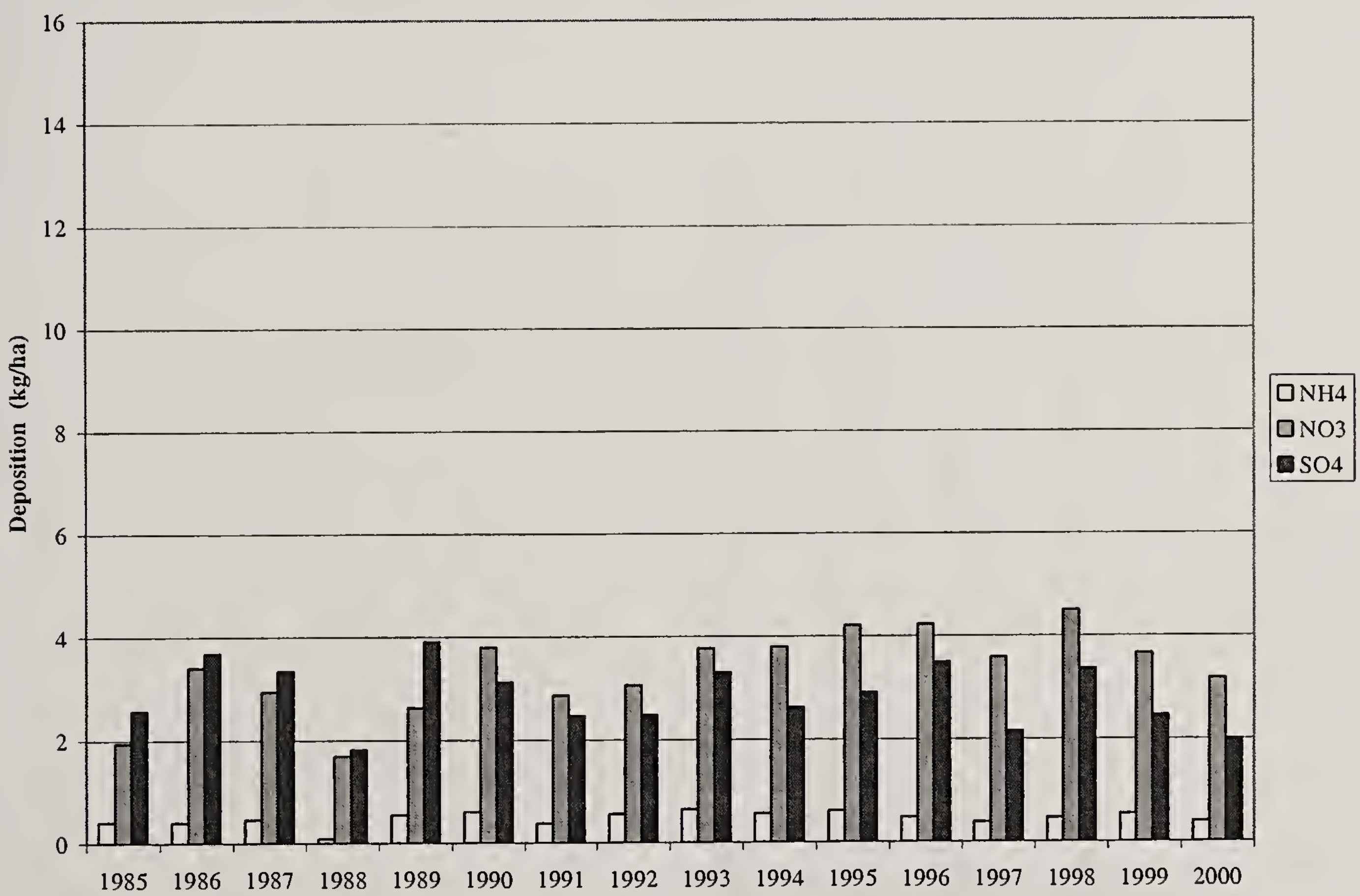
Source: NADP WY00 (Snowy Range) and WY97 (South Pass City).

Figure 3.1-13a. Mean Annual Wet Deposition in the Snowy Range in Wyoming.



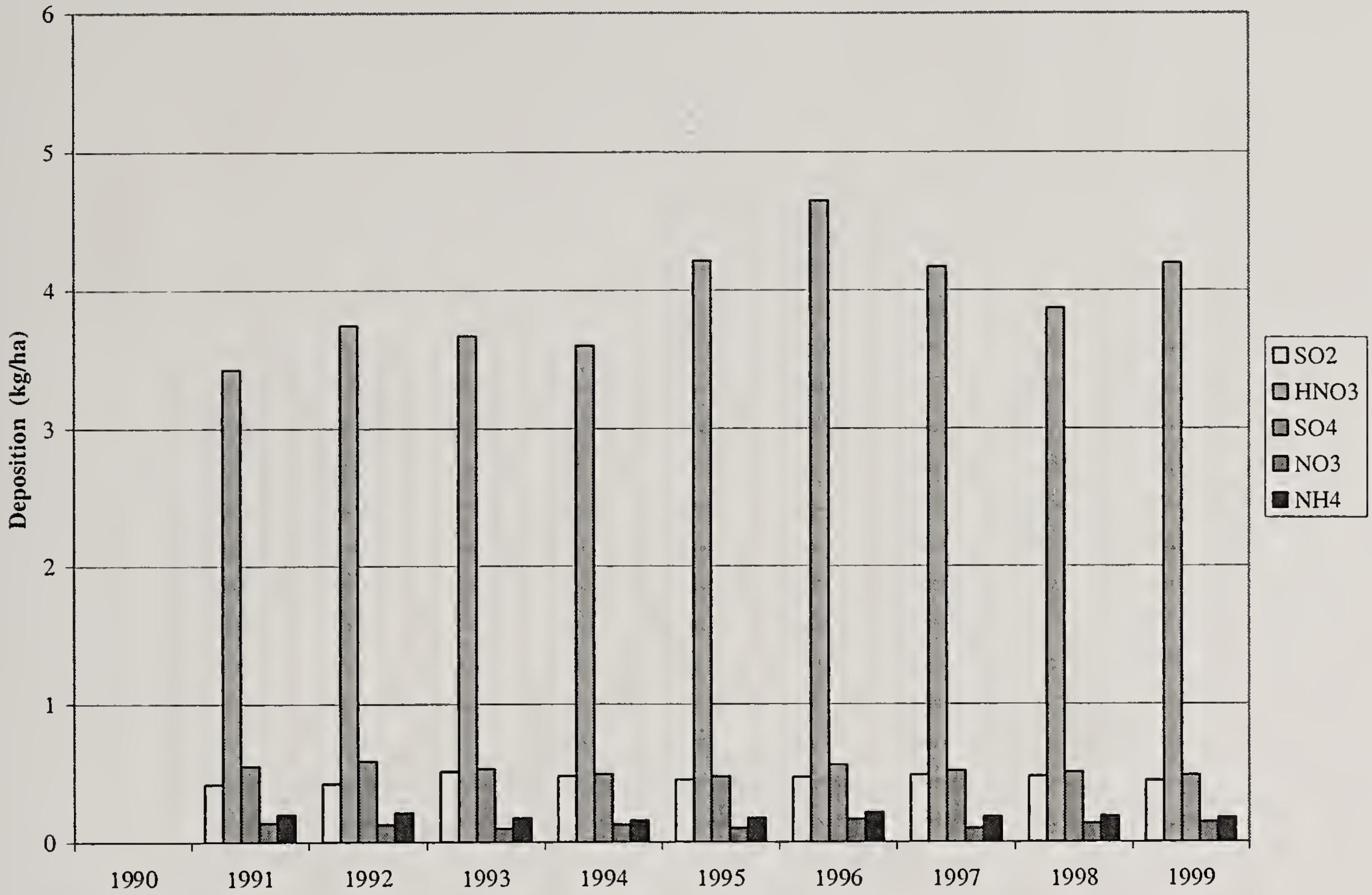
Source: NADP Site WY00.

Figure 3.1-13b. Mean Annual Wet Deposition in South Pass City, Wyoming.



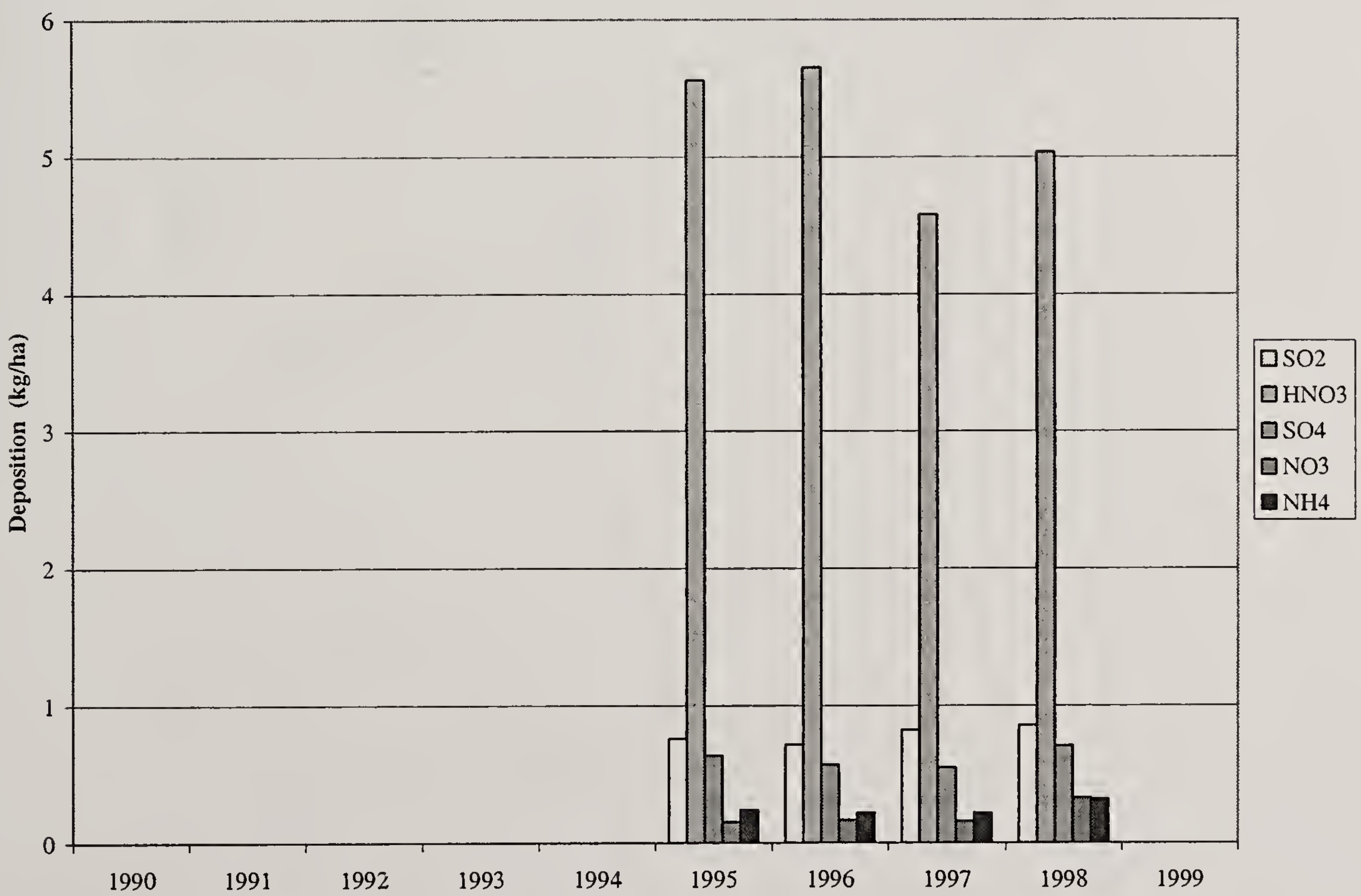
Source: NADP Site WY97.

Figure 3.1-14a. Mean Annual Dry Deposition of Sulphur and Nitrogen Compounds in Centennial, Wyoming.



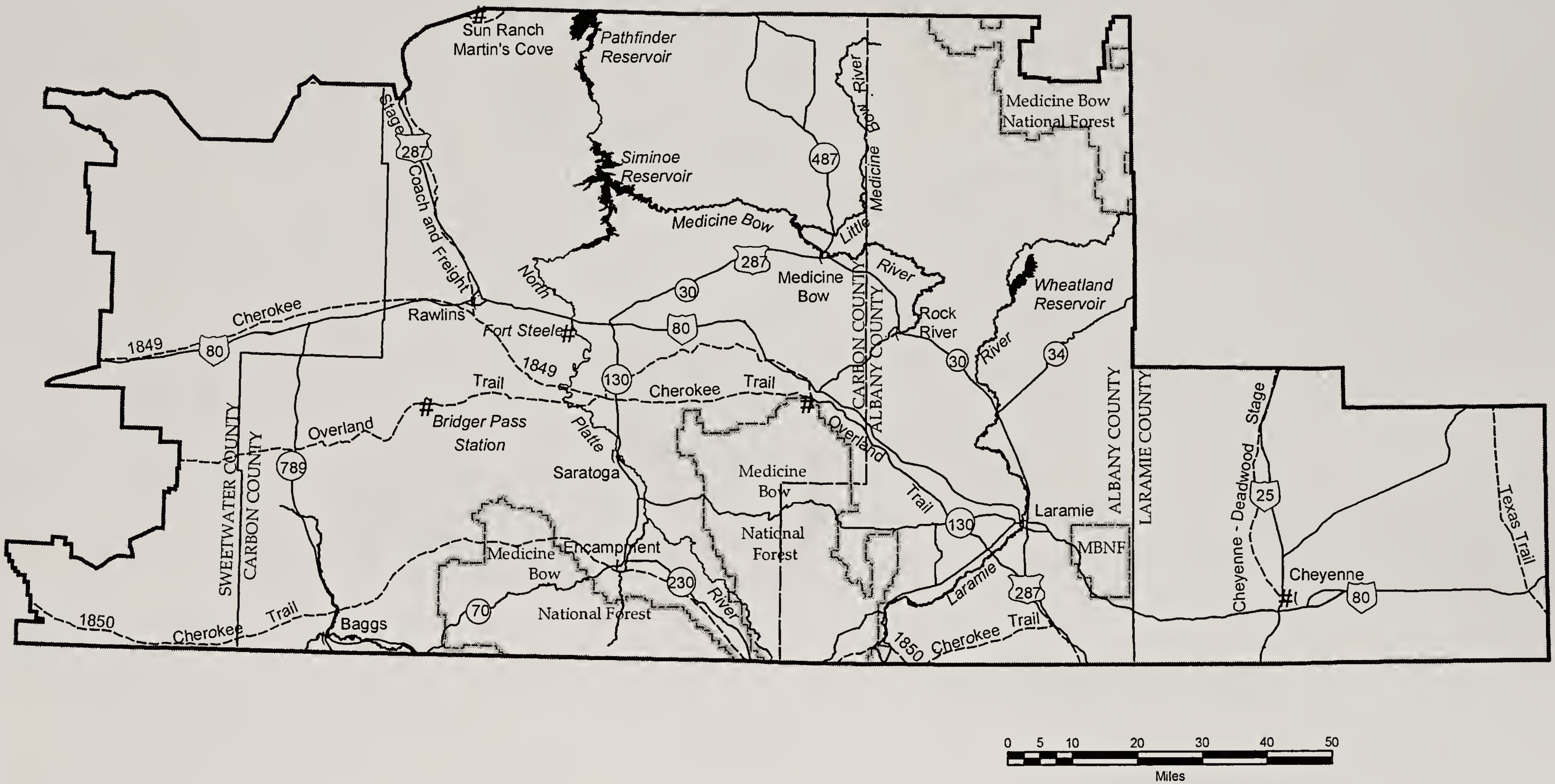
Source: CASTNet.

Figure 3.1-14b. Mean Annual Dry Deposition of Sulphur and Nitrogen Compounds in Rocky Mountain National Park, Colorado.



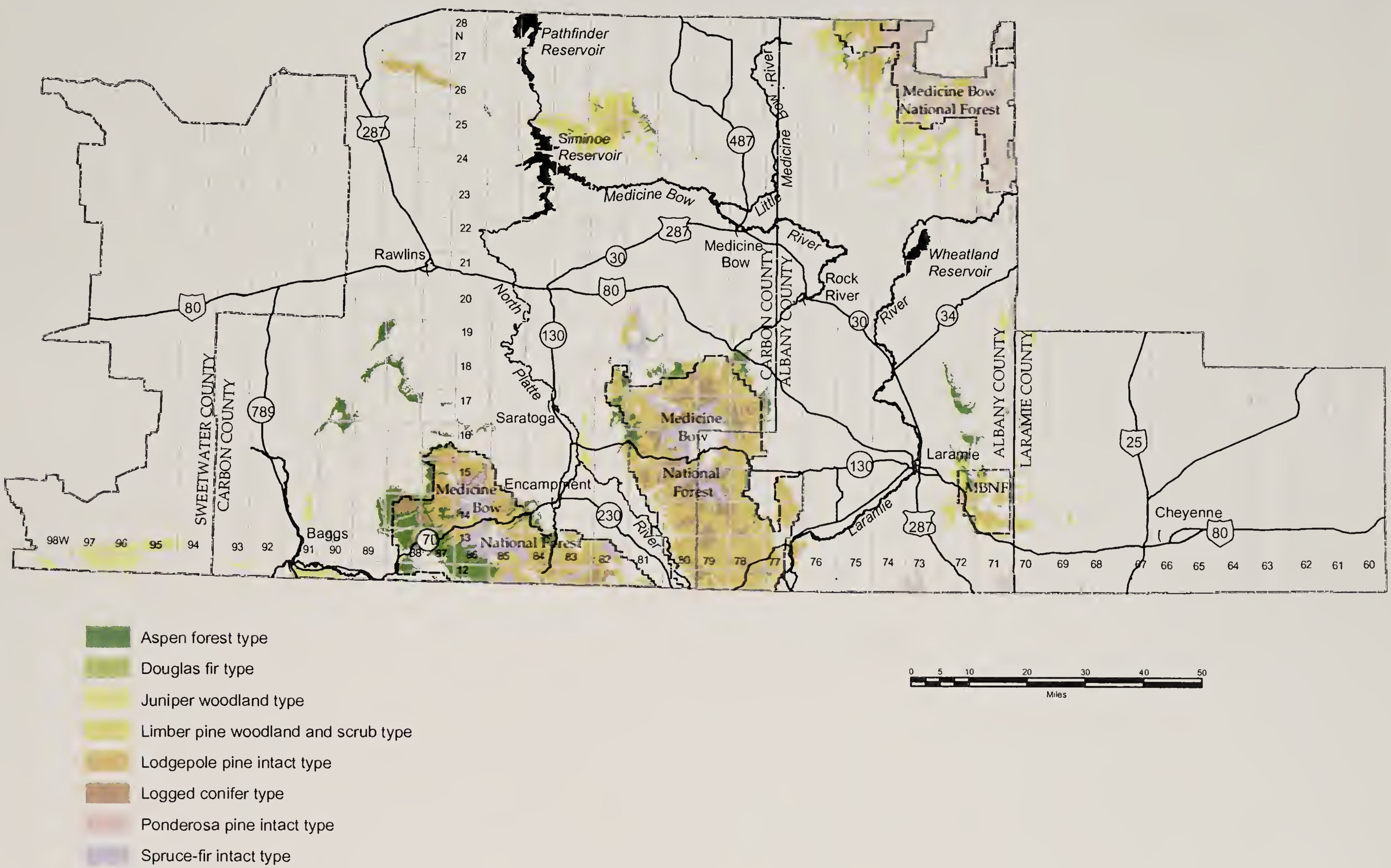
Source: CASTNet.

Figure 3.2-1. Rawlins Historic Trails and Points.



R-Figure 3.2-1 Historic trails and points

Figure 3.4-1. Forest Type and Stand Delineation.

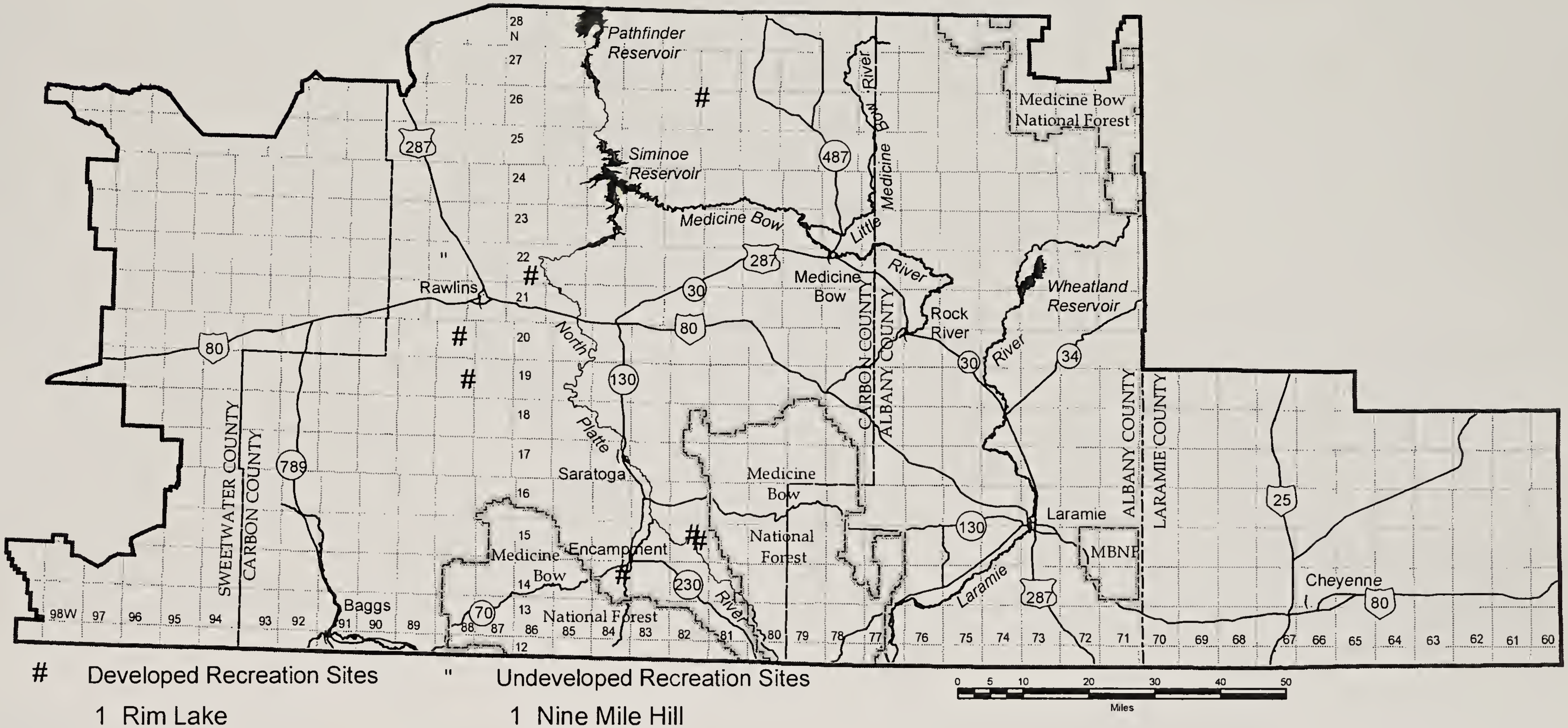


R-Figure 3.4-1 forest type

Figure 3.5-2. Major Oil and Gas Field Locations.

(data being converted for GIS use)

Figure 3.11-1a. Recreation Sites.



Developed Recreation Sites

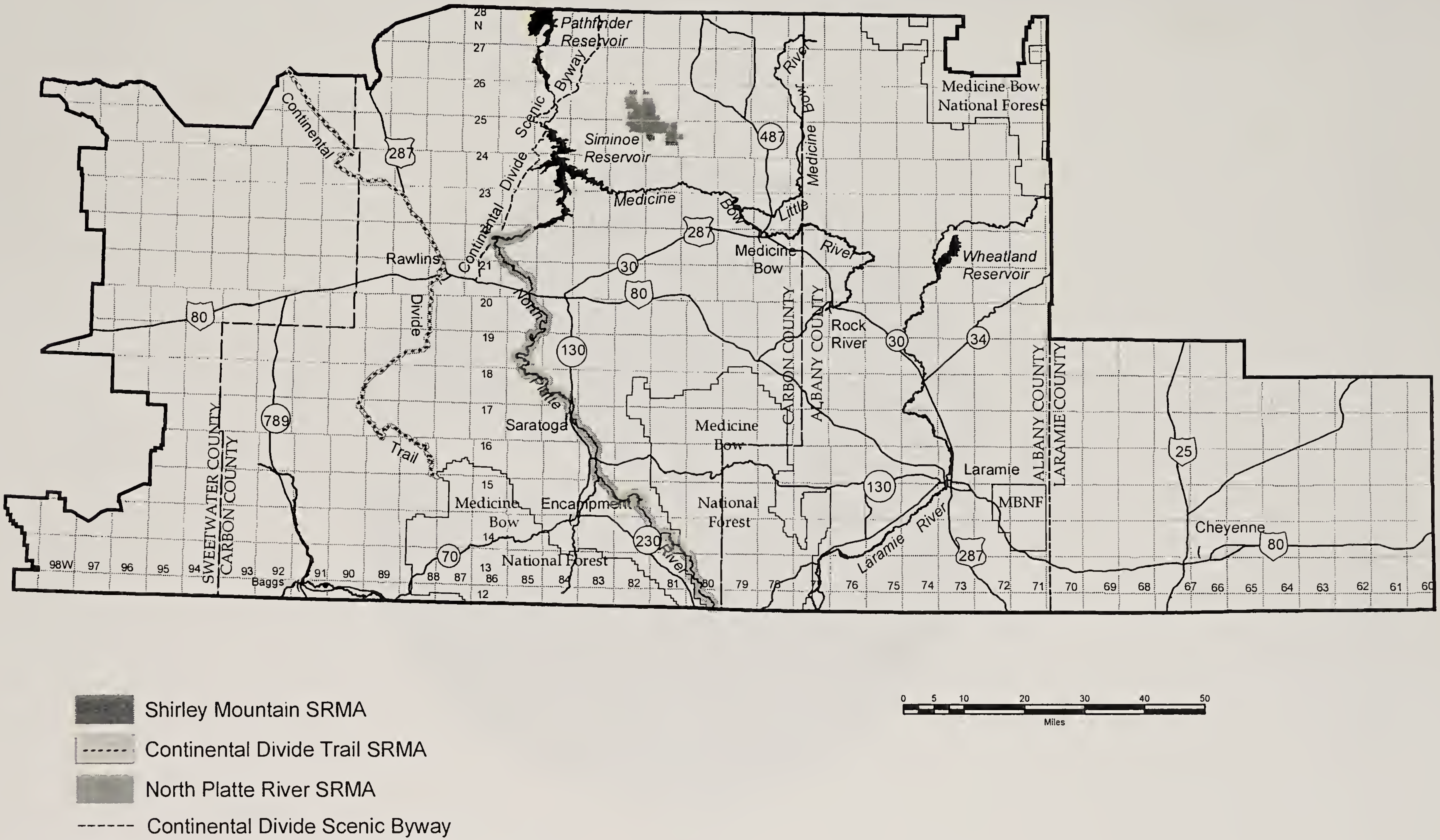
1 Rim Lake
2 Teton Reservoir
3 Encampment River
4 Bennett Peak
5 Corral Creek
6 Dugway
7 Pryor Flat

" Undeveloped Recreation Sites

1 Nine Mile Hill
2 Big Creek

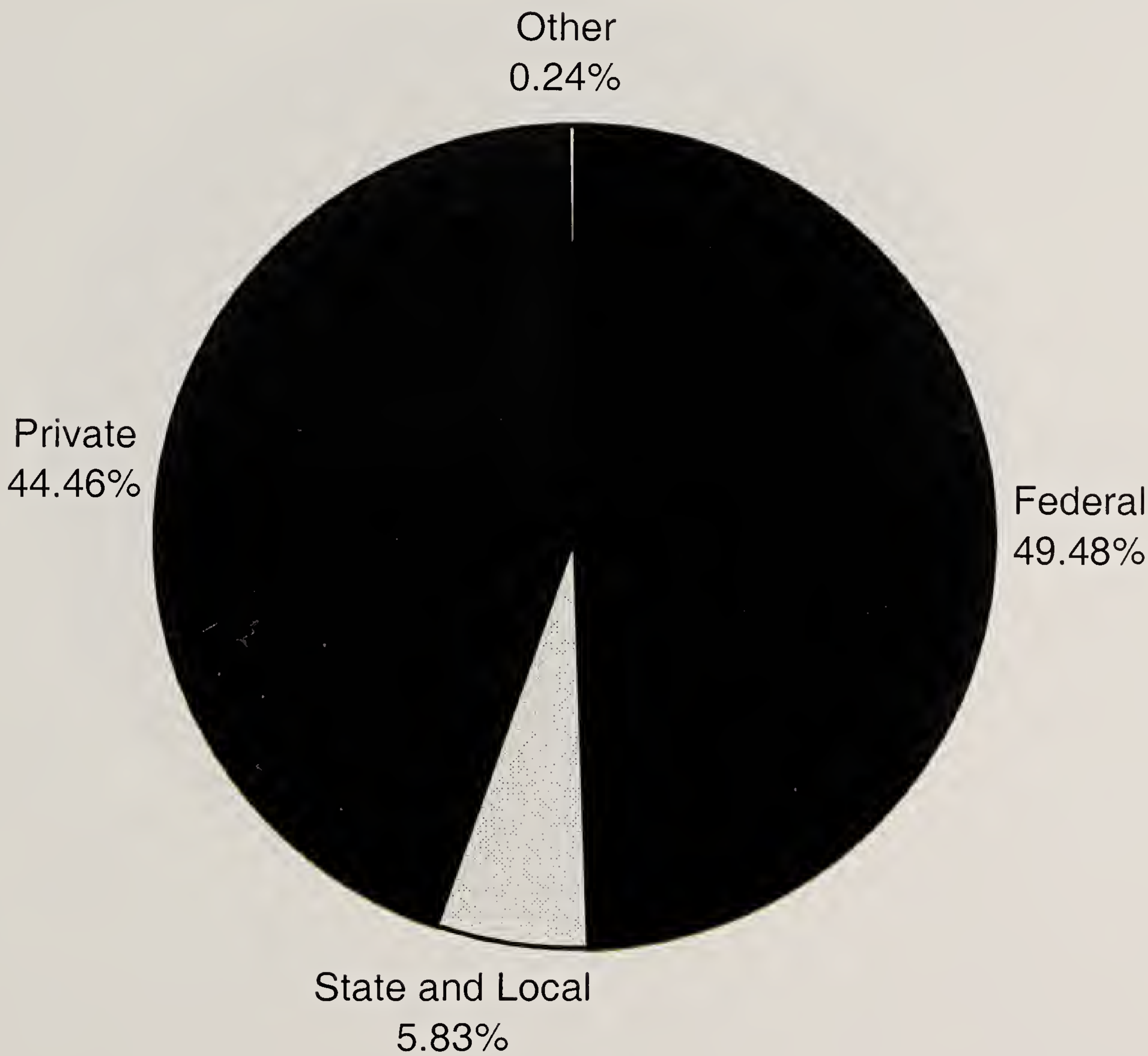
R-Figure 3.11-1a Recreation Sites

Figure 3.11-1b. Special Recreation Management Areas.



R-Figure 3.11-1b SRMA

Figure 3.12-1. Land Ownership—Four County Socioeconomic Study Area.



Source: Wyoming Division of Economic Analysis

Figure 3.12-2. Land Ownership—Rawlins RMPPA.

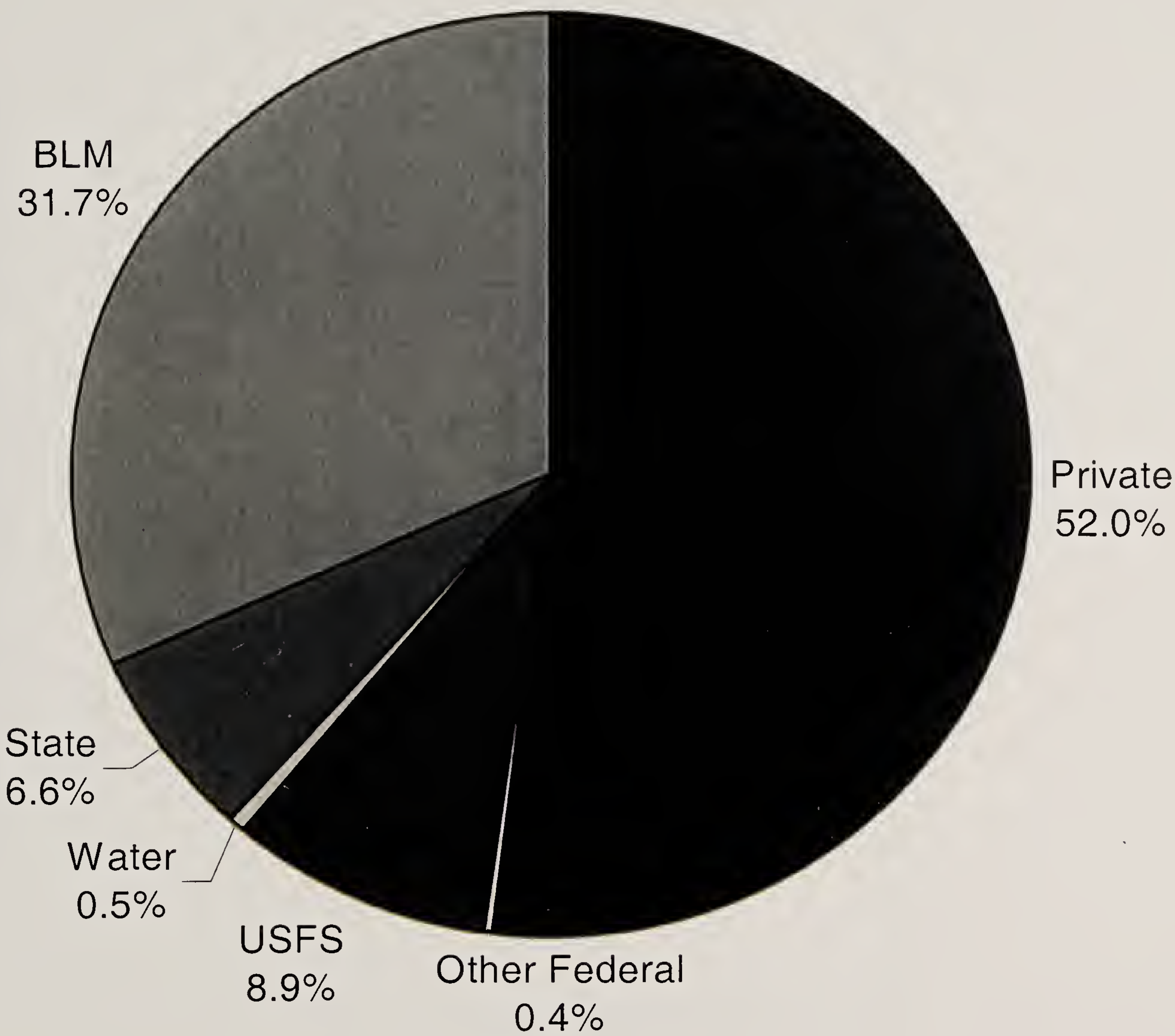


Figure 3.12-3. Population Estimate for Counties in the Socioeconomic Study Area.

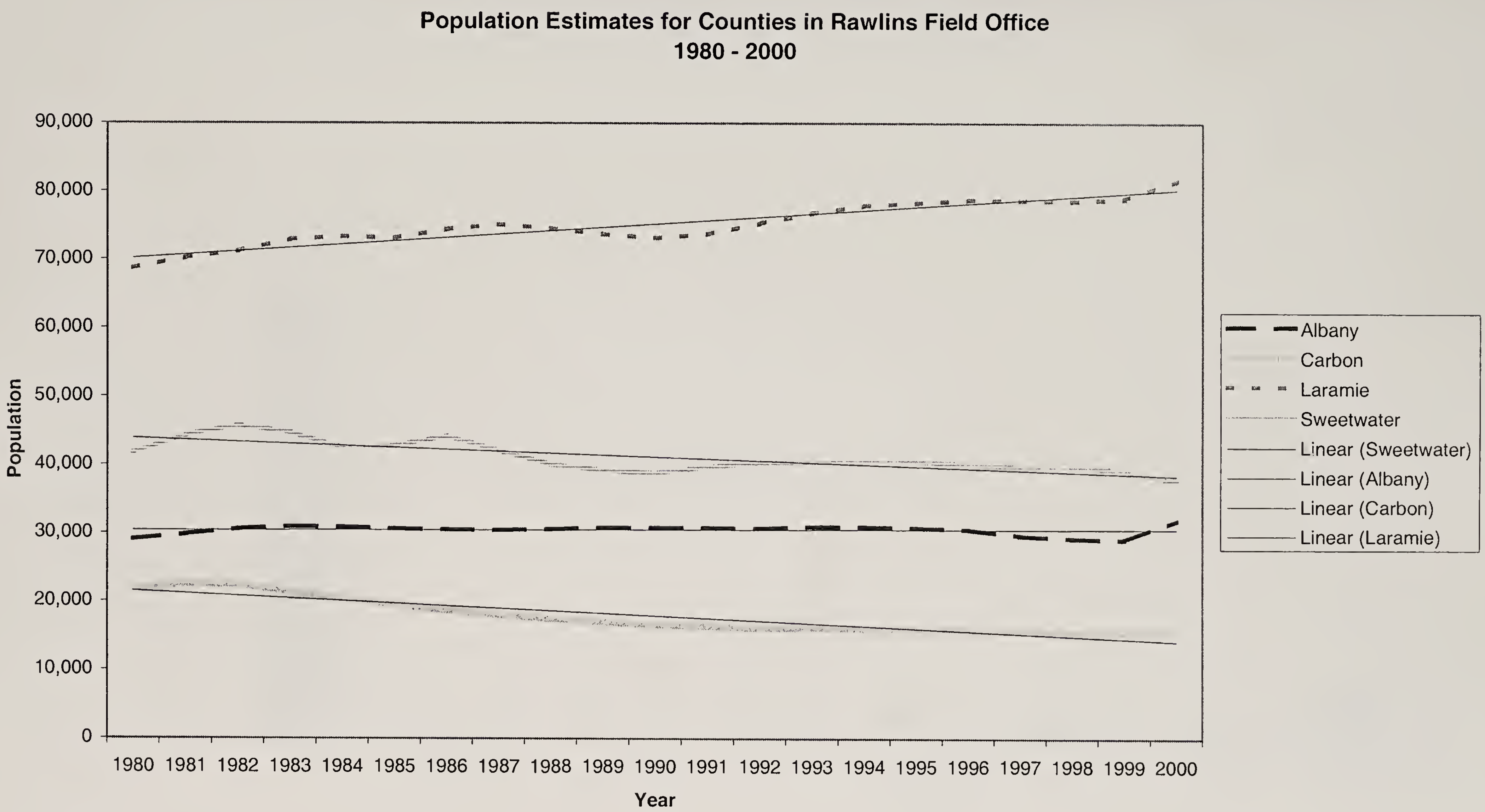


Figure 3.12-4. Ethnicity in the Socioeconomic Study Area.

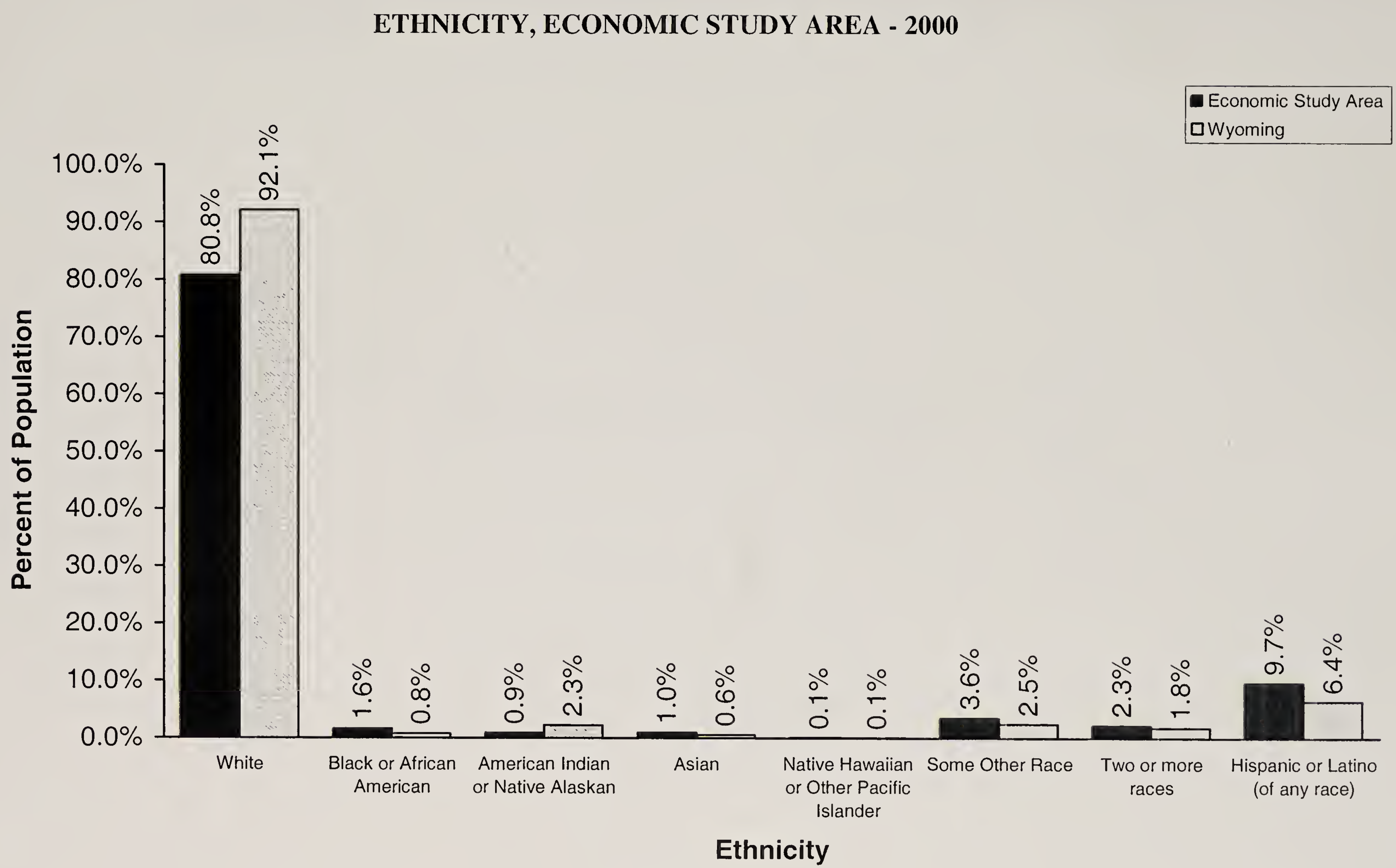


Figure 3.12-5. Unemployment Rate in the Socioeconomic Study Area.

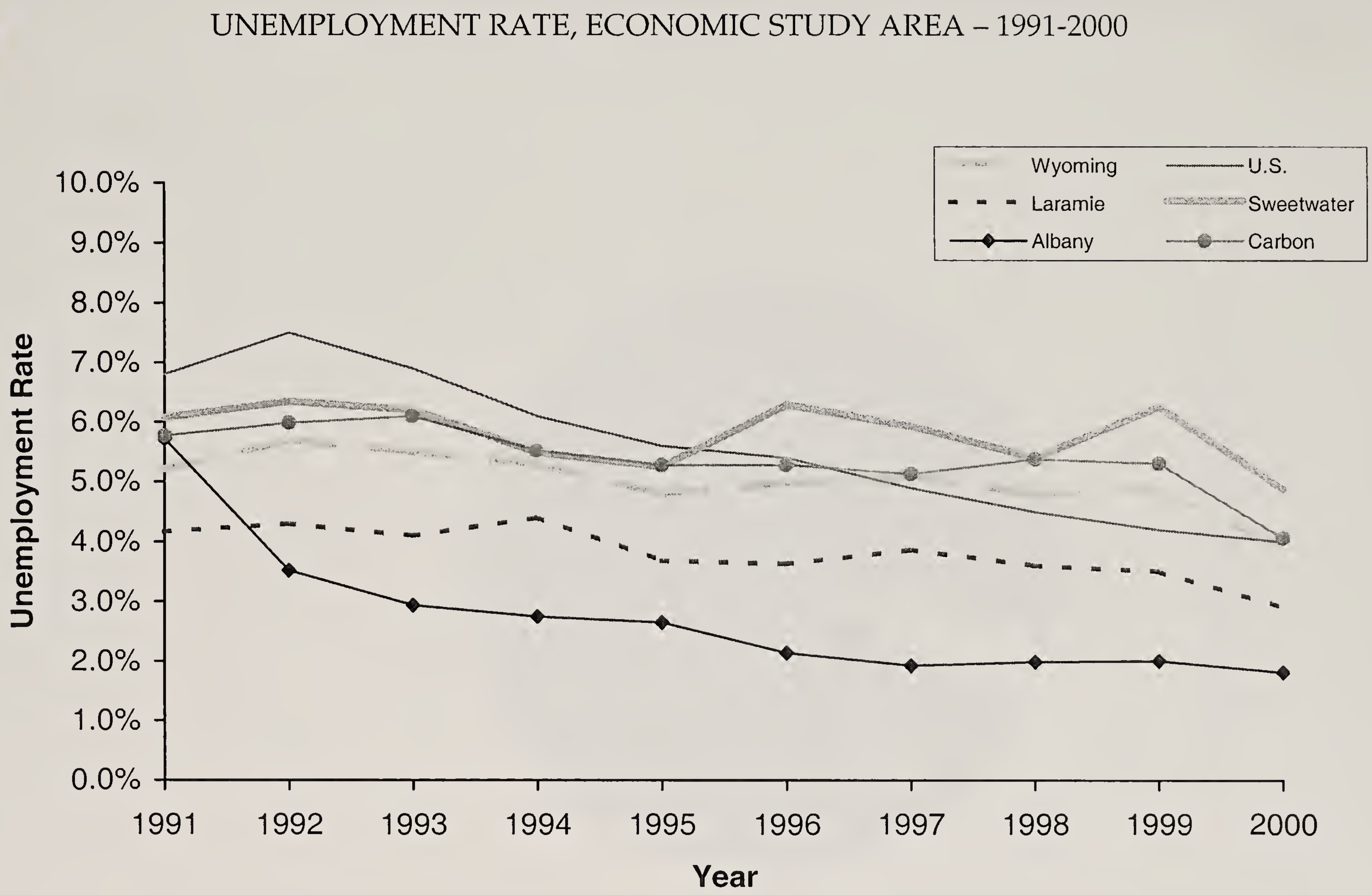


Figure 3.12-6. Employment by Industry in the Socioeconomic Study Area.

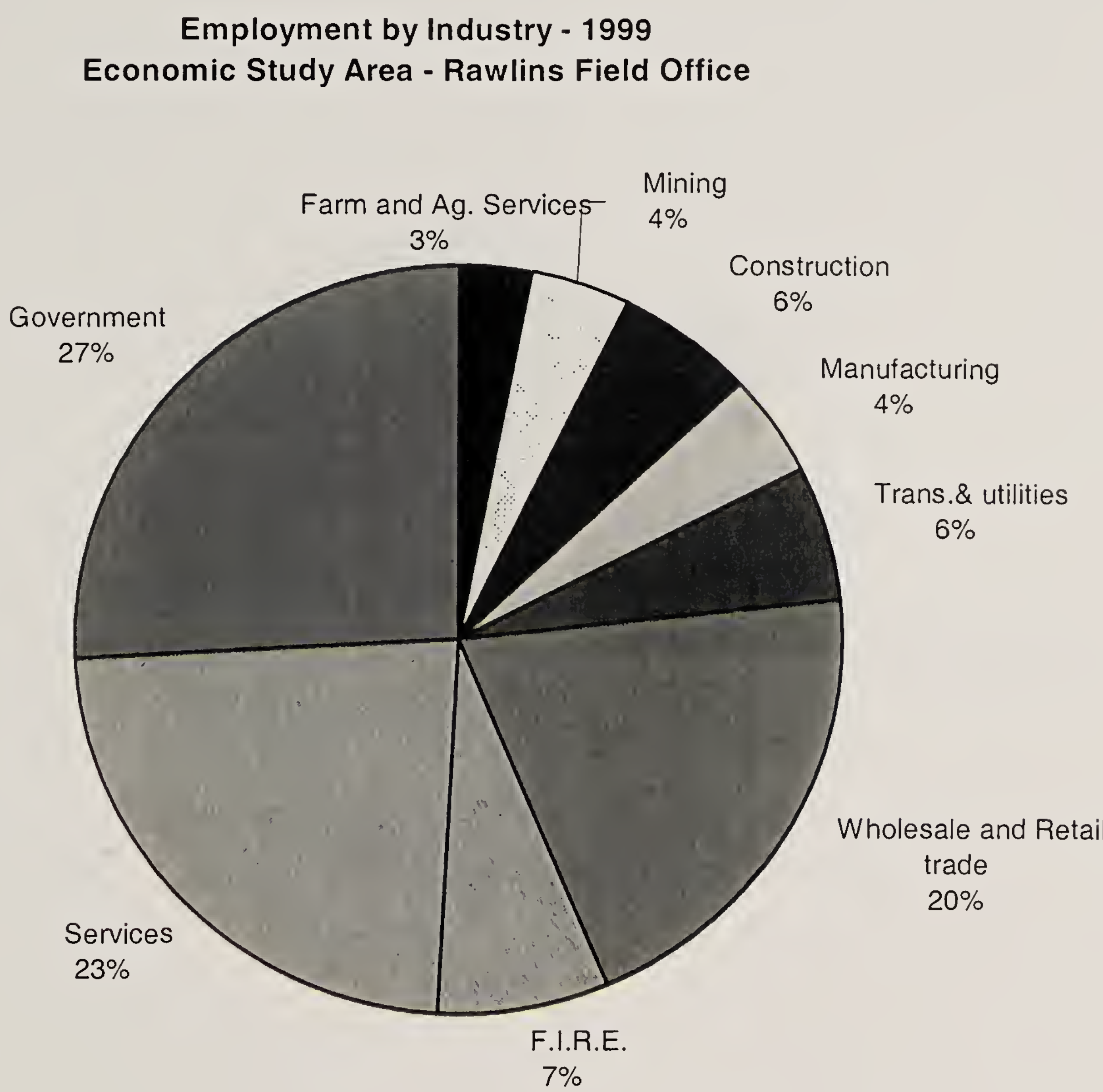


Figure 3.12-7. Percentage of Gross Earnings by Industry in the Socioeconomic Study Area.

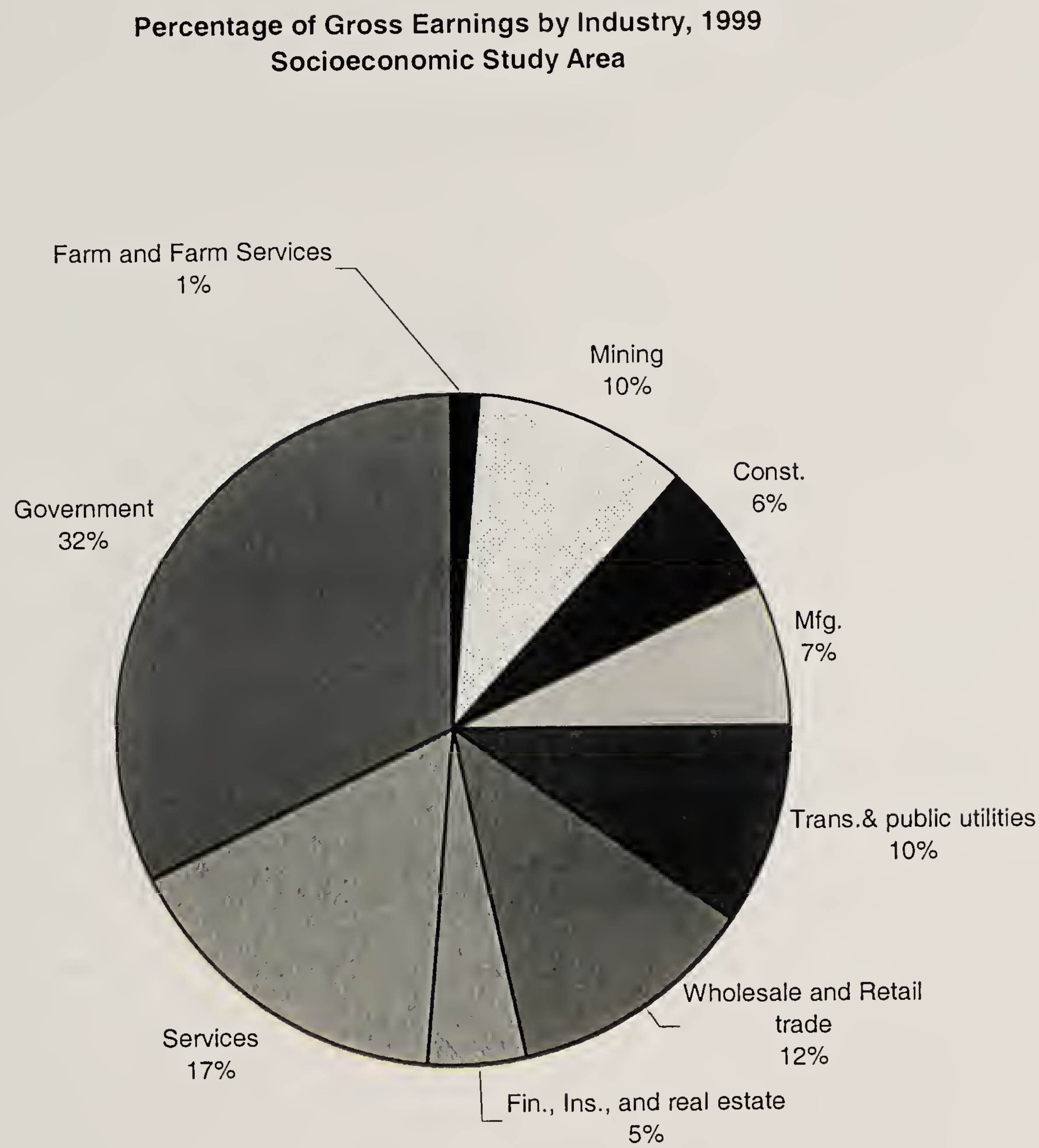


Figure 3.12-8. Local Assessed Property in the Socioeconomic Study Area.

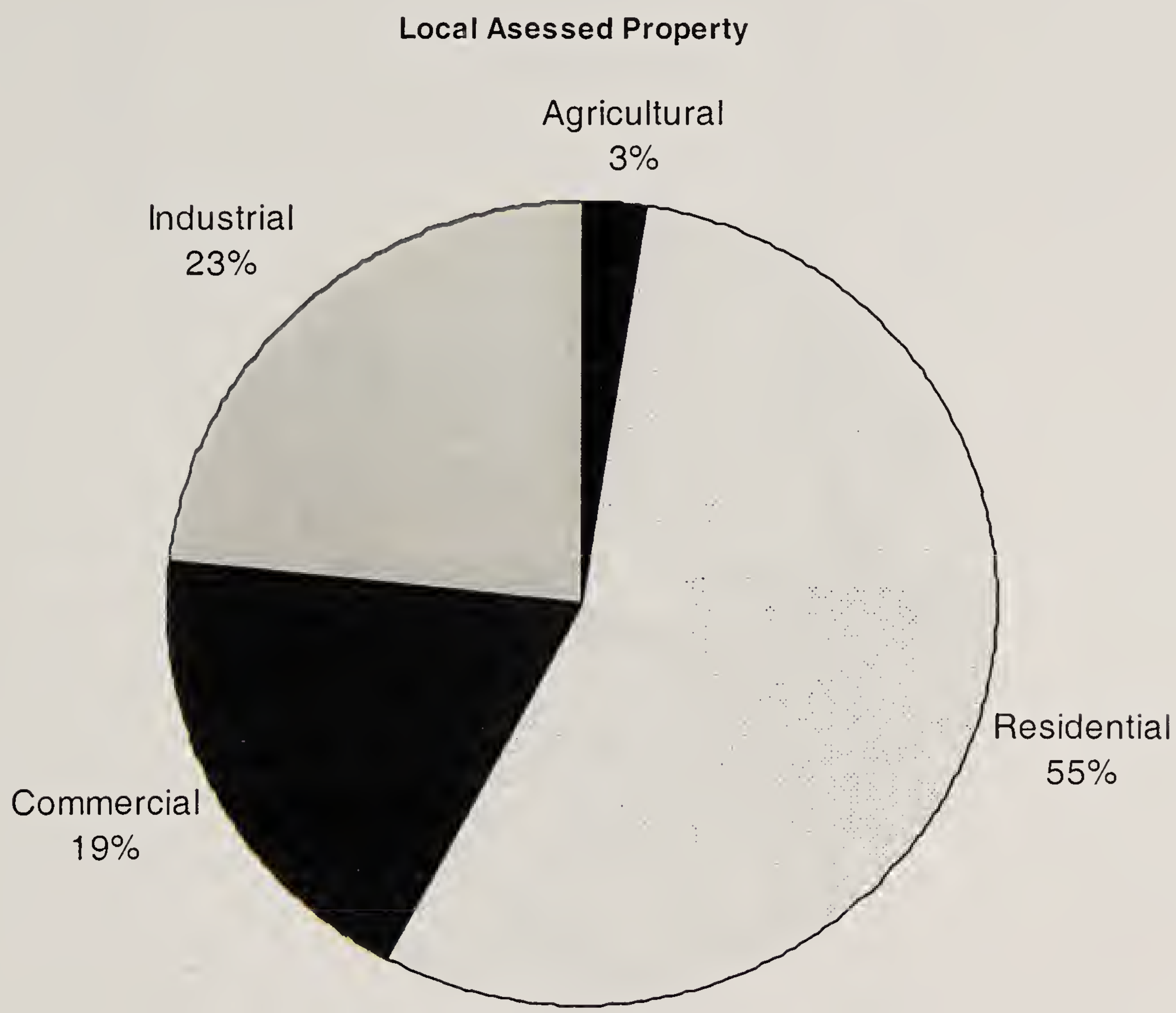


Figure 3.12-9. Historic Gas Production in the Socioeconomic Study Area.

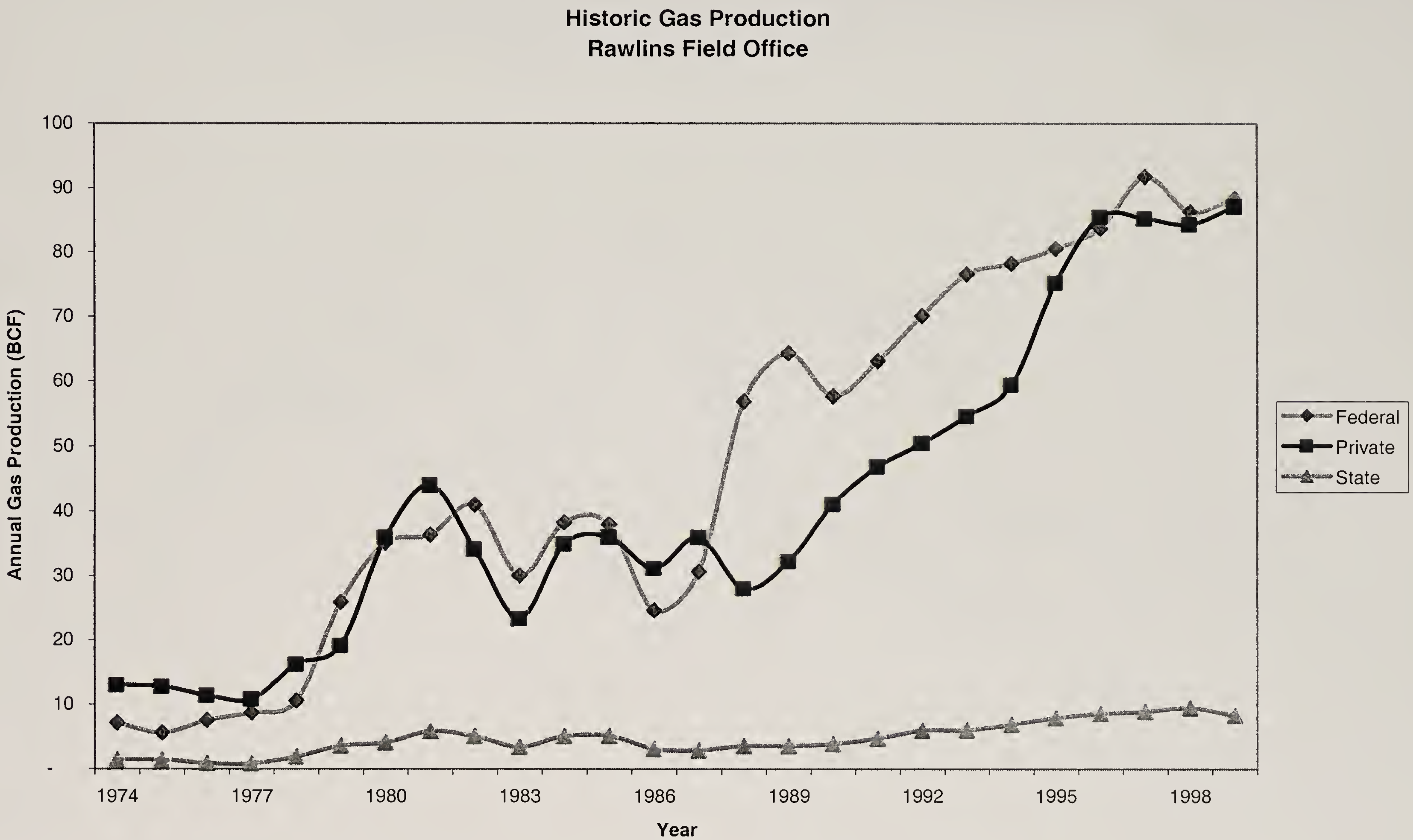


Figure 3.12-10. Historic Production of Oil in the Socioeconomic Study Area.

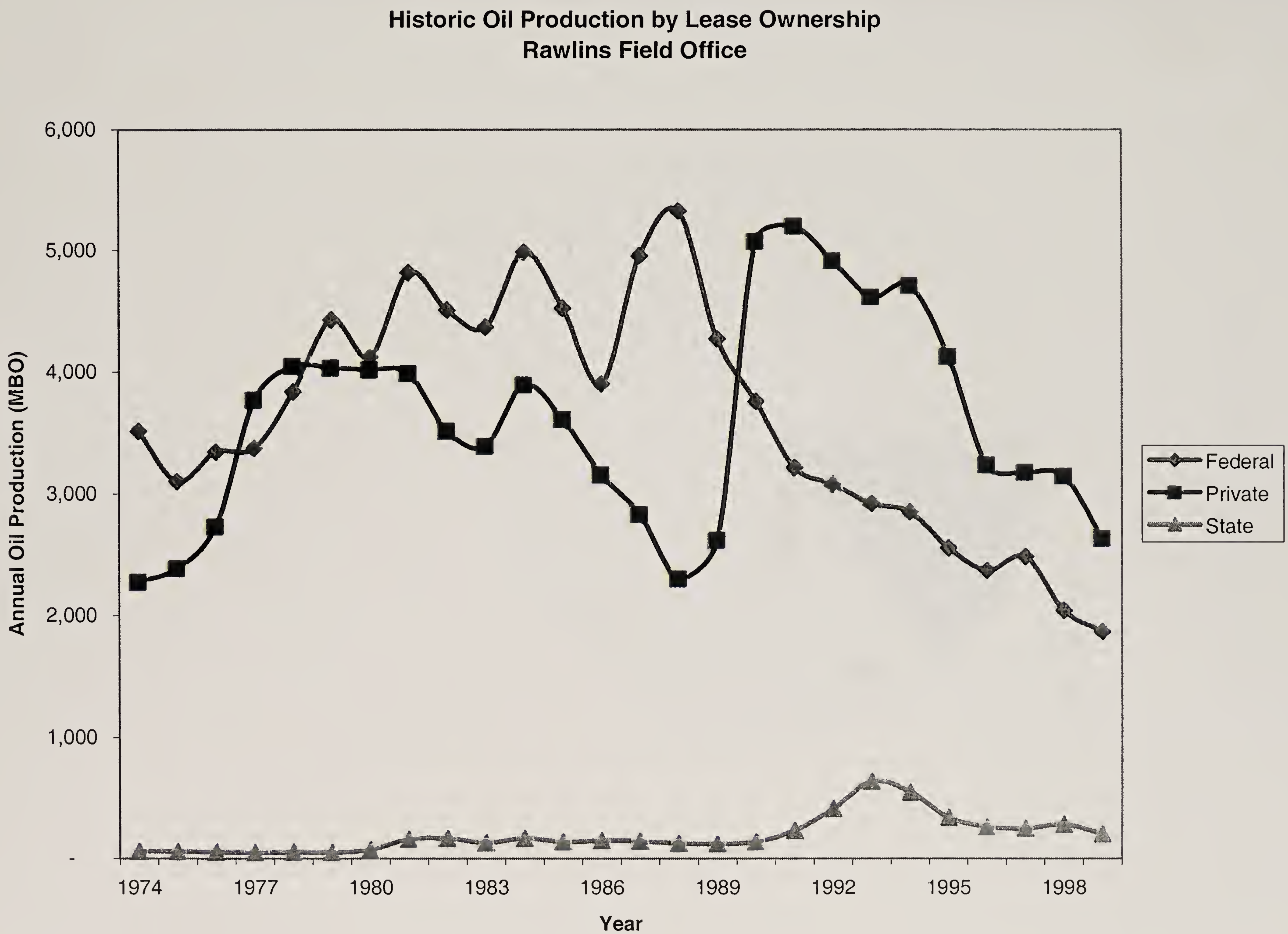


Figure 3.12-11. State Assessed Property in the Socioeconomic Study Area.

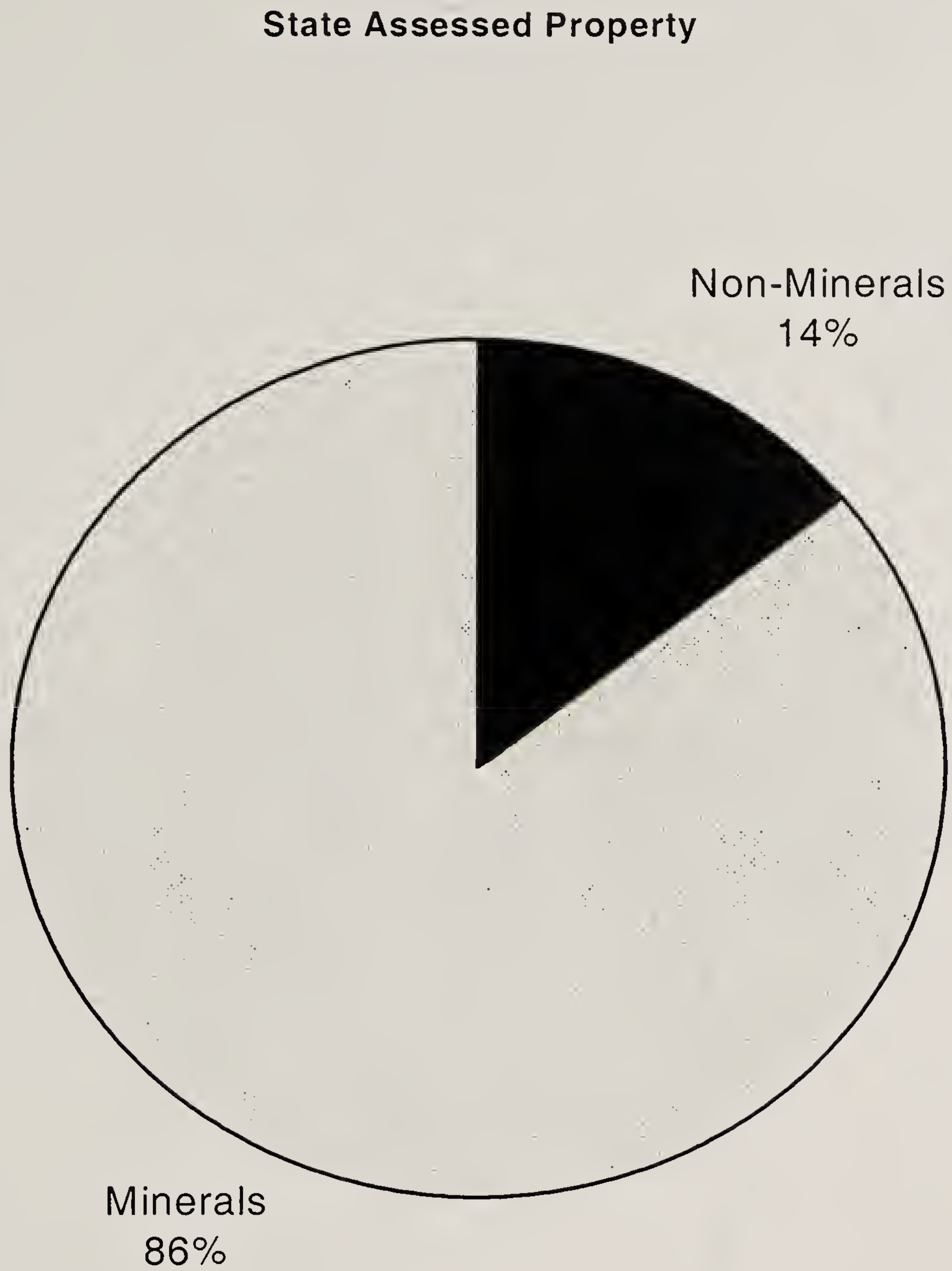


Figure 3.12-12. Annual PILT Payments in the Socioeconomic Study Area.

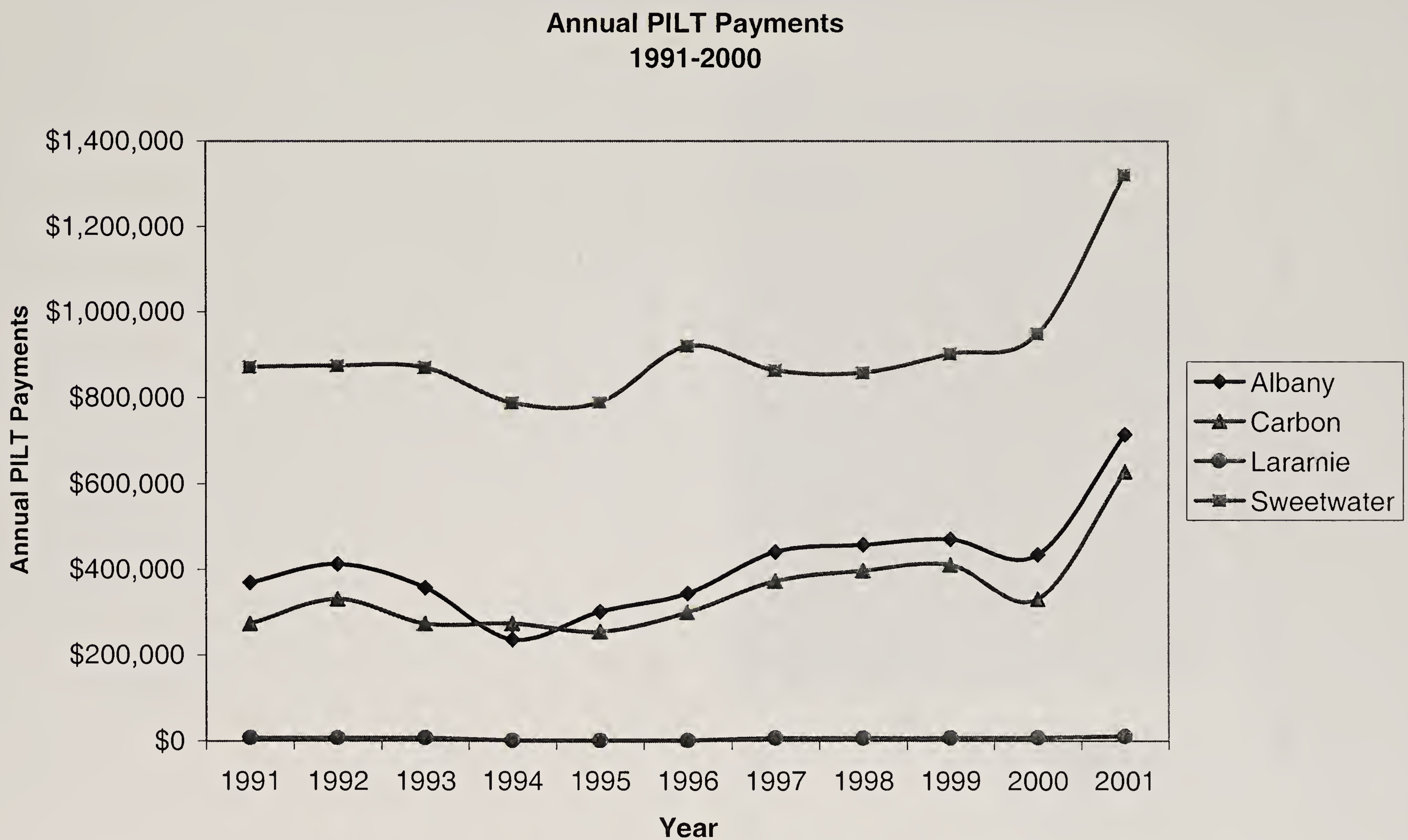


Figure 3.12-13. Percent of Minority Population by County in Wyoming, Including the Socioeconomic Study Area.

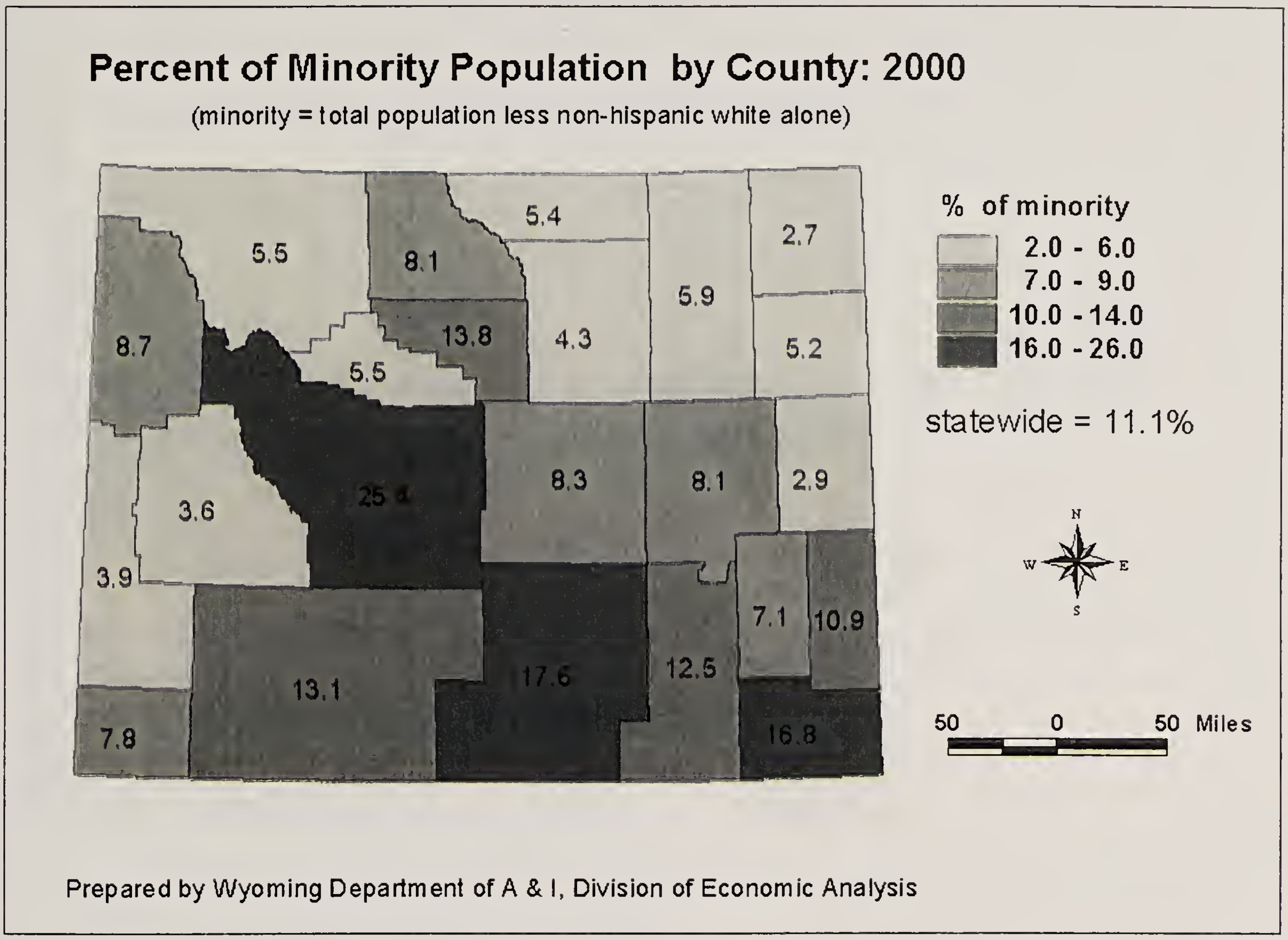
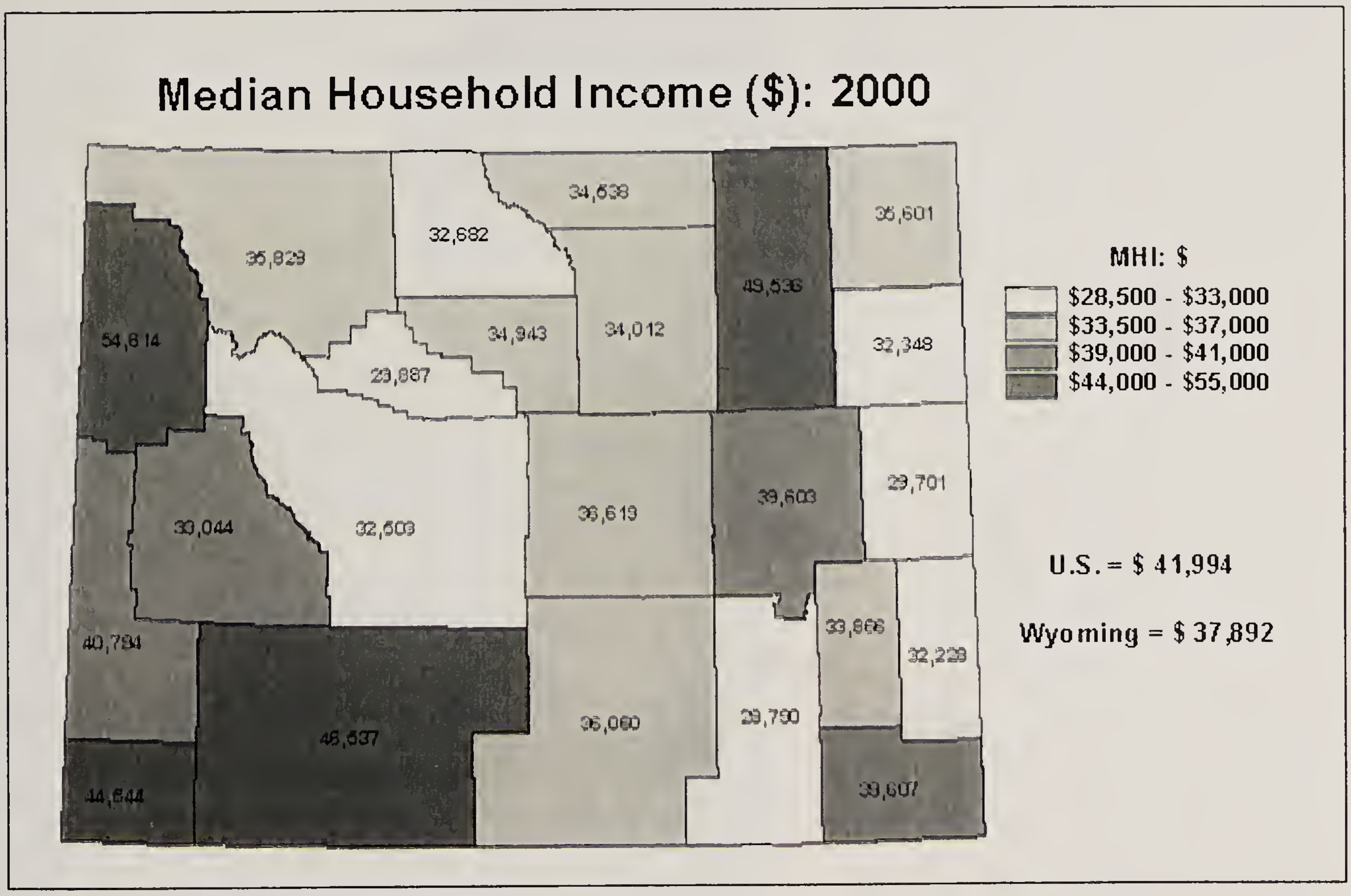
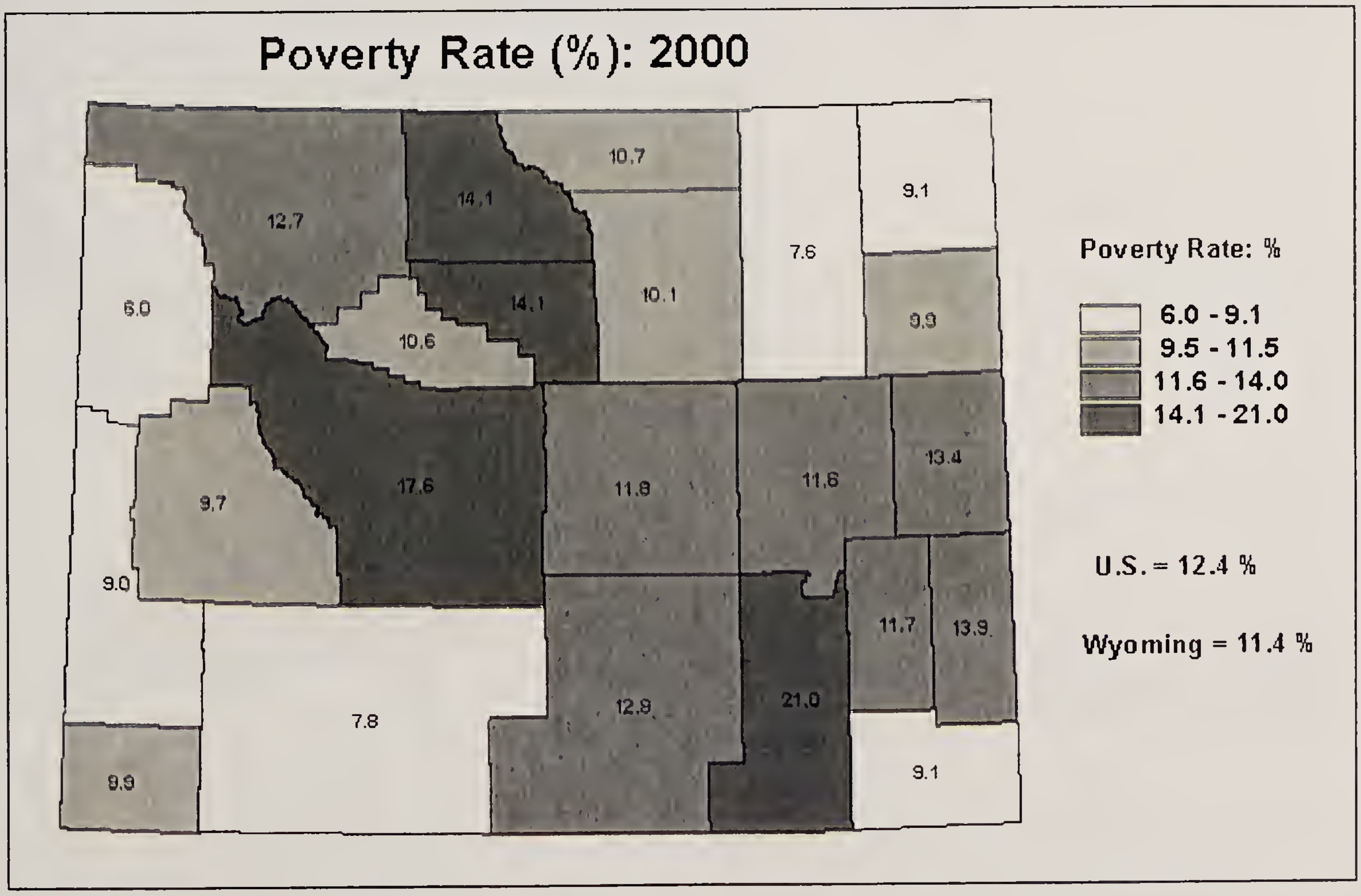


Figure 3.12-14. Median Household Income and Poverty Rate by County for Wyoming, Including the Socioeconomic Study Area.

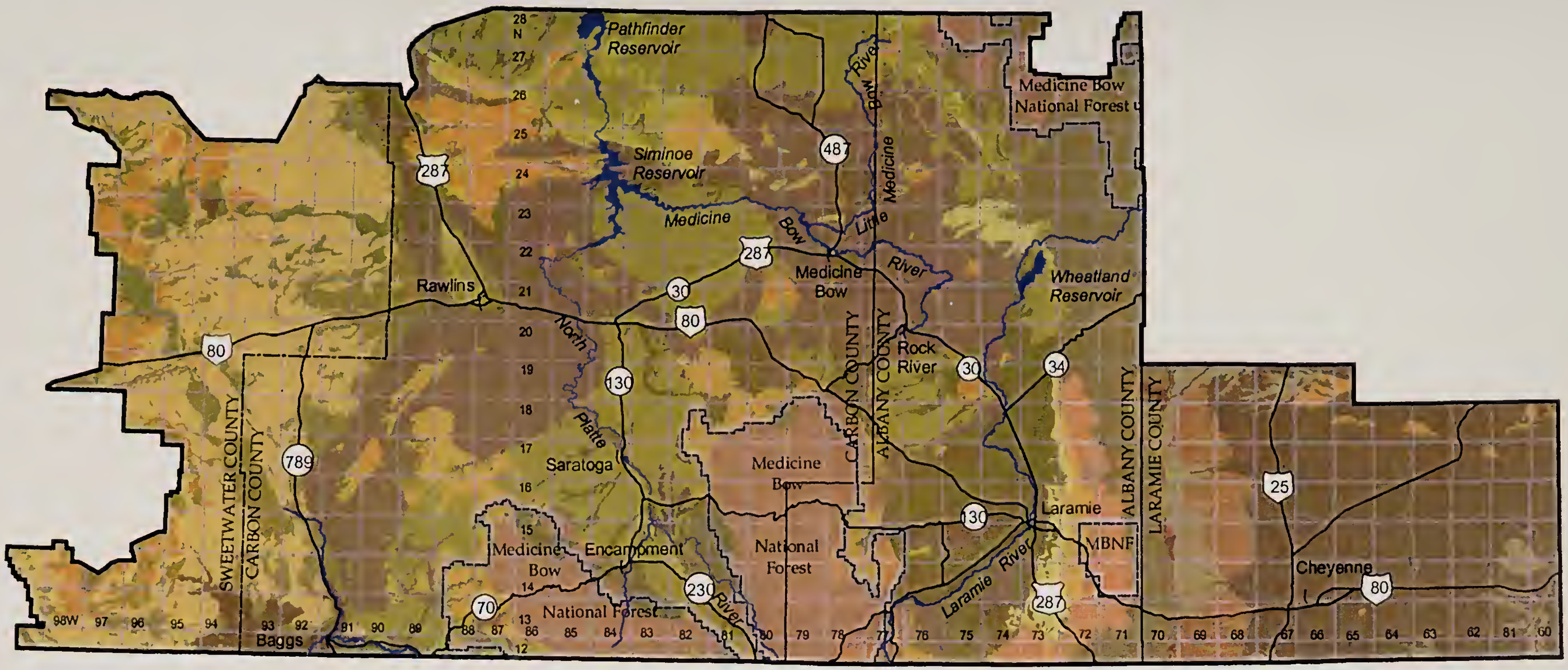




Source: U.S. Census Bureau

Prepared by Wyoming Economic Analysis Division

Figure 3.13-1. Soil Types.



- Typic Haplocryalfs, Typic Dystrocryepts and Typic Haplocryolls
- Typic Haplargids and Typic Haplocalcids
- Typic Torripsamments
- Calcic Haplosalids
- Typic Torriorthents
- Typic Argiustolls
- Ustic Haplocambids and Ustoic Torriorthents
- Ustic Torriorthents and Aridic Ustochrepts
- Ustic Torriorthents and Ustic Haplocambids
- Typic Torrifluvents and Typic Haplaquolls
- Typic Haplocryalfs and Typic Dystrocryepts
- Histic Cryaquepts and Typic Cryaquolls
- Typic Dystrocryepts and Lithic Cryorthents
- Typic Dystrocryepts and Typic Cryothents
- Typic Dystrocryepts
- Lithic Torriorthents
- Ustic Haplargids and Ustic Natrargids
- Typic Natrargids and Typic Torriorthents
- Ustic Torriorthents and Ustic Haplocalcids
- Typic Petrocalcids and Ustic Calciargids
- Ustic Haplocambids and Ustic Haplargids
- Ustic Haplargids, Ustic Haplocambids and Ustic Natrargids
- Ustic Haplocambids and Ustic Torriorthents
- Aridic Haplustolls and Ustic Haplocambids
- Ustic Haplargids and Ustic Torrifluvents
- Typic Hapludalfs and Aridic Haplustepts

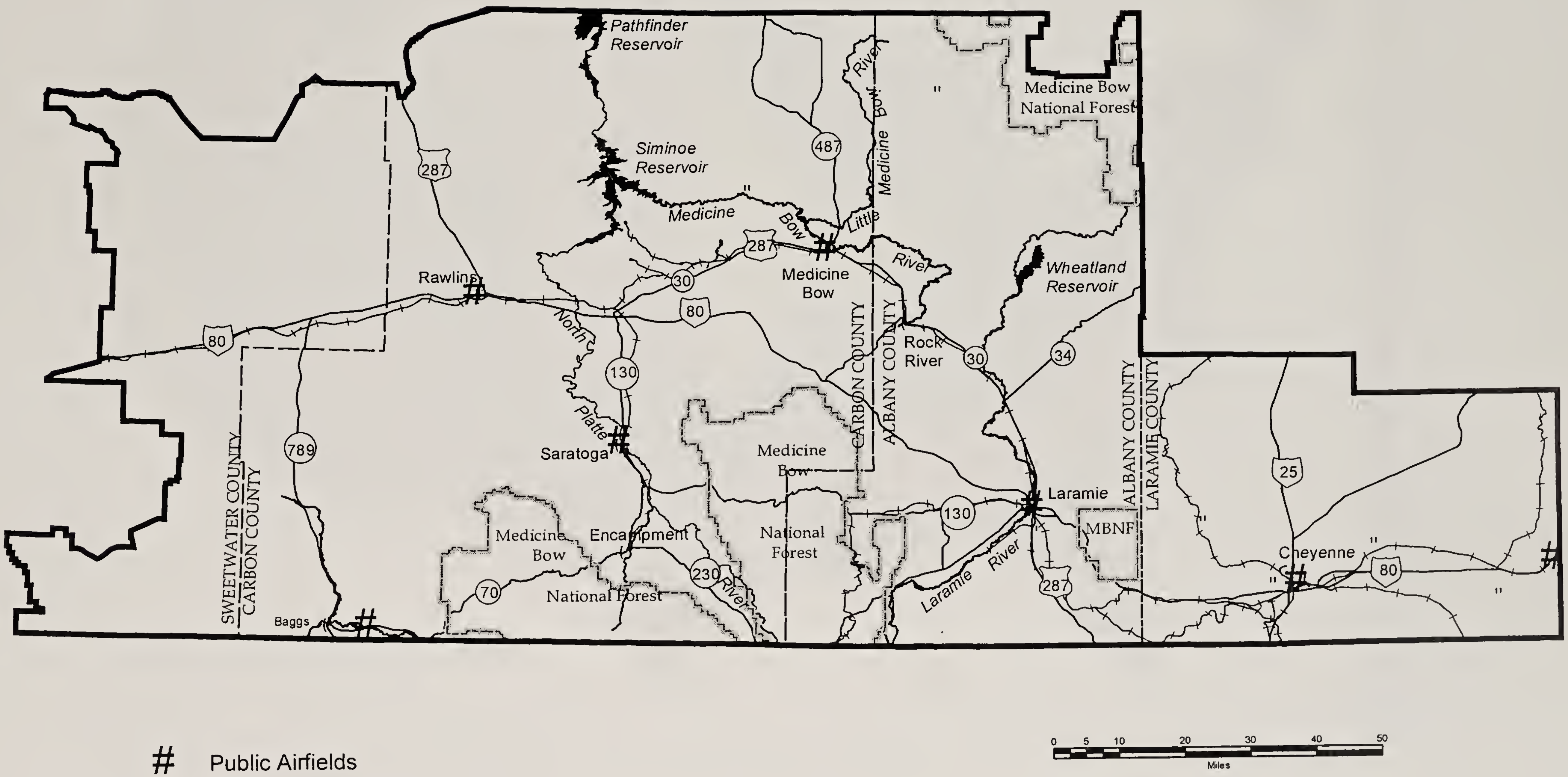
R-Figure 3.13-1 Soil Types

Figure 3.13-2. Statewide Soil Zones from 1987 RMP/EIS.

(Information to be provided for Final)

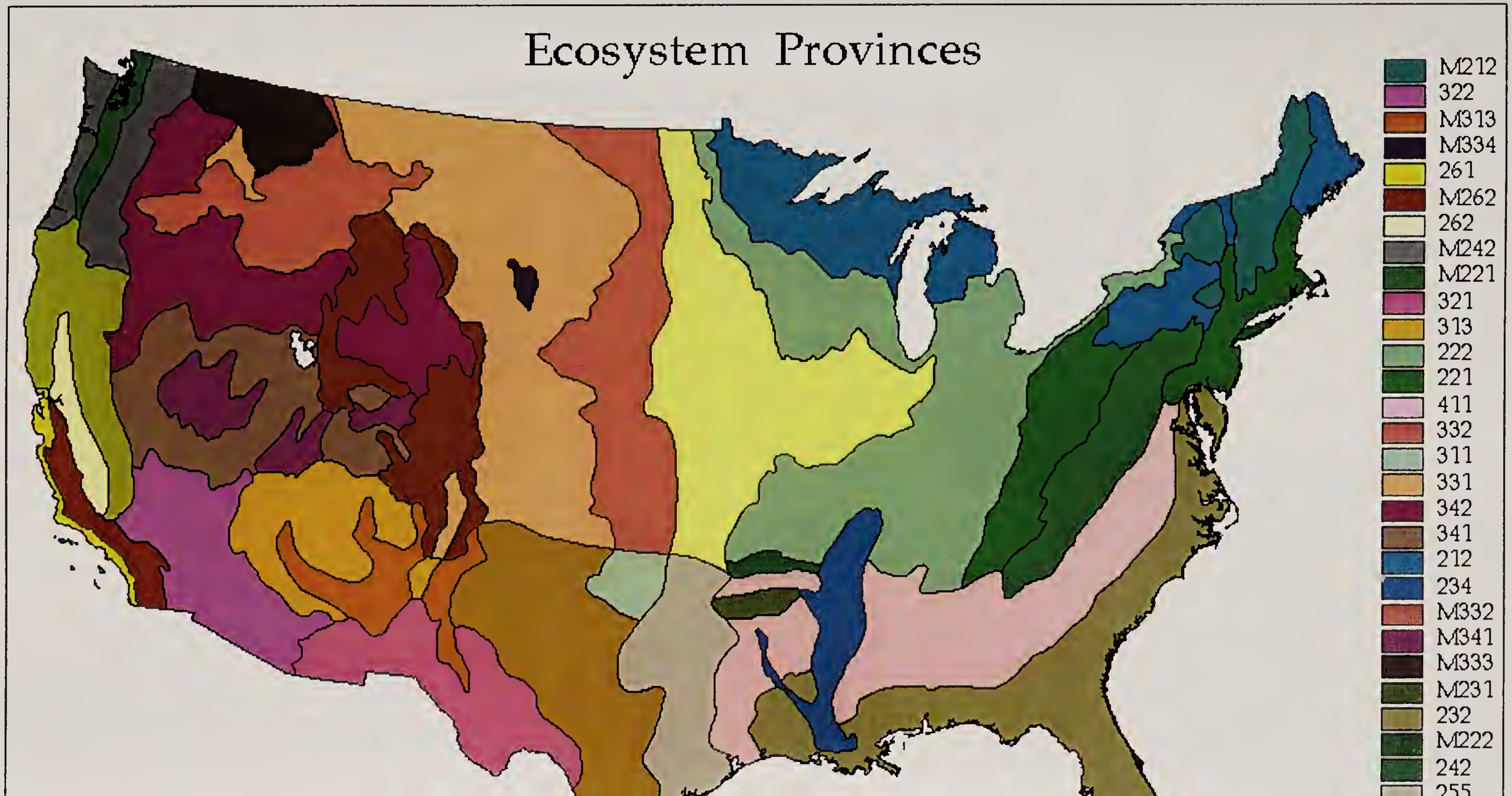
R-Figure 3.12-2 Statewide Soil Zones

Figure 3.14-1. Transportation Network.



R-Figure 3.14-1 Transportation Network

Figure 3.15-1. Ecological Provinces.



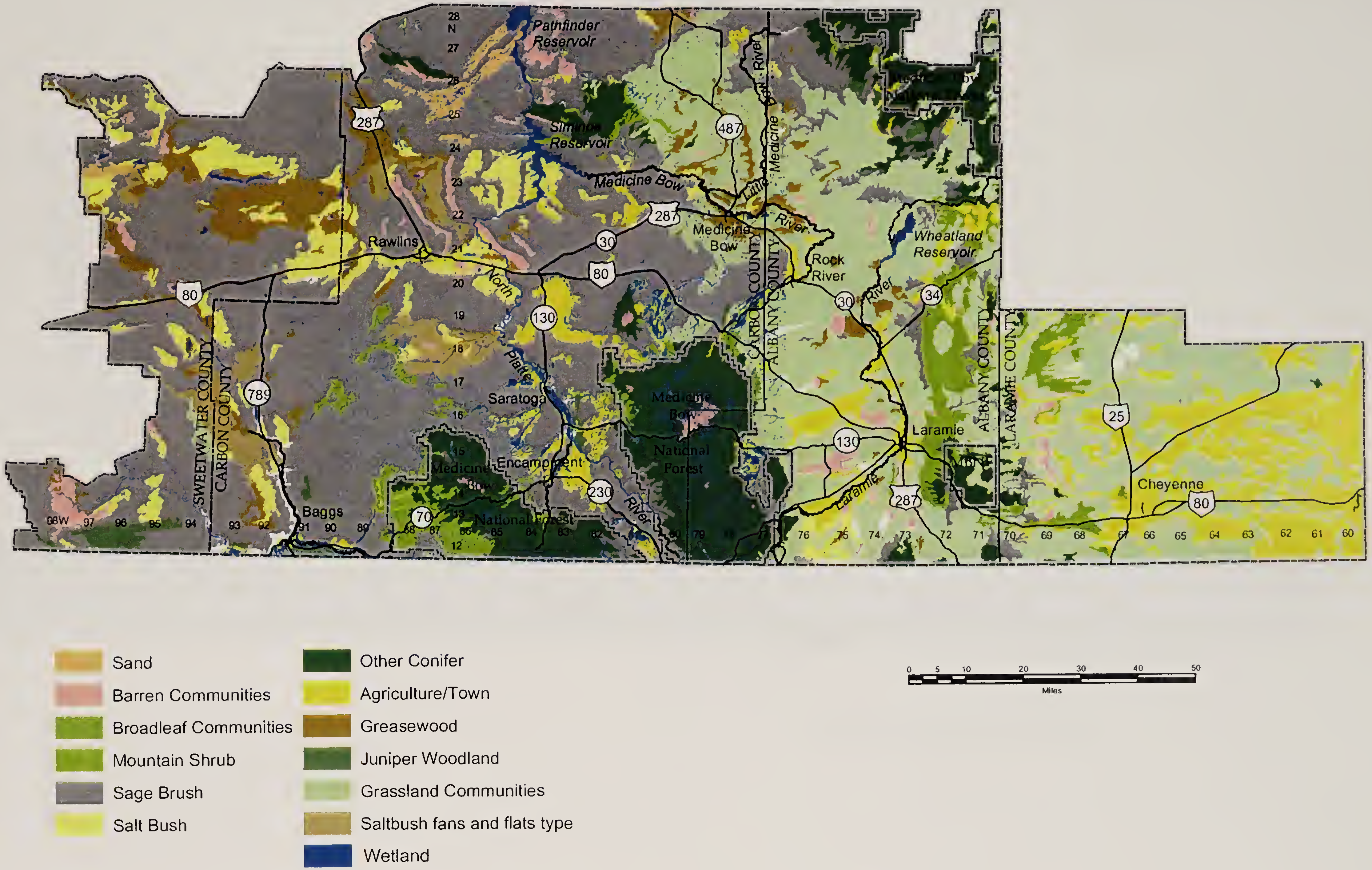
330 Temperate Steppe Division
- 331 Great Plains-Palouse Dry Steppe Province
- 332 Great Plains Steppe Province

M330 Temperate Steppe Division - Mountain Provinces
- M331 Southern Rocky Mountain Steppe--Open Woodland--Coniferous Forest--Alpine Meadow Province
- M332 Middle Rocky Mountain Steppe--Coniferous Forest--Alpine Meadow Province
- M333 Northern Rocky Mountain Forest-Steppe--Coniferous Forest--Alpine Meadow Province
- M334 Black Hills Coniferous Forest Province

340 Temperate Desert Division
- 341 Intermountain Semidesert and Desert Province
- 342 Intermountain Semidesert Province

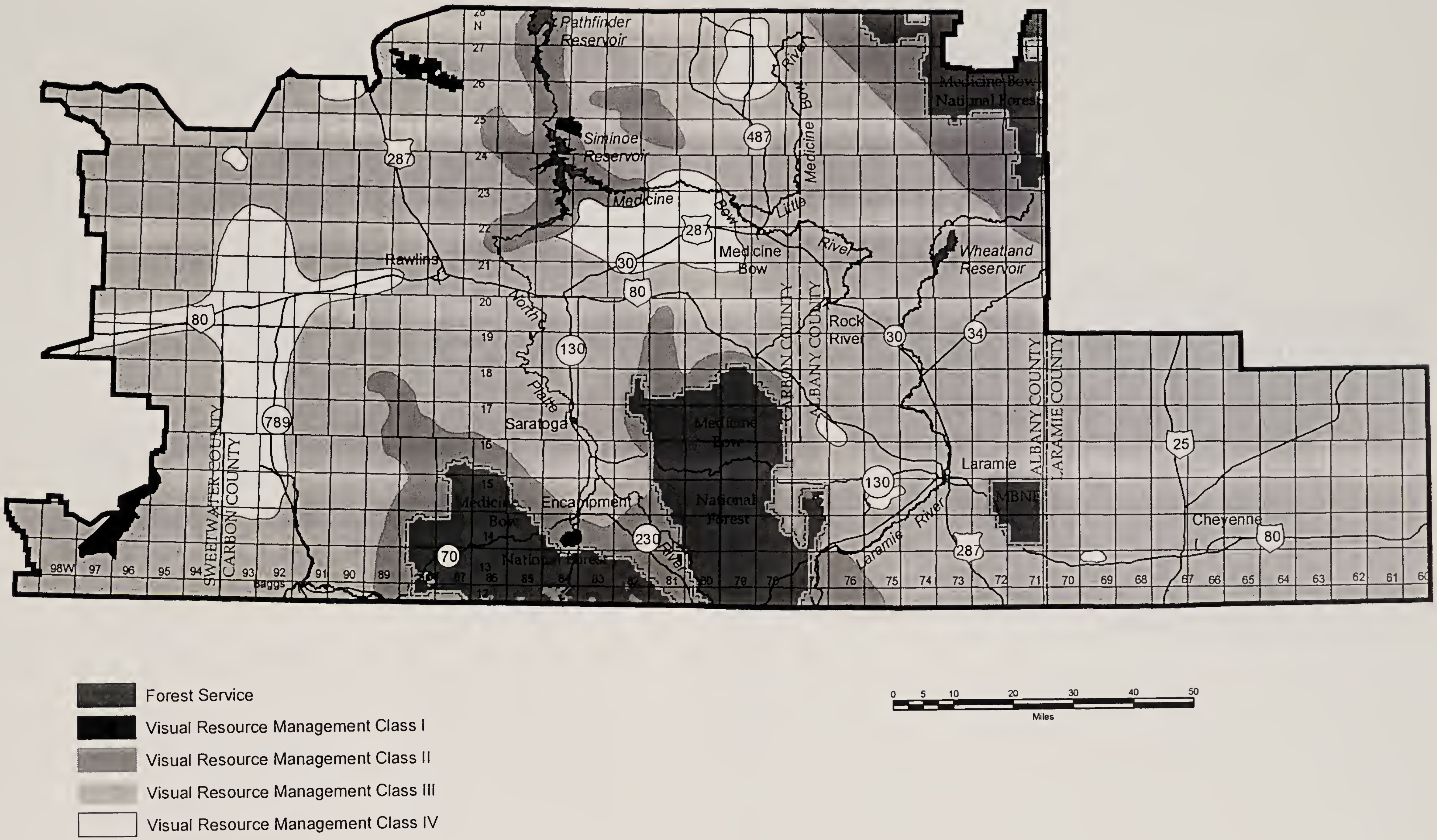
R-Figure 3.15-1 Ecological Provinces

Figure 3.15-2. GAP Vegetation Map and NWI Wetland Data.



R-Figure 3.15-2 GAP veg wetland

Figure 3.16-1. Visual Resource Management Classes.



R-Figure 3.16-1 VRM Classes

Figure 3.17-1. Fourth Order Watershed.

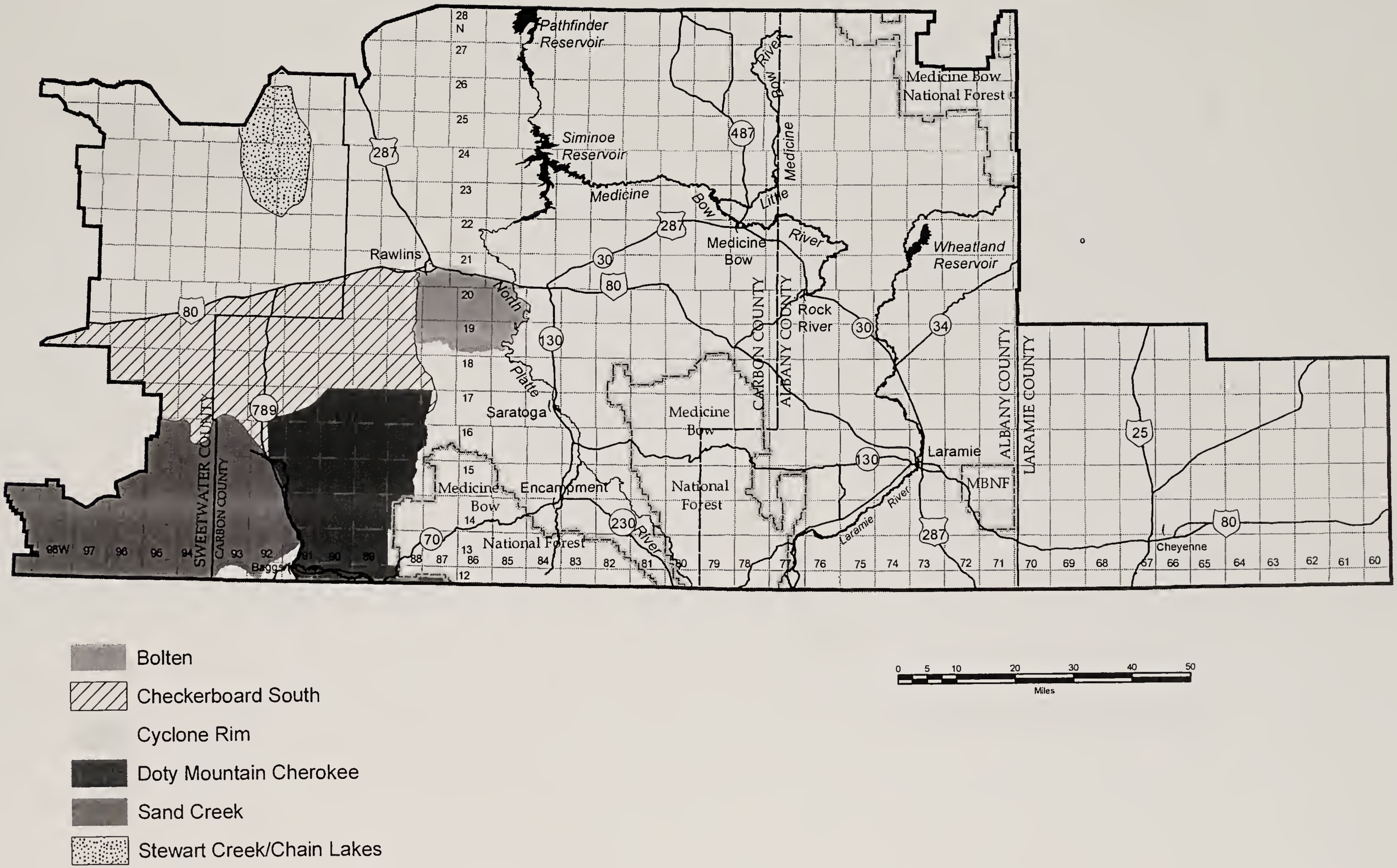
1	Bitter
2	Cache La Poudre
3	Crow
4	Glendo Reservoir
5	Great Divide Closed Basin
6	Horse
7	Little Medicine Bow
8	Little Snake
9	Lone Tree-Owl
10	Lower Laramie
11	Lower Lodgepole
12	Medicine Bow
13	Middle North Platte-Casper
14	Muddy
15	Pathfinder-Seminoe Reservoirs
16	Pumpkin
17	Sidney Draw
18	Sweetwater
19	Upper Laramie
20	Upper Lodgepole
21	Upper North Platte
22	Vermilion

△ USGS Gaging Stations

0 5 10 20 30 40 50
Miles

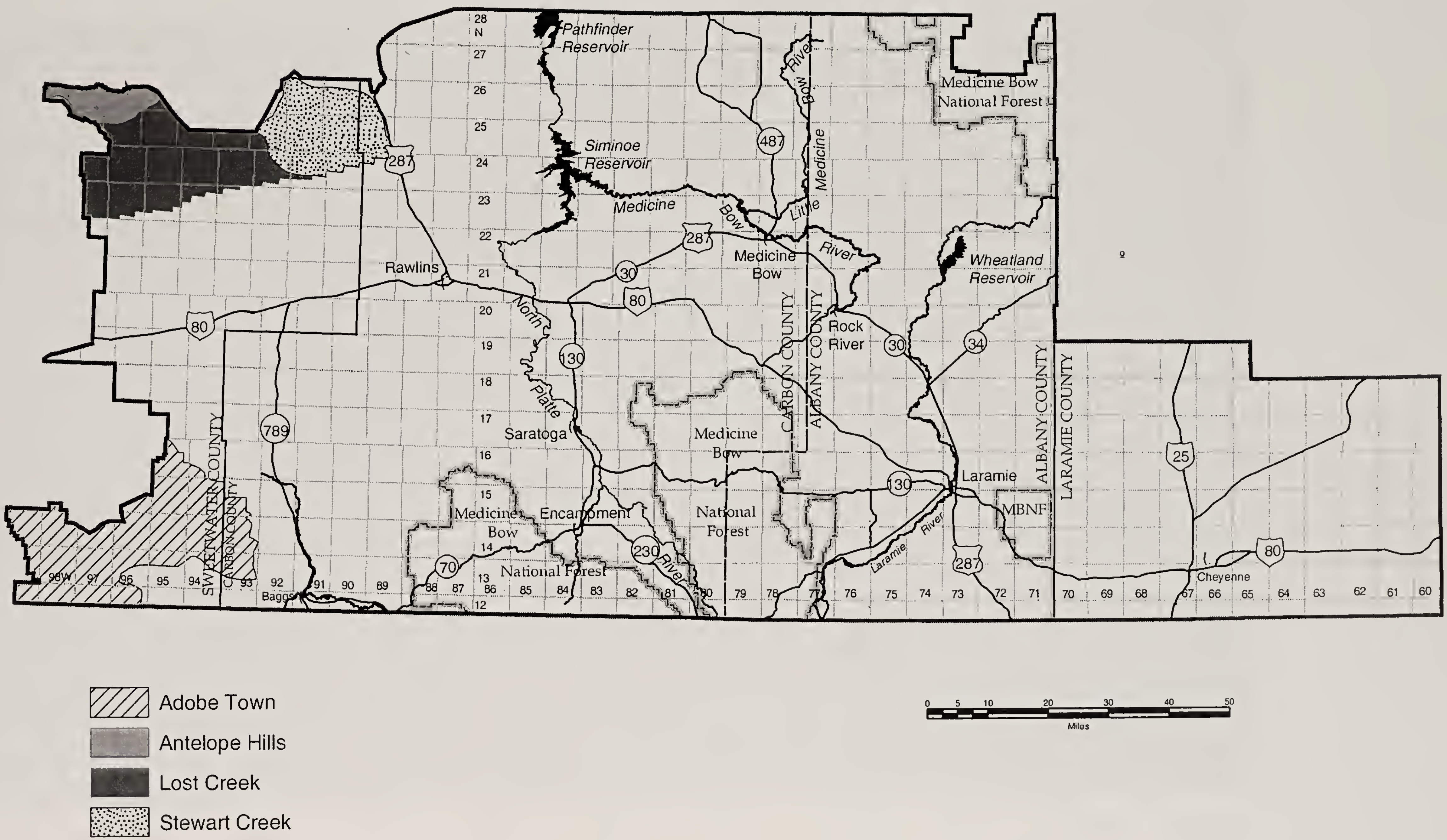
R-Figure 3.17-1 Fourth Order Watershed

Figure 3.18-1a. Wild Horse Locations in 1971.



R-Figure 3.18-1a Wild Horse locations 1971

Figure 3.18-1b. Wild Horse Management Areas.



R-Figure 3.18-1b Wild Horse

Figure 3.18-2. Wild Horse Population Fluctuations in Two of the Rawlins RMPPA Horse Management Areas.

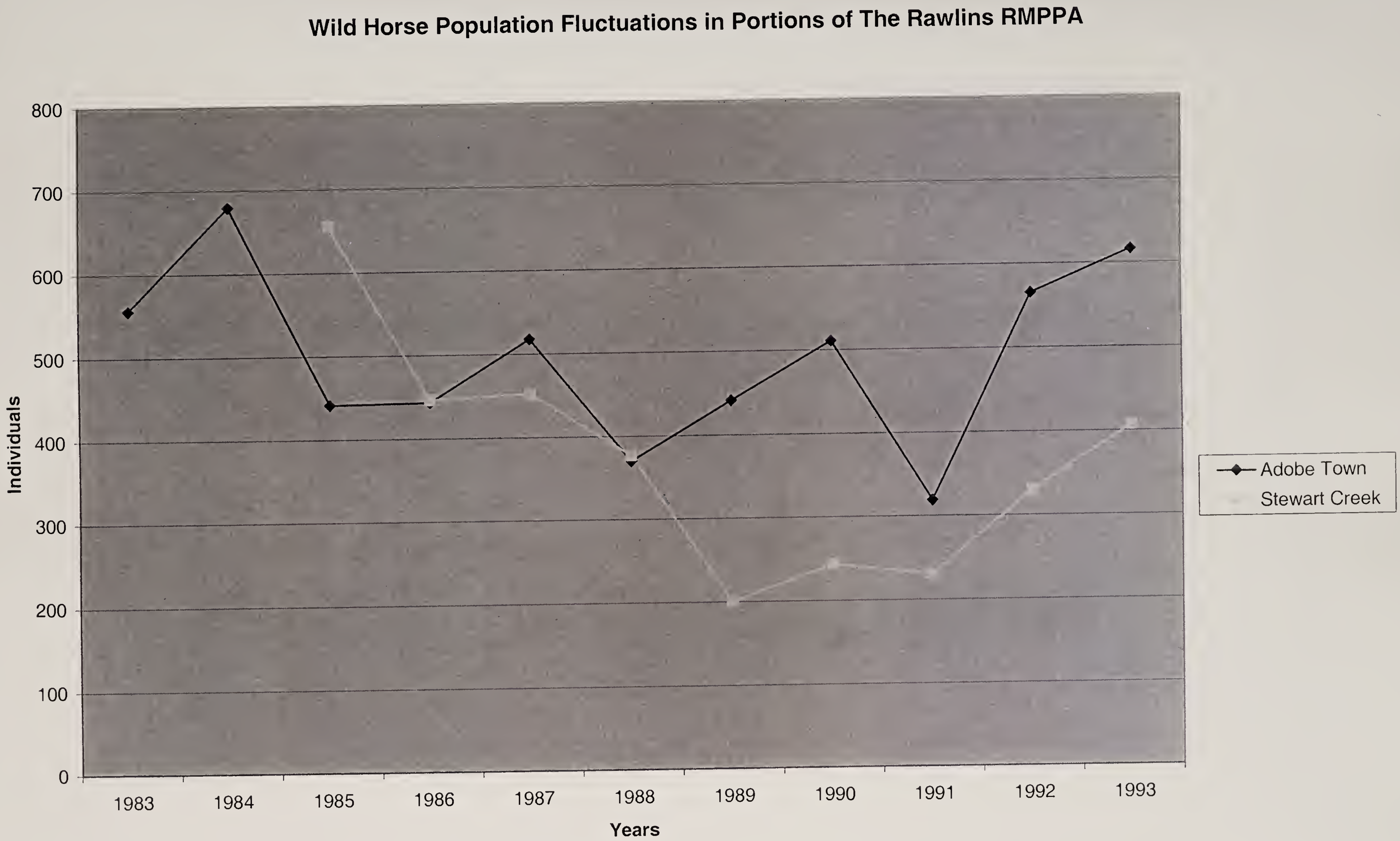
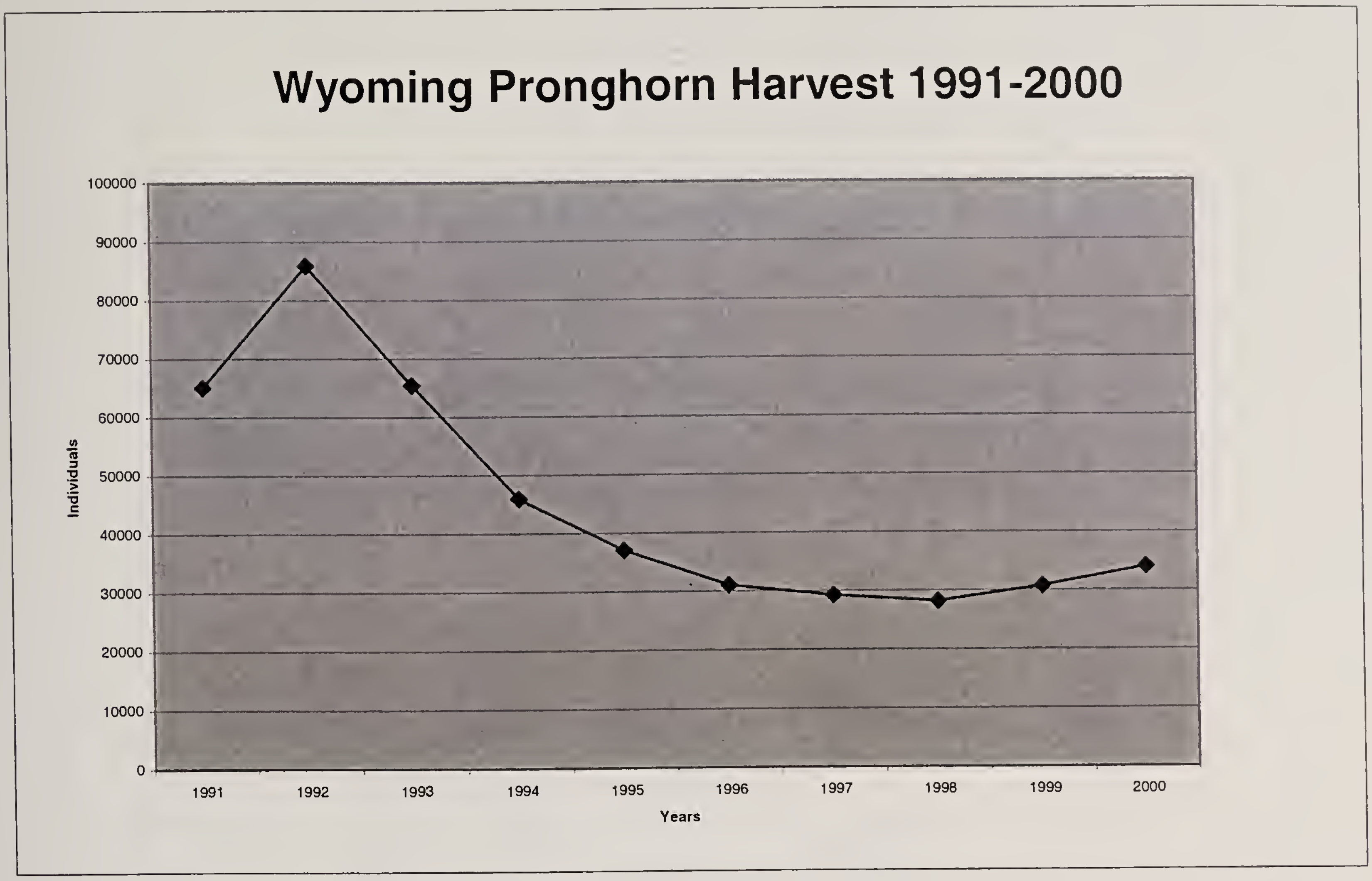


Figure 3.19-1. Pronghorn Harvest in Wyoming and Major Herd Management Areas Within the Rawlins RMPPA.



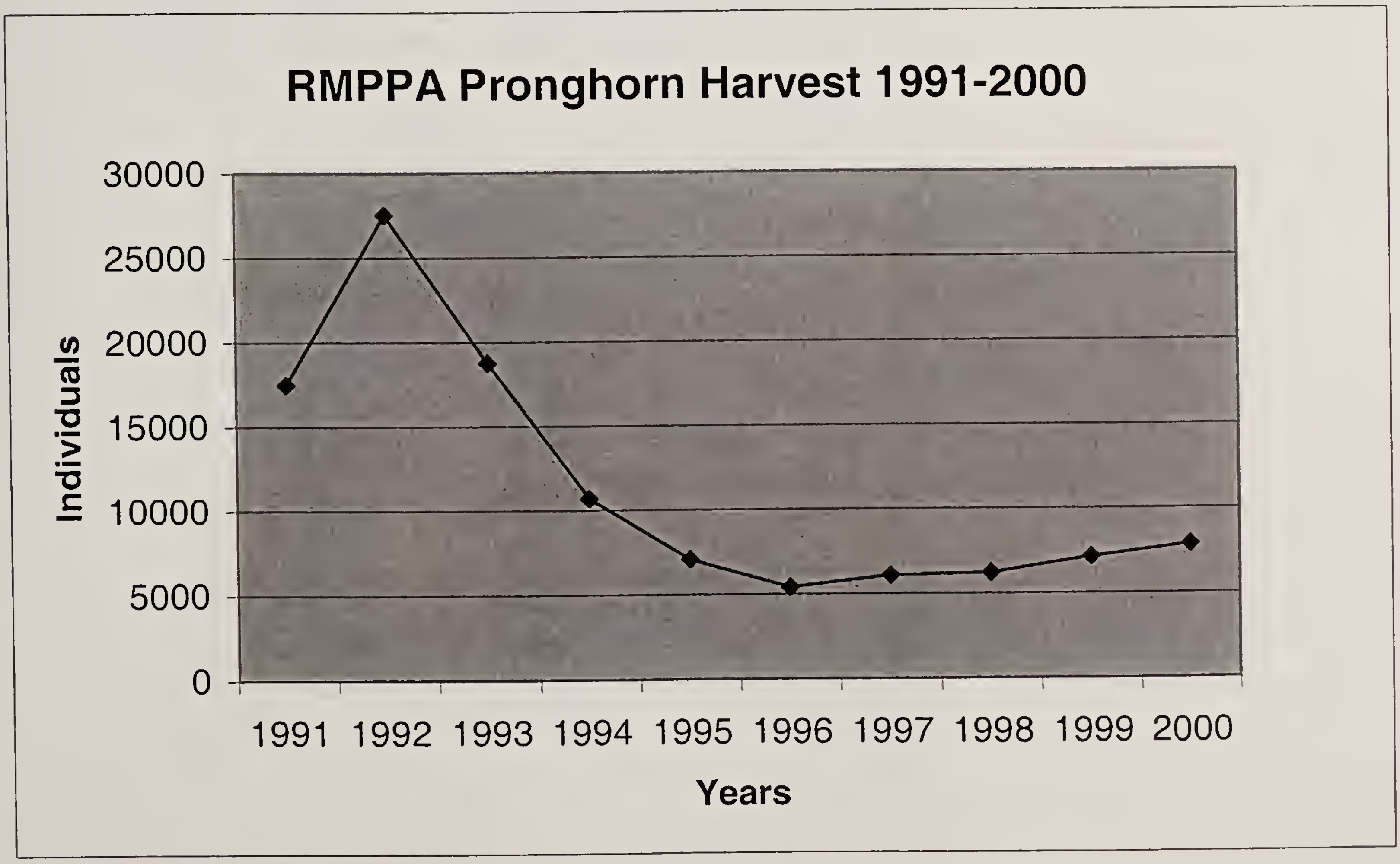
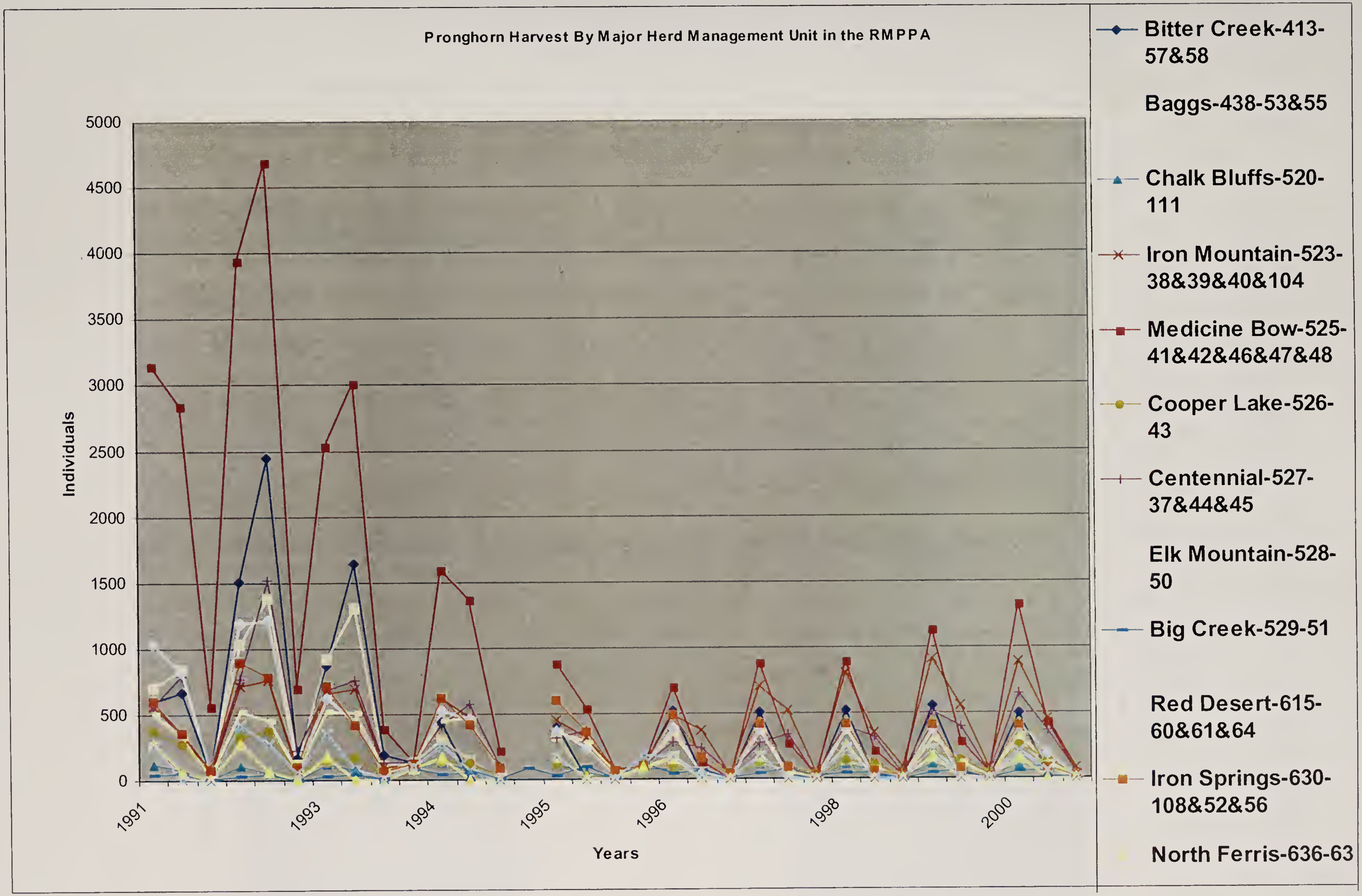


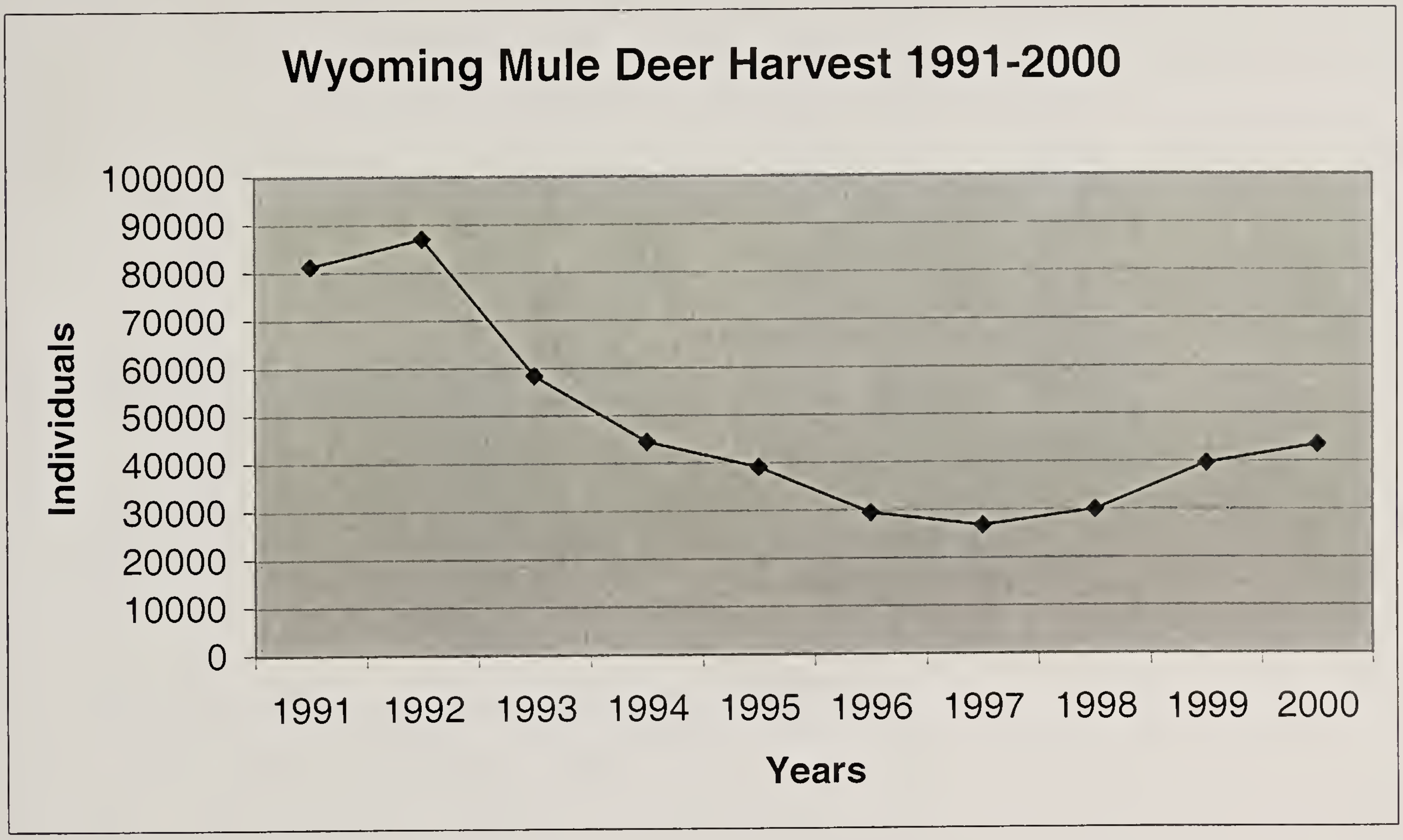
Figure 3.19-2. Antelope Crucial Winter Range and Herd Management Areas.

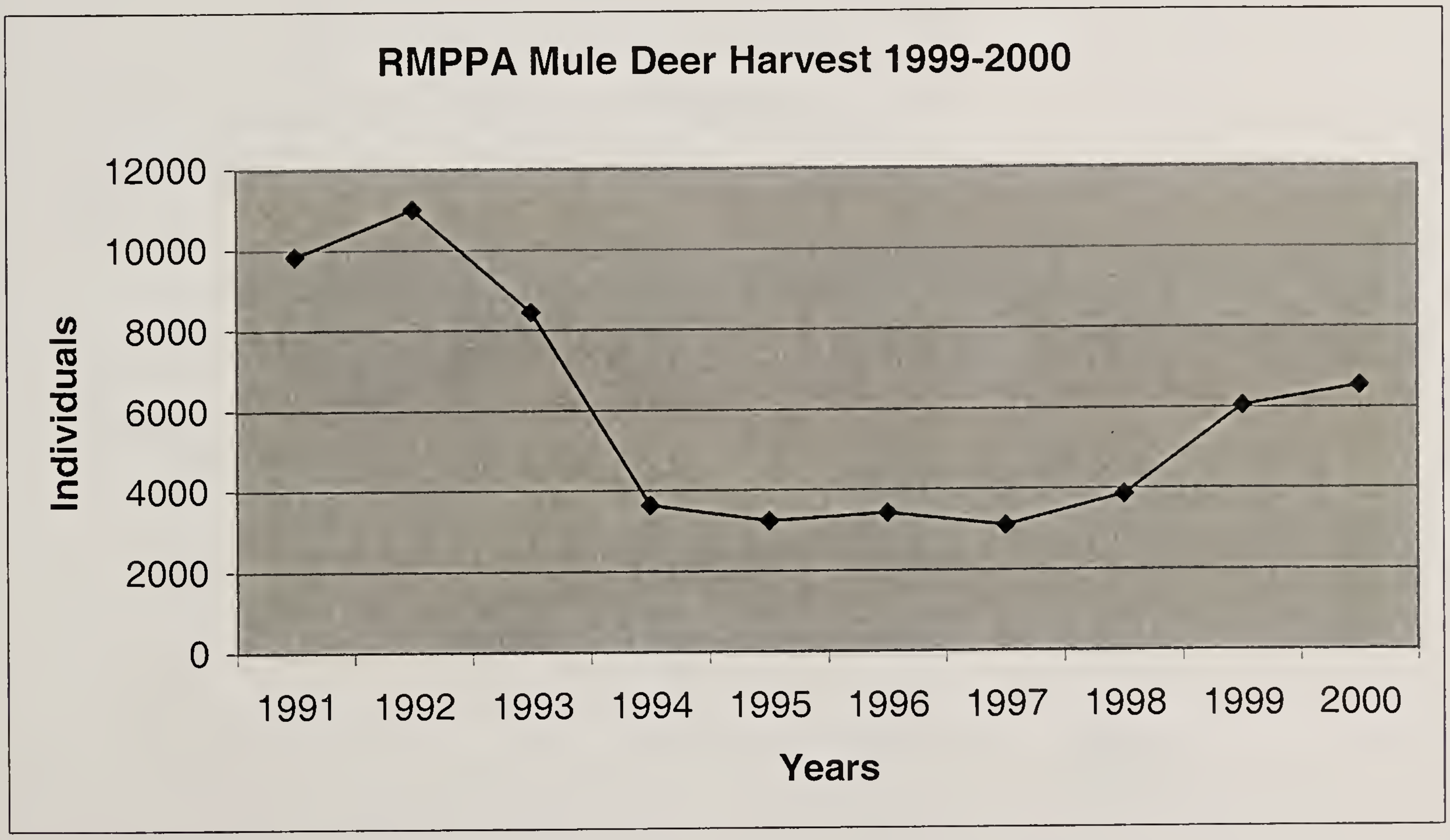
Figure 3.19-3. Pronghorn Harvest by Major Herd Management Unit Within the Rawlins RMPPA.



Note: There are three data points for each year, for buck, doe, and fawn harvest, respectively.

Figure 3.19-4. Mule Deer Harvest in Wyoming and Major Herd Management Areas Within the Rawlins RMPPA.





Note: Data are missing for 1996 in the RMPPA.

Figure 3.19-5. Mule Deer Herd Management Areas and Critical Winter Range.

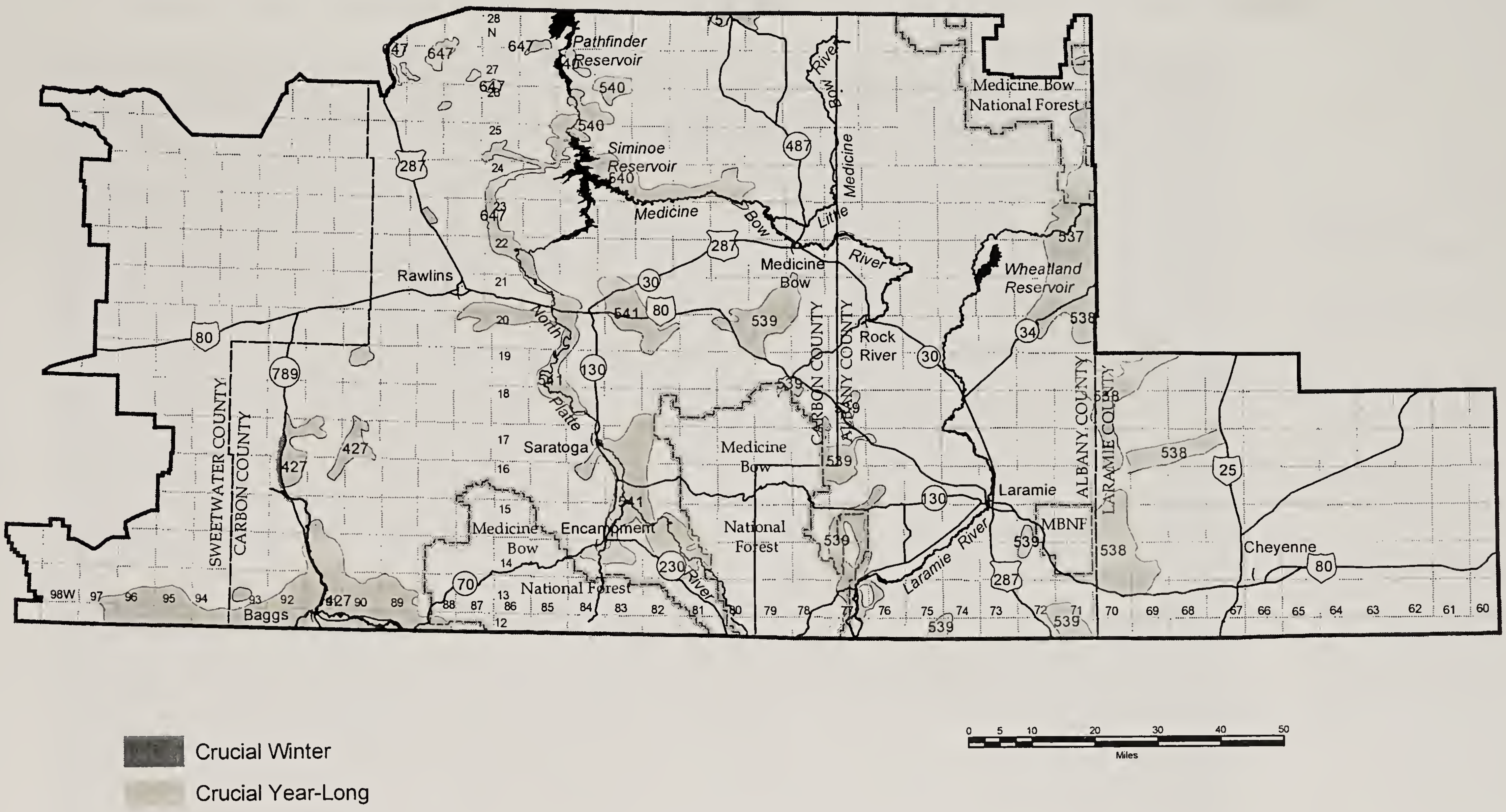
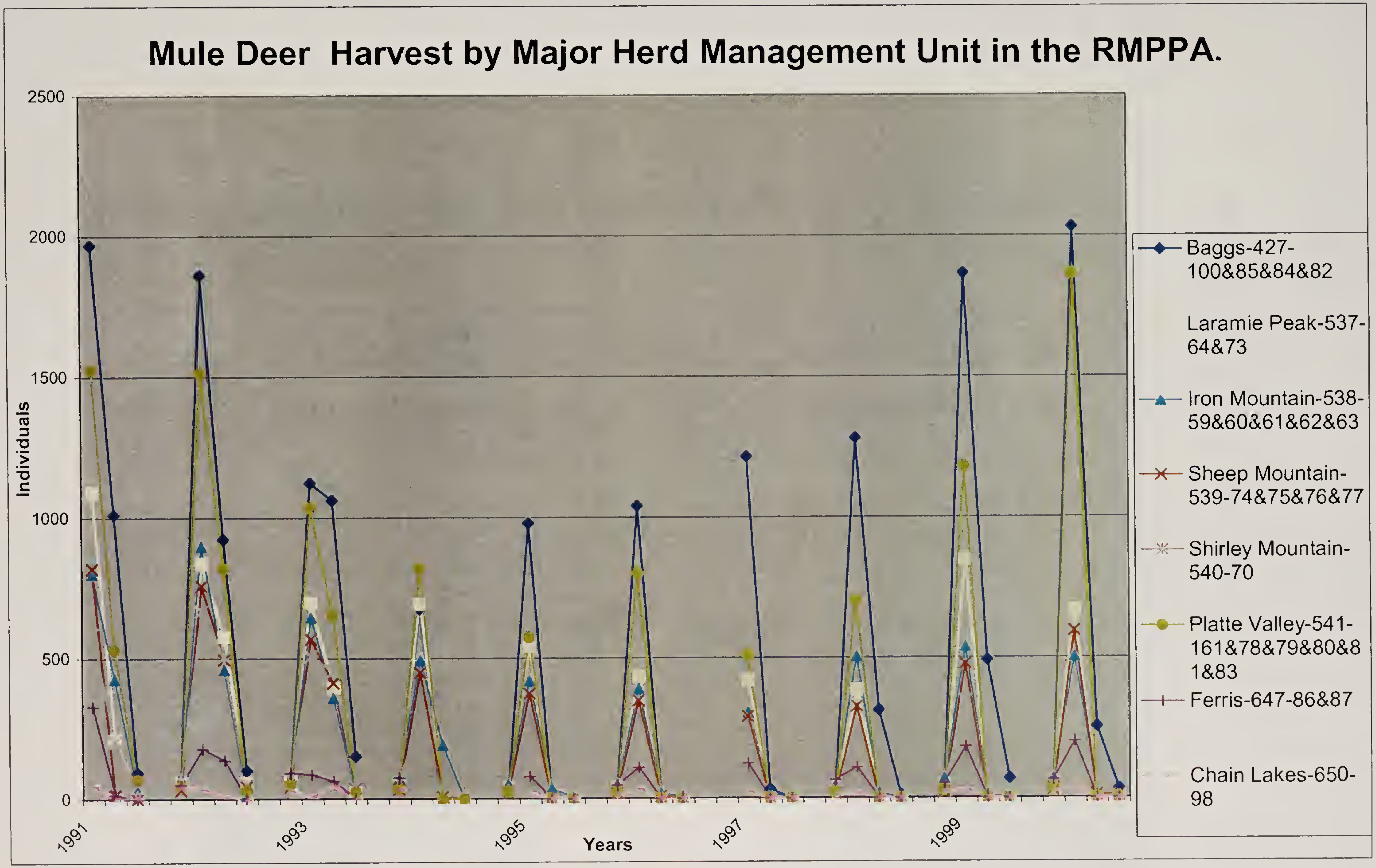
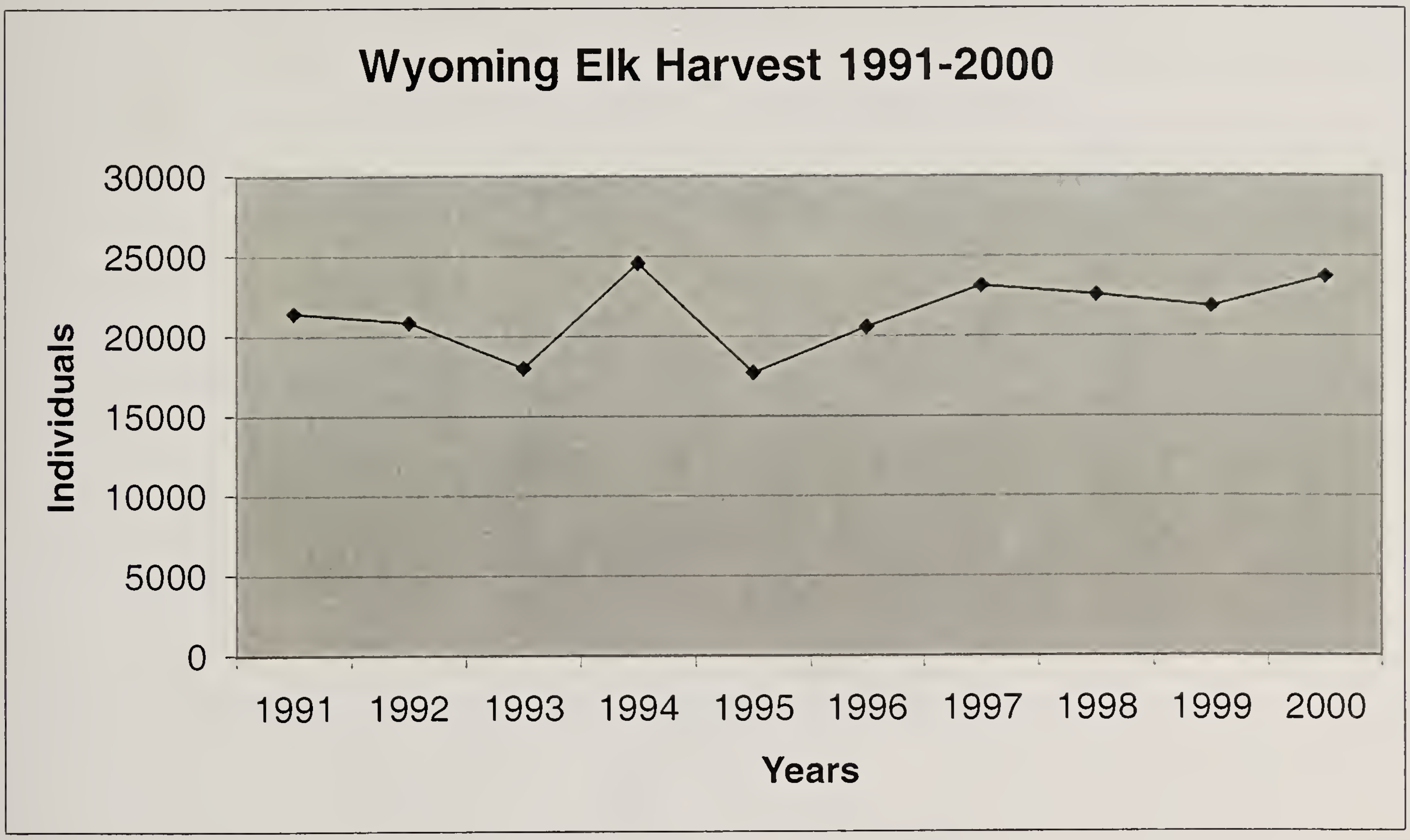


Figure 3.19-6. Mule Deer Harvest by Major Herd Management Unit Within the Rawlins RMPPA.



Note: There are three data points for each year, for buck, doe, and fawn harvest, respectively.

Figure 3.19-7. Elk Harvest in Wyoming and Major Herd Management Areas Within the Rawlins RMPPA.



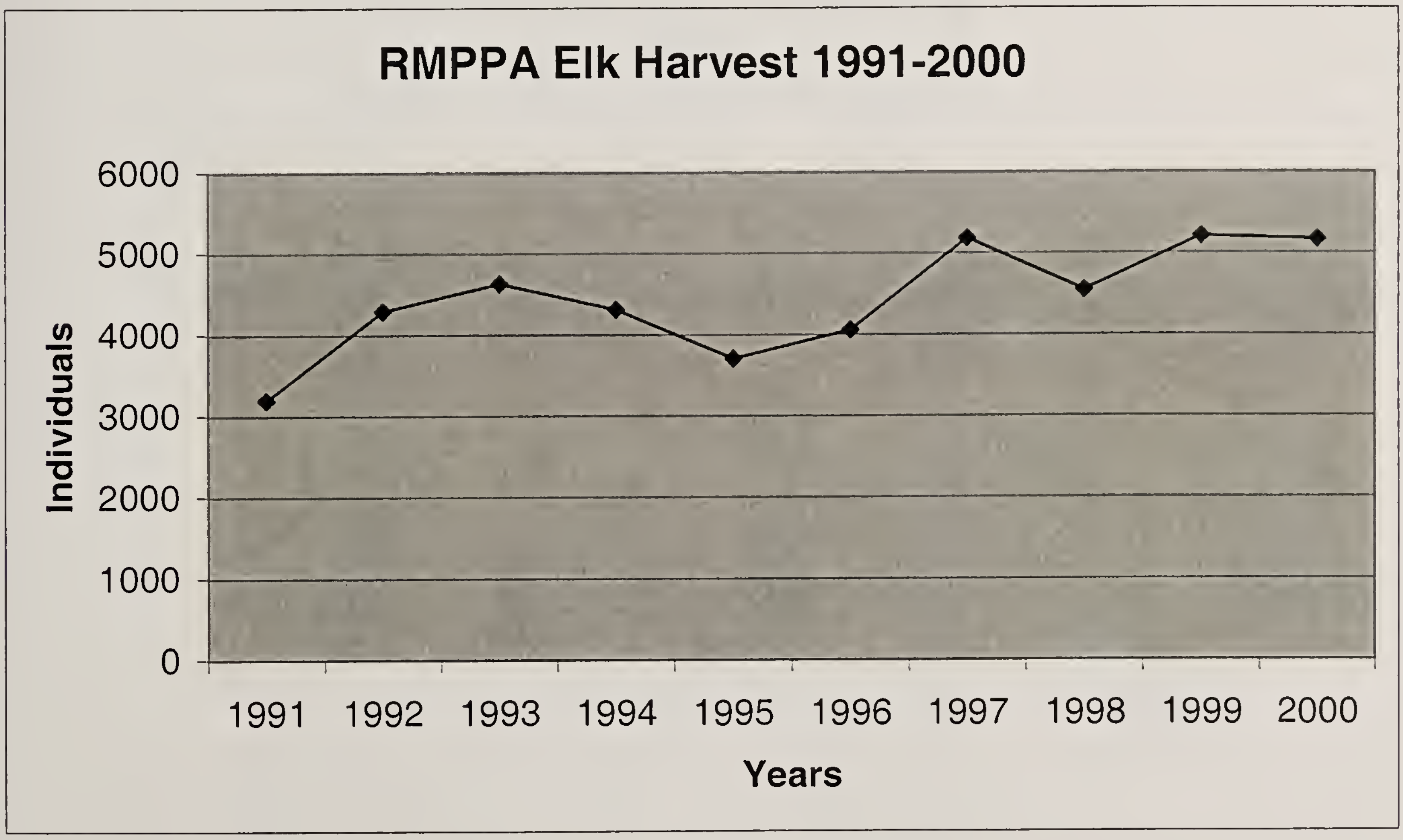
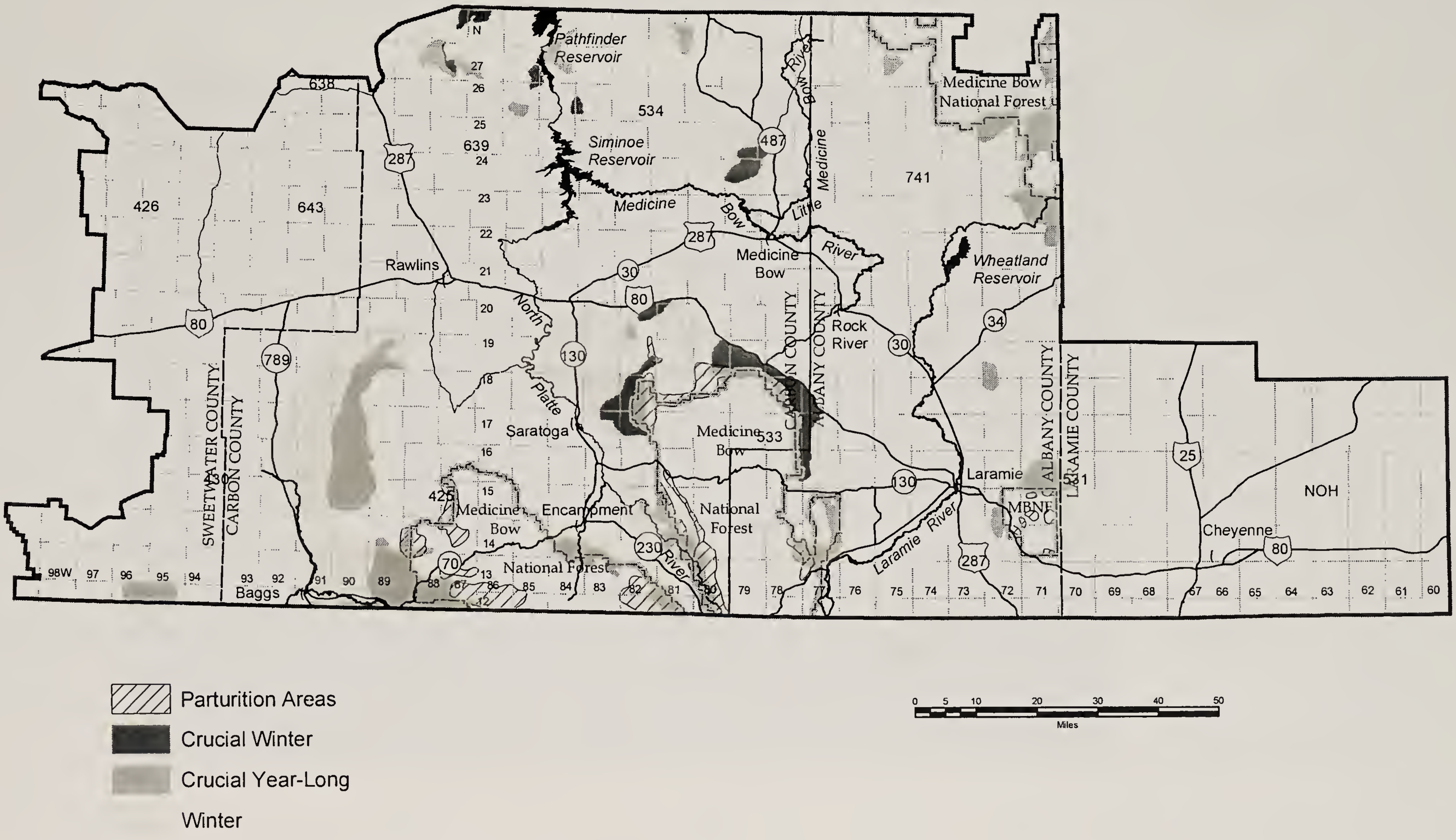
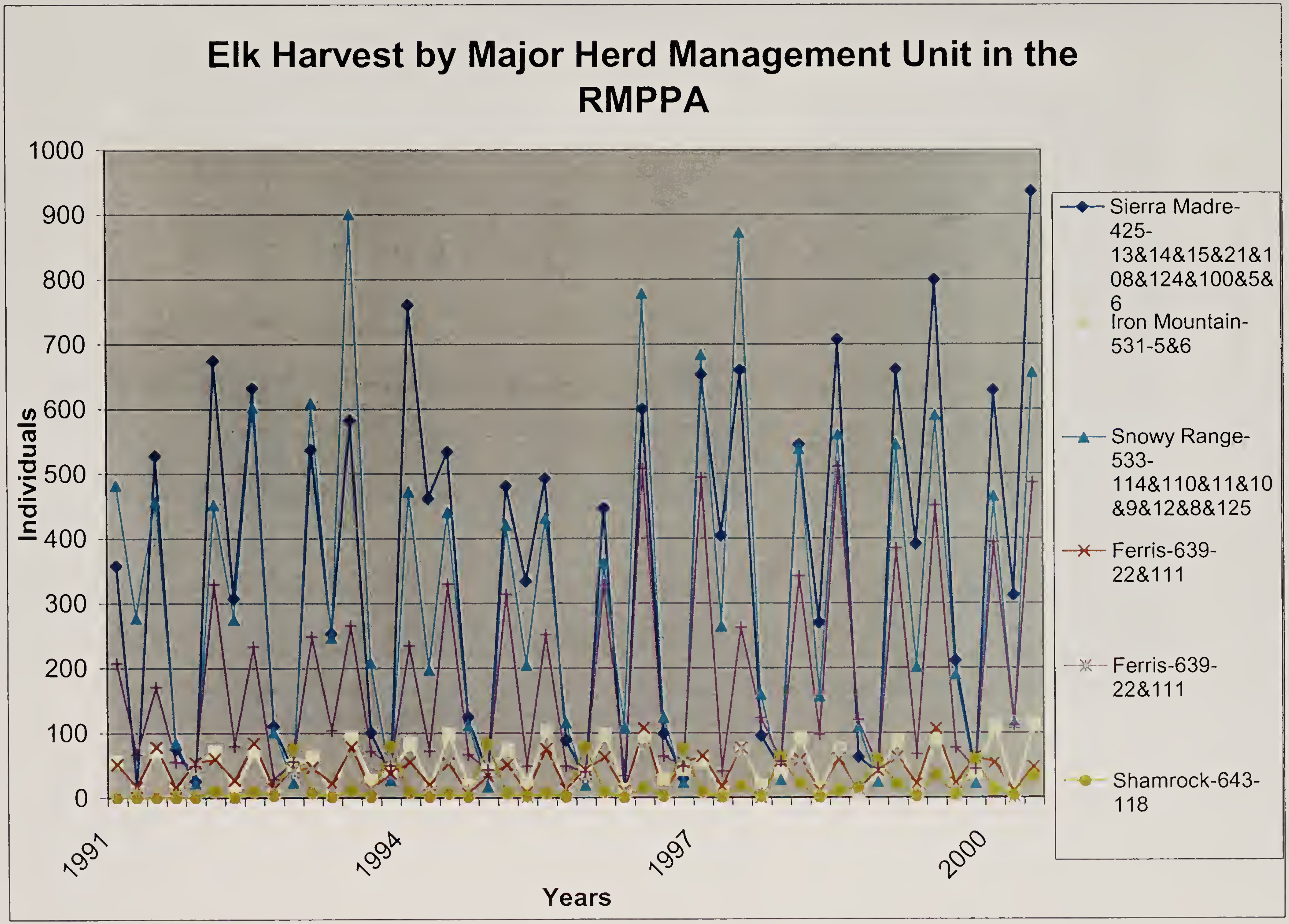


Figure 3.19-8. Elk Crucial Winter Range with Parturition Areas.



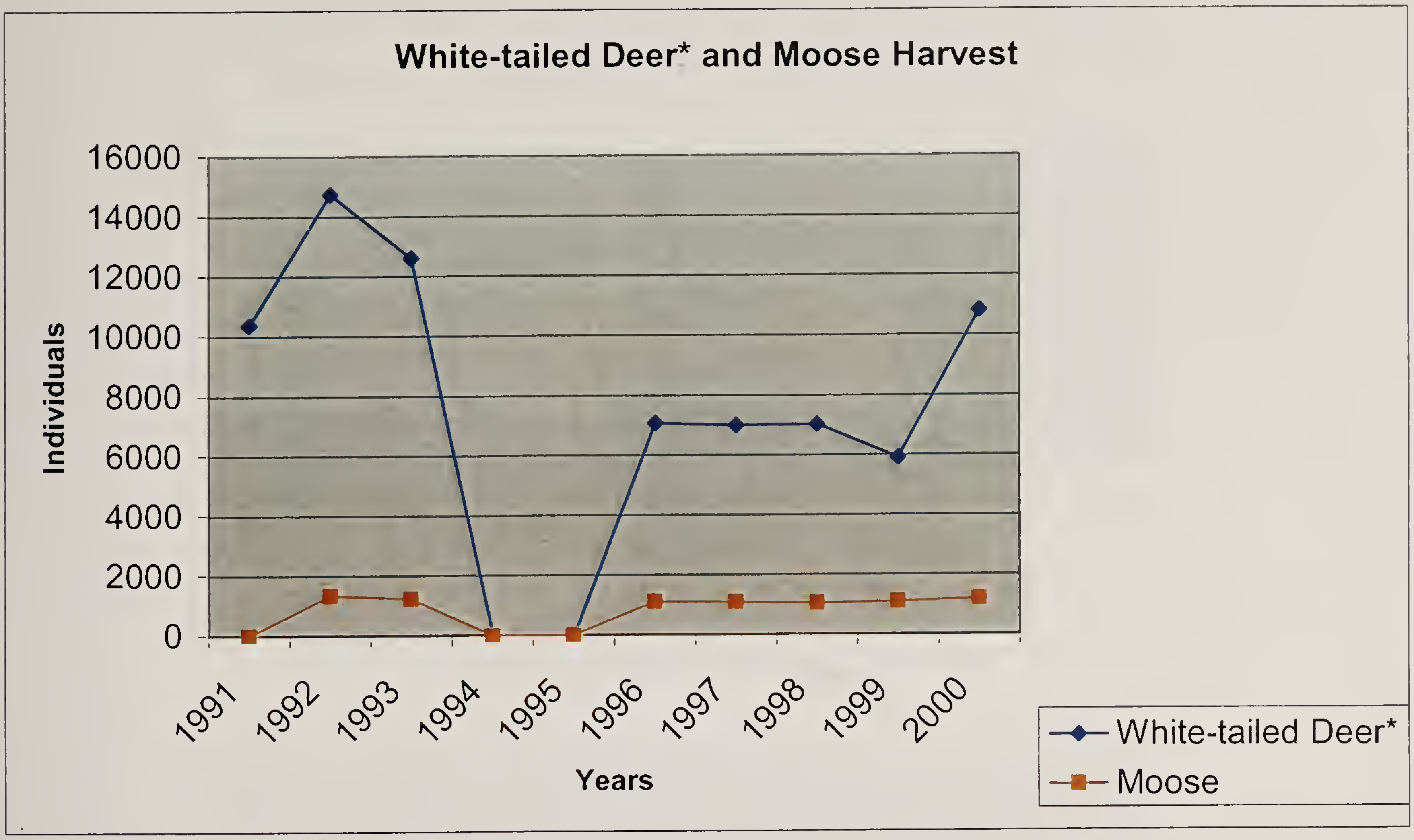
R-Figure 3.19-8 Elk Management Areas

Figure 3.19-9. Elk Harvest by Major Herd Management Unit in the Rawlins RMPPA.



Note: There are four data points for each year, for bull, spike, cow, and calf harvest, respectively.

Figure 3.19-10. Harvest of Other Big Game Species in Wyoming.



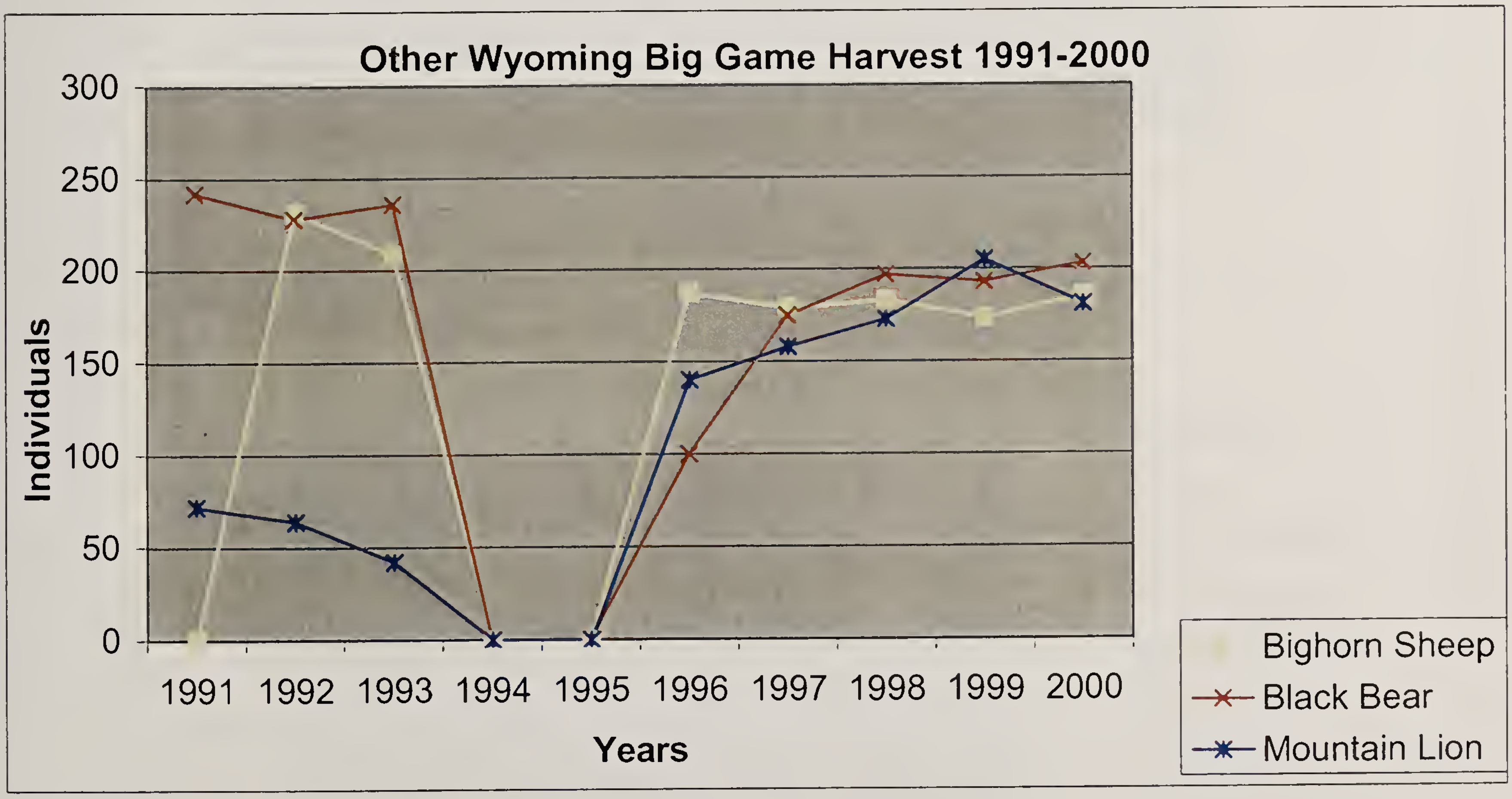
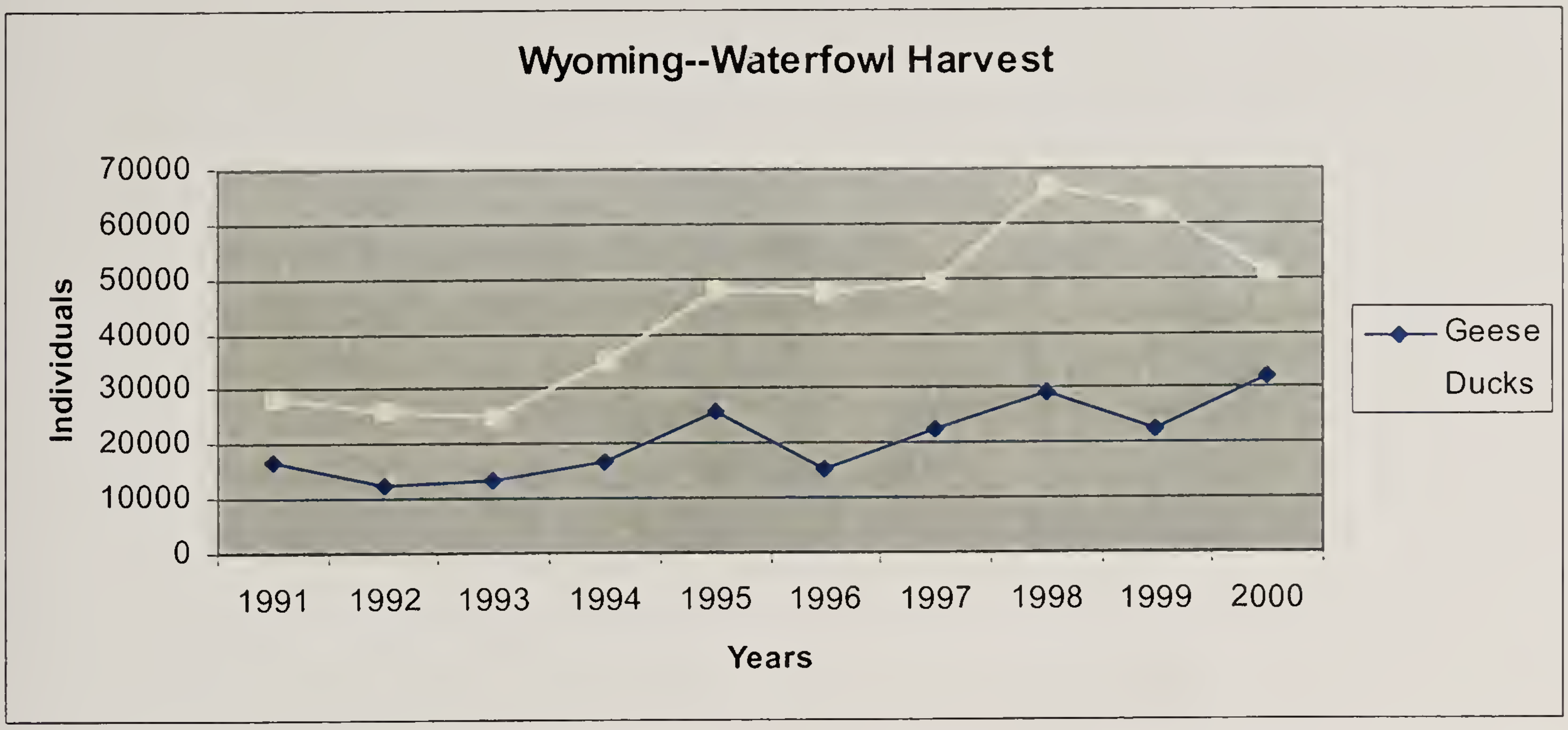
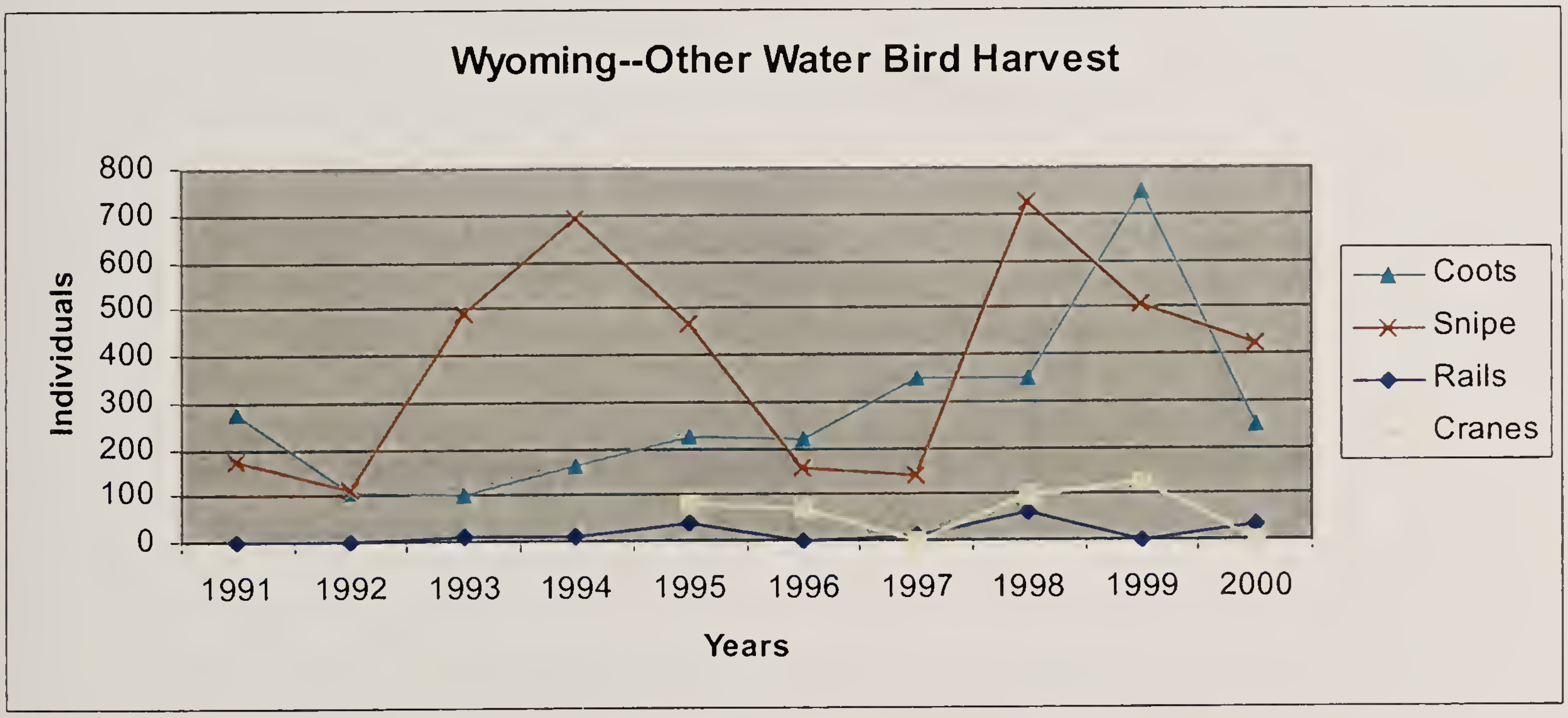


Figure 3.19-11. Wyoming Harvest Data for Waterfowl, Other Water Birds, and Upland Game Birds.





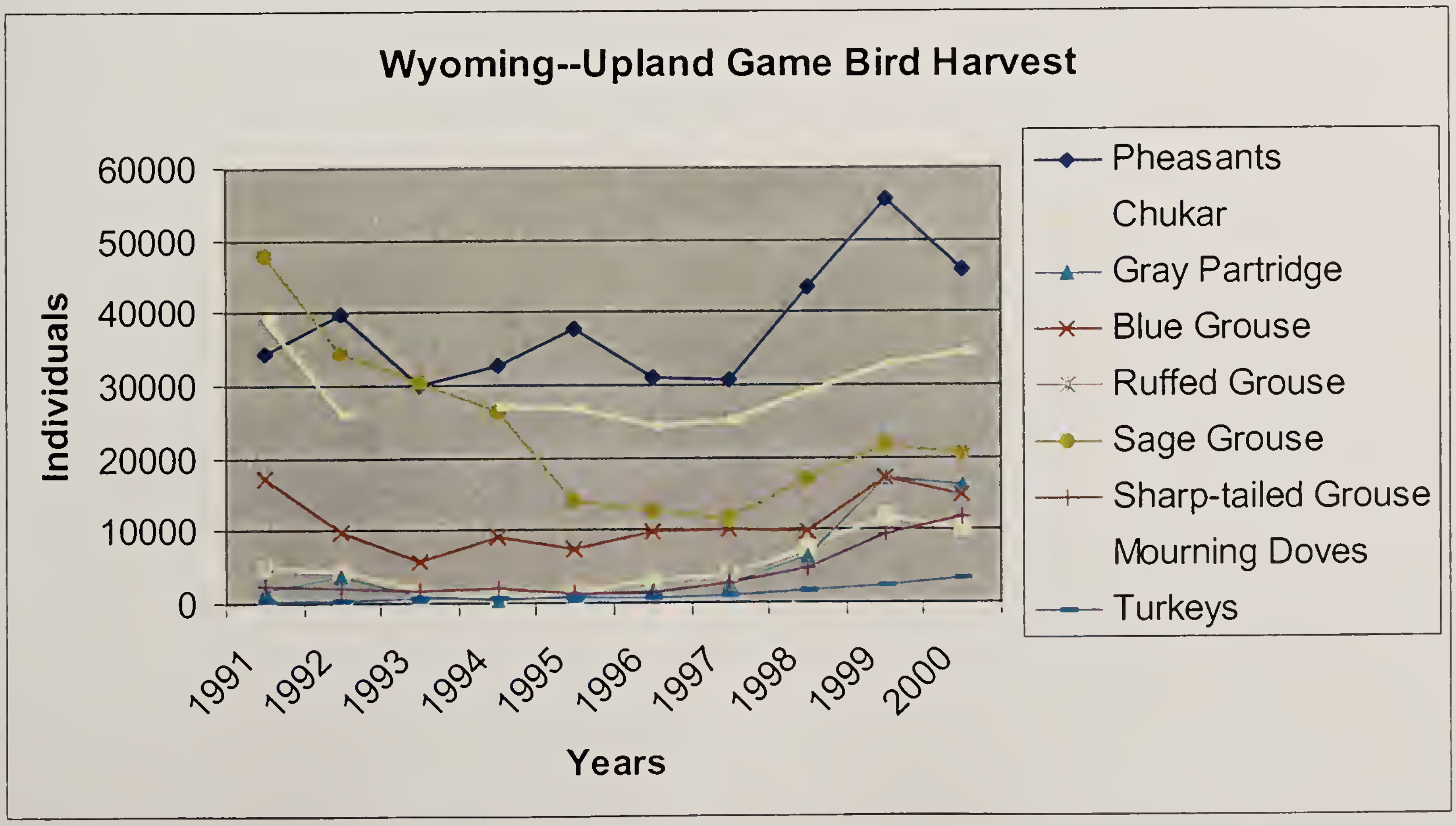


Figure 3.19-12. Waterfowl Management Areas.

(Information to be provided in Final)

Figure 3.19-13. Harvest of Waterfowl and Other Water Birds in the Major Management Areas of the Rawlins RMPPA.

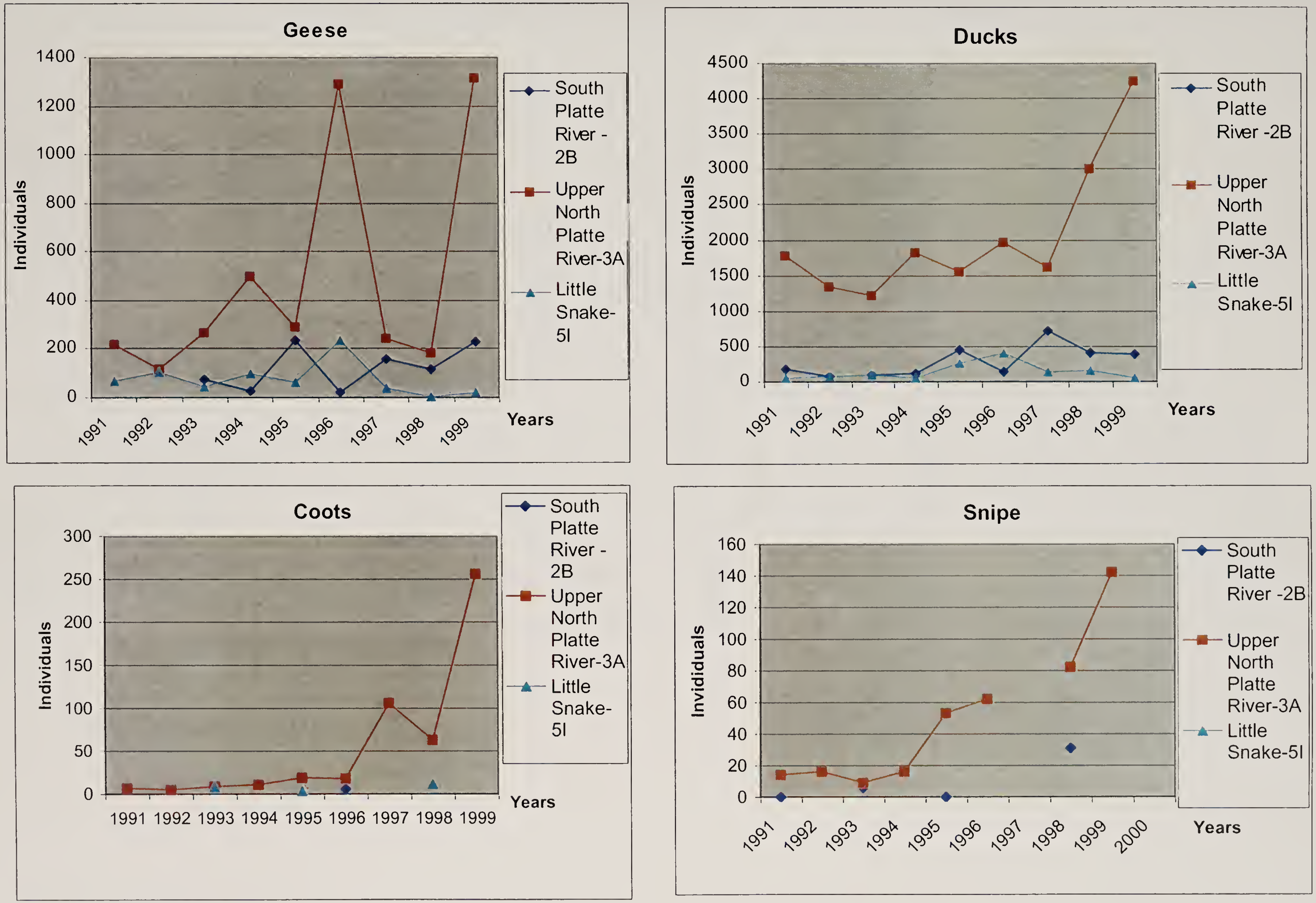
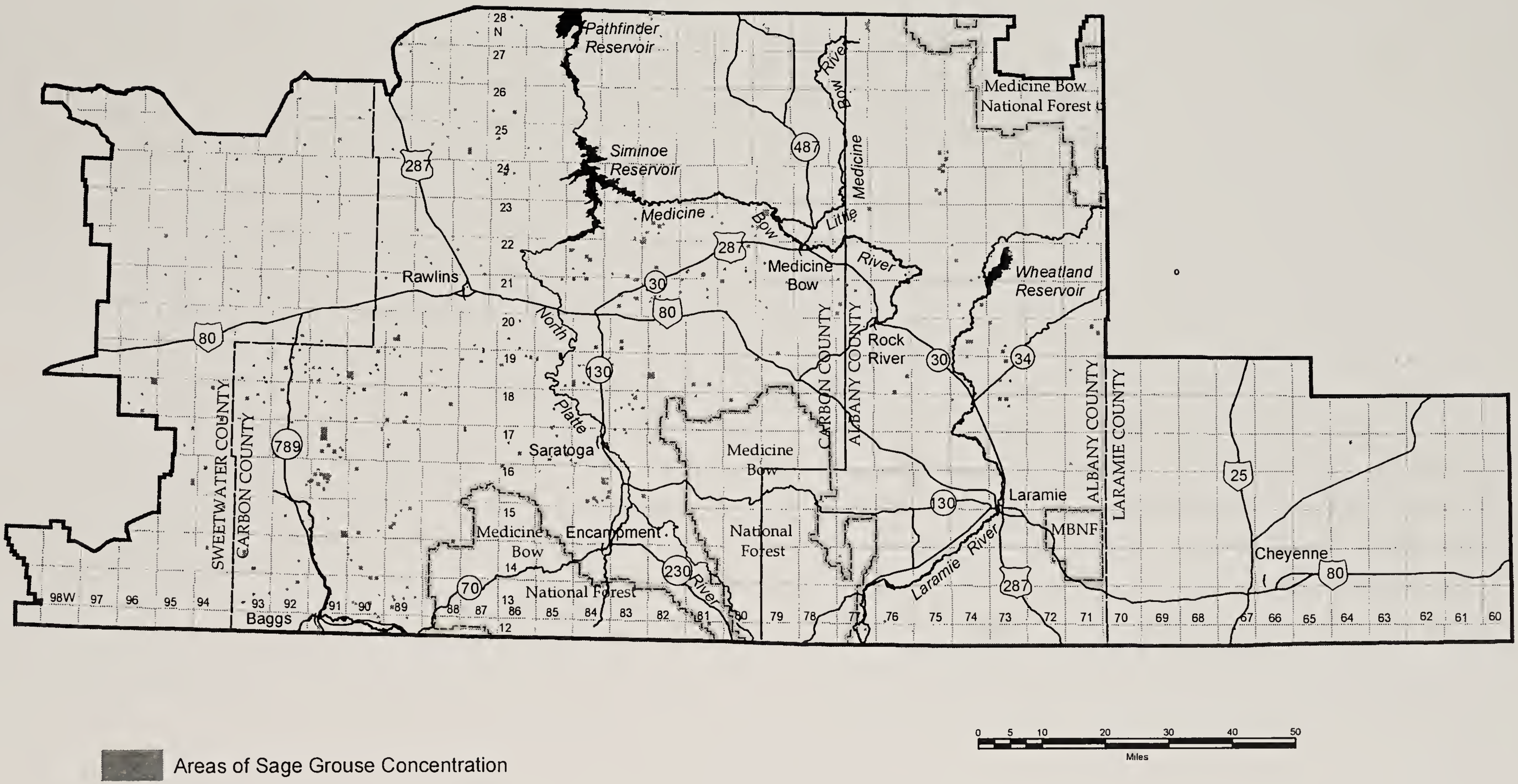


Figure 3.19-14. Sage Grouse Leks.

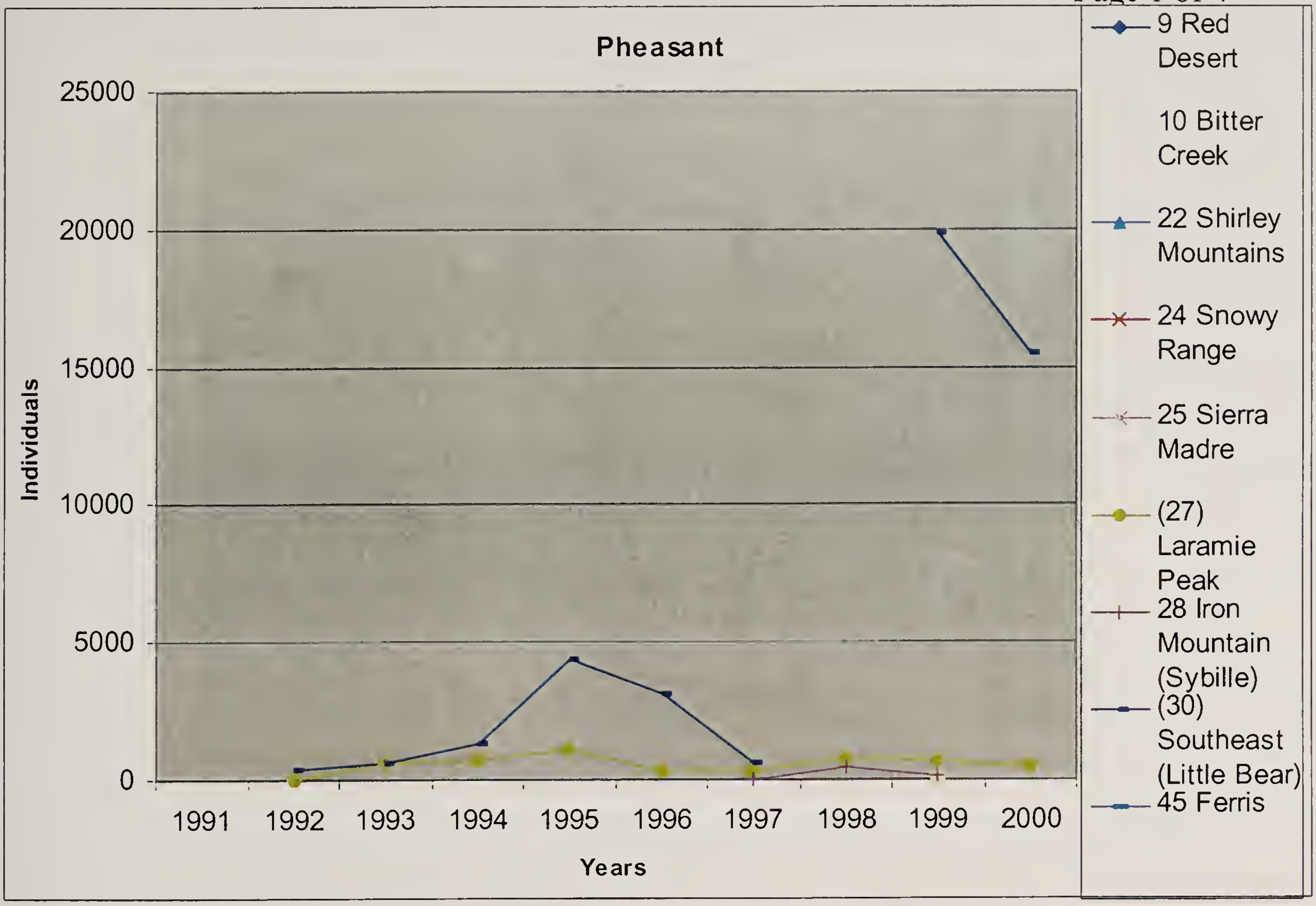


R-Figure 3.19-14 Sage Grouse Leks

Figure 3.19-15. Upland Game, Small Game, and Furbearer Management Areas.

(Information to be provided in Final)

Figure 3.19-16. Harvest of Upland Game Species in Major Management Areas of the Rawlins RMPPA.



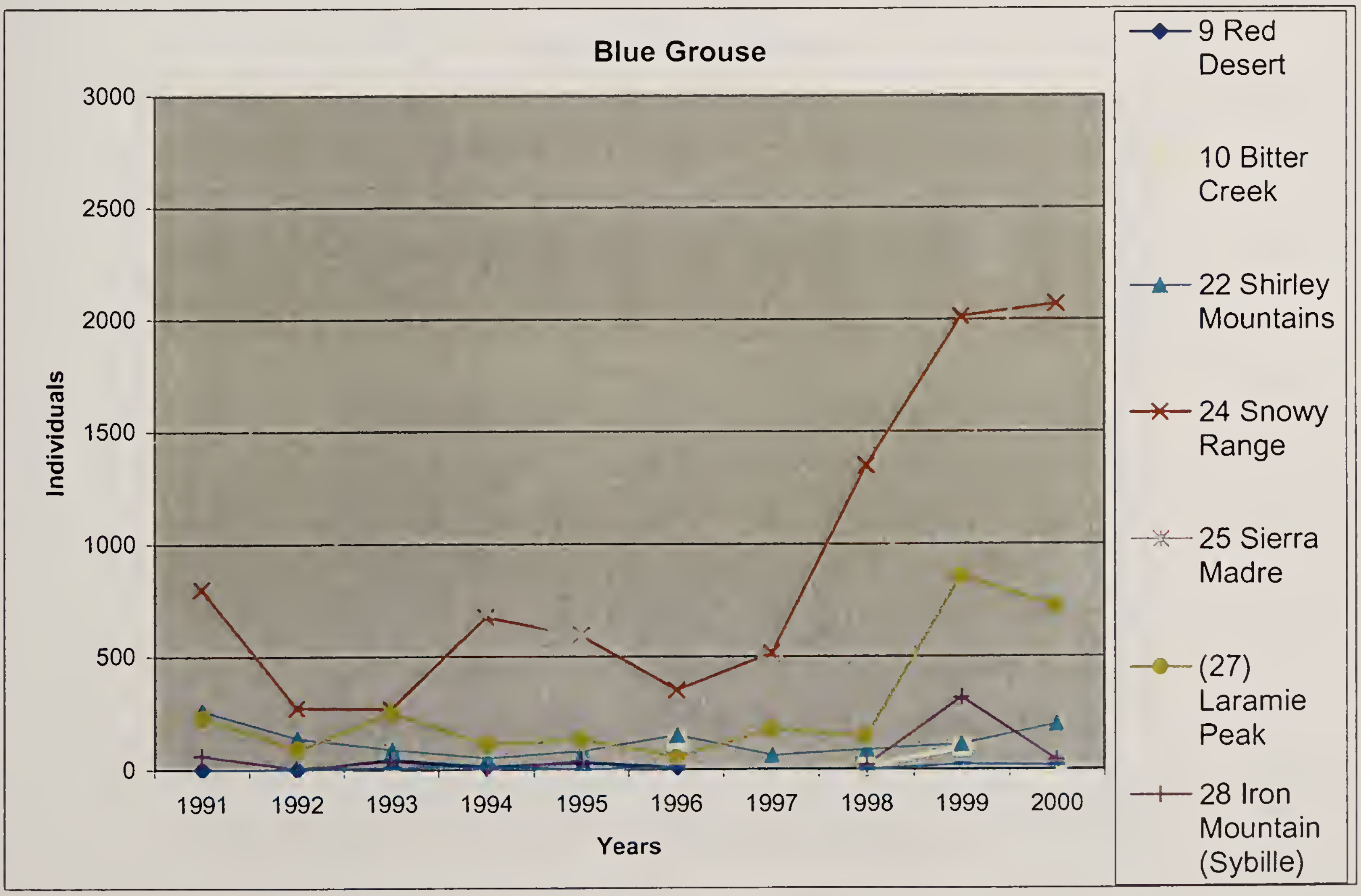


Figure 3.19-16. Harvest of Upland Game Species in Major Management Areas of the Rawlins RMPPA.

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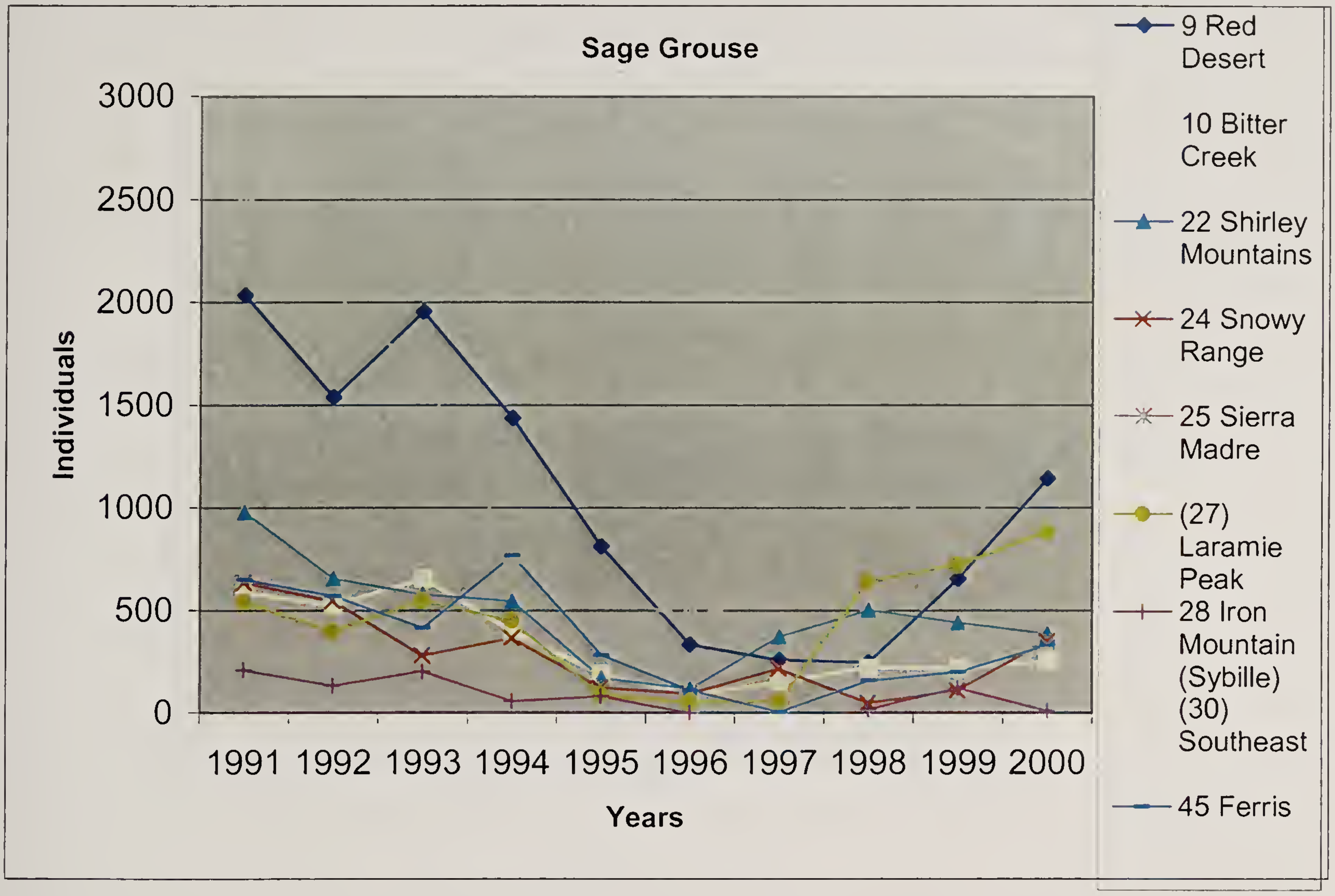


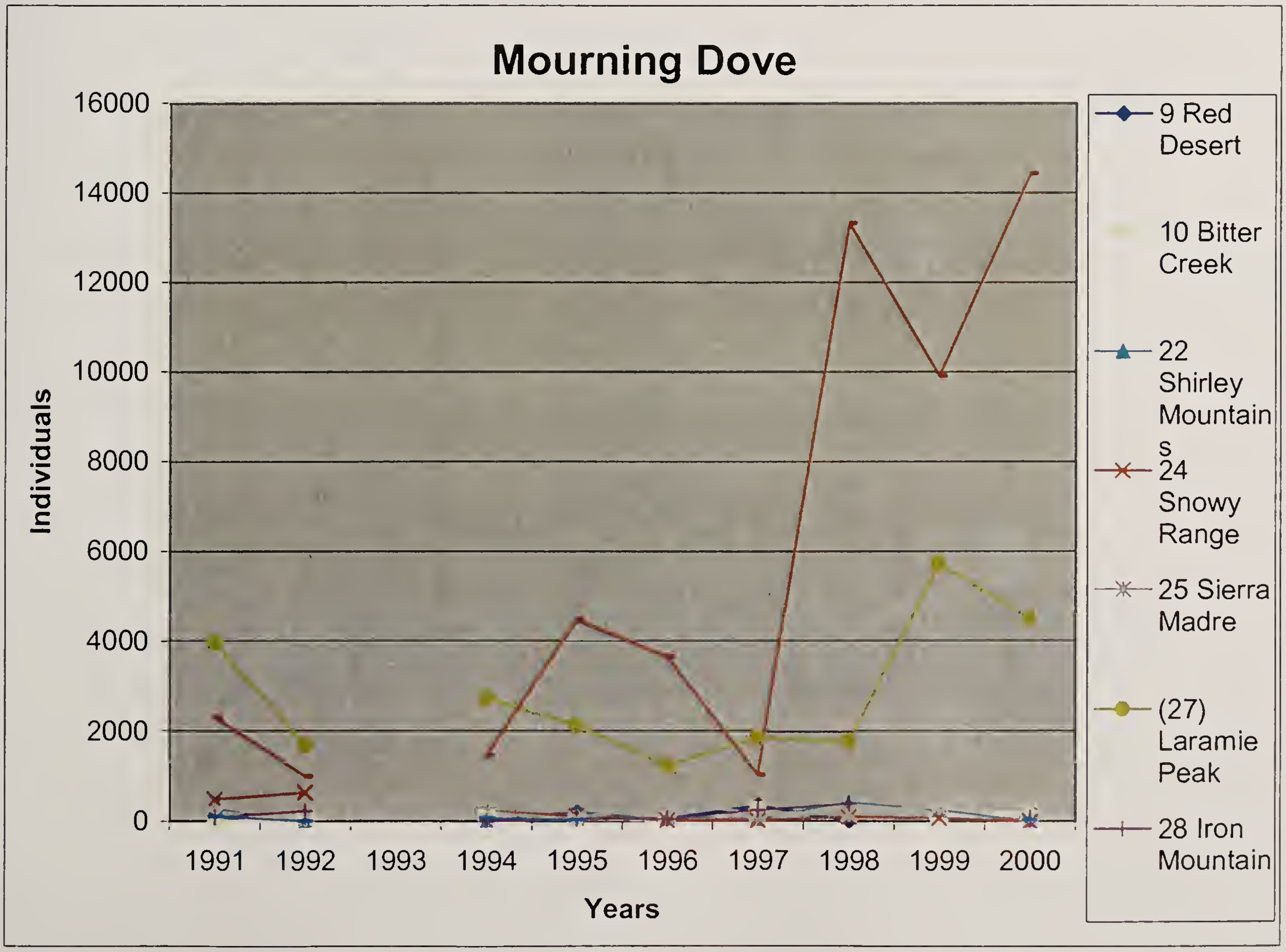
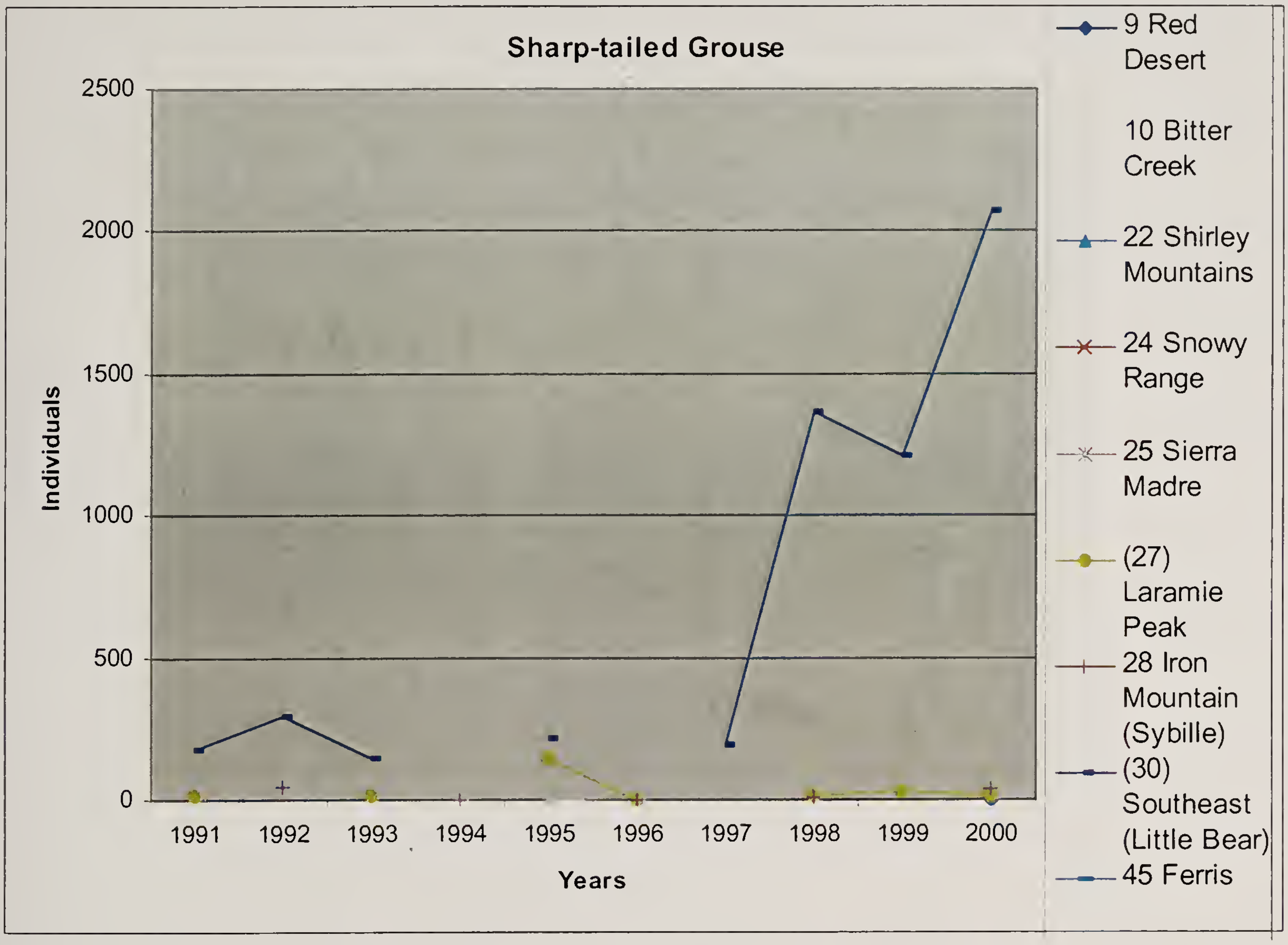


Figure 3.19-16. Harvest of Upland Game Species in Major Management Areas of the Rawlins RMPPA.



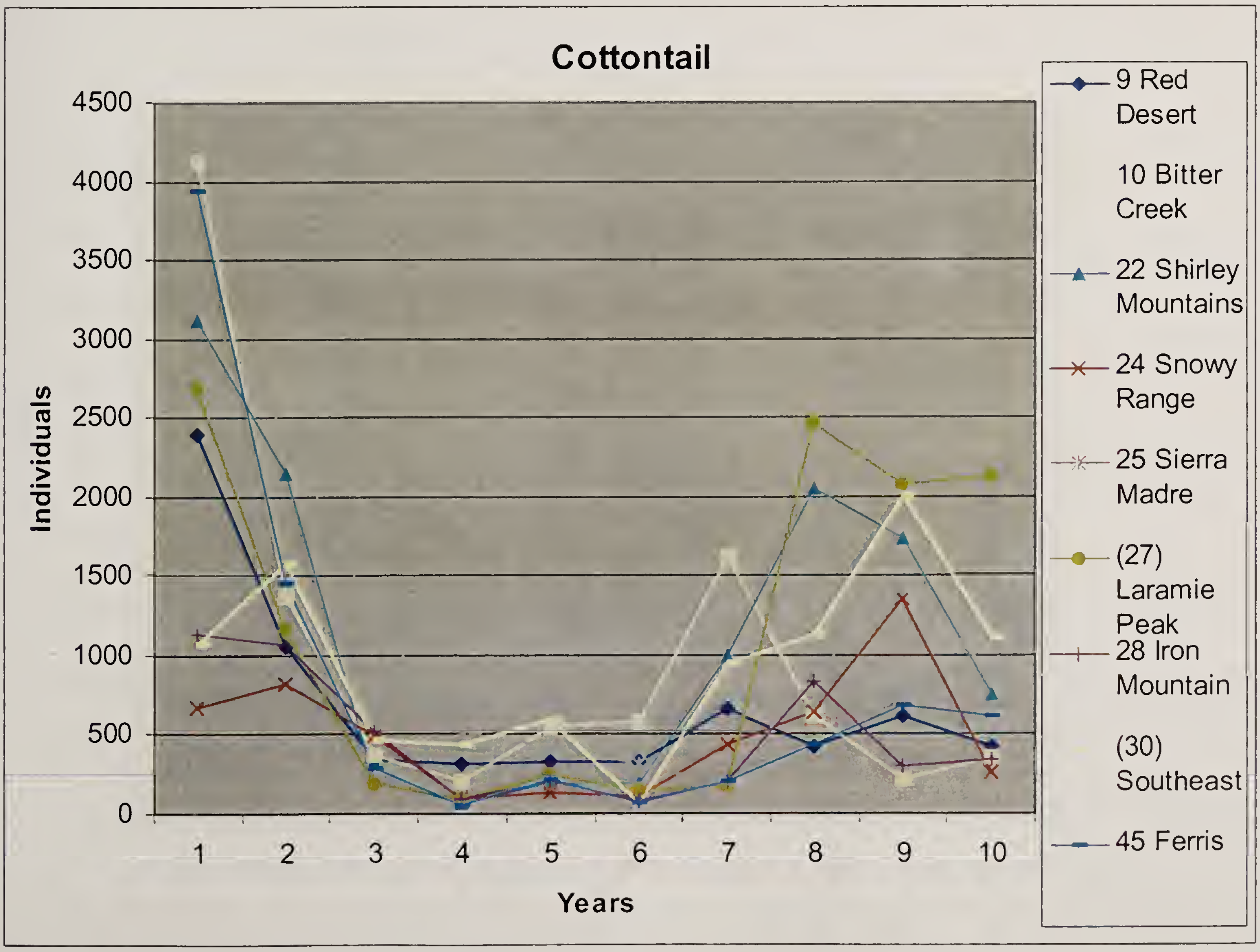
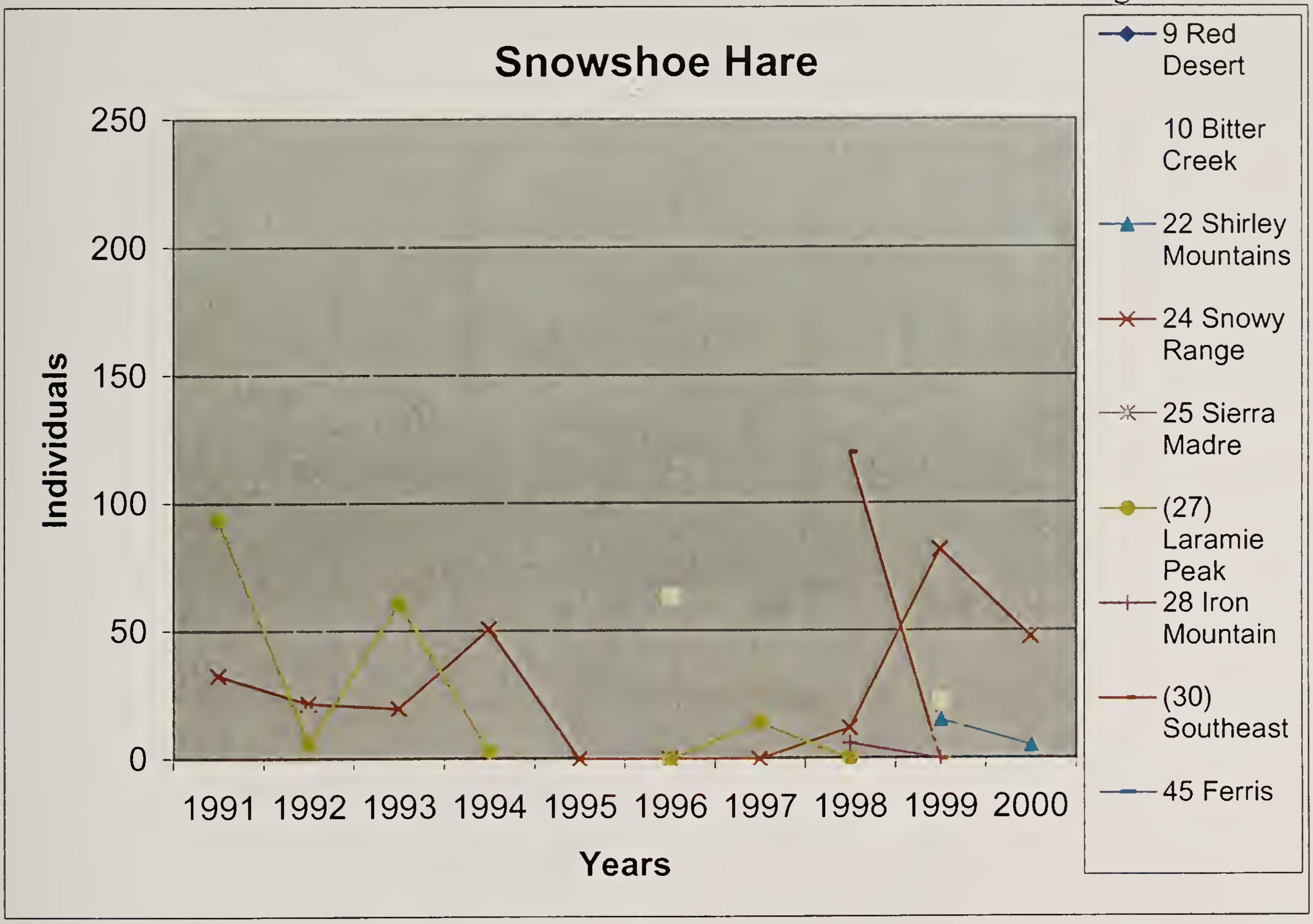


Figure 3.19-16. Harvest of Upland Game Species in Major Management Areas of the Rawlins RMPPA.



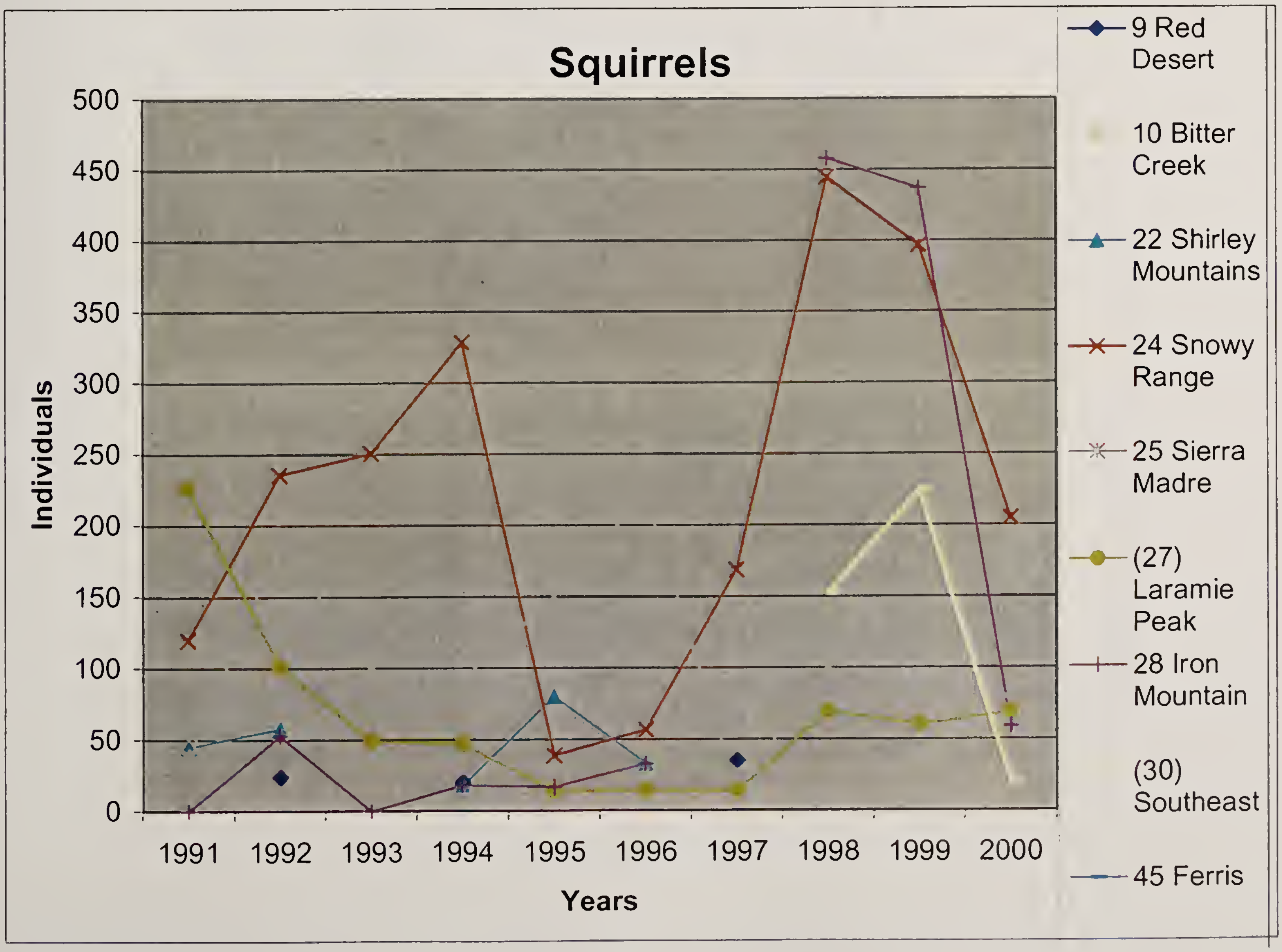
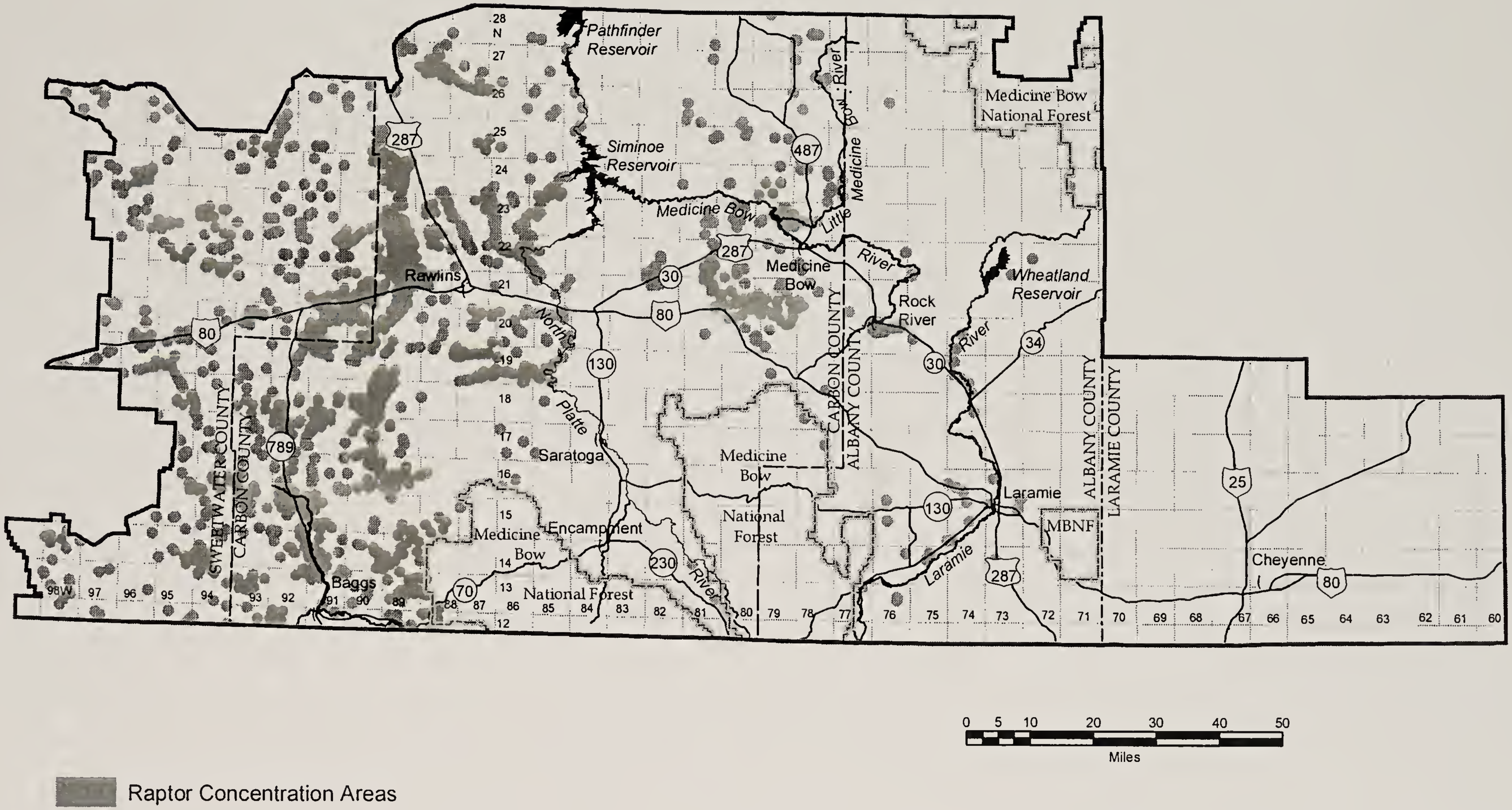


Figure 3.19-17. Raptor Concentration Areas.



R-Figure 3.19-17 Raptor Concentration Areas

Glossary

Acronyms

Chapter 4

4.0. IMPACTS ASSOCIATED WITH CONTINUATION OF EXISTING MANAGEMENT DIRECTION

This chapter presents a summary of potential impacts associated with continuation of Existing Management Direction. This analysis should be considered preliminary in nature. The formal impact analysis process associated with an EIS process is best completed after all alternatives have been identified so that impact analysis can occur on a parallel basis for all alternatives under consideration. Furthermore, at this early stage of the RMP/EIS process, extensive interdisciplinary discussion of potential impacts has not occurred. The next steps of the RMP/EIS process that will allow for extensive interdisciplinary discussion of impacts include public comment on the MSA and alternatives development, which are scheduled to occur in late 2002 and early 2003.

4.1. AIR RESOURCES

(THIS SECTION IS BEING COMPLETED BY SUSAN CAPLAN FROM THE BLM STATE OFFICE)

4.2. CULTURAL RESOURCES

The Existing Management Direction is intended to identify and protect significant cultural resources within the RMPPA from surface disturbing activities related to multiple uses of public lands. The various uses of BLM-administered public lands are managed to avoid damage to cultural resources; minimize conflicts between uses of cultural and other uses of public lands; provide for appropriate mitigation of avoidable adverse effects on cultural resources prior to their disturbance or destruction: and identify and protect cultural resources.

Current Rawlins Field Office cultural resource management objectives and actions and Federal and State of Wyoming regulations protect significant cultural resources while allowing development activities to occur. Increased pressure on BLM cultural resource personnel to expedite cultural clearance has occurred due to increased oil and gas, and other resource developments. Resource development has two potential impacts. The first impact is that surface disturbance might destroy the resources, remove them from their context before proper documentation has been gathered thereby greatly diminishing their value, and consequently preclude their contribution to the greater framework of cultural knowledge or setting. The second impact is that the development of energy related resources could be delayed due to unanticipated discoveries.

Potential impacts to areas of particularly high cultural resource value are dealt with more specifically. The 160-acre Gangplank (proposed) National Natural Landmark (NNL), the 640-acre Big Hollow NNL, and the 160-acre Sand Creek NNL are overseen by the National Park Service and BLM is interested in transferring ownership of these sites to an agency that would manage them specifically as NNLs. There is interest in better interpretation and identification of the segments of the Overland Trail, The Cherokee Trail and the Rawlins-Fort Washakie Stage Road that have public access. Impacts to trails are largely unmonitored at present because they are largely unmarked and fragmented as they traverses the checkerboard landownership pattern in the Union Pacific Railroad corridor. Impacts to other cultural resources certainly occur during ground disturbing activities because, even with prior awareness of potential cultural resource presence, such occurrences are unpredictable and may not be obvious, especially to the untrained eye.

To provide a more timely response for such situations measures could be implemented that include developing a cultural resources context for the RMPPA that would define what constitutes a significant site, and developing protocols to identify significant, subsurface archaeological sites prior to construction. Unfortunately, because of the heavy workload focusing on project-by-project NEPA compliance efforts, agency personnel do not have the time to develop long-range plans for cultural resources, or synthesize the large volume of information that has been accumulated as a result of the various compliance projects. Existing and emerging cultural resource issues and concerns would be difficult to resolve because of the constraints of insufficient manpower, time, and budget under continuation of the Existing Management Direction.

4.3. FIRE

Wildfires are an unavoidable occurrence within the RMPPA, and will continue to occur both naturally and through human interaction with the natural environment. Current BLM objectives (BLM 1990) are to control fire where there is high resource or human value, and intermingled surface ownership, while using prescribed burns to reduce fuel loads or manage vegetation and the wildlife habitat it provides. Much of the RMPPA (60%) is designated for full suppression, limited suppression in areas west of the North Platte River and in the Shirley Basin (37%), and full suppression with management options is in specified areas south of I-80 and largely west of SH-789.

Fire protection on public lands is managed by taking suppression actions appropriate to the terrain, resource management considerations, and the need to protect health, safety, and property. Resource and operational support for presuppression and suppression planning will continue to be closely coordinated with the Forest Service; the Sheriff's Offices in Sweetwater, Carbon, Albany, and Laramie Counties; Wyoming State Forestry Division; and local fire protection districts. The implementation of the National Fire Plan on BLM-administered public lands within the RMPPA will result in an overall reduction in the number of wildfires and the number of acres burned over the 20-year planning period.

Both wildfire and prescribed burns provide a variety of benefits and impacts for numerous resources. Positive benefits include increased forage for livestock and wildlife, and successional changes that promote habitat diversity and rejuvenation. Negative impacts include damage to cultural or paleontological sites, destruction of or damage to vegetation or wildlife (including special status species), loss of life and property, impacts to resource extraction infrastructure (e.g., oil and gas pipelines, well heads etc.), and the possible release of hazardous materials into the environment. Adverse effects arise through the fire itself or through application of fire retardants, fire line construction, vehicle operations, or smoke damage.

Increasing activity on public lands is increasing the probability that wildfires will occur. In addition, prolonged lack of prescribed burns or naturally occurring wildfires will reduce the grass/forb component of the system and increase brush occurrence. As the number of wildland/urban interface areas increases, so does the demand for fire protection and the expectancy for immediate response.

Under the Existing Management Direction, prescribed burns would continue to be used to achieve specific vegetation manipulation goals as needed and as budgets allow. Fires that are prescribed or that occur within prescribed fire areas are typically beneficial because they occur under environmental conditions or in areas where they can be contained and where they do not become excessively hot. Fires that occur outside prescribed fire areas, particularly under environmental conditions that support their rapid expansion, are most often detrimental. These often burn with such intensity that they kill the rootstocks of even the most fire-resistant species and often damage soil fertility, leaving it essentially barren for years. Depending on the severity of the burn, such sites may never return to the vegetation mix present at the time of the burn.

4.4. FORESTRY

Current BLM objectives for forest management are to enhance the health, productivity, and diversity of forests on BLM-managed lands over the 20-year planning period (BLM 1990). Under the 1990 RMP, the management of forest resources focused especially on what may be logged or rejuvenated for logging, although a balance of other resource values were beginning to be contrasted against timber value when the plan was drafted.

Current implementation of that policy focuses more strongly on the diversity of values produced by a healthy forest, including timber production as well as silvicultural practices to continue long-term health of the forest and support the many other valuable forest uses such as wildlife habitat and recreation. The checkerboard ownership pattern prevalent in the Rawlins Field Office area complicates management actions related to forests due to contradictory resource extraction practices.

There are both benefits and impacts from logging and other consumptive uses of forest products. Benefits include an increase in the diversity of forested lands from changes in successional stage, density of existing individual trees, and density of understory vegetation. With proper harvest planning, preparation, and implementation techniques, forest regeneration occurs rapidly as is apparent on parcels harvested on BLM-managed lands. In addition, clearing of sizable patches of forest having trees afflicted with parasitic mistletoe and secondary insect invaders allows some control of mistletoe dispersion. Impacts include loss of habitat for species that use the parcel being logged, reduction in overall size of homogeneous habitat blocks for species that have large home ranges, and the enabling of motorized access to lands previously without roads.

Under the Existing Management Direction, factors that would continue to be considered in forest management within the RMPPA include production of forest products, natural and recreational values, and enhancement of other resources, such as wildlife habitat. Timber harvesting practices would continue to be consistent with accepted silvicultural guidelines for each species, but also reflective of individual stand conditions or other resource or environmental concerns. Possible consolidation of land ownership on Elk Mountain and in the Shirley Mountains would facilitate the effective management of forest regeneration. Fuel reduction activities would increase in all forest management areas as the National Fire Plan objectives are implemented. As a result, significant reduction in fire risk would occur.

4.5. GEOLOGY, TOPOGRAPHY, AND MINERALS

Minerals are the primary geologic resource that is managed by the BLM. As discussed in Section 3.5 and in the *Rawlins Draft Mineral Occurrence and Development Potential Report*, oil and gas drilling, coalbed methane development, and coal mining projects would continue to occur at a rapid rate in the RMPPA with Continuation of Existing Management Direction into the future.

Most of the RMPPA has a high potential for the occurrence of hydrocarbons, and development of these resources would be allowed to continue under the Existing Management Direction. Activities expected to occur in the future to support hydrocarbon development include leasing of Federal lands, seismic surveys and other exploration methods to identify potential oil/gas locations, and development of the resources. Coal bed methane development and coal mining are also expected to continue and increase, but their future level of development is more uncertain than oil and gas development.

With respect to the continued energy resource development in the Rawlins RMPPA, both effects from oil and gas activity, coal mines, and coal bed methane activity on other resources, and effects to these industries from other BLM programs can be identified. The benefits are largely socioeconomic, given the substantive income to various entities within the Rawlins RMPPA from minerals development. Potential impacts from oil and gas, coal bed methane, and coal development activity, as well as from other more minor surface-disturbing activities, include:

- disturbance of vegetation,
- disturbance of soils and increased erosion potential,
- increased total suspended particulate loads in streams,
- introduction or spread of noxious weeds,
- air emissions,
- destruction of wildlife habitat,
- displacement of wildlife,
- precluded use of traditional use areas, such as leks or other display areas, calving areas, and nesting sites,
- fragmentation of large habitat blocks that are needed by wildlife species having large home ranges,
- disturbance or destruction of cultural and/or paleontological resources
- health/safety concerns,
- conflicts with recreation or livestock grazing,
- degraded water resources,
- degraded visual resources.

These impacts have already been identified under the existing level of development, and would likely occur at a higher magnitude in the future with Existing Management Direction. Impacts from other programs on the oil and gas industry include seasonal restrictions on exploration and/or drilling activity, and limited surface occupancy requiring directional drilling.

Even with the regulatory restrictions in place, oil and gas exploration has been able to continue at a fairly good pace. As noted above, the current projections for minerals development within the Rawlins RMPPA are either the same as or greater than what was foreseen in 1990 (BLM 1990). Projected acres of disturbance are:

- 34,843 acres due to oil and gas development through 2020, with 14,195 acres of disturbance until 2010 and an additional 20,648 acres of disturbance between 2010 and 2020,
- 12,118 acres of disturbance if the Carbon Basin alone were developed for coal, with an additional 56,240 acres of disturbance if the other six major areas were also fully developed,
- 699,000 acres, or 6.23 percent of the RMPPA if the five areas of high to moderate potential development for coalbed methane are developed,
- small localized acreages for other mining of such resources as aggregates (e.g., sand and gravel) and decorative stone (moss rock and boulders).

Overall, oil and gas development will likely continue to be the major focus of activity within the RMPPA with continuation of Existing Management Direction. Existing and continued leasing of Federal lands is the key precursor to continued drilling. The legal framework appears to support continued drilling once leasing occurs. Once land is leased, the BLM has little recourse to preclude surface-disturbing activity, unless environmental impacts are of an unacceptable level under NEPA.

Resource extraction from the small areas where salable minerals may be extracted will have only a minor impact in terms of acreage while they have larger visual impact on the environment. These activities have the potential to cause conflicts with other natural resources, resource programs, and resource use activities within the Rawlins RMPPA.

4.6. HEALTH/SAFETY AND HAZARDOUS MATERIALS

The primary health and safety concerns within the Rawlins RMPPA are associated with hazardous materials. Other health and safety issues are associated with fire, ranching and recreation. Potential impacts from health and safety issues range from simple cuts and abrasions to loss of life as a result of personal injury and from transitory burning of mucous membranes and skin rashes to systemic and long term responses, such as cancer as a result of exposure to hazardous waste.

Other than maintenance on selected stretches of road and stipulations on where OHVs may travel, BLM management has little control over personal injury to ranchers and recreationists using BLM-managed lands. Hazardous waste material disposal is contracted out by the Rawlins Field Office, while regulations and major actions are mandated by other Federal agencies. The BLM's role is in requiring that proposals for exploration and operation of minerals adequately address proper handling of and exposure to hazardous materials and the policing of areas under its administration. Natural resource development activities, such as oil and gas resource drilling, coal mining, and coal bed methane development, would continue to be the most likely sources of hazardous materials that could be spilled or dumped. Increased dumping of hazardous materials by residents of the Rawlins Field Office Area on public land is a growing concern.

Responsibility for implementing the procedures falls on the developer. These procedures are monitored by BLM personnel. As development activities increase and as more people use the public lands, the possibility of chemical spills and even unauthorized dumping is a concern. The potential for a spill, other accident, or illegal dumping, however, cannot be eliminated through management measures.

Lands are also inspected prior to transfer to public ownership or prior to acquisition to protect the public from contact with hazardous materials. Water resources would also be tested to determine if hazardous substances were present.

4.7. LANDS AND REALTY

BLM's objectives in managing lands and realty are to support the goals and objectives for resources associated with the lands and realty and to be responsive to public demand for land use authorizations.

The Rawlins Field Office has identified few private parcels of land for acquisition actions. Acquisitions are problematic in the highly fragmented checkerboard land ownership areas of the field office. In addition, the occurrence of State lands enclaves further complicates acquisition objectives. In the near future, lands and realty activities are expected to focus on small lands disposal actions, land exchanges, and Rights-of-Way (ROW) for road, transmission lines, and energy related transportation corridors necessary to support oil and gas development activities. Oil- and gas-related ROW activities have increased commensurate with increased fuel minerals development and have reduced the availability of staff resources to process other land and realty actions.

Legal actions in the Field Office area have also stalled land withdrawals and have the potential to hold up lands and realty management plans. Consequently, proposals to dispose of BLM-administered public lands would be considered, evaluated and implemented on a case-by-case basis according to criteria developed by the Rawlins Field Office. Consolidation of land holding proposed by private landowners and the State of Wyoming will also be considered if impacts are positive and not at the expense of current resource management objectives. The Rawlins Field Office is reluctant to identify tracts of land available for disposal so as to prevent land speculation by outside parties.

Withdrawal review has not been given the attention it needs to terminate unnecessary withdrawals and classifications. The time it takes to coordinate with other federal agencies and potential lawsuits are the main reasons. Review of Reclamation withdrawn lands will continue to proceed on a low priority basis until staff and budgetary resources can be made available.

High potential recreation areas are a focus of future land tenure adjustments and will have the benefit of protecting the natural environment.

As part of the Existing Management Direction, however, there is no requirement for a comprehensive utility/transportation/communication plan that would address coordinated planning for such corridors and ROWs across the RMPPA. Such a plan would minimize many of the impacts from minerals development that drive Lands and Realty considerations.

4.8. LIVESTOCK GRAZING

Under the Existing Management Direction, the primary objective is to enhance livestock grazing while maintaining or improving range condition and balancing economic uses with the enhancement of wildlife habitat, watersheds, and riparian areas.

The primary impacts from livestock grazing in the Rawlins Field Office Area are the potential to:

- overgraze the land since livestock are constrained by fences and dependent on ranchers to move them to other pastures,
- degrade riparian areas because livestock tend to congregate around and in water and wetland areas,
- compete for forage and water with wildlife species and wild horses (Section 4.18), which are managed differently than other livestock.

Mitigation of grazing pressure is through the system of grazing allotments described in Section 3.8. Strategic grazing systems implemented through this allotment system over the past 30 years have enabled optimal use of forage on public lands without damaging it.

In addition to the impacts on forage and wetland areas, grazing livestock may also cause impacts from their interaction with wildlife. Big game species and livestock compete for forage resources. During most of the year, grazing by livestock is compatible with wildlife. There are certain times and areas, however, in which conflicts occur. Areas used by the big game species for winter range are critical to the survival of the populations. Deer and antelope are considered browsers; their preferred forage is brush species, such as sagebrush, mountain mahogany, and bitter brush. Cattle or horses do not typically graze these plants. This results in minimal dietary overlap and minimal conflicts. Although, sheep eat the brush species, the number of sheep allotments is continually declining so their impact on wildlife forage is diminishing too. Vegetation manipulation that enhances grass and forb production, but reduces shrub species, will impact these species that browse. The wildlife-livestock forage competition is more prevalent between elk and livestock. Elk and livestock are both grazers, so there is more dietary overlap and both benefit from vegetation manipulations that increase grasses and forbs.

Continued management using the current techniques applied on the Rawlins RMPPA will likely maintain flexibility in grazing systems and properly manage the rangeland resource for both livestock and wildlife. In maintaining this balance, an additional consideration is the conversion of much of the RMPPA from sheep to cattle grazing. Sheep normally are herded daily by a sheepherder, who lives on the open range year round, keeping the sheep moving, and preventing any over concentration by the herd on an area. Cattle do not require this constant attendance and when they are left for various amounts of time, tend to concentrate in one area until the forage is completely exhausted. Thus, different management is required to maintain the health of an allotment that has been converted to use by cattle.

In addition to the impacts of livestock grazing on other resources, livestock grazing may also be impacted by other ongoing activities. Large-scale gas field development has the potential for livestock grazing conflicts and impacts to the forage resource. These include construction activities, open trenches, large areas of soil disturbance, increased vehicle traffic, and shifts in grazing distribution. Monitoring has not been conducted to determine the extent of impacts or conflicts, if any. The oil and gas industry has already impacted parts of the Rawlins RMPPA, and this impact would likely continue. Acreage is lost due to establishment of wells and related infrastructure, areas are unused due to traffic, and fences are cut. The heavy truck traffic already causes livestock to concentrate use in less active areas. The heavy trucks also damage the cattle guards and fences. Once a cattle guard or fence is compromised, mixing of cattle or unauthorized use occurs. Even though the impacts from livestock grazing may be exacerbated by mineral development within grazing allotments, the AUMs identified for each allotment are not typically adjusted to account for surface disturbance or livestock displacement.

4.9. OFF-HIGHWAY VEHICLE RESOURCES

OHV use throughout the Rawlins RMPPA is limited to existing roads and trails with seven exceptions (noted in Section 3.9) where use is limited or prohibited due to resource conflicts (Pennock Mountain Wick Wildlife Habitat Areas, Encampment Canyon, Encampment River Trail, Ferris Mountains, and Adobe Town) or restricted to open sand in a specified area (Dune Ponds Cooperative Management Area).

Based upon the present OHV use trends and on current RMP actions for other resources, potential impacts from OHV activity include the following:

- Continued creation and expansion of OHV trails within the planning area without adequate monitoring and control of this activity will probably lead to the long-term, negative effects of extensive soil erosion, loss of vegetation, degradation of wildlife habitat, and wildlife disturbance. Continued expansion of OHV trails would have related long-term negative effects on visual quality,

- Disturbance of stabilizing vegetation and consequent alteration in the natural pattern of dune movement is a particular and unique concern in the sand dunes stretching across the northern portion of the Rawlins RMPPA and in the Sand Dunes ACEC in the southwestern portion of the RMPPA,
- The long-term reduction in water quality from oil or fuel spills at stream crossings, and from sedimentation of streams and creeks with eroded soils,
- The long-term increasing risk of fire from human activity such as campfires and smoking that may be associated with the use of OHV trails. Internal combustion engines also increase the risk, particularly if proper spark arresters are not in place,
- The long-term, negative effects of the loss of existing OHV recreational areas, through displacement, to rapid oil and gas development, urban encroachment, and private development. This displacement would tend to reduce the OHV recreational opportunities available to the public,
- Short-term and direct negative impacts from noise intruding on the experience of solitude important to other recreationists. OHV-produced noise would tend to degrade and diminish the recreational opportunities for those recreationists who seek solitude, quiet, and natural settings,
- Such conflicts resulting from different expectations in the experience of resource use will continue to increase as the population of resource users increases,
- The long-term, negative effects on air quality (and visual quality) caused by the increased production of fugitive dust that could cause a localized, but frequent, reduction in visibility.

The impacts from OHV use and the increase in its popularity mandate the development of an OHV implementation plan for the RMPPA, as was intended in the 1990 RMP (BLM 1990). In addition, it is difficult to enforce the current restriction of OHVs to existing roads and trails in most areas because the Rawlins RMPPA is so large and the term existing trail can mean anything from a well established trail with posted signs to a recently established linear pattern of bent grass. Further, OHV use in areas having mixed surface ownership is difficult to manage, since what is allowed on one side of an (often invisible) ownership boundary may not be allowed on the other side of the boundary and actual use will tend to gravitate toward the least restrictive requirements. An actively implemented OHV management plan, with associated Memorandums of Understanding between BLM and adjacent landowners, would mitigate such impacts and enable OHV users to recreate freely in specified areas, yet eliminate their impact in areas where other resources are the highest priority.

4.10. PALEONTOLOGY

The objective of Existing Management Direction for paleontological resources is to retain the integrity of their scientific value. For paleontological resources exposed at the ground's surface, this is implemented through the issuance of paleontological collection permits and eliminating public access to sensitive areas. The rapid increase of oil and gas exploration in the Rawlins RMPPA, however, has the potential to impact paleontological resource through the unwitting or thoughtless destruction of sensitive fossils during ground-disturbing activities. Current management guidelines including the PFYC system (see section 2.10.2) mitigate the negative impacts on significant paleontological resources present beneath the Earth's surface during oil and gas exploration. However, the shortage of qualified personnel to implement the stipulations and guidelines has the potential to limit surface disturbing activities and destruction of sensitive paleontological resources.

4.11. RECREATION

The management objective under the Existing Management Direction is to ensure the continued availability of outdoor recreational opportunities, while meeting legal requirements for visitor health and safety, and mitigating conflicts with other resources. Visitor use in the RMPPA will continue to grow given the population increases throughout the Intermountain West. The direct, long-term impacts to recreational resources, under the Existing Management Direction include the following:

- The potential loss of existing recreational areas, through displacement, to oil and gas development, urban encroachment, and private development. This displacement would tend to reduce the recreational opportunities available to the public, as well as to minimize the ability to experience solitude, isolation, stillness, and a natural landscape.
- Long-term, increased levels of noise, dust, traffic, visually intrusive facilities, potentially intrusive night lighting, and new roads associated with by oil and gas development would conflict with recreational activities.
- A change in and degradation of the quality of the recreational experience, caused by overcrowding at camping areas, within SRMAs, and in areas along the North Platte, Medicine Bow, and Laramie Rivers wherever the limited public access to recreational waters occurs. Resource use conflicts are emerging as a result of overcrowding, and it is expected that the instances and degree of conflicts will increase. Changes in the recreational experience might include loss of solitude, increased noise, intrusive night

lighting, dissatisfaction with the recreational opportunities, and permanent changes in the recreational natural setting and landscape caused by severe overuse.

The indirect effects of maintaining the current RMP might include changes in recreational use patterns and the levels of visitation caused by overcrowding and loss of recreational areas. Those recreationists seeking solitude, quiet surroundings, and a natural setting may seek it elsewhere on other public lands outside of the Rawlins RMPPA.

Impacts to recreational resources are also considered in Sections 4.9 and 4.20, which discuss OHVs and Special Management Areas. These sections focus on activities or areas where recreational participation is particularly intense and has special management issues.

4.12. SOCIOECONOMICS

The BLM does not manage socioeconomic resources. Rather, it manages public lands and the natural resources that occur on them, working cooperatively with other Federal and with State agencies to manage those natural resources where multiple agencies have a mandate to protect and manage the resources (e.g., fossils, artifacts, fish, and wildlife). Nonetheless, as can be seen in numerous sections of this MSA (e.g., Sections 4.5, 4.8, 4.9, 4.11, 4.14, 4.15, 4.16, 4.19, 4.20) socioeconomic resources are integrally connected with BLM's management of public lands. Increases in population in urban areas, increase the recreational pressure on public lands. Alternatively, the presence of extensive public lands that can provide high quality recreational experiences may draw people to urban areas that otherwise might be less attractive. Economic and political pressures for increased minerals extraction, driven in part by population increases, increase the pressure for more active oil and gas activities. Therefore, in managing the public lands under its purview, the BLM must be highly aware of its socioeconomic setting. Its management decisions impact and are impacted by the population in the areas surrounding BLM-managed lands. BLM has the most direct control of these interactions through its management of when, where, how, and how many oil and gas leases are actively explored and developed.

Under the Existing Management Direction, some areas within or near the Rawlins RMPPA would continue to show an increasing population. Any increases in population would tend to be driven by continued growth of the oil and gas development industry, and by increasing demand for areas with high quality recreational resources and quality of life. Some parts of the study area would not see population increases because of constraints in housing availability/costs or a perceived lower quality of life than in other locations.

Income in the socioeconomic study area would continue to see an increasing portion from non-earned income sources, such as pensions, interest, and dividends. Increases in earned income would accrue from oil and gas operations, which have relatively high wage levels compared to the services and retail economic sectors.

For those areas with increasing populations, indirect effects would occur to housing and public services. Housing supply is a private sector function, with little or no involvement of governments. An increasing demand for public services also would have effects on service-provider (e.g., cities, counties, and special districts) budgets. Increased oil and gas development, however, would generate substantial revenues for the U.S., state, county, and local governments (including school districts) through ad valorem taxes, severance taxes, federal royalties, PILT, and other taxes on facilities and production. An increased BLM personnel presence would also contribute positively to the local economy.

The socioeconomic setting would continue to see conflicts among oil and gas development, recreation, preservation of natural settings, and protection of natural resources. Lifestyles and perceived quality of life would continue to differ among individuals and groups based on values, beliefs and goals.

4.13 SOILS

Under the Existing Management Direction, objectives relative to soils are to maintain or improve soil cover and productivity, as well as to minimize sediment damage and salt damage resulting from erosion.

Following the Existing Management Direction should maintain or improve the soil resource in its present condition. Areas that are highly susceptible to erosion, salinity, sodicity, and other limiting soil characteristics, however, need to be identified in detail across the Rawlins RMPPA. Ongoing efforts need to be continued and expanded to minimize erosion, especially in the Muddy Creek and Sage Creek drainages where naturally high erosion is exacerbated by road construction and traffic. Stipulations for individual soil disturbing activities, such as well pad construction, access roads, and ROW corridors should be more responsive to the soil type and characteristics at the specific site where surface-disturbance will occur. Planning for the most efficient and least disruptive transportation should also consider soil characteristics and limitations.

4.14 TRANSPORTATION AND ACCESS

Under the Existing Management Direction new utility/transportation systems are to be located next to existing facilities when possible and to avoid important resource values if possible, else intensive mitigation is required. There is, however, no mandate for development of a comprehensive transportation plan throughout the RMPPA. Such a plan could require that specific, existing roadways be used to access developing areas and designate specific corridors where additional access could be developed. These corridors could avoid areas of particular importance to wildlife, paleontological resources, cultural resources, and visual resources.

Impacts from transportation and access networks include underutilized recreational resources and inefficient access to minerals development sites if transportation and access networks are insufficient. If such networks are too extensive and poorly planned, however, impacts include loss of wildlife habitat, fragmentation of wildlife habitat, loss of grazing land, disturbance of livestock and wildlife in adjacent areas, a decline in recreational experience and general rural quality of life, and a decline in visual aesthetics.

Under the Existing Management Direction, legal access is to be acquired or maintained to a number of areas designated as of high, moderate, or low importance. Areas of high importance are Arlington, Elk Mountain, Little Medicine, and Shirley Mountains for forestry and Atlantic Rim, Big Creek, Ferris Mountains, Miller Hill, and Shirley

Mountains for recreation. Areas of moderate importance are North Laramie River, Pine Mountain-Split Rock, Toltec, and White Rock Canyon for forestry and Rawlins Uplift, and Seminoe-Pathrinder for recreation. Areas of low importance are primarily for forestry (Seven Mile, Sugarloaf, and Woodedge), although the Continental Divide Trail was identified for recreation. To meet this mandate, more access roads may need to be developed in the future.

More evaluation of road and trail closures also needs to occur in the future. Road or trail closures should be based on desired road/trail densities; demands for new roads; closure methods; type of access needed; resource development or protection needs; and existing uses. Traffic from oil and gas development vehicles results in additional impact to roadways (Wadsworth 2002). Without increased monitoring and management of the transportation aspects of these operations, this impact will continue. Roadways are built by oil and gas companies and then abandoned once exploration is complete. Currently, there is no standardized method for reclamation. These roads present liability issues when used by the general public because they are not maintained. Without a system for proper closure, these roads will continue to present a liability and hazard, as well as encourage habitat fragmentation.

Access to specific locations is often affected by private land holdings within the boundaries of the Rawlins RMPPA. These access issues will continue to be a problem as long as the private holdings exist.

4.15. VEGETATION

Under the Existing Management Direction, objectives are focused on maintaining or enhancing the populations of sensitive plant species or communities and on providing habitat quality adequate to support a natural diversity of wildlife and fish by maintaining or improving overall ecological quality.

Threatened and endangered plant species require that, if BLM actions potentially may affect listed species, formal consultation be initiated with the Fish & Wildlife Service. Actions are defined as anything that will result in potentially disturbing plant habitats directly and indirectly. Once a plant species is identified as being potentially impacted by specific actions, inventories are initiated to determine the plants distribution, abundance, status, and habitat needs. After an understanding is gained about a species, appropriate land use planning, conservation strategies, monitoring, NEPA compliance, information exchange and development of Best Management practices can be initiated.

Thus, particularly for wetlands and special status species, an elaborate protocol for protection is in place to monitor impacts on vegetation. This is important, since many activities affect the threatened, endangered, and sensitive vegetation species in the RMPPA. Road construction, oil and gas development sites, pipelines, grazing, recreation and the use of OHV's have directly and indirectly impacted the vegetation. Directly, roads and development fragment plant communities and increase the potential for erosion. Grazing directly impacts native plant communities by the activities of cattle foraging and trampling sensitive soils and in some locations increasing erosion. On a watershed basis, the removal of overstory cover on many streams directly affects peak and base flows of the stream network. Grazing has removed bank stabilizing vegetation and impacted banks directly through trampling and trailing. Stream channel entrenchment prevents water infiltration in floodplain soils, thereby reducing water storage that would support meadows, marshes and the riparian area. Recreation and oil and gas development roads, by entering new ground, allow noxious weeds and non-native species the opportunity to invade sensitive areas from such sources as imported fill materials, automobile tires and mud deposits, and human clothing. Noxious weeds are a major threat to native ecosystems and contribute to the loss of rangeland productivity, increased soil erosion, reduced species and structural diversity, loss of wildlife habitat, and, in some instances, are hazardous to human health and welfare. Portions of the one or more riparian areas are in unsatisfactory condition, and many have yet to be surveyed. Certain areas have excessive sagebrush canopy and/or decadent non-productive, old stands of sagebrush or greasewood, which reduces vegetation diversity and the amount of desirable forage available for wildlife and/or livestock. Logging of private lands interspersed among BLM-managed public lands in the Shirley Mountains has not followed planning, pretreatment, and implementation practices that facilitate forest regeneration, resulting in highly unproductive parcels that are interspersed among BLM-managed land and impede forest management.

From a livestock and wildlife perspective, gas field construction removes habitat, displaces livestock and wildlife, and fragments continuity of range. Resource use policy is toward beginning immediate reclamation of field development sites on completion of use, however, which mitigates decreases in range, habitat, and visual resource quality (recreational/scenic value) as rapidly as possible. Displacement of livestock and wildlife and habitat fragmentation continue, unless roads are also reclaimed.

Thus far, demands for surface disturbance (primarily oil and gas field development) versus those of surface maintenance (range/habitat) of vegetated lands has permitted those combined uses of the landscape. Management actions by BLM have minimized or mitigated the potential impacts. Active riparian management in the Rawlins RMPPA has been initiated on nearly all perennial and many intermittent streams. Exclosures and other grazing practices have been used to improve riparian habitat and have generally been successful when fences and management actions are maintained. Vegetation surveys using protocols defined by the BLM have been used to identify existing conditions of plant communities within the project area. Much of the data collected from these surveys have been initially analyzed to provide the BLM with a perspective on the priority areas that require attention in the permitting process and the development of management stipulations. Growth expansion, however, could potentially unbalance matters in time. This is particularly likely, given that disturbed acreage from oil and gas well development alone is projected to be 1.7 times the current value by 2010 and an additional 2.5 times the current value by 2020.

Impacts to vegetation from minerals development are very difficult for BLM to control. At the time of leasing, BLM can add stipulations to the lease that are protective of vegetation. Stipulations cannot be added to old leases, however, unless there is documented evidence of their need. The absence of adequate survey data on special status plant and animal species with only a ‘sensitive’ status rather than a form of ‘threatened’ status is not a basis for hindering projects from proceeding. Therefore, impacts to sensitive species and sensitive species habit may occur because they are insufficiently known. Thus, although there is a well-established system for protection of at least special status plant species, the reality is that time and monetary constraints on implementing that system may preclude its effectiveness.

Other impacts to vegetation are from management actions such as brush control. Big game and sage grouse habitat guidelines for brush control state that a maximum of 20 percent of sagebrush type vegetation may be treated at any time within winter, winter/yearlong, or summer habitat for antelope, moose, and mule deer (BLM 1988). Within crucial winter ranges for antelope, mule deer, and sage grouse, habitat guidelines for brush control are more stringent, specifying "no treatment unless beneficial to antelope, mule deer and sage grouse" (BLM 1988). Similar limitations are required on forested lands to prevent adverse affects to elk habitat by encouraging habitat regeneration and reduction of cumulative impact potential.

4.16. VISUAL RESOURCES

Under the Existing Management Direction, adverse effects on visual resources are to be minimized, while the effectiveness of land-use allocations is maintained (BLM 1990). To facilitate meeting this objective, visual resource management categories were applied across the RMPPA as discussed in Section 3.16. Existing and potential future impacts on visual resources result primarily from OHV use and the rapid increase of oil and natural gas exploration and extraction in the Rawlins RMPPA.

OHV use is not yet highly popular in the Rawlins RMPPA; however, an increase in unmanaged, unmonitored OHV use within the area for both recreation and access to the surrounding Forest Service-managed lands in the Medicine Bow National Forest has the potential to create direct, negative visual impacts throughout the Rawlins RMPPA. OHV use results in the cutting of new trails and roads, and accelerates soil erosion. Areas of conflict between VRM class objectives and OHV use were described in Section 3.16. Under the Existing Management Direction, OHV-produced visual degradation caused by the production of fugitive dust within the area is localized, but long-term. Visual degradation from trail creation is extensive and long-term.

Oil and gas development could potentially affect large areas within the resource planning area. Direct, local adverse effects would result from:

- Fugitive dust from road and well pad construction, and vehicle traffic associated with development,
- The large number of proposed drilling sites and their associated roads, drilling towers, and support facilities, further altering the form, line, color and texture of the landscape,
- Increased night lighting of these wells and facilities that may introduce new, intrusive, and potentially undesirable elements into the visual landscape, affecting recreational opportunities and the recreational experience.

Indirect, regional effects of oil and gas development may include the increased degradation of air quality and the formation of regional haze (and the associated loss of visual quality) from compressor engine emissions, vehicle emissions, and natural gases escaping from the oil and gas wells. The occasional flaring of natural gases further degrades the visual landscape.

The long-term impact trends for visual resources under the Existing Management Direction are:

- Continued degradation of visual quality throughout the area from unmanaged, uncontrolled use of OHVs,
- Increasing visual resource use conflicts between recreationists who seek a high level of visual quality (i.e., campers, hikers, river rafters and floaters, those traveling through the area, fishermen, hunters, etc.) and oil and gas development, which tends to degrade visual quality,
- Increasing pressure to explore and extract oil and gas resources from areas with resource potential not specifically designated (based on VRM objectives) as off-limits to exploration and extraction -- oil and gas development would include road construction, well pad construction, the erection of drilling towers, the placement and operation of well pumps, and the construction and operation of facilities needed to maintain these activities.

As increasing numbers of sightseers and those seeking various types of recreational opportunities pass through the Rawlins RMPPA, a heightened sense of scenic values and of the existing scenic quality is occurring. Many residents and those traveling through the area are becoming more aware of and more sensitive to the scenic quality and scenic values within the Rawlins RMPPA.

4.17. WATER QUALITY AND WATERSHED

Under the Existing Management Direction, the water-related management objectives are to control flood and sediment damage, reduce salt loading in the portion of the Colorado Basin that lies within the RMPPA, to meet or exceed established standards for surface or ground water quality where humans have lowered the natural quality, and provide for the physical and legal availability of water for fisheries, wildlife, livestock, recreational, municipal, and industrial uses. The watershed focus in meeting these objectives is, in priority order, Muddy Creek, Sage Creek, Second and Third Sand Creeks, and the remaining Little Snake River (excluding Muddy Creek).

The Rawlins Field Office is in the process of implementing management plans and monitoring activities on a watershed basis. This will enhance their ability to assess the watershed response to various impacts and management activities. Watershed environmental health is monitored through analysis of proper functioning condition (PFC) of riparian vegetation and actions are taken accordingly. Stream channels often respond to watershed management actions, and the current monitoring efforts will evidence how the stream channel integrity and water quality are being affected.

In general, best management practices are followed with respect to road building and other surface-disturbing activities associated with oil and gas leases; however, the overall road density, even if constructed properly, is currently contributing to higher sediment yield and likely will remain a major source of sediment yield into the future. The consequence will be the inability to fully respond to deteriorating watershed conditions.

BLM's management response to deteriorating watershed conditions can occur relatively quickly with respect to OHV use and grazing. Oil and gas leases, once granted, are not subject to rapid management change, however. This is of particular concern with regard to the development of coal bed methane, which may produce large quantities of water from poor quality aquifers. Frequent water quality sampling of potentially affected streams and rivers will monitor potential impacts to them.

The monitoring of surface water quality for salinity and sediment yield on a regular basis in all watersheds might be a more direct method of assessing their health than the monitoring of PFC. The consequence of not actively monitoring these parameters could be a greater lag time in recognizing deteriorating watershed conditions.

4.18. WILD HORSES

Under the Existing Management Direction, the objective for wild horses is the protection, maintenance, and control of a viable, healthy herd of wild horses that is free-roaming on adequate habitat.

Impacts from wild horses, especially when their numbers are markedly above the AML, are primarily competition with other livestock and elk for forage. Horses range markedly further from water than cattle, so in the HMAs where horses currently occur they tend to use forage that might not be available to cattle. By utilizing small springs and seeps, horses are also better able to disperse throughout the HMAs. Competition with elk, while possible, is unlikely to be substantive, given the habitat in the HMAs. Horses also do not tend to congregate and spend a great deal of time at water sources, therefore, their impact on riparian areas is less than that of other livestock.

Impacts to wild horses, given the degree of competition for forage discussed above, are minimal, with the exception of the need to control their populations. Potential methods and times for population control are varied. Populations are controlled exclusively by adoption at present, with unadopted animals going to adoption facilities. Antifertility treatments have been explored, but are not currently considered an effective means of population control. In the absence of population control, horse herds are able to increase rapidly as discussed in Section 3.18. This negatively affects not only their balance with livestock in areas that are designated grazing allotments, but also leaves the horse herds subject to more competition for survival in times of drought or other climatic extremes.

Wild horse roundups have an impact on the horses, and also on other wildlife species as well. A more detailed evaluation of the potential impacts of the proposed wild horse roundups (BLM 1999) had the following conclusions:

- During roundup procedures, surface-disturbing activities would not be allowed during the reproductive period of April 1 through June 30 within 200 meters of identified concentration areas to reduce impacts to nesting mountain plover. Concentration areas are defined as areas where broods and/or adults have been found in the current year or documented in at least two of the past five years.

- Roundup practices themselves, such as the use of saddle horses and helicopters, are not likely to adversely affect swift fox; however, any surface disturbing activity, such as the construction of corrals, potentially disruptive to denning fox are prohibited during the period from March 1 to July 31 for the protection of denning areas.
- Even if no prairie dog towns are identified in a pre survey, the area would be rechecked when the actual permanent or temporary project (e.g., corrals) is constructed. If a new town has been established within and adjacent to a particular project, and the project site qualifies as potential black-footed ferret habitat, then the project would either have to be moved or a survey of the site and informal/formal consultation with the U.S. Fish and Wildlife Service completed.
- In all three HMAs, there are sage grouse leks and potential nesting habitat that tend to contain sagebrush pockets in drainages and draws or on the flats. Most of the natural landscapes within the HMAs contain grass-dominated areas with low growing forbs and/or badlands-type habitats, which are not used by grouse for nesting and/or brood rearing. In general, the impacts to sage grouse strutting and nesting areas should be minimal provided that the horse population is in balance with the ecosystem. Nonetheless, site-specific EAs completed for any surface disturbing activities, which would not be allowed between March 1 and June 30 for the protection of strutting and nesting sage grouse.
- Raptor species should not be impacted by wild horses and implementation of management actions.

The substantive overlap between the Adobe Town HMA and the Adobe Town WSA plus its proposed addendum, means that the wild horse herd in that HMA may not be subject to development pressures that are anticipated elsewhere in the RMPPA.

4.19 WILDLIFE AND FISH

As noted in Section 3.19, BLM manages the habitat used by wildlife and fish species, while the WGFD and the U.S. Fish and Wildlife Service manage the wildlife species themselves. Thus, under the Existing Management Direction, the BLM's objective for wildlife is to provide habitat quality adequate to support a natural diversity of wildlife and fish, to maintain or improve the long-term quality of high priority habitats, and to maintain the overall ecological quality of high priority habitat types, with the ecological quality of moderate and low priority habitats being balanced with multiple-use. The BLM's objectives for wildlife are, therefore, largely the same as their objectives for vegetation. In addition, to these general objectives for wildlife and fish habitat, are objectives for raptor concentration areas, the Baggs Crucial Elk Winter Range, White Pelican Island, and ACECs specifically established for their wildlife values.

The above objectives and actions to implement them have been followed insofar as feasible. It is apparent, however, that in most portions of the RMPPA, development will be allowed to continue, albeit with stipulations. Difficulties have already been mentioned regarding the collection of adequate data to identify the need for and support development of stipulations prior to leasing, or for existing leases. Other impediments to implementing the above objectives and actions are the degree of coordination required with other Federal and State agencies to manage both the wildlife or fish resource and its habitat. Not only are there cultural differences among agencies, but also differing goals and priorities. Some of the species for which BLM manages habitat move across state lines, further complicating the issue. The management of the Savery Creek mule deer herd exemplifies some of these difficulties. Within the checkerboard area, coordination with and cooperation of private land owners is necessary to enable effective management of habitat for wildlife species that do not recognize ownership boundaries. The ACECs developed for special recognition and management of wildlife are in the checkerboard and a case in point. The Shamrock Hills ACEC, which recognizes what is believed to be the highest concentration of ferruginous hawks in the nation (and is certainly the best documented concentration), cannot be managed as a cohesive unit because it consists of alternating parcels of BLM-managed and private land.

In addition to the above administrative difficulties, there are impacts to various wildlife species under the Existing Management Direction. Indirect impacts to wildlife and fish through their habitat have already been discussed (Section 4.15). Direct impacts to wildlife include the following:

- Displacement from traditional use areas to intolerable levels of human activity,
- Interruption of breeding cycle activities ranging from courtship through rearing of young. Because many species are dependent on seasonal triggers to stimulate their breeding cycle and their breeding behaviors are often prescribed sequences, interruption of the cycle often means the loss of breeding for the year,
- Death of individual animals through increased predation enabled by loss of cover for prey or by provision of improved hunting sites for predators,
- Death of individual animals through road kill, other accidents, and poaching.

Direct impacts to fish and amphibian species are tied directly to habitats associated with water (e.g., wetlands, riparian areas, and open water aquatic areas).

The evaluation of impacts to special status wildlife and fish species is enabled by the same legislation and follows the same procedure as was discussed for special status plant species. Thus, the impacts to these habitats and to water quality are indirect impacts to these aquatic species, as well. More specifically:

- Road construction has altered the ability of many streams to access their floodplains, constricted the floodplains, and straightened or constricted the stream channels resulting in channel incision and erosion,
- Logging and associated road construction has removed overstory cover on many watersheds, affecting peak and base flows of the stream below,
- Grazing has removed bank stabilizing vegetation and impacted banks directly through trampling and trailing,
- Water withdrawal for irrigation, stock watering, and energy development has affected the ability of fish to survive in the streams. Water withdrawals from streams reduce summer flows and result in increases in water temperature,
- Channeling streams to better control the spread of water and removal of willows to create irrigated pastures and agricultural fields has resulted in channel incision and loss of habitat. Diversions often block movement of fish species to and from spawning and rearing areas.

Direct impacts are as for wildlife, and include displacement, interruption of breeding cycle, and death through more effective predation or human actions.

To better understand these impacts and develop appropriate mitigating measures under the Existing Management Direction, aquatic habitat surveys using the PFC protocols have been used to identify existing conditions on streams within the project area. Many of the data collected from these surveys have been initially analyzed to provide the BLM with a perspective on the priority streams that require attention. Active riparian management in the Rawlins RMPPA has been initiated on nearly all perennial and many intermittent streams.

Initial analysis indicates that stream temperature and sediment loading are major limiting factors on the project area streams, resulting in generally poor overall rating on most stream reaches. Increased temperatures result from water withdrawals, loss of streamside vegetation, channel widening, and lower summer flows. Stream channel entrenchment prevents water infiltration in floodplain soils, thereby reducing water storage that would promote longer duration streamflow and reduced or eliminated interflow between the stream and the riparian area. Even under pristine conditions, water temperatures seasonally reach levels within the RMPPA that may stress and directly impact salmonid and other cool water species. Prior to stream fragmentation, salmonids were historically able to migrate to cooler waters during the summer season and avoid stressful conditions. Today restricted channel conditions, reduced flows and loss of access to summer refugium limit the ability of salmonid and whitefish species to survive.

Federal agency actions resulting in water depletions to the Colorado River may affect the endangered Bonytail chub, Colorado pikeminnow, Humpback chub, and Razorback sucker downstream in the Green and Colorado River systems and require formal consultation with the U.S. Fish and Wildlife Service. This is also true of Federal agency actions resulting in water depletions to the Platte River, which may affect the endangered Pallid sturgeon downstream in the Platte River system. In addition, Colorado River cutthroat trout have been declining through out their range due to loss of habitat, exotic species introductions and management actions. Activities of potential concern include development of ponds, lakes, reservoirs, created or enhanced wetlands, pipelines, wells, diversion structures, and water treatment facilities.

Implementation of effective grazing and rangeland management is the primary tool for ensuring adequate riparian habitat to protect stream corridors for fish and macroinvertebrates, and wetlands and stream edges for amphibians. Grazing management actions include developing exclosures, rotating, resting and/or deferring defined areas from grazing use on a scheduled basis. Small exclosures are used in meadows, riparian areas and aspen stands.

Habitat required by the fish species in the project area will continue to be impacted by grazing, OHV use, development, road construction, lack of law enforcement, recreational activities, hunting and fishing, and withdrawal of water from the stream network. Impacts will be both direct and indirect and may lead to increased erosion, loss of riparian vegetation, reduction in watershed stability, reduction in connectivity of stream networks and reduced water quality conditions for salmonids and other cool water fish species and macroinvertebrates. Ongoing impacts to amphibians are expected to be similar.

4.20 SPECIAL MANAGEMENT AREAS

The existing 1990 RMP includes provisions for activity plan development for each of the ACECs. Due to management difficulties mentioned in Section 4.19, draft activity plans for Jep Canyon and Shamrock Hills ACECs have never been finalized, and a management plan for the Sand Hills ACEC has not been started. In addition to the management difficulties imposed by the checkerboard pattern of ownership, BLM has a reticence to impose substantive restrictions on development within these areas of acknowledged importance to wildlife. This has left recognition of the importance of the wildlife resource in these areas as the sole function of ACEC designation.

Affects on SMRA's would be similar to affects on other recreational resources, as discussed in Section 4.11.

Any potential for future designations of Wild, Scenic, or Recreational rivers in accordance with the Wild and Scenic River Act would be dependent upon the results of the statewide inventory currently underway. The longest stream reach being considered for WSR designation is Muddy Creek, although the reaches of Skull Creek within the Adobe Town WSA are also numerous. WSR designation of these streams would impact their management, especially for Muddy Creek, which is within an active grazing allotment that has natural erosion problems.

The Adobe Town, Bennett Mountains, Encampment, Ferris Mountains, and Prospect WSAs will continue to be managed as WSAs until such time when Congress designates one or more of them as wilderness, or releases them from consideration as wilderness. Consequently, until such determination is made, the wilderness values will be preserved for these areas. There would be no additional wilderness proposed by the BLM, although there could be externally generated proposed wilderness proposal areas, such as those currently being considered in the vicinity of Adobe Town and Kinney Rim South.

4.21 CUMULATIVE IMPACTS

Cumulative impacts result from several activities occurring at the same time, and in the same general location over a period of time. The result of this interaction is a synergistic impact where the sum of the effects from all contributing activities is greater than the simple addition of the whole. In the Rawlins RMPPA, some preliminary projections of cumulative impacts can be extrapolated from the management decisions and impact assessments in the MSA, taking into account the interactions of oil and gas development, livestock grazing, wildlife use and habitat protection, forest management, hunting and fishing, OHV use, recreational use, and other multiple uses on BLM-administered public lands and anticipated activity on intermingled private and state lands.

In the RMPPA, there are four primary elements of the environment that require evaluation for overall cumulative impacts. These are s (including wildlife habitat considerations). Additionally, potential impacts to cultural, paleontological, or visual resources also must be monitored to identify potential cumulative effects. In most cases, there is not enough overlap in activity timing or extent for substantive cumulative impacts to occur among the elements that are being evaluated.

The expanding infrastructure to support oil and gas development will lead to the proliferation of additional roads in the Rawlins Anticline area and other mineral developments locations generating some noticeable degradation of air and visual quality during times of intensive heavy truck activity. Diligent monitoring by BLM and state authorities to assure adherence to APD stipulations designed to reduce oil and gas operational impacts on air quality will be necessary to limit the overall cumulative impacts of these activities on recreational use, scenic viewsheds and protected landscapes.

The impact of increased oil and gas, and coal development is already having a dramatic impact on the cultural resources of the RMPPA. As mentioned previously in this chapter, agreements between BLM and Operators are in place that will provide the opportunity for inventory and assessment of discoveries associated with mineral development. Current Rawlins FO staff capabilities are not adequate to provide required monitoring, inventory and assessment work commensurate with the extent of development activity. Staff resources and budget for monitoring will need to be increased to accommodate the rapid increase in new projects. Anticipated delays in production to resolve cultural resource issues will be lessened if BLM resources are adequate to meet their management responsibilities. The expanded knowledge and associated archeological material emerging from projects in the path of mineral development will be beneficial to the understanding of the pre-history of western Wyoming and the RMPPA. A significant increase in research activity is expected as well as a more intense interest and focus on artifacts and information on the part of local and national museums and university programs. Some of the more important sites will require planning to protect and interpret their importance for recreational visitors and the local population. In some cases, these sites may require special designation and more intensive management depending upon the level of visitor demand. Closer coordination and cooperation with Native American tribal interests will be necessary as the proliferation of new sites and archeological materials emerge

Implementation of the National Fire Plan, and the resulting availability of funds for fire reduction planning and projects at the local level will result in an overall reduction in the risk of fire in treated fire prone areas and enhance response to fire incidents. An increase the number of fuel reduction projects and treated acreage in expected as well as enhanced cooperative strategies to protect the urban interface areas from wildfires. The existing fire suppression cooperative arrangements between BLM, Forest Service, Wyoming State Forestry Division, County Sheriff's Departments, local cooperating fire agencies and the State Land Department will continue.

No significant long-term cumulative impacts from other land use activities in the RMPPA will result from the existing management scenario. As population growth, tourism and increased employment resulting from mineral development continues, additional recreational pressures are expected and additional facilities may be required to accommodate and managed the visitor population in the most intensely used areas. Timber harvest will continue at a low priority for the unforeseeable future.

The cumulative impacts of oil and gas development in the RMPPA will be significant over time. Potential economic growth and an increase in real estate values in Rawlins and other affected communities could occur. These potential affects may improve local economic conditions currently characterized by real estate decline. This has the potential to increased tax revenues in the near future that will contribute to some of the costs of increased infrastructure and services demands in local communities.

BLM lands within major oil and gas and coal methane project areas will experience some environmental degradation, some loss of wildlife habitat and reduction in wildlife activity due to increased human activity, automobile and truck traffic on new roads constructed to well pads and other facilities, and noise from various development activities. Some recreational use conflicts will occur placing greater demand on protected areas for recreational activities. BLM management decisions and associated stipulations in APDs are designed to minimize the impact of development on the environment and on cultural resources. These stipulations assume a level of monitoring and enforcement commensurate with the increased development activity. If appropriate staff and budgetary increases are not made available to the Rawlins FO in a timely fashion, regulatory oversight will be lacking and failure of the Operators to perform properly may result. In some cases, delay in development may occur until BLM staff resources can be applied to resolve resource conflicts in the path of mineral development. More intense interest and focus on transportation management and planning within the RMPPA will be necessary as well as greater coordination between the BLM and county governments regarding road construction and maintenance.

Urban growth and tourism are stimulating recreational development on BLM-administered lands and requiring BLM to place more emphasis on development of more recreational areas, campsite and facilities. In turn, recreational activities are contributing more revenue to the local economy and placing demand on local communities for recreational related services and facilities.

The land ownership patterns in the Rawlins FO are not expected to change dramatically during the next 20 years. The BLM manages its lands for retention, not disposal, and will continue to do so. Land exchanges will continue to be used as the primary tool for land disposal and acquisition, and acquisition priorities will be heavily influenced by recreational and wildlife habitat priorities. The necessity for access to oil and gas well pads and other facilities on public lands will place an increasing burden on BLM staff resources to evaluate and process ROW applications and to monitor the construction and use of access roads and the closure and restoration of mineral access roads once they are no longer needed. Mineral related ROWs can create road density problems and good transportation planning will be required to a greater extent as more roads are proposed and constructed. Close coordination and cooperation with local governmental entities will be necessary to assure proper road maintenance. BLM will continue to emphasize use of transportation corridors for consolidation of transmission and transportation facilities to reduce the environmental impact and the proliferation of ROWs. The checkerboard ownership pattern prevalent in the Rawlins Field Office area has the potential to complicate lands and realty actions.

Wild horses will continue to have an impact on the livestock grazing and wildlife habitat on BLM-administered lands. The impacts can be beneficial aesthetically and adverse depending upon the extent to which good range management practices and wild horse management actions are pursued. Herd reductions, range improvements and vegetative manipulation will improve range conditions, reduce erosion and provide increased forage over the 20-year planning period. Conflicts will continue with livestock and wildlife for forage in certain areas and seasonally, but the conflicts will be minimized through improved range and wildlife management practices.

Livestock grazing will continue to have a major impact on the BLM-administered lands and the local economy of the RMPPA. The impacts can be both beneficial and adverse depending upon the extent to which good range management practices and stipulations in permits and AMPs are followed. Range improvements and vegetative manipulation will improve range conditions, reduce erosion and provide increased forage over the 20-year planning period. Conflicts will continue to occur between livestock and wildlife for forage in certain areas and seasonally, but the conflicts will be minimized through improved range and wildlife management practices.

A cross-reference cumulative resource impact matrix is being developed that will allow NEPA alternative selection process. The matrix will be developed with the cooperation of all participants to ensure that cumulative impact assessments are exhaustively determined.

GLOSSARY (under development)

ACTIVITY PLANNING. Site-specific planning that precedes development. This is the most detailed level of BLM planning. An activity plan details management of one or more resources on a specific site. Examples are allotment management plans and recreation area management plans. Activity plans implement decisions made in the RMP.

ACTUAL USE. The number of livestock actually grazing on a given allotment. The use made of forage by livestock or wildlife without reference to permitted or recommended use.

ALLOTMENT. An area allocated for the use of the livestock of one or more qualified grazing lessees. It generally consists of BLM-managed lands but may include parcels of private or state-owned lands. The number and kind of livestock and period of use are stipulated for each allotment. An allotment may consist of several pastures or may be only one pasture.

ALLOTMENT MANAGEMENT PLAN. A concisely written program of livestock grazing management, including supportive measures, if required, designed to attain specific management goals in a grazing allotment. An AMP is prepared in consultation with the permittee(s), lessee(s), and other affected interests. Livestock grazing is considered in relation to other uses of the range and in relation to renewable resources such as watershed, vegetation, and wildlife. An AMP establishes seasons of use, the number of livestock to be permitted, the range improvements needed, and the grazing system.

ANIMAL DAMAGE CONTROL. The control of animals that are causing economical losses to agriculture, damage to property, or causing hazards to human health. This control usually results in killing the offending animal(s).

ANIMAL UNIT. A standardized unit of measurement for range livestock or wildlife. Generally, one mature (1,000-pound) cow or its equivalent, based on an average daily forage consumption of 26 pounds of dry matter per day.

ANIMAL UNIT MONTH. A standardized unit of measurement of the amount of forage necessary for the sustenance of one animal unit for one month; also, a unit of measurement that represents the privilege of grazing one animal unit for one month.

APPROPRIATE MANAGEMENT RESPONSE. Specific actions taken in response to a wildland fire to implement protection and fire use objectives.

AREA OF CRITICAL ENVIRONMENTAL CONCERN. 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.

BOARD FOOT. A unit of solid wood 1 foot square and 1 inch thick.

CASUAL USE. Activities ordinarily resulting in no appreciable disturbance of public lands, resources, or improvements; for example, activities that do not involve the use of mechanized earthmoving equipment or explosives or, in areas designated as closed to ORVs, do not involve the use of motorized vehicles.

CATEGORY 1, 2, or 3 CANDIDATE SPECIES. Classification by the Fish and Wildlife Service, U.S. Department of the Interior, of taxonomic groups or species of plants or animals that are being considered for listing as either threatened or endangered under the Endangered Species Act of 1973, as amended.

Category 1 refers to species or taxonomic groups for which the USFWS has on file substantial information on biological vulnerability and threat(s) to support the appropriateness of proposing to list them as endangered or threatened. Data are being gathered on category 1 species concerning precise habitat needs and, for some, the precise boundaries for critical habitat designations.

Category 2 refers to species or taxonomic groups for which information in possession of the USFWS indicates that listing them as endangered or threatened species is possibly appropriate, but for which substantial data on biological vulnerability and threat(s) are not known or on file. Further research and field study usually will be necessary to ascertain the status of category 2 species, and some will not warrant listing while others will be found to be in greater danger of extinction than some listed in category 1.

Category 3 refers to species or taxonomic groups that are no longer being considered for listing as threatened or endangered, some because there is persuasive evidence of extinction, some because they do not meet the act's definition of "species," and some because they have proven to be more abundant or widespread than was previously believed.

CLASSIFICATION AND MULTIPLE USE. Refers to both the Classification and Multiple Use Act of 1964 and the classifications that were placed on the lands pursuant to that act. The objective of the C&MU act was to provide an opportunity for the BLM to categorize lands for multiple use management and for disposal. The act provided four years for the BLM to classify lands for multiple use management by prohibiting disposal or entry under various public land laws to be specified in the particular classification document.

The C&MU classifications referred to in this document prohibited disposal under the Isolated Tracts Act (Revised Statutes 2455) and entry under the agricultural entry laws (Homestead Act, Desert Land Act, and others); portions of the C&MUs also prohibited entry under the General Mining Law of 1872. Today, the multiple use provisions of FLPMA fulfill the purpose and objectives of the C&MU classifications.

"CLOSED" DESIGNATION (ORV). Vehicle travel is prohibited yearlong with no exceptions other than for emergency vehicles in emergency situations. Access by means other than motorized vehicles is permitted.

COMMERCIAL FORESTLAND. Forestland that is now producing or is capable of producing at least 20 cubic feet of wood fiber per acre per year from commercial coniferous tree species, and which has met certain economic, environmental, or multiple use criteria for inclusion in the commercial forestland base.

CRUCIAL HABITAT. Habitat on which a species depends for survival because there are no alternative ranges or habitats available.

CRUCIAL WINTER RANGE. The portion of the winter range to which a wildlife species is confined during periods of heaviest snow cover.

CULTURAL RESOURCE. A fragile and nonrenewable remnant of human activity, occupation, or endeavor reflected in districts, sites, structures, buildings, objects, artifacts, ruins, works of art, architecture, or natural features.

CULTURAL RESOURCE INVENTORY. A descriptive listing and documentation, including photographs and maps, of cultural resources. Processes involved are locating, identifying and recording of sites, structures, buildings, objects, and districts through library and archival research; collecting information from persons knowledgeable about cultural resources; and conducting on-the-ground field surveys of varying levels of intensity. Also see Cultural Resource Inventory Classes.

CULTURAL RESOURCE INVENTORY CLASSES. A Class I inventory of a defined area provides a narrative overview derived from existing information and a compilation of existing data on which to base the development of the BLM's site record system. A Class II inventory is a sample-oriented field inventory designed to locate and record, from surface and exposed profile indications, all cultural resource sites within a portion of a defined area to make possible an objective estimate of the nature and distribution of cultural resources in the entire defined area. A Class III inventory is an intensive field inventory designed to locate and record all cultural resource sites within a specified area. Upon completion of such an inventory, no further cultural resource inventory work is normally needed in that area.

CULTURAL RESOURCE MANAGEMENT PLAN. A plan designed to inventory, evaluate, protect, preserve, or make beneficial use of cultural resources and the natural resources that figured significantly in cultural systems. The objectives of such plans are the conservation, preservation, and protection of cultural values and the scientific study of those values.

CULTURAL RESOURCE SITE (cultural property). A physical location of past human activities or events. Cultural properties are extremely variable in size, ranging from the location of a single cultural resource feature to a cluster of cultural resource structures with associated objects.

DISPOSAL. Transfer of ownership of a tract of public land from the United States to another party through sale, exchange, or transfer under the Recreation and Public Purposes Act.

ENDANGERED SPECIES. Any plant or animal species that is in danger of extinction throughout all or a significant portion of its range, as defined by the U.S. Fish and Wildlife Service under the authority of the Endangered Species Act of 1973.

ENVIRONMENTAL ASSESSMENT. A record of the environmental factors involved in a land management action.

ENVIRONMENTAL IMPACT STATEMENT. A written analysis of the impacts of a proposed project and alternatives.

FEDERAL LANDS. As used in this document, lands owned by the United States, without reference to how the lands were acquired or what federal agency administers the lands. The term includes mineral estates or coal estates underlying private surface but excludes lands held by the United States in trust for Indians, Aleuts, or Eskimos. Also see Public Land.

FIRE MANAGEMENT. The integration of knowledge of fire protection, prescribed fire, and fire ecology into multiple use planning, decision making, and land management activities. Fire management places fire in perspective with overall land management objectives.

FIRE MANAGEMENT PLAN. A strategic plan that defines a program to manage wildland and prescribed fires and documents the Fire Management Program in the approved land use plan. The plan is supplemented by operational procedures such as preparedness plans, preplanned dispatch plans, prescribed fire plans and prevention plans.

FIRE SUPPRESSION. All work activities connected with fire extinguishing operations, beginning with discovery and continuing until the fire is completely out.

FORESTLAND. Land that is now, or is capable of becoming, at least 10% stocked with forest trees, which has been developed for nontimber use.

FULL SUPPRESSION. A fire suppression strategy requiring immediate and continuous aggressive attack to attain the suppression objectives with the leastdamage of property or loss of resources in the most cost-effective manner. Such actions may include control, containment, or confinement of wildfire to attain land management objectives.

GRAZING PREFERENCE. The total number of AUMs on public land apportioned and attached to base property owned or controlled by a lessee.

GRAZING SYSTEM. A systematic sequence of grazing use and nonuse of an allotment to reach identified multiple use goals or objectives.

HABITAT MANAGEMENT PLAN. An officially approved activity plan for a specific geographic area of public land. An HMP identifies wildlife habitat and related objectives, defines the sequence of actions to be implemented to achieve the objectives, and outlines procedures for evaluating accomplishments.

INITIAL ATTACK. An aggressive suppression action consistent with firefighter and public safety and values to be protected.

LEASABLE MINERALS. Minerals subject to lease by the federal government, such as coal, oil and gas, oil shale, potash, sodium, phosphate, and other minerals that may be acquired under the Mineral Leasing Act of 1920, as amended. The major leasable minerals in the planning area are oil and gas and coal.

LEK. A site used by grouse for courtship display. Also called "strutting ground" or "dancing ground." The lek is the center point of the annual reproduction cycle. Most nesting occurs within 2 miles of the lek.

"LIMITED" DESIGNATION (ORV). Vehicle travel is restricted in some manner in the area. Restrictions could take many forms, but the most common are "limited to existing roads and trails;" which allows vehicle travel only on roads that were in existence at the time of designation or as authorized for future uses; "limited to designated roads and trails," which allows vehicle travel only on roads that the BLM designates by signs; and "seasonal restrictions," which restricts vehicle travel in an area or on certain roads during some portion of the year (such as wintertime vehicle restrictions to protect big game on crucial winter range).

Under limitations to existing or designated roads and trails, vehicle travel off roads is permitted only to accomplish necessary tasks and only if such travel would not result in resource damage. Necessary tasks are defined as work requiring the use of a motor vehicle. Examples include picking up big game kills, repairing range improvements, managing livestock, and mineral activities where surface disturbance does not total more than 5 acres, as described in the provisions of 43 CFR 3809.1-3.

LIMITED SUPPRESSION. A deviation from normal fire suppression procedures based on a land-use decision or practiced where controlling fires is extremely difficult or dangerous, or where the values at risk do not warrant the expense associated with full suppression. Such fires will receive an appropriate suppression response.

LIMITED SUPPRESSION PLAN. A written fire management plan that is approved by the appropriate line authority and designates limited fire suppression areas. Such plans must include plan objectives, area description, fire history and effects, action planned, and evaluation procedures required.

LOCATABLE MINERALS. Generally, the metallic minerals subject to development specified in the Federal Mining Law of 1872. Examples are gold, silver, and copper.

MITIGATION. A method or process by which impacts from actions may become less injurious to the environment through appropriate protective measures. Also called mitigative measure.

MONITORING. Specific studies that evaluate the effectiveness of actions taken toward achieving management objectives.

MULTIPLE USE. Coordinated management of various surface and subsurface resources so that they are used in the combination that will best meet present and future needs.

NATIONAL REGISTER OF HISTORIC PLACES. The official list, established by the Historic Preservation Act of 1966, of the nation's cultural resources worthy of preservation.

NONCOMMERCIAL FORESTLAND. Land that is not capable of yielding at least 20 cubic feet of wood per acre per year of commercial species; also, land that is capable of producing only noncommercial tree species.

OFF-ROAD VEHICLE. Any motorized tracked or wheeled vehicle designed for cross-country travel over any type of natural terrain. Exclusions (from Executive Order 11644, as amended by Executive Order 11989) are nonamphibious registered motorboats, any military, fire, emergency, or law enforcement vehicle while being used for emergency purposes, any vehicle whose use is expressly authorized by the authorizing officer or otherwise officially approved, vehicles in official use, and any combat support vehicle in times of national defense emergencies.

"OPEN" DESIGNATION (ORV). Vehicle travel is permitted in the area (both on and off roads) if the vehicle is operated responsibly in a manner that will not cause significant undue damage to the soil, wildlife, vegetation, cultural resources, or other important resources on the public lands.

PERENNIAL STREAM. A stream that flows throughout the year.

PREFERENCE. Grazing privileges established following the passage of the Taylor Grazing Act, based on the use of the federal range during the priority period. The active preference and suspended preference together make up the total grazing preference.

PREPAREDNESS. Activities that lead to a safe, efficient, and cost effective fire management program in support of land and resource management objectives through appropriate planning and coordination.

PRESCRIBED FIRE. Any fire ignited by management actions to meet specific objectives. A written, approved prescribed fire plan must exist, and NEPA requirements must be met, prior to ignition.

PRESCRIPTION. Measurable criteria which guide selection of appropriate management response and actions. Prescription criteria may include safety, economic, public health, environmental, geographic, administrative, social or legal considerations.

PUBLIC LAND. As used in this document, federally-owned surface or mineral estate specifically administered by the Bureau of Land Management. Also see Federal Lands.

RANGE IMPROVEMENT. Any activity or program on or relating to rangelands that is designed to improve production of forage, change vegetation composition, control patterns of use, provide water, stabilize soil and water conditions, or provide habitat for livestock, wild and free-roaming horses and burros, or wildlife. Range improvement projects may be fences, reservoirs, brush control, or spring and well developments.

RANGELAND MONITORING PROGRAM. A program designed to measure changes in plant composition, ground cover, animal populations, and climatic conditions on the public rangeland. Studies monitor changes in range condition and determine the reason for any changes. Studies also monitor actual use, forage utilization, trend, and climatic conditions.

RECREATION AND PUBLIC PURPOSES. R&PP refers to both the Recreation and Public Purposes Act [(43 USC 869(a)] and the uses to be made of public land transferred under the act. The objective of the R&PP Act is to meet the needs of state and local government agencies and nonprofit organizations by leasing or conveying public land required for recreation and public purpose uses. Examples of uses made of R&PP lands are parks and greenbelts, sanitary landfills, schools, religious facilities, and camps for youth groups. The act provides substantial cost benefits for land acquisition and provides for recreation facilities or historical monuments at no cost.

RIGHT-OF-WAY. The legal right of use, occupancy, or access across land or water areas for a specified purpose or purposes. Also, the lands covered by such legal rights.

RIPARIAN. Situated on or pertaining to the bank of a river, stream, or other body of water. Normally used to refer to plants of all types that grow rooted in the water table of streams, ponds, and springs.

RIPARIAN COMMUNITIES. Communities of vegetation associated with either open water or water close to the surface. Examples are meadows, aspen, and other trees and shrubs associated with water.

SALABLE MINERALS. Minerals that may be sold under the Material Sale Act of 1947, as amended. Included are sand, gravel, flagstone, scoria, and crushed rock such as limestone.

SAWTIMBER. Trees that have reached sufficient size and maturity to be used for "dimension lumber" such as 2 x 4s.

SEASON OF USE. The time during which livestock grazing is permitted on a given range area, as specified in the grazing lease.

SPATIAL MANAGEMENT. As used in this document, intensive control of the location and level of surface disturbance that would be allowed in a particular area.

SPLIT ESTATE. Surface and minerals of a given area indifferent ownerships. Frequently the surface will be privately owned and the minerals federally owned.

STIPULATION. A condition or requirement attached to a lease or contract, usually dealing with protection of the environment or recovery of a mineral.

STRUTTING GROUND. An area used by sage grouse in early spring for elaborate, ritualized courtship displays. Also see Lek.

SURFACE DISTURBANCE. Disturbance of the vegetative or soil surface by any action. "No surface disturbance" restrictions apply to all activities but casual use and emergency situations such as fire suppression.

SURFACE OCCUPANCY. Placement or construction on the land surface of semipermanent or permanent facilities requiring continual service or maintenance. Casual use is not included.

TEMPORAL MANAGEMENT. As used in this document, intensive control of the period during which the BLM will allow activities that are physiologically disturbing or disrupting to normal wildlife activities such as elk migration.

THREATENED SPECIES. Any plant or animal species that is likely to become an endangered species throughout all or a significant portion of its range, as defined by the U.S. Fish and Wildlife Service under the authority of the Endangered Species Act of 1973.

UNSUITABILITY CRITERIA. Criteria of the federal coal management program by which lands may be assessed unsuitable for all or certain stipulated methods of coal mining. See Appendix II.

VISUAL RESOURCE. Visible feature of the landscape such as land, water, vegetation, animals, and other features that make up the scenery of an area.

VISUAL RESOURCE MANAGEMENT. The system by which the BLM classifies and manages scenic values and visual quality of public lands. The system is based on research that has produced ways of assessing aesthetic qualities of the landscape in objective terms. After inventory and evaluation, lands are given relative visual ratings (management classes), which determine the amount of modification allowed to the basic elements of the landscape.

VISUAL RESOURCE MANAGEMENT CLASSES. Visual resource management classes are the degree of acceptable visual change within a characteristic landscape. A class is based on the physical and sociological characteristics of any given homogeneous area and serves as a management objective. The four classes are described below:

Class I provides for natural ecological changes only. This class includes primitive areas, some natural areas, some wild and scenic rivers, and other similar areas where landscape modification activities should be restricted.

Class II areas are those where changes in any of the basic elements (form, line, color, or texture) caused by management activity should not be evident in the characteristic landscape.

Class III includes areas where changes in the basic elements (form, line, color, or texture) caused by a management activity may be evident in the characteristic landscape. However, the changes should remain subordinate to the visual strength of the existing character.

Class IV applies to areas where changes may subordinate the original composition and character; however, they should reflect what could be a natural occurrence within the characteristic landscape.

WATERSHED. A total area of land above a given point on a waterway that contributes runoff water to the flow at that point. Sensitive watershed is an area with fragile geologic, soil, or vegetative conditions, where small changes in the intensity of land use can cause large changes in erosion rates.

WETLANDS. Permanently wet or intermittently flooded areas where the water table (fresh, saline, or brackish) is at, near, or above the soil surface for extended intervals, where hydric wet soil conditions are normally exhibited, and where water depths generally do not exceed two meters.

WILDFIRE. Any unwanted wildland fire.

WILDLAND FIRE. Any non-structure fire, other than prescribed fire, that occurs in the wildland.

WILDLAND FIRE SITUATION ANALYSIS (WFSA). A decision-making process that evaluates alternative management strategies against selected safety, environmental, social, economical, political, and resource management objectives as selection criteria.

WITHDRAWAL. An action that restricts the use of described public lands from operation of certain laws, which are also described in the withdrawal order. Withdrawal also may be used to transfer jurisdiction or management to other federal agencies.

Acronyms

LIST OF ACRONYMS

(Note: Acronyms still being developed)

ACEC	Area of Critical Environmental Concern
AMP	Allotment Management Plan
AUM	Animal Unit Month
BLM	Bureau of Land Management, U.S. Department of the Interior
BOR	Bureau of Reclamation, U.S. Department of the Interior
CASTNet	Clean Air Status and Trends Network
CBM	Coalbed Methane
CFR	Code of Federal Regulations
C&MU Act	Classification and Multiple Use Act of 1964
CO	Carbon Monoxide
CRM	Coordinated Resource Management Plan
DEQ	Wyoming State Department of Environmental Quality
dv	Deciviews
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
FLPMA	Federal Land Policy and Management Act of 1976
FS	Forest Service, U.S. Department of Agriculture
H_2SO_4	Sulfuric Acid
HAP	Hazardous Air Pollutants
HMP	Habitat Management Plan
HNO_3	nitric acid
I-80	Interstate 80
IMPROVE	Inter-Agency Monitoring of Protected Visual Environments
MFP	Management Framework Plan
NAAQS	National Ambient Air Quality Standards
NADP	National Atmospheric Deposition Program
NEPA	National Environmental Policy Act of 1969
NGVD	National Geodetic Vertical Datum
NH_4^+	Ammonium
$(NH_4)_2SO_4$	Ammonium Sulfate
NO_2	Nitrogen Dioxide
NO_3^-	Nitrate
NO_x	Nitrogen Oxides
NRCS	Natural Resource Conservation Service, U.S. Department of Agriculture
O_3	Ozone
OHV	Off-Highway Vehicle
PA	Programmatic Agreement
Pb	Lead
PM_{10}, $PM_{2.5}$	Particulate Matter

ppb	Parts Per Billion
PSD	Prevention of Significant Deterioration
RMP	Resource Management Plan
RMPPA	Resource Management Plan Planning Area
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SO_4^{--}	Sulfate
SRMA	Special Recreation Management Area
$\mu g/m^3$	Micrograms Per Cubic Meter
USDA	United States Department of Agriculture
USDI	United States Department of the Interior
USFWS	U.S. Fish and Wildlife Service, Department of the Interior
VOC	Volatile Organic Compounds
VRM	Visual resource management
WAAQS	Wyoming Ambient Air Quality Standards
WARMS	Wyoming Air Resources Monitoring System
WGFD	Wyoming Game and Fish Department
WSA	wilderness study area
W-SHPO	Wyoming State Historic Preservation Officer