U.S. Department of the Interior
Bureau of Land Management
Wyoming State Office

Pinedale Field Office January 2003

DRAFT
Environmental Impact Statement for the Snake River Resource Management Plan

MISSION STATEMENT

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

BLM/WY/PL-03/007+1610

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Wyoming State Office
P.O. Box 1828
Cheyenne, Wyoming 82003-1828

In Reply Refer To:

1610 (930)
Snake River RMP

JAN 2 1 2003

Dear Reader:

The Draft Environmental Impact Statement (DEIS) on the proposed Snake River Resource Management Plan is submitted for your review and comment. The Snake River planning area includes approximately 1,073 acres of Bureau of Land Management (BLM) administered public land surface along the Snake River in Jackson Hole, Teton County, Wyoming, along with approximately 15,123 acres of BLM-administered federal mineral estate underlying privately-owned surface lands in Jackson Hole.

This DEIS has been prepared to analyze the potential impacts of six alternative Resource Management Plans (RMP) that have been developed for the Snake River planning area. These alternatives were designed to address four land management issues that were identified during the planning process. The environmental consequences of the alternatives have also been analyzed.

Please review the document and direct any written comments to the Snake River RMP Team Leader, Pinedale Field Office, P.O. Box 768, Pinedale, WY 82941. Comments may also be submitted electronically to pinedale_wymail@blm.gov (reference **Snake River RMP** in the subject field) or by Fax to 307-367-5329. All submissions must include legible full name and return address on the envelope, letter, postcard, or e-mail.

If you wish to comment on the DEIS, we request that you make your comments as specific as possible. Comments will be more helpful if they include suggested changes, sources, or methodologies.

An open house will be held on Wednesday, March 26, 2003, in Jackson, Wyoming, in the Teton County Commissioners' Meeting Room, 200 South Willow St., from 1 to 5 p.m. The purpose of the open house is to answer any questions you may have about the DEIS. The open house will be followed by a formal public hearing on the DEIS, in the same location, on the same date, from 5 to 8 p.m. The purpose of the hearing is to receive formal public comments, verbal and written, on the DEIS.

Freedom of Information Act Considerations: Public comments submitted for this planning effort, including names and street addresses of respondents, will be available for public review in their entirety after the comment period closes at the Pinedale Field Office during regular business hours (7:45 a.m. to 4:30 p.m.), Monday through Friday, except federal holidays. Individual respondents may request confidentiality. If you wish to withhold your name or address from public review or from disclosure under the Freedom of Information Act, you must state this prominently at the beginning of your comments. Such requests will be honored to the extent allowed by law. All submissions from organizations or businesses, and from individuals or officials representing organizations or businesses, will be made available for public inspection in their entirety.

Through your participation in this effort, we may move forward together toward a common goal of improved public land management in the Snake River planning area.

Sincerely,

Robert A. Bennett
State Director

SNAKE RIVER

RESOURCE MANAGEMENT PLAN

DRAFT ENVIRONMENTAL IMPACT STATEMENT

BUREAU OF LAND MANAGEMENT
Pinedale Field Office
Pinedale, Wyoming

January 2003

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CHAPTER 1

PURPOSE OF AND NEED FOR THE PLANNING EFFORT

INTRODUCTION

This draft environmental impact statement (EIS) evaluates alternative land use plans for the management of public lands and resources administered by the Bureau of Land Management (BLM) in the Jackson Hole area of the Pinedale Field Office (PFO). The Snake River planning area is located approximately 80 miles northwest of Pinedale, Wyoming. Each alternative analyzed in detail represents a complete and reasonable resource management plan (RMP) which could be used to guide the management of BLM-administered public lands and resources in the planning area. Each alternative also considers the land use plans of local and state governments and other Federal agencies in and around the Jackson Hole area to assure that the approved RMP will be compatible with them.

Original surveys of the Jackson Hole area conducted in the late 1800s ended at "meander lines" established near the then-banks of the very wide, braided channel of the Snake River. At some points, this channel was a mile or more wide. These "omitted lands" (omitted from the official U.S. survey) remained in public ownership as the Jackson Hole valley was settled. As levee construction proceeded in the 1950s, the lands began to be separated from the active channel of the Snake River. In the 1970s and 1980s, after long litigation, many of the "omitted" parcels were titled to the adjacent private landowners, resulting in the scattered nature of the parcels that remain in public ownership today (Map 1). See Appendix 4 and Maps 3-9 for descriptions of the individual public land parcels. For most of the parcels that did go into private ownership, recreation easements on the river channel were granted to the United States. Some of these easements include access to the riverbank levees. These easements do not actually enhance access to the river, but allow activities on the river that are generally not allowed on navigable waters crossing private lands in Wyoming. For instance, on the Snake River through the planning area, recreationists can anchor boats, wade, hike, picnic, and fish on the river as it crosses private lands.

Because ownership of the lands was still in litigation at the time BLM's Pinedale Field Office RMP was completed in 1988, the lands were not included in that RMP. The Snake River RMP will be the first land use plan implemented for these public land parcels and mineral estate.

The process for the development, approval, maintenance, and amendment or revision of RMPs was initiated under the authority of Section 202(f) of the Federal Land Policy and Management Act of 1976 (FLPMA) and section 202(c) of the National Environmental Policy Act of 1969 (NEPA). The process is guided by BLM planning regulations in Title 43 of the Code of Federal Regulations, part 1600 (43 CFR 1600) and the Council on Environmental Quality (CEQ) regulations in 40 CFR 1500.

The first tier of the three-tiered BLM planning process consists of (1) compiling and reviewing the current laws, regulations, policies, Executive Orders, and directives pertaining to the planning area; and (2) development of any needed State Director's guidance, specific to the planning effort

and the planning area. Development of the RMP represents the second of the three-tiered BLM planning process, the land use planning tier. As such, the approved RMP will prescribe the future resource and land use management for the BLM-administered public lands in the planning area. It is this process of planning for the management of the public land and resources, and allocating their uses, that guides activity planning and daily operations. Activity planning, the third tier of the BLM planning process, incorporates the resource and land use decisions of the RMP into the specific management guidance for administering the public lands in the planning area. During activity planning, the management prescriptions in the RMP are applied (1) to specific geographic areas in developing and implementing site-specific activity plans (e.g., recreation or river management plans); (2) in issuing various land and resource use authorizations; (3) in identifying mitigation needs; and (4) in developing and implementing other similar plans and actions.

After completion, the Snake River RMP will be kept current through maintenance actions, amendments, or revision as defined in 43 CFR 1610.5. Maintenance, amendment or revision of the RMP will be considered as demands on public lands and resources change, as the land and resource conditions change, or as new information is acquired.

PURPOSE AND NEED

The purpose for developing the Snake River RMP is to provide a comprehensive and environmentally adequate framework for managing and allocating uses of BLM-administered public lands and resources, including mineral estate, in the Jackson Hole area. This draft environmental impact statement (DEIS) documents the description of alternatives analyzed (current and alternative management plans) for the planning area and their consequences. The DEIS provides the basis for developing an RMP that resolves the resource and land use issues involved with current management and that provides direction for site-specific activity planning and implementation of management actions in the future. Until the Snake River RMP is completed, existing authorized practices and uses of the public lands and resources in the Jackson Hole area will continue, with most decisions on new actions or resource uses postponed until completion of the RMP.

DESCRIPTION OF THE PLANNING AREA

The general planning area for the Snake River RMP is the Jackson Hole area, a portion of Teton County in northwestern Wyoming (Map 1). The planning area is bounded on the east, south, and west by the Bridger-Teton National Forest boundary, and on the north by the Grand Teton National Park boundary.

As provided by the Federal Land Policy and Management Act (FLPMA), the BLM has the responsibility to plan for and manage the public lands. As defined by the Act, the *public lands* are those Federally owned lands, and any interest in lands (e.g., Federally owned mineral estate), that are administered by the Secretary of the Interior, specifically through the Bureau of Land Management. Within the Snake River RMP planning area, there are varied and intermingled land surface ownerships and overlapping mineral ownerships. Therefore, the administrative jurisdictions for land use planning and for managing the land surface and minerals also are varied, intermingled, and overlapping.

Because of this, the completed Snake River RMP will not include planning and management decisions for lands or minerals within the planning area that are privately owned or owned by the State of Wyoming, U.S. Fish and Wildlife Service, or local governments. Table 1-1 summarizes

the land surface and mineral ownership and administrative relationships for the area (also see Map 2). In areas where the Federal land surface is administered by the USFWS, and the Federal mineral estate is administered by the BLM, the land surface planning and management decisions are the responsibility of the USFWS. Any BLM administrative responsibilities within these areas (for example, actions concerning the Federal mineral estate) are handled case by case and are guided by the policies, procedures, and plans of the USFWS.

The 23 surface parcels of public lands are also shown in a series of close-up maps (Maps 3-9).

TABLE 1-1
LAND AND MINERAL OWNERSHIP AND ADMINISTRATIVE JURISDICTIONS WITHIN THE SNAKE RIVER RMP PLANNING AREA

Jurisdiction	Approximate Acres
Areas the Snake River RMP Decisions Will Cover:	
A. Federal surface/federal minerals[1]	1,073
B. Private surface/federal minerals[2]	14,050
Total BLM-administered federal land surface to be covered by RMP decisions	1,073
Total BLM-administered federal mineral estate to be covered by RMP decisions	15,123
Areas the Snake River RMP Decisions Will NOT Cover:	
C. USFWS land/federal minerals[3]	12,500
D. State land/nonfederal minerals[4]	2,540
E. Private land/nonfederal minerals	42,120
F. USFWS/nonfederal minerals	13,360
Total BLM-administered federal mineral estate that will NOT be covered by RMP decisions	12,500
Total land surface areas in the Snake River RMP planning area (all ownerships)	85,643

[1] In areas where the Federal land surface and Federal mineral estate are both administered by the BLM, the RMP will include planning and management decisions for both the land surface and the mineral estate.

[2] In areas where the land surface is privately owned, and the minerals are Federally owned, the RMP will include planning and management decisions for only the BLM-administered Federal mineral estate. While the land and resource uses and values on the non-Federal surface will be taken into account and will affect development of the Federal mineral planning and management decisions, these decisions will not pertain to the privately owned land surface. At the same time, surface and minerals management actions and development activities anticipated in these areas will be taken into account for purposes of cumulative impact analysis in the Snake River RMP EIS.

[3] In areas where the Federal land surface is administered by the USFWS, and the Federal mineral estate is administered by the BLM, the land surface planning and management decisions are the responsibility of the USFWS. Any BLM administrative responsibilities within these areas (for example, actions concerning the Federal mineral estate) are handled case by case and are guided by the policies, procedures, and plans of the USFWS. At the same time, surface and minerals management actions and development activities anticipated in these areas will be taken into account for purposes of cumulative impact analysis in the Snake River RMP EIS.

[4] The Snake River RMP will not include any planning and management decisions for areas where the land surface and minerals are both privately owned, or owned by state, local, or other federal government agencies.

PLANNING ISSUES AND PLANNING CRITERIA

Planning Issues

The process for developing an RMP EIS begins with identifying the issues (40 CFR 1501.7; 43 CFR 1610.4-1). 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 affects land uses.

Planning issues for the Snake River RMP have grown, in part, from lack of management of the parcels. Because ownership of the lands was still in litigation during the production of the Pinedale RMP, the parcels were excluded from that plan and have never been covered by a land use plan. In the absence of a land use plan, most management decisions for the parcels have been deferred until completion of the Snake River RMP. In particular, these include decisions on management of recreation use, mineral extraction, and land ownership (whether the BLM should retain or dispose of the parcels).

Issue 1: Cooperative Management

Public lands administered by the BLM along the Snake River are interspersed with private and state lands and bounded upstream and downstream by lands administered by the National Park Service, USDA-Forest Service, and Teton County. Some of the private and state lands are affected by recreational easements administered by the BLM. The Army Corps of Engineers and Teton County also have jurisdictional responsibilities including cooperative maintenance of levees for flood control. Several organizations are interested in cooperating with private landowners and government agencies for maintaining open space and public access. Because of these intermingled ownerships, agreements, and management interests, it is important that the Snake River RMP be coordinated with the plans of other managing agencies in and around Jackson Hole. Opportunities for cooperation include coordination by BLM, National Park Service, and USDA-Forest Service in addressing river floating, consideration of landownership adjustments, and leasing public lands for parks and pathways. Other benefits of cooperation could include sharing scientific information and preparing joint studies and recommendations on matters such as wild and scenic river potential.

Issue 2: Recreational Opportunities

Public lands along the Snake River are accessible, with no fees charged for recreation activities, and are used by the residents of Teton County and surrounding counties for high quality recreation. Activities include hiking, horseback riding, cross country skiing, boating, fishing, picnicking, and watching wildlife.

Recreational use is growing, with the result that some public lands are experiencing crowding and associated resource problems, such as increases in noxious weeds and other invasive species, and declines in the quality of the recreational experience. In addition, unregulated commercial float outfitting is occurring, leading to concerns about overcrowding, health, and safety of river users. Questions to be addressed in the Snake River RMP EIS involve how best to accommodate the demand for recreation on these public lands, while protecting important natural resources and recreational experiences.

Issue 3: Development of Construction Materials

Special attention is needed to address the mining of sand and gravel on public lands in the planning area. These materials are needed primarily to maintain levees along the Snake River for flood control, and for road construction around Jackson Hole. The availability of gravel is limited in Jackson Hole, and resources from federal mineral estate could help to supply a growing need in the area. Questions to be addressed in the Snake River RMP EIS include whether mining of sand and gravel is appropriate on public lands, and what conditions should be applied to protect recreational opportunities, watershed resources, and important wildlife habitat.

Issue 4: Land Ownership Adjustment

At issue is whether the public land parcels should be retained in public ownership. Because of the small size, irregular shape, and scattered nature of the parcels, and their distance from the BLM Pinedale Field Office, they are difficult and costly for the BLM to manage. In addition, the Pinedale Field Office has received many requests and expressions of interest from adjacent private landowners in purchasing the parcels. For these reasons, disposal of the parcels must be considered as an option. This decision is central to the future management of the lands. Questions to be addressed in the Snake River RMP EIS include whether the parcels should be retained in public ownership and what criteria should be used to determine whether parcels are suited for disposal.

Planning Criteria

Planning criteria are the conditions and guidelines or parameters for conducting the planning effort, for preparing the RMP EIS, and for developing the approved RMP. The planning criteria serve the following purposes:

1. To ensure that the planning effort is focused on the issues, follows and incorporates legal requirements, addresses management of all public land resources and land uses in the planning area, and that plan preparation is accomplished efficiently;

2. To identify the scope and parameters of the planning effort for the decision maker, the interdisciplinary planning team, and the public; and

3. To inform the public of what should and should not be expected from the completed RMP, including identification of any planning issues that are not ready for decision-making in the RMP and that will be addressed only through subsequent planning efforts. Planning criteria are based on standards prescribed by laws and regulations; guidance provided by the BLM Wyoming State Director; the results of consultation and coordination with the public and with other agencies and governmental entities, and Indian Tribes; analysis of information pertinent to the planning area; public input; and professional judgment of the Planning Team.

The planning criteria focus on the preparation of alternatives, the analysis of their effects, and the selection of a preferred alternative. Additional planning criteria may be developed as the process proceeds.

Criteria for Developing Alternatives

The following will be considered in one or more of the alternatives:

- Management of significant cultural, historic, and scenic resources.
- The protection and enhancement of riparian areas.
- The protection of habitat for threatened, endangered, proposed, and candidate species and other important plants and animals.
- Identification of lands suitable for sand and gravel mining, motorized vehicle use, rights-of-way construction, and other activities that may result in surface disturbance.
- Identification of lands where rights-of-way construction and other surface-disturbing activities would be avoided.
- Livestock grazing practices that are compatible with other resource management objectives.
- Opportunities for enhancing recreation.
- Opportunities for adjusting land ownership to meet goals for resource management and public access (e.g., transfer land to other public or private ownership).
- Opportunities for maintaining open space.
- The protection and enhancement of natural resources and ecological processes.
- Management of recreational use and designation of special recreation management areas (SRMAs).

Criteria for Analyzing Environmental Consequences

The following potential environmental consequences will be addressed:

- The effects of opening or closing public lands to development.

- Effects of surface-disturbing activities on air and scenic quality, cultural resources, recreational opportunities, vegetation, watershed, and wildlife.

- Effects of recreational activity on cultural resources, recreational experiences, vegetation, watershed, and wildlife.

- Effects of landownership adjustments on recreational opportunities and open space.

- Economic impacts of land use restrictions.

- Effects on private land.

Criteria for Selecting the Preferred Alternative

The following considerations will guide selection of the preferred alternative:

- The level of land use restrictions needed to protect resources and keep lands and resources available for public use.

- The potential for the occurrence of mineral resources such as sand, gravel, oil and gas, and gold.

- Consistency with the land use plans, programs, and policies of other federal agencies, state and local governments, and Native American tribes.

- The potential eligibility of public lands along the Snake and Gros Ventre rivers and their tributaries to be included within the National Wild and Scenic Rivers System.

- The protection of habitat for threatened, endangered, proposed, and candidate species and other important plants and animals.

- Efficiency of management of the parcels.

- Responsiveness to the planning issues.

CHAPTER 2

DESCRIPTIONS OF THE ALTERNATIVES, INCLUDING THE BLM PREFERRED ALTERNATIVE

ALTERNATIVE FORMULATION

The goal in formulating alternatives for a resource management plan environmental impact statement (RMP EIS) is to identify combinations of management practices for and uses of the public lands and resources that would resolve the planning issues. Each alternative is to represent a complete and reasonable interdisciplinary (or multiple use) land use plan to guide future management of the public lands and resources in the planning area. One alternative represents the continuation of existing management direction (no action alternative). The other alternatives provide a range of choices for solving problems associated with present management. Problems with present management are identified through scoping and issue identification for the planning process, and through impacts analysis.

Analysis of impacts that would be associated with the alternatives is required by BLM planning regulations and the NEPA-based Council on Environmental Quality (CEQ) regulations. Comparison of the differences among the alternatives is also required. Based upon this comparative analysis, BLM managers are able to choose a preferred alternative. The preferred alternative selected may be one of the initial alternatives considered, it may be made up from portions of two or more of those alternatives, or it may be a completely different alternative.

This chapter presents six resource management plan alternatives, including BLM's preferred alternative for managing the public lands and resources in the Snake River planning area. Alternative A, the Continuation of Existing Management Direction or "No Action" Alternative, would continue current management practices based on compliance with federal laws, regulations, and BLM policy, as well as adherence to court decisions granting recreational access and addressing livestock grazing within the Snake River corridor. Alternative A would provide for the parcels to remain in public ownership for public purposes; the parcels could be retained by the BLM, or parcels could be transferred to other public agencies or entities for management as public open space, recreation facilities, or parks. Alternative A would allow recreational activity to continue, with no management or fee program for recreation. Generally, mineral development would be prohibited, although mining for mineral materials, such as sand and gravel, would be allowed case by case.

Compared to Alternative A, Alternative B would reduce the level of land use restrictions while providing for higher levels of mineral development and recreational use. Recreation would be emphasized through the development of primitive, boat-in campsites, the construction of a new boat and river access site, and the posting of interpretive and directional signs. Under Alternative B, BLM would retain most of the parcels, although some lands could be removed from public ownership and use via exchange, transfer or sale to meet other objectives or to consolidate lands.

Alternative C would be similar to Alternative A in its level of land use restrictions but would further constrain access by motorized vehicles. The protection of wildlife habitat and a more isolated recreational experience would be pursued through a reduced level of river floating. As in Alternative B, public education would be highlighted through the use of interpretive signs. Generally, Alternative C would provide for the retention and possible consolidation of public lands. In cases where lands might be removed from public ownership and use, they would be protected from development through the use of conservation easements. Alternative C would close all federal mineral estate in the planning area to mineral extraction.

Alternative D provides for disposal of all the public land parcels as a primary goal. The parcels would be disposed of within 15 years. The BLM would retain all mineral rights; minerals management would be similar to the Preferred Alternative. While some parcels could be transferred to local government or other entities for use as public parks or conservation areas, there is a probability that all the parcels could end up in private ownership. Under this alternative, no intensive management would be invested in the parcels prior to their disposal. The plan would not restrict or limit the disposal of the lands, unless required by law. Entities or individuals acquiring the parcels would be free to close, develop, sell, or otherwise manage them.

Alternative E would provide limited options for disposal or exchange of the public land parcels, similar to Alternatives B and C; most of the parcels would be retained in BLM ownership. Recreation would be managed through a fee permit system for commercial outfitters. Mineral extraction would be limited in favor of protecting wildlife habitats, watersheds, and the quality of the recreational experience. Livestock grazing would be maintained in areas where it is currently occurring, with elimination of fall grazing and the provision that grazing leases would be forfeited if the leaseholder's adjacent private lands were converted to a use other than grazing.

The BLM preferred alternative provides for transfer of the parcels to another public land-managing agency, or to private non-profit land preservation entities. The goal would be to transfer the lands within 15 years. BLM would retain all mineral rights, and minerals management would be similar to Alternative E. There would be no intensive management of recreation use by the BLM in the interim prior to parcel disposal. Another option is that the actual land surface could be retained by BLM, if partners could be found to take over management of public uses of the parcels. For impact analysis it is assumed that the entities acquiring these parcels or taking over management responsibility would be obligated under the terms of the transaction to apply management prescriptions to retain the lands, and maintain them for public access, recreation use, open space, and wildlife habitat. This alternative assumes that agencies or public entities could be found to accept ownership or management of all the parcels.

ALTERNATIVES AND MANAGEMENT OPTIONS CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

The following alternatives and management options were considered as possible methods of resolving the planning issues and answering the planning questions, but were eliminated from detailed study because they were unreasonable or impractical due to technical, legal, or policy factors.

Disposal of Federal Mineral Estate

Disposal of the Federal mineral estate was considered as a logical management option as a facet of Alternative D. Regulations at 43 CFR 2720.0-2 provide a mechanism where mineral interests owned by the United States may be conveyed to an existing or future surface owner, in order to consolidate the surface and subsurface estates.

Disposal of the Federal mineral estate was eliminated from detailed analysis because these regulations only allow for such a disposal under two circumstances:

1. where there are no known mineral values underlying the private land, or

2. where the reservation of minerals underlying the private land interferes with or precludes appropriate non-mineral development of the private land, and such development is a more beneficial use of the land than the mineral development.

The first provision does not apply because most or all of the Federal mineral estate has at least some known potential for gravel or other saleable minerals.

In order to qualify under the 2nd provision, an applicant must show what the development is or will be. Leaving the land in an undisturbed or scenic state does not meet the criteria for development. If the applicant can meet the development test, and further processing is warranted, an exploratory program may need to be conducted to determine the extent and value of the mineral deposits in the land.

The surface owner must bear the cost of determining whether mineral values exist on the property as well as the cost of an appraisal on the value of the mineral estate. This cost must be paid up front with no guarantee that the surface owner will eventually gain title to the mineral estate. Prior to gaining title, the surface owner must also pay the government fair market value for this mineral estate. This program has had very minimal success in Wyoming since its inception.

Firewood Harvest

Allowing firewood harvest was eliminated from detailed analysis because of the small size of the parcels, lack of road access, the age of many of the trees, and the need for standing dead trees as roosting, nesting, and foraging sites for avian species, particularly raptors. No public interest in harvesting firewood on the parcels has been expressed.

Use of Prescribed Fire

Use of prescribed fire was eliminated from detailed analysis because of the scattered nature and small size of the parcels, and the age of most of the cottonwood stands. Due to the decreased probability of postfire sprouting by older mature trees, prescribed fires in narrowleaf cottonwood stands are not recommended past the pole and early maturation stages. In addition, spotted knapweed (*Centaurea maculosa*), a noxious species present on most or all of the public land parcels, will increase following fire (USDA 2002). Control of prescribed fires would be difficult due to the lack of natural firebreaks; fire control activities could cause erosion and siltation of the Snake River. Most of the BLM parcels are also very near private homes, barns, and meadows, making fire control extremely important; the expanded control measures required in these situations would be cost-prohibitive. While prescribed fire was used along the river by native

cultures, its use would be inappropriate today given the population, recreation use, and property values in the planning area. If vegetation treatment is needed in the future, mechanical or biological means would be used.

Desert Land Entry

The Desert Land Entry statute (43 CFR 2520.0-1) was enacted "to encourage and promote the reclamation, by irrigation, of the arid and semiarid public lands of the Western states through individual effort and private capital, it being assumed that settlement and occupation will naturally follow when the lands have been thus rendered more productive and habitable." Allowing Desert Land Entry was eliminated from detailed analysis for this RMP because the Snake River public land parcels are not suitable as defined by the criteria set forth in 43 CFR 2520.

Use of Lethal Animal Control Measures

Use of lethal animal control measures (including M-44's) was eliminated from detailed analysis because of the proximity of private homes and the level of public recreation on the parcels. Using traps or poison devices to control predators or other animal species carries too many risks in this environment. No requests to use these devices to control animals have been received.

Establishment of Wilderness Study Areas

Section 202 of the Federal Land Policy and Management Act requires the BLM to inventory public lands for wilderness qualities and recommend to the President those lands suitable for inclusion in the National Wilderness Preservation System (NWPS). BLM handbook H-6310-1 Wilderness Inventory and Study Procedures provides the BLM policy, direction, general procedures, and guidance for making wilderness considerations as part of management plan development.

The federal lands within this planning unit were not found to possess the qualities of wilderness as described in the Wilderness Act of 1964. The lands considered here are of insufficient size to make practicable its preservation and use in an unimpaired condition. Additionally, within the planning unit there are no adjacent, contiguous federal lands managed within the NWPS.

Maximum, Unconstrained Alternatives

Alternatives and general management options that proposed maximum development, production, or protection of one resource at the expense of other resources were not analyzed in detail. The purpose of the approved RMP is to provide multiple use management direction for the planning area. Generally, promoting a single land and resource use by eliminating all others does not meet the objectives of the BLM multiple use management mandate and responsibilities. However, the alternatives analyzed in detail do include various considerations for eliminating or maximizing individual resource values or uses in specific areas where conflicts exist.

ALTERNATIVES ANALYZED IN DETAIL

Introduction/Overview

The six alternatives addressed in the Draft RMP EIS are detailed in Table 2-1. A complete resource management alternative can be read in each column of the table, from top to bottom. Resources and resource uses are listed in alphabetical order. For each resource, management objectives are listed first, followed by management actions that would be taken or allowed to meet these objectives. Actions that would be the same under all alternatives are listed at the beginning of the table; actions that would differ between the alternatives are listed beginning on page 17. The alternatives may be compared in this table format. Expected environmental consequences of the alternatives are detailed and compared in Table 4-2 in Chapter 4.

It should be noted that for many resources, actions are listed in the Preferred Alternative that would only apply for as long as BLM owns and is actively managing the lands, in the interim period before they are transferred to other public entities or management of resources and programs is transferred. An acquiring agency or entity would have more freedom in managing the lands and resources, as long as the basic requirements of public access, open space, and wildlife habitat are met.

The Standards for Healthy Rangelands (Appendix 1) would apply to all land uses, so long as the parcels are retained by BLM.

Table 2-1
Comparison of Alternatives

Pages 13-41

TABLE 2-2
OFF-HIGHWAY VEHICLE DESIGNATION BY ALTERNATIVE

OHV Class	Preferred Alternative (acres)	No Action Current Management Alternative A (acres)	Alternative B (acres)	Alternative C (acres)	Alternative D (acres)	Alternative E (acres)
Open	0	0	0	0	0	0
Limited	631	0	1073	631	0	631
Closed	442	0	0	442	0	442

TABLE 2-3
VISUAL RESOURCE MANAGEMENT CLASSIFICATION BY ALTERNATIVE

VRM Class	Preferred Alternative (acres)	No Action Current Management Alternative A (acres)	Alternative B (acres)	Alternative C (acres)	Alternative D (acres)	Alternative E (acres)
I	0	0	0	0	0	0
II	999	999	295	999	0	999
III	74	74	778	74	0	74
IV	0	0	0	0	0	0

CHAPTER 3

AFFECTED ENVIRONMENT

INTRODUCTION

This chapter contains a description of the existing physical, biological, and socioeconomic characteristics of the planning area that would be affected by the alternatives described in Chapter 2. Environmental components that would not be affected or that are not important to the resolution of planning issues are not covered in detail. For descriptions of the public land parcels, see Appendix 4 and Maps 3-9.

Much of this information has been summarized from reports and other material on file in the Pinedale Field Office. Information which is available upon request includes a list of threatened, endangered, and candidate plant and animal species to be covered in the RMP EIS, a geologic map of the planning area, monthly weather station data, vegetative treatment guidelines for the control of noxious weeds, and copies of the judgments and stipulations entered in the court cases settling ownership of the parcels in the 1970s and 1980s.

The following resources are not present in the planning area and are not addressed in this RMP EIS: Prime and Unique Farmlands, Wilderness, Wild Horses, and Forestry (marketable timber). In addition, no areas have been determined to meet the criteria for designation as Areas of Critical Environmental Concern or other special management area designation.

AFFECTED RESOURCES

Climate and Air Quality

Climate and Meteorology

The climate of the Snake River area is classified as mid-latitude highland or alpine (Trewartha & Horn 1980; Martner 1986). 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.

Weather data for the Snake River planning area is available from a weather station located in Jackson. The Jackson weather station is at an elevation of 6,330 feet and is within the Snake River planning area.

Diurnal (morning to night) and seasonal (summer to winter) ranges in temperature are greater in valleys than on slopes (Martner 1986). Mean annual temperature is 39 degrees F. in Jackson. Summer highs are usually in the 70's and low 80's. Winter lows are generally in the single digits but may reach the minus teens (Western Regional Climate Center).

Mean annual precipitation is 16 inches in Jackson. Annual precipitation ranges from 8 inches in drought years to as much as 25 inches in wet years. Monthly precipitation is generally 1 to 1.5 inches throughout the year (Western Regional Climate Center). Total winter snowfall averages

about 4 feet, with most snow occurring from November through March. Mean monthly winter snowfall ranges from 10 to 20 inches (Western Regional Climate Center).

Wind speed and direction are highly variable due to the effect of local topography in the Snake River area. Annual average wind speed in Jackson is 6 miles per hour, and annual wind direction is generally from the northwest, west or southwest (Martner 1986). In mountainous areas like the Snake River area, local topography can strongly affect wind direction, particularly at night and under low wind speed conditions.

Air Quality

Pollutant Concentrations

Pollutant concentration refers to the mass of pollutant present in the air, and can be reported in units of micrograms per cubic meter ($\mu g/m^3$) or parts per billion (ppb) (see Table 3-1). Air quality in the planning area is considered excellent; however, current and complete criteria air pollutant concentration data for the Snake River area are not available. The State of Wyoming has used monitoring and modeling to determine that the Snake River region is in compliance with Wyoming and federal standards. Air quality regulations for the state of Wyoming are listed in Appendix 3.

TABLE 3-1
CONCENTRATIONS OF CRITERIA AIR POLLUTANTS

Pollutant	Averaging Time	Monitored & Modeled 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
Sulphur 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	
Particulate Matter (PM_{10})	Annual	12	24	24
	24 hour	20	13	13
Fine Particulate Matter ($PM_{2.5}$)	Annual	6	40	
	24 hour	10	15	

Carbon Monoxide

Carbon monoxide (CO) data were collected in Colorado in conjunction with the proposed oil shale development in the 1980s. Because carbon monoxide 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 (NO_2) 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 Pinedale and Yellowstone National Park of nitric acid (HNO_3), nitrate (NO_3), and particulate ammonium (NH_4) are very low and are not increasing over time.

The Clean Air Status and Trends Network (CASTNet) has measured concentrations of nitric acid, nitrate and ammonium, as well as ozone, sulphur dioxide and sulfate, in the United States since the late 1980s. There are three CASTNet stations in Wyoming: Centennial, Yellowstone National Park, and Pinedale. CASTNet data are available for Pinedale from 1989 through 1999, and for Yellowstone National Park from 1997 through 1999.

Mean annual concentrations of nitric acid (HNO_3) are less than 0.45 ppb in Pinedale and less than 0.3 ppb in Yellowstone National Park. Nitric acid concentrations typically range from 0.02 to 0.3 ppb in remote areas, and range from 3 to 50 ppb in polluted areas (Seinfeld 1986).

Mean annual concentrations of nitrate (NO_3) are less than 0.2 ppb in Yellowstone National Park. These concentrations are typical for remote areas. Polluted urban areas show mean annual nitrate concentrations of 1 ppb or more (Stern 1973).

Mean annual concentrations of ammonium (NH_4) are less than 0.3 ppb in Yellowstone National Park. Ammonium concentrations in remote areas are typically about 0.3 ppb, and about 1.5 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. Weekly concentrations of nitrate (NO_3) are below 1.5 $\mu g/m^3$, and concentrations of ammonium (NH_4) are below 0.5 $\mu g/m^3$ at Pinedale. Mean annual concentrations in remote areas are 0.5 $\mu g/m^3$ for nitrate (NO_3) and 0.2 $\mu g/m^3$ for ammonium (NH_4).

Because the chemistry of nitrogen-containing pollutants is very complex, it would be inappropriate to infer nitrogen dioxide (NO_2) concentrations from concentrations of nitric acid (HNO_3), nitrate (NO_3), and ammonium (NH_4). But it would be unlikely that high nitrogen dioxide (NO_2) concentrations would occur with low concentrations of other nitrogen-based pollutants.

Sulfur Dioxide

Sulfur dioxide (SO_2) data were collected at the LaBarge study area in the 1980s. More recent sulfur dioxide (SO_2) data were collected by CASTNet in Pinedale and Yellowstone National Park, and by WARMS in Pinedale. Concentrations of sulfate (SO_4) from CASTNet and WARMS are also available. These concentrations are low and not increasing over time. Concentration of sulfur dioxide (SO_2) is about 1 ppb in Yellowstone National Park. Mean annual sulfur dioxide

(SO_2) concentrations typically range from 1 to 10 ppb in remote areas, and from 20 to 200 ppb in polluted urban areas (Seinfeld 1986). Mean annual concentrations of sulfate (SO_4) are about 0.6 ppb in Yellowstone National Park. Sulfate concentrations in remote areas are typically about 0.6 ppb, and about 2.5 ppb in polluted urban areas (Stern 1973).

The weekly WARMS concentrations of sulphur dioxide (SO_2) from mid-1999 through 2001 was about 1.5 $\mu g/m^3$ or less. Mean annual concentrations of sulphur dioxide (SO_2) are typically less than 25 $\mu g/m^3$ in remote areas and range from 50 to 500 $\mu g/m^3$ in polluted urban areas (Seinfeld 1986).

Although it may not be appropriate to compare mean annual CASTNet sulphur dioxide (SO_2) concentrations with national or Wyoming standards, the CASTNet concentrations do suggest that sulphur dioxide (SO_2) concentrations are well below the NAAQS and WAAQS.

Ozone

Ozone (O_3) data were collected by the CASTNet station at Pinedale and Yellowstone National Park. Concentrations are relatively high (over 50% of the standards), but in compliance with the NAAQS and WAAQS. Mean annual ozone (O_3) concentrations in Yellowstone National Park have remained steady from 1989 through 1999.

Particulate Matter

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% of the NAAQS and WAAQS, and mean annual $PM_{2.5}$ were 40% of the NAAQS.

Visibility

The Inter-Agency Monitoring of Protected Visual Environments (IMPROVE) program has measured visibility in national parks and wilderness areas in the United States since the 1980s. There are four IMPROVE stations in Wyoming: Centennial, Pinedale, Yellowstone National Park, and North Absaroka. 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.

Visibility data are calculated for each day, ranked from cleanest to haziest, and divided into three categories:

- 10% cleanest: 10th percentile - mean visibility for the 10% of days with the best visibility
- average: the 50th percentile - the annual median visibility
- 10% haziest: the 90th percentile - mean visibility for the 10% of days with the poorest visibility

In Yellowstone National Park, visual range on the 10% cleanest days varies from 110 to 160 miles, average visual ranges varies from 85 to 115 miles, and visual range for the 10% haziest days varies from 50 to 90 miles. Trend analysis shows that visibility in Yellowstone National Park has improved from 1988 to 1998.

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 (VOC)
- nutrients: such as nitrate (NO_3) and ammonium (NH_4)

The estimation of atmospheric deposition is complicated by the 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. The natural pH of rainwater ranges from 5.0 to 5.6 (Seinfeld 1986). Mean annual pH at Yellowstone National Park has varied from about 5.1 to 5.7.

Mean annual wet deposition of ammonium (NH_4), nitrate (NO_3), and sulfate (SO_4) at Yellowstone National Park are low: about 0.5 kg/ha for ammonium (NH_4), less than 3 kg/ha for nitrate (NO_3), and less than 4 kg/ha for sulfate (SO_4). Mean annual deposition is typically less than 5 kilograms per hectare in remote areas. Wet deposition values from 1980 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. The Clean Air Status and Trends network (CASTNet) measures dry deposition of ozone (O_3), sulphur dioxide (SO_2), nitric acid (HNO_3), sulfate (SO_4), nitrate (NO_3), and ammonium (NH_4). Mean annual dry deposition of sulphur- and nitrogen-containing compounds for Yellowstone National Park from 1990 through 1999 has been about 1 kilogram per hectare or less. Mean annual deposition is typically less than 5 kilograms per hectare in remote areas. Dry deposition values are low and steady, indicating that deposition has not worsened during that time.

Cultural and Natural History Resources

The planning area contains both prehistoric and historic cultural resources. It is not known if the planning area contains traditional cultural properties or sites considered sensitive to modern Native Americans.

Prehistoric Resources

Prehistoric cultural resources are present in the planning area; however, formal inventory work conducted by the BLM is limited. Preserved sites are projected to be few in number on BLM-administered public lands because of the recent age of many of the Snake River floodplain sediments. However, two sites (48TE1195 and 48TE1443) occupy higher land and confirm prehistoric occupation in the planning area. These two known sites are not eligible for the National Register, and are in the "discharged use" category (see Glossary).

The earliest sites found in western Wyoming are referred to as Paleoindian localities. One Paleoindian locality of national significance is the Lawrence Site, found at the inlet to Jackson Lake. Here, artifacts 10,000 to 11,000 years old have been located. More recent Archaic Period sites (9,000 years to 2,000 years old) containing dart points and Late Prehistoric Period sites (2,000 years old to about AD 1800, coming after the introduction of the bow and arrow) also occur in the planning area.

Prehistoric campsites are preserved in alluvial soils on the higher terraces of the Snake River. Sites predicted in this geomorphic setting include lithic scatters (predominantly containing obsidian), campsites, special use or extraction sites, stone alignments, hunting and fishing sites, and especially lithic procurement locales. The bluffs, terraces, and benches overlooking the Snake River can contain Pleistocene-aged quartzite cobble deposits exhibiting evidence of lithic procurement. The Teton Pass area is a major source of obsidian found in southwestern Wyoming archaeological sites and Teton Pass Obsidian will likely be identified in prehistoric sites of the planning area.

The Snake River may be named for the Shoshone (Snake) Indians and was a travel route for this tribe and others, such as the Bannock and the Flathead. Protohistoric Indian use by Numic speakers is postulated by at least one researcher (Butler 1983), so the presence of historic-period native American sites is possible.

The soils include alluvial loams and extensive river-deposited quartzite cobbles. When cobbles dominate the surface, the potential for finding buried sites is low. The National Park Service (1997, p 27) indicated that regular changes in the river channel would tend to destroy or displace prehistoric sites in the Snake River floodplain.

The few prehistoric sites like 48TE1195 or 48TE1443 discovered on public lands so far may not meet National Register criteria, but they can add to our knowledge of the overall prehistory of the area. The fact of their preservation along the Snake River is noteworthy, in view of the overbank flooding, river channel meandering, and massive events of erosion and deposition. Source analysis of the obsidian recovered from these sites can shed important light on prehistoric trade routes and exchange in the region. Certainly, much of the prehistory along the Snake has been lost. Studies at Jackson Lake (Conner, et al. 1991) have documented that dam construction and

wave action severely damaged the many sites along that water source. Smaller sites such as 48TE1443 shouldn't be overlooked for their potential to increase our knowledge of prehistoric settlement patterns.

There is a low probability of locating rock art on public lands along the Snake River, due to the lack of sandstone cliffs suitable for the inscription of petroglyphs.

Historic Resources

The potential for locating historic period Euroamerican sites in the planning area is good. The first non-Native American to visit the Snake River area was Robert Stuart, an Astorian fur trapper who passed through in 1812 (Rollins 1935). The Snake River valley was settled in the mid- to late-nineteenth century, so Euroamerican cultural resources might be encountered. Historic Period sites projected to be within the planning area include homestead remains, such as the John Dodge homestead (Wilson 1985, p. 314), located on the east side of the Snake River, at the base of Gros Ventre Butte. An examination of Government Land Office maps dating between 1890 and 1917 identified several cabins, homesteads (for example, Harmenson's House, George Bonnet's Cabin), roads, fences, and trails along the Snake River. One site, "Morse's House" near Taylor Creek, is plotted on 1902 maps as being very near public lands on the Snake River. During river reconnaissance in 2001, BLM located the remains of what appears to be the eastern approach of an early Snake River Bridge on Parcel 9. This historic period cultural resource is not recorded, nor is it evaluated for National Register eligibility. Other possible historic period sites include stock maintenance sites, placer mining sites, historic levee constructions, historic dam or bridge remains, ferries, historic trash scatters, and other cultural material remains over fifty years of age.

The Snake River is famous for periodic flooding and many dikes, levees, water diversions, bank stabilizations, and other flood control structures were constructed during the historic period. There is a high potential for some of these features to be found on BLM-administered lands.

Lands along the Snake River may qualify as a rural historic landscape. The Snake River valley retains a high degree of "integrity of setting," as natural topography is unspoiled and frequently breathtaking. It is unknown whether the landscape contains "character-defining features" that contribute to the historical significance of a rural historic landscape. Future inventory may include an assessment of the area's historic landscape potential.

In recent years, there has been an increased interest in the archaeology near Jackson, Wyoming. Spurred by a series of National Park Service, U.S. Fish and Wildlife Service, and USDA-Forest Service projects there is an increased understanding of the prehistory of the area. Most of these projects have concentrated on large sites where mitigative excavations took place.

Residents of Jackson frequent the public lands along the Snake River to fish, enjoy the river, walk their dogs, jog, bicycle, and to observe floaters going by. This intense public use may account for the lack of prehistoric tools on recorded, preserved sites in the planning area. No proactive, site-specific cultural inventories have been done for the planning area.

Fire Management

Fire History

Fire frequency during recorded history has been low, due to the moist riparian environment which keeps lightning caused fires from spreading. During periods of extreme drought, it is likely that catastrophic fires may have resulted from heavy fuel loading that accumulated during long fire-free intervals. Wildland fire ignitions on the BLM-administered public lands parcels have been infrequent, and are generally suppressed at 0.1 acre or less. In the summer of 2001, the Green Knoll Fire burned over 2,000 acres, mostly on the Bridger-Teton National Forest, in an area south of Wilson, WY, and west of the Snake River. The fire exhibited some extreme fire behavior, and threatened many homes in the area.

Plant Responses To Fire

Fire can be an effective tool in the long-term maintenance of narrow-leaf cottonwood riparian complexes. Most of the plants associated with the narrow-leaf cottonwood riparian complex are fire tolerant and resprout following light to moderate fires.

Narrowleaf cottonwood (*Populus angustifolia*) resprouts from roots, healthy and fire damaged branches, and root crowns after fire. Postfire sprouting generally occurs after light- to moderate-severity fire in pole sized and recently mature stands. The ability to produce postfire sprouts is greatly affected by stand age and location of the water table. Sprouting potential decreases proportionally as mature trees age. High water tables aid in the sprouting ability and subsequent sprout survival. Water insulates the tree's roots and reduces possibility of the tree being killed by the heat The ability to resprout from branch fragments may also aid in postfire establishment (USDA 2002).

Fire generally increases the sediment load in streams when the majority of bank stabilizing vegetation is consumed. Narrowleaf cottonwood branch fragments have the ability to trap sediment for localized deposition by impeding stream flow. Fresh, moist, barren alluvium in full sun is very important in the regeneration of narrowleaf cottonwood. Regeneration through seeding is favored by fires that thin the overstory, allow more light penetration, and expose the mineral soil.

Due to the decreased probability of postfire sprouting by older mature trees, prescribed fires in narrowleaf cottonwood stands are not recommended past the pole and early maturation stages of development. Livestock grazing should be excluded for at least five years after fire, with wildlife browsing monitored.

Fire kills the aboveground portion of Canada thistle (*Cirsium arvense*) plants. The roots can survive severe fires. Overall, fire can slightly damage, or can enhance, Canada thistle. The plants can survive fire and sprout vegetatively from extensive perennial root systems, or colonize bare ground via seedling establishment after fire. When sites supporting Canada thistle are burned, its response is variable, and may be affected by season of burn, burn severity, site conditions, and plant community composition and phenology before and after the fire. Existing research provides no clear correlations with these variables (USDA 2002).

Spotted knapweed (*Centaurea maculosa*), a noxious species, will increase following fire (USDA 2002).

Fire Management – Appropriate Management Response Category

In accordance with the 2001 Federal Wildland Fire Management Policy, firefighter and public safety are the first priority in fire management. All parcels fall into Category A – Areas where wildfire is not desired at all. Supression is required to prevent direct threats to life or property. The USDA Forest Service has fire protection responsibility for the BLM-administered lands in Teton County. Under a mutual aid and protection agreement, Teton County is a first repsonder to any wildland fire incident on BLM-administered public lands. Burned areas will be evaluated to determine whether fire rehabilitation is needed.

Fuel Management

Several communities in the valley were identified as at high risk from wildfire in the August 17, 2001 Federal Register notice. Due to the riparian nature of the parcels and their proximity to private lands chemical treatments to reduce fuel loads will not be considered. Mechanical or biological treatments may be performed to reduce hazardous fuels in the urban interface. Projects will be analyzed on a case-by-case basis and the standard mitigtation guidelines will apply.

Desired Future Conditions

Maintain the existing mature cottomwood trees. See the Vegetation section for a description and the Table 2-1 Vegetation Management for Objectives.

Emergency Stabilization and Rehabilitation (ESR)

Emergency stabilization and rehabilitation refers to activities that may be compeleted following a wildfire. Activities could include seeding with native or nonnative species, noxious weed control, erosion control, and repairing or building temporary fencing burned in the fire. If an evaluation indicates that any of these activites is needed, an ESR Plan will be prepared and implemented in accordance with the Department of the Interior Handbook and BLM ESR guidance.

Lands and Realty

Access

Access to the public land parcels is fair. While some parcels are easily accessed, others can be reached only from the river channel (see Appendix 4 and Maps 1 and 3-9). Parcels that have good access include some of the largest parcels and the most valuable for recreation, including parcels 9-10, 11-14, 17-19, and 26. Parcels 3 and 8 are accessible through Grand Teton National Park, but only by hiking from public roads within the Park. Parcel 23 is accessible from the Fall Creek Road; however, it is difficult to determine where the parcel lies and the risk of trespassing on adjacent private lands is high. Parcel 27 can be accessed from US highway 189/191; however, it contains a trash transfer station and access is controlled by Teton County. Parcels 4-7, 15-16,

20-22, and 24 can only be accessed from the river, and it is extremely difficult to identify the parcels from the river channel.

Within the Snake River corridor, recreational access is available along levees maintained by the U.S. Army Corps of Engineers and Teton County, especially in the vicinity of Wyoming Highway 22 and Wilson Bridge. About 3 miles of levee on the west side of the river, leading south from Wilson Bridge, and 4 miles of levee east of the river and leading north from Wilson Bridge are accessible for hiking, horseback riding, skiing and other types of nonmotorized recreation. The access east of the river begins on public land near Emily Stevens Park, then crosses 11 acres of private land along an easement held by the Jackson Hole Land Trust, and continues on public land through the 320 acres of the Walton Greenway (Parcels 9-10, Map 5) .

A boat and river access site is located on the west side of the river immediately north of Wilson Bridge, on parcel 13 (Maps 1 and 5). Access to the Wilson boat ramp is currently private. There is no public easement to access the ramp. An easement should be pursued to ensure continued public access to the Wilson boat ramp.

A second major area for boat and river access is near South Park Bridge, across the river from parcel 26 (Maps 1 and 9). The area is private land leased by the Wyoming Game and Fish Department and used as a take-out and put-in point by boaters floating from upstream or floating downstream. As described in an environmental assessment prepared by the Jackson Ranger District of the Bridger-Teton National Forest (February 7, 2000), the USDA-Forest Service has proposed that the boat ramp be moved across the river to the BLM-administered public land (parcel 26). The public land parcel is a better location for launching and landing boats during high water when the opposite bank is often flooded, and the public land parcel offers safer vehicle access from U.S. Highway 189/191. Teton County is proceeding, in cooperation with the BLM, to propose a boat ramp to be located on this parcel. A recreation project plan and environmental assessment (EA) for this project are being drafted by Teton County.

Restricted public use is allowed on most of the private lands in the Snake River channel through recreational easements. This access does not extend outside the river levees; in many cases it does not even include the levees themselves. The BLM was granted these easements and the responsibility for their management as part of the judicial settlements determining the ownership of the Snake River omitted lands (see "Landownership"). These easements allow only very specific uses of the river on private lands, including floating, fishing, wading, hiking, and picnicking. Most notably, boats can be anchored for fishing in these areas. They do not allow individuals to cross upland private lands to reach the river. Other uses, including camping, building fires, and hunting, are prohibited on the easements. No maps of the recreation easements are currently available. However, metes and bounds descriptions of the easement boundaries are available in the Pinedale Field Office. The Pinedale Field Office, together with the BLM Wyoming State Office, is pursuing mapping the recreation easements.

Maintaining "open public access to...natural resource areas," including the Snake River, for vehicle use, biking, hiking, horseback riding, and skiing is a community goal described in the Jackson/Teton County Comprehensive Plan (1994).

Landownership

Map 1 depicts landownership patterns in the planning area. See Appendix 4 and Maps 3-9 for descriptions of individual parcels of public land administered by the BLM along the Snake River.

The pattern of private, state, and public landownership along the Snake River, and BLM's administration of recreational easements in that area, has an interesting legal history. Original surveys conducted in the late 1800s ended at "meander lines" established near the then-banks of the very wide, braided channel of the Snake River. At some points, this channel was a mile or more wide. These "omitted lands" (omitted from the official U.S. survey) remained in public ownership as the Jackson Hole valley was settled. As levee construction proceeded in the 1950s, the lands began to be separated from the active channel of the Snake River. In the 1970s and 1980s, after long litigation, many of the "omitted" parcels were awarded to the adjacent private landowners, resulting in the scattered nature of the parcels that remain in public ownership today. For most of the parcels that did go into private ownership, recreation easements to the river channel were granted to the United States. Some of these easements, in the Wilson Bridge area, include access to the riverbank levees (Map 1).

The BLM is also responsible for administering mineral exploration and development on an additional 15,123 acres of federal mineral estate (Map 2). This mineral estate, which is mostly outside the river corridor, underlies privately owned lands.

According to the Jackson Hole Land Trust website, roughly 9,000 acres of conservation easements, along with some private lands, have been purchased in and around Jackson Hole for the preservation of critical wildlife habitat, open space and scenic vistas, and historic ranching heritage.

The Jackson/Teton County Comprehensive Plan (1994) describes the acquisition of conservation easements as "an effective programmatic strategy for accomplishing natural resource protection and preservation of community character."

There is currently one Recreation and Public Purposes (R&PP) lease on BLM-administered lands. Parcel 27 is leased to Teton County for the Teton County Transfer Site (WYW-82509). Due to current regulations and Teton County's desire for this 40-acre site, this parcel should be sold to Teton County before the current lease expires (3/2/2015).

Rights of Way

There are no utility corridors designated on the BLM-administered lands. No interest has been expressed in developing utility corridors on the public land parcels; the parcels are disconnected, interspersed with private lands, and mostly located in riparian habitat on the river. Utility corridors would be more appropriately located in more accessible areas. BLM-administered lands do not contain suitable lands for communication sites. The BLM has granted several rights-of-way in the past for utilities and access roads. It is anticipated that sand and gravel development activity and the population growth in the area will continue to create a demand for rights-of-way.

Withdrawals

Withdrawals are used to preserve sensitive environmental values, protect major federal investments in facilities, support national security, and provide for public health and safety. They segregate a portion of public lands and suspend certain operations of the public land laws, such as desert land entries or mining claims. Land withdrawals can also be used to transfer jurisdiction to other Federal land-managing agencies. It is now federal policy to restrict all withdrawals to the minimum time required to serve the public interest, maximize the use of withdrawal lands consistent with their primary purpose and eliminate all withdrawals that are no longer needed.

Approximately 2,890 acres of public lands and mineral estate described in public land order (PLO) 7143 (published on June 1, 1995 in the Federal Register, see Appendix 7) are closed to mineral or surface entry until June 1, 2005 (Map 12). As explained in the PLO, "mineral or surface entry" pertains to activities such as the staking and development of mining claims for locatable minerals and desert land entry, but does not apply to the sale, exchange, or transfer of public lands, or mineral leasing, or the extraction of sand and gravel through sales and permits.

Livestock Grazing

Livestock grazing is authorized in four grazing allotments totalling about 544 acres in the planning area (Map 14). The level of authorized use is 300 animal unit months (AUMs). Sixty-two AUMs are authorized for spring grazing subject to an annual authorization. The remaining use takes place primarily during the summer on 10-year grazing leases issued under section 15 of the Taylor Grazing Act. Only a few range projects have been constructed in these allotments. There are also about 529 acres of unallotted public lands.

No grazing allotment management plans or grazing systems have been implemented in the planning area, but some rangeland monitoring information, including actual use records, utilization studies, and field observations, has been collected. The condition of riparian areas has also been assessed.

The allotment categorization process (see Glossary) helps managers identify the intensity of management activity need for each allotment. The Walton allotment (Parcels 9-10) was placed in the I (improve) category in 1999. Supporting documentation is available in the Pinedale Field Office.

All of the allotments have been assessed for conformance with the Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management (Appendix 1). The Walton allotment (Parcels 9-10) failed to meet standard #4 because of past heavy grazing use on a portion of the allotment, which has reduced the health of the native shrub community. Management changes intended to bring the allotment into compliance with the standard have been agreed to. There has been some difficulty in consistently applying these management changes. The Porter Estate allotment (parcel 21) also failed standard #4, although a cause could not be determined at the time. Monitoring is ongoing to determine a course of action that will address the condition of Parcel 21. The Snake River Ranch allotment (parcels 23 and 24) met all the Standards. Documentation of Standards assessments and subsequent management of all the allotments is available in the Pinedale Field Office. While parcels 15-16 are also under grazing lease to the

Porter Estate, they have not been grazed by livestock in recent years and were not assessed for conformance with the Standards.

Livestock grazing is specifically mentioned in the settlement judgment for parcel 9, the Walton allotment. The Stipulation for Entry of Judgment was filed September 21, 1982, in the case between the United States and the Walton Ranch Company (United States of America v. Donald H. Albrecht, et al., U.S. District Court for the District of Wyoming, September 22, 1982). Item 5 of the Stipulation states:

> The United States agrees as part of the settlement entered into by the parties herein, that the Walton Ranch Company, or its successor in interest in ownership … shall have the right, as long as it or they are eligible under the laws and rules of the United States, to lease from the United States for grazing, agricultural or other authorized uses consistent with the maintenance of such property in its existing condition on the date hereof those parcels identified as 40, 41, 42, 43 and that portion of parcel 44 located north of the right of way line of Wyoming Highway 22, as long as the adjacent property of the Walton Ranch Company … is utilized for agricultural purposes. The right of the Walton Ranch Company to lease said parcels shall be subject to a determination by the United States in any legally mandated planning procedure that said parcels should be maintained in their existing condition and/or utilized for agricultural purposes. In the event that it is determined by the United States in a legally mandated planning procedure that any part of said parcels should not be maintained in its existing condition and/or utilized for agricultural purposes, the Walton Ranch Company shall have the right to lease the remaining portion of the tracts in accordance with the provisions of this stipulation. The United States agrees that it will, to the greatest extent possible and permitted by law, insure that any use and/or development of any portion of the above described parcels will be consistent with the maintenance of such parcels in an optimum condition for the protection and preservation of aquatic and wildlife habitat.

Minerals and Geology

The planning area lies at the south end of the Jackson Hole basin (see Map 2). The landscape consists predominately of a floodplain composed of glacial outwash, with the glacial-shaped West Gros Ventre and East Gros Ventre buttes rising out of this plain. Volcanic activity, glaciers, running water, and movement along faults have shaped the present landscape over the last few million years. Glaciers have had the biggest role in current land form design. The Snake River has also had a significant contribution to the present day geomorphology. During the maximum glacial advance about 125,000 years ago (the Bull Lake Stage), ice covered the entire planning area. The ice sheet advanced south to the area of Munger Mountain. It once covered the tops of the Gros Ventre Buttes and was almost 2,000 feet thick in the vicinity of the town of Jackson (Good 1996).

Volcanic activity within the area is represented by basalt and andesite flows deposited on top of the Gros Ventre Buttes. Numerous hot and warm springs in and around the planning area provide evidence of hot magma at depth. Boyles Hill and Abercrombie Warm Springs occur within the planning area and are located on state and private land, respectively.

Tectonically, the area is one of the most active and structurally complex regions in the United States. Movement along the Teton and Hoback fault zones continues today, with earthquakes with magnitudes ranging from 1 to 6 occurring every few years. A magnitude 4 earthquake occurred along the Hoback Fault near Camp Davis in the spring of 1998. Higher magnitude earthquakes (greater than 7) occur every few thousand years. It is these more intense earthquakes that can modify landscapes and further displace fault scarps in moraine deposits along the east flank of the Teton Range. Two large Holocene earthquakes that created vertical displacement of 4.1 meters (13 feet) in surface alluvium and glacial deposits along the Teton Fault occurred about 7,175 years ago (Smith 1993). The Teton Range is one of the youngest mountain ranges in North America, with formation beginning about 13 million years ago. Today, the Tetons are still rising, and the Jackson Hole basin is still subsiding and receiving basin fill sediments.

Much of the tectonic activity of Jackson Hole is directly related to geologic events that have occurred in present-day Yellowstone and eastern Idaho over the last several million years. A series of deep magma plumes have risen from the earth's core to the surface over the last 15 million years to create explosive volcanic calderas. These eruptions have migrated northeast across southern Idaho where the most recent volcanic eruption created the Lava Creek Caldera in Yellowstone 600,000 years ago.

Mineral Resources

Leasable Minerals

Oil and Gas

There have been no oil and gas wells drilled within the planning area. The nearest wells to the planning area (all dry holes) were drilled along the Darby Thrust Fault in and around Hoback Junction, about 14 miles south of Jackson. All these wells were drilled in the late 1970s or early 1980s when petroleum prices were at their peak and justified the high risk of exploring a frontier area. The deepest well was drilled in 1981-82 to a depth of 16,350 feet in the Astoria Unit near Hoback Junction. There have been no oil and gas discoveries near the planning area. The nearest show was a noncommercial gas discovery from the Frontier Formation at Game Hill about 12 miles to the southeast.

The petroleum potential within the planning area north of the Cache Creek Thrust Fault is unknown. No deep drilling has taken place to evaluate the potential of the deep post Precambrian section underlying Jackson Hole. South of the Cache Creek Thrust Fault, the planning area is within the overthrust belt with a thick post-Precambrian rock section up to 20,000 feet thick. Potential for occurrence of hydrocarbons in the southern portion of the planning area is moderate.

In 1995, the US Geological Survey (USGS) conducted an assessment of the oil and gas resources of the United States. The assessment presents information about the undiscovered accumulations of oil and gas in various geologic or structural provinces from which hydrocarbons have been or may be produced. Information from that assessment concerning the Jackson Hole area is presented in Table 3-2.

TABLE 3-2
USGS CONVENTIONAL PLAY DATA FOR THE SOUTHWESTERN WYOMING PROVINCE

Play Name	Exploration Status	Producing	Oil Fields (>1 MMBO)		Gas Fields (>6 BCFG)	
			Size Range	Number Range	Size Range	Number Range
Moxa Arch LaBarge	Mature	Yes	5-20 MMBO	1-4	50-250 BCFG	2-7
Basin Margin Anticline	Immature-Moderately Mature	Yes	5-30 MMBO	1-3	12-100 BCFG	1-10
Subthrust	Immature-Moderately Mature	Yes	5-50 MMBO	1-5	20-150 BCFG	1-5
Jackson Hole	Immature	No	2-10 MMBO	1-3	9-40 BCFG	1-3

For this assessment, undiscovered, technically recoverable resources were defined as estimated quantities of resources hypothesized to exist on the basis of geologic knowledge, data from past discoveries, and resources which may be contained in undiscovered accumulations outside of known fields. Estimates of resource quantities were determined to be producible using current recovery technology, but without considering economic viability.

As can be seen from the table, the possibility for several oil and gas fields exists in the Jackson Hole area. Potential production of oil and gas would be substantially lower than for other areas in southwest Wyoming. The exploration status of the Jackson Hole area can be described as immature, since little or no drilling has taken place in the area.

Geothermal

The geothermal potential within the study area is moderate to good. However, the potential for commercial development of the resource is low. Legislation has been introduced at the state and federal level on several occasions to protect geothermal resources within the greater Yellowstone ecosystem from drilling and development.

Abercrombie Warm Springs occurs at the north end of East Gros Ventre Butte along the Warm Springs Fault. Boyles Hill Warm Springs occurs along the Jackson Thrust Fault. Kelly and Teton Valley Warm Springs are found just northeast of the planning area while Astoria Warm Springs is located along the Snake River south of the planning area. The water temperature of these warm springs ranges between 80 and 100 degrees Fahrenheit. All the above springs occur on private and state lands.

Coal

No economic coal deposits exist within the planning area. The only coal mine known to exist within the area was on the northwest side of Boyles Hill. The long-abandoned mine went into the hillside at least 30 feet and the zone mined was in the steeply dipping Cretaceous-age Bacon

Ridge Sandstone located near the Jackson Thrust Fault (Love 1972). The adit was originally timbered but is now caved in. No coal thickness was determined due to the lack of outcrops. The areal extent of this coal deposit is very limited, probably less than five acres. The coal was probably mined in the early part of the century and used locally to supply the heating needs of the Jackson area. Outcrops of the Aspen Shale in the southern portion of the area may contain low-grade, thinly bedded coal, but are not of economic significance. No other coal deposits are known to exist in the planning area.

Sodium, Potassium, and Oil Shale

The potential for the occurrence of these leasable minerals is low. No deposits are known to exist within the planning area.

Phosphate

The south half of the planning area (the Jackson quadrangle) was mapped in the late 1960s and early 1970s by the U.S. Geological Survey in order to classify public lands, to investigate potential mineral resources, and to provide a basis for environmental planning (Love 1972). Actual and potential resources identified include phosphate, coal, sand and gravel, limestone, and riprap. There are some public lands inside the planning area that have been classified for phosphate.

Nearly all phosphate is contained in the Meade Peak Member of the Phosphoria Formation. Outcrops of the Phosphoria Formation with phosphate-bearing beds occur on both East and West Gros Ventre Buttes. Exposures of the Phosphoria Formation also occur south of Snow King Mountain east of the Hoback Fault and U.S. Highway 189. Gere and others in 1966 exposed phosphate beds in a trench dug on the south side of Snow King Mountain in the northeast corner of sec. 9, T. 40 N., R. 116 W. Two phosphate beds were exposed in the Meade Peak Member. One bed was 4.4 feet thick (containing 23 percent phosphate) and the another bed was 12 feet thick (assayed at 15 percent phosphate). Additional lands classified as potentially valuable for phosphate lie west of the planning area and south of Teton Pass.

Outcrops of the Phosphoria Formation in the areas described have very limited extent due to steep bedrock dips of 15 to 60 degrees. Because of these limited exposures and steep dips in mountainous terrain, it is unlikely that any phosphate would be developed.

Salable Mineral Deposits

The most important mineral material occurring within the planning area is gravel. Extensive deposits occur in terraces and along the floodplain of the Snake and Gros Ventre Rivers. The glacial deposits of gravel are generally 50 to 100 feet thick along the Snake River but in some areas, as under the town of Jackson, the gravel thickness may reach 300 feet. The planning area in the past contained many gravel pits and quarries to meet the needs of highway, county, and private road construction. Today, the planning area contains only three gravel operations. Two are companies operating on private lands along the Snake River. The third operation was located north of the South Park highway bridge to supply gravel for widening U.S. Highway 189 south of

Jackson. No sand or gravel is currently being commercially produced from federal lands or mineral estate in the planning area.

Demand for sand and gravel in Jackson Hole is increasing as the number of homes, businesses, and roads in the area continues to grow. The private gravel operations have limited resources.

In portions of the river where gravel is currently being extracted from private lands, high river flows in the spring have been replacing the gravels extracted in the previous year. This creates a unique situation where a supply of gravel is available annually, without the creation of an ever-enlarging gravel pit. In some portions of the river, particularly upstream of highway bridges, streambed gravels are building up and have caused channel aggradation of up to nine feet above the 1954 channel level.

Another mineral material of somewhat less importance is riprap. Demand for riprap is great along the Snake River to build and maintain the river levees. Maintaining these levees is important to prevent flooding and thereby protect surrounding real estate. Riprap can be obtained from existing quarries in volcanic rocks located upon East and West Gros Ventre Buttes. Talus debris at the bottom of the buttes may also supply some riprap demands.

Locatable Minerals and Mining Claims

There are no active mining claims within the planning area; however, claims have been located in the past. The most recent claims were located in the late 1960's, with the latest activity in 1982. For the most part, these were placer claims located along the Snake River for gold. All claims in the planning area have been abandoned.

Gold is the primary locatable mineral deposit within the planning area. The potential for the occurrence of gold within the river gravels is low. Placer gold was first discovered in the Snake and Gros Ventre River gravels in the 1860's. The gold occurs as minute flakes and flour within large volumes of sand and gravel. The source area for the gold is unknown.

The potential for placer gold development is low within the study area, since it is unlikely that sufficient amounts of gravel could be mined to make an operation profitable. No past placer operations in Jackson Hole Valley are known to have yielded economically profitable amounts of gold (Love 1972).

Mineral Withdrawal

Approximately 5,937 acres of public lands and mineral estate described in public land order (PLO) 7143 (published on June 1, 1995 in the *Federal Register,* see Appendix 7) are closed to mineral or surface entry until June 1, 2005 (Map 10). As explained in the PLO, "mineral or surface entry" pertains to activities such as the staking and development of mining claims for locatable minerals and desert land entry, but does not apply to the sale, exchange, or transfer of public lands; mineral leasing; or the extraction of sand and gravel through sales and permits. Public land and mineral estate not included in the area described in PLO 7143 are currently open to locatable mineral or surface entry.

Geologic Hazards

Potential geologic hazards in the planning area include river flooding, earthquakes, and landslides. In general, the risk of property damage (and possible human injury) caused by geologic hazards is increased as development of the Jackson Hole area increases.

Flooding

The greatest near-term hazard is from river levee failure during extreme high water in the Snake and Gros Ventre rivers. Flows usually peak from mid-May to early July each year. Rapid erosion and possible flooding may occur with flow rates exceeding 20,000 cubic feet per second. The U.S. Army Corps of Engineers is the primary agency responsible for building and maintaining the Snake River levee system and protecting the surrounding lands from flooding.

Construction of the levee system for flood control was begun in the 1950s. The levees have been expanded over the years as needed to improve flood control. Unfortunately, the levees have restricted the river's flow and changed the dynamics of the system, primarily by increasing the erosive force of the water. Because many homes have been built in the floodplain, an increasing number of private levees are being constructed to protect the real estate.

When flooding along the Snake River does occur, as in the spring of 1986, levees can fail and land with river bank trees can be swept into the river. Later these trees and other woody debris catch in the river channel and create new "snags." The snags then collect silt and gravel and change the hydrodynamics of the river system. If the snags are left in the river, future erosion of the levees with potential flooding is more likely. The Corps estimated in 1988 that the Snake River had about 10,000 snags from the south boundary of Grand Teton National Park to the South Park Bridge. The Corps completed an environmental study in 1989 and 1990 which addressed removing some of these snags to restore some of the main river channel.

Higher than normal snow melt occurred in the spring of 1997 and high water flows destroyed a levee on public land where Butler Creek enters the river. With the levee gone, valuable ranch land was swept into the river.

Earthquakes

Within the planning area are portions of the active Teton and Hoback normal faults. For the most part, earthquakes have been frequent (every year or so) and have been low in intensity. Little property damage due to earthquakes has occurred in the past hundred years. A magnitude 6 earthquake occurred in 1932 near the town of Jackson. A magnitude 6 earthquake also occurred at Teton Pass in 1948 where the Cache Creek and Jackson thrust faults intersect. There have been at least five other earthquakes in the planning area vicinity with magnitudes of 4 or 5 over the past 70 years.

The potential for property damage has increased, especially in the northwestern portion of the planning area. Today, more and more homes are built away from the valley floor upon slopes and loosely-consolidated alluvial fan deposits. As a consequence, even small intensity quakes may activate landslides and dislodge boulders, resulting in property damage.

Landslides

Landslides and mudslides are another geologic hazard within the planning area. Landslides caused U.S. Highway 189 to be rerouted from the east bank of the Snake River to the west bank, and the South Park bridge to be built. Here soft Tertiary shale and sandstone rock has slid toward the river bank as the Snake River exits the Jackson Hole valley and enters the upper Snake River Canyon. The fast moving water has cut into this steep bank as the Snake River makes a sharp bend southeast of the South Park highway bridge.

The most famous recent landslide of the region is the Lower Gros Ventre Slide. This slab-type slide occurred in 1925 when Pennsylvanian-aged rocks on the north slopes of Sheep Mountain slid north, blocking the Gros Ventre River. A natural dam 225 feet high was created. Water backed up behind the debris dam and created Lower Slide Lake, which is two miles long. Two years later in the spring of 1927, the top 50 feet of this natural dam broke and flooded the Gros Ventre valley. This sudden wall of water destroyed the village of Kelly, with a loss of six lives (Love 1997). Other more ancient landslides exist further up the Gros Ventre river drainage system. The Lower Gros Ventre Slide is located about 12 air miles northeast of the planning area (for the geology of the slide area, see Love 1992).

Further to the south in the spring of 1997, a mudslide blocked U.S. Highway 89 just south of Hoback Junction. Landslides are most prone to happen in the spring when the ground is saturated with snowmelt and glide planes are well lubricated.

Off-Highway Vehicles

Most of the existing roads on the public land parcels are part of the US and/or Teton County transportation system. Off-highway vehicles (OHVs) which are used in the planning area include snowmobiles, motorcycles, all-terrain vehicles, and mountain bikes. OHV use on BLM parcels in the planning area is minimal, due to limited public road access. However, some unauthorized trails are becoming established. Motorized boating occurs but is not currently a popular activity. Mountain biking on the levees is a common recreation activity. Some mountain bike use is also occurring off road and contributes to the maintenance of unauthorized trails.

The BLM recognizes the use of bicycles and other human-powered, mechanized conveyances as appropriate recreational activities. Federal regulations do not specifically address management of non-motorized vehicle use. There are substantial differences in the types of use, associated impacts, and management approaches between non-motorized and motorized vehicle activities. Until a national strategy and rules for non-motorized vehicle use on public lands are established, the BLM will continue to include non-motorized use within the context of OHV designations.

Paleontological Resources

Pleistocene-age river terrace deposits along the Snake River have a very slight potential to contain vertebrate fossils. The occurrence of fossils in the river gravels and riparian areas is very remote. There is a slightly higher potential for fossil occurrence on the parcels (20, 22, and 26) that include lands above the river terraces.

Recreation

The types of recreation activities available on BLM-administered lands in the planning area or as a result of public access include: float fishing and scenic floating, both private and guided; waterfowl hunting; mountain biking; hiking, dog walking, wildlife viewing, cross-country skiing and OHV activities. The season of use for the planning area is year long; there are recreation activities for any season of the year. Visitor use is highest during the summer months. In addition to public lands in the planning area, recreation easements on private lands within the river levees provide for recreation access for the purposes of boating, rafting, fishing, hiking, and picnicking. These easements do not provide increased access to the river, but a greater range of activities when one is on the river. Unlike most areas in Wyoming, recreationists may anchor boats, wade, swim, and hike in the river channel where the underlying surface is private land. Hunting, open fires, and overnight camping are prohibited on all recreation easements on private lands. Public lands in the planning area are closed to overnight camping.

The majority of river floating activity occurs during the warmest months following the high flows of early summer snow melt. Float fishing use begins in April with the opening of trout fishing season and peaks as fishing conditions improve during late summer and fall. Walking, biking, and horseback riding are the most common upland activities. Swimming and wade fishing are also popular activities and most commonly occur near the public access locations provided at the Wilson Bridge and near Emily Stevens County Park. A few lesser known road-accessed river locations provide additional river corridor access.

The only developed boating access on public lands is the Wilson Bridge boat ramp (parcel 13, Map 5). The Wilson Bridge boat ramp is a boating take-out and put-in for approximately 23 miles of the Snake River. This access, developed in cooperation with Teton County, consists of a gravel ramp for launching and landing boats, a parking area, restrooms, and information kiosk. The National Park Service provides boating access at Moose, Wyoming, for floating downstream to the Wilson Bridge access. Some limited floating access is provided by private landowners.

Other public boating access is provided by the Wyoming Game and Fish Department through an access agreement on private lands located at the north end of the South Park Bridge. An area on public lands on the south side of the South Park bridge (parcel 26, Map 9) has occasionally been used for landing and launching boats, but has not been developed for this purpose. There is currently a proposal to develop a boat launch area on public lands near the South Park bridge.

Commercially-guided scenic float and fishing trips are popular in the planning area as part of the tourism-based economy of the town of Jackson. Commercial, competitive, and large group floating activities are currently unregulated within the planning area, except where floating access is provided by the National Park Service in Moose, Wyoming. The USDA-Forest Service

regulates commercial, competitive, and group use in river segments below the South Park bridge. Commercial and private floating use fluctuates yearly, but water-based recreation activity and demand throughout the region has increased dramatically over the past 20 years. The demand for these services and activities will likely continue to grow. River use allocation measures have been implemented by other land management agencies to protect wildlife habitat, provide for human health and safety, and maintain a quality recreation experience. The commercial floating and large group floating use is at times at or near maximum use levels. The river segments within the planning unit provide for substantial commercial and private floating use. Rough estimates of floating use in the Wilson to South Park floating segment exceed 25,000 people per floating season. As many as 60 boats per day may launch from the Wilson Bridge boat ramp. Upland use by the public for recreation activities on public lands and easements within the river corridor likely exceeds 25,000 visits per year. The demand for recreation facilities and recreation activities currently exceeds the supply of services and opportunities. This imbalance is expected to continue regardless of applied existing or future management scenarios. A trend of increasing recreation visitation is also expected to continue, further widening the gap between supply and demand.

Recreation Opportunity Spectrum

Public lands are managed to provide a broad spectrum of recreational opportunities. The recreation opportunity spectrum (ROS) provides the BLM with a framework for determining existing outdoor recreation opportunities and management potential based upon a combination of activity, setting, and experience.

Use of the ROS provides for establishment of outdoor recreation management goals and objectives for specific areas, provides for analysis of the impact of proposed resource management actions on available recreation opportunities, provides for monitoring in terms of established standards for recreation experience and opportunities settings, and provides for specific management objectives and standards for project plans.

The ROS system divides the continuum into six management classes, with “primitive” providing the most isolated, natural, and challenging setting and “urban” providing the most user intensive, developed, and modified setting. The ROS classifications for this planning process were described based upon what the recreationist may see, hear, and experience from the river corridor where public lands and recreation easements allow for public use management. The six classes are: primitive, semi-primitive nonmotorized, semi-primitive motorized, roaded natural, rural, and modern urban. The ROS classifications for the Snake River corridor are depicted on Map 16.

The recreation opportunity spectrum system describes probable physical settings, experiences, and activities for each class and identifies where these combinations occur within the planning area. Area classification allows for flexibility where the overlapping of class characteristics commonly occur. The use of this system on public lands will help better recognize and meet the public’s growing demand for a wide variety of recreation activities and settings within the planning area.

Socioeconomics

Overview

Jackson is located in northwest Wyoming and serves as a gateway to Grand Teton and Yellowstone National Parks. It is located in a scenic valley known for the surrounding majestic mountains and beautiful vistas. As a result of the beauty of the area, tourism is an important component to the local economy. In addition, given this backdrop, Jackson is a highly desirable place to live. However, this desirability must be contrasted against the high cost of living in the area.

Due to high housing costs, Teton County is the most expensive county in Wyoming in which to live (State of Wyoming 2001). The cost of living in Teton County is, on average, 41% higher than in all the other counties in Wyoming. This is a significant cost of living differential that sets Jackson apart from the rest of the state.

Population

The population growth rate from 1970 through 2000 for Jackson and Teton County has been substantially greater than the average for the state of Wyoming, as shown in Table 3-3. This high sustained growth rate for the 30 year period beginning in 1970 illustrates the desirability of the Jackson area. In addition, it reveals the potential for an increase in demand for local access to public land along the Snake River.

The Wyoming Department of Administration and Information projected the populations of Jackson and Teton County would be 6,701 and 16,280, respectively, by 2008. However, Table 3-3, with information from the 2000 Censis, indicates the forecast was underestimated. Both Jackson and Teton County had surpassed the population forecast for 2008 by the year 2000.

TABLE 3-3
POPULATION

Year	1970	1980	1990	2000
Jackson				
Population (number of persons)*	2,688	4,511	4,472	8,647
Compound Annual Growth Rate (10 year increments)		5.31%	-0.09%	6.82%
Compound Annual Growth Rate (1970 base year)				3.97%
Teton County				
Population (number of persons)*	4,823	9,355	11,172	18,251
Compound Annual Growth Rate (10 year increments)		6.85%	1.79%	5.03%
Compound Annual Growth Rate (1970 base year)				4.54%
Wyoming				
Population (number of persons)*	332,416	469,557	453,588	493,782
Compound Annual Growth Rate (10 year increments)		3.51%	-0.35%	0.85%
Compound Annual Growth Rate (1970 base year)				1.33%

*U.S Bureau of Census

Income

Tourism is an important component of the local economy in Jackson and Teton County. As illustrated in Table 3-4, the sectors entitled retail trade and services have been growing at an adjusted annual compound rate of 5.54% and 6.48%, respectively, from 1970 through 2000 (measured in 2000 dollars). Moreover, retail trade is growing at a rate that is 73% greater than the growth rate for retail trade for the state of Wyoming (Table 3-5).

It is also interesting to note that services accounted for nearly 25% of personal income in Teton County, compared to only about 13% of personal income in Wyoming, in 2000. Also, in 2000, retail trade constituted nearly 9.5% of personal income in Teton County, compared to only 6.2% of personal income for the state of Wyoming. As a percentage of personal income, the sectors making up the bulk of the tourism economic activity are much more important to the Teton County economy than to the Wyoming economy as a whole.

Teton County has been experiencing a substantial growth rate in population. This is reflected in four of the sectors: construction; retail trade; finance, insurance and real estate; and services. The annual adjusted growth rate difference from 1970 to 2000 in these four categories for Teton County compared to the state of Wyoming is, respectively, 73.26%, 72.99%, 60.45% and 41.35% higher.

TABLE 3-4
PERSONAL INCOME, TETON COUNTY

	1970	1980	1990	2000	Compound Annual Growth Rate
Personal income	134,933	294,069	510,621	933,387	6.66%
Nonfarm personal income	130,322	292,796	509,101	933,510	6.78%
Farm income[1]	4,611	1,273	1,520	-123	
Earnings by place of work	97,311	210,694	360,418	638,655	6.47%
less: Personal cont. for social insurance[2]	3,488	9,122	24,423	42,553	8.70%
plus: Adjustment for residence[3]	-555	-6,000	-40,875	-97,123	18.79%
equals: Net earngs by place of residence	93,268	195,572	295,121	498,979	5.75%
plus: Dividends, interest and rent[4]	36,672	85,661	193,683	399,688	8.29%
plus: Transfer payments	4,993	12,836	21,817	34,720	6.68%
Wage and salary disbursements	65,467	137,946	263,516	475,034	6.83%
Other labor income	2,734	13,621	27,435	41,494	9.49%
Proprietors' income[5]	29,110	59,127	69,449	122,127	4.90%
Farm proprietors' income	2,206	-698	542	-1,055	
Nonfarm proprietors' income	26,904	59,825	68,908	123,182	5.20%
Farm earnings	4,611	1,273	1,520	-123	
Nonfarm earnings	92,700	209,422	358,898	638,778	6.65%
Private earnings	75,537	176,001	312,756	561,772	6.92%
Ag. Services, forestry, fishing, & other[6]	746	788	1,760	7,967	8.22%
Mining	852	14,497	1,265	(D)	8.16%
Construction	9,218	34,699	54,898	117,143	8.84%
Manufacturing	3,484	6,382	7,822	15,083	5.01%
Transportation and public utilities	2,694	7,367	9,846	21,205	7.12%
Wholesale trade	1,172	4,353	5,341	(D)	
Retail trade	17,544	35,111	58,071	88,517	5.54%
Finance, insurance, and real estate	4,966	9,636	17,909	66,455	9.03%
Services	34,862	63,169	155,843	229,072	6.48%
Government and government enterprises	17,162	33,420	46,142	77,006	5.13%

TABLE 3-5
PERSONAL INCOME, WYOMING

	1970	1980	1990	2000	Compound Annual Growth Rate
Personal income	5,806,353	11,646,597	10,750,231	13,521,575	2.86%
Nonfarm personal income	5,435,440	11,466,606	10,559,189	13,412,188	3.06%
Farm income[1]	370,913	179,991	191,042	109,387	-3.99%
Earnings by place of work	4,579,659	9,481,940	7,530,552	8,940,138	2.25%
less: Personal cont. for social ins.[2]	161,615	434,627	443,716	546,999	4.15%
plus: Adjustment for residence[3]	586	-160,186	-15,830	-33,763	
equals: Net earngs by place of res.	4,418,630	8,887,127	7,071,006	8,359,376	2.15%
plus: Dividends, interest and rent[4]	933,448	1,941,106	2,512,872	3,561,517	4.56%
plus: Transfer payments	454,275	818,364	1,166,353	1,600,682	4.29%
Wage and salary disbursements	3,483,912	7,382,858	5,562,081	6,772,578	2.24%
Other labor income	211,952	864,057	793,082	803,106	4.54%
Proprietors' income[5]	883,794	1,235,025	1,175,390	1,364,454	1.46%
Farm proprietors' income	231,556	59,840	124,188	29,084	-6.68%
Nonfarm proprietors' income	652,239	1,175,186	1,051,201	1,335,370	2.42%
Farm earnings	370,913	179,991	191,042	109,387	-3.99%
Nonfarm earnings	4,208,746	9,301,949	7,339,511	8,830,751	2.50%
Private earnings	3,117,233	7,649,396	5,366,109	6,735,326	2.60%
Ag. Svcs, forestry, fishing, other[6]	27,215	30,425	50,777	73,498	3.37%
Mining	547,538	2,368,178	1,310,740	1,326,625	2.99%
Construction	377,198	1,131,352	498,755	760,400	2.36%
Manufacturing	274,686	433,727	365,436	471,765	1.82%
Transportation and public utilities	481,361	924,125	740,282	767,328	1.57%
Wholesale trade	144,195	414,417	250,765	298,233	2.45%
Retail trade	536,004	875,953	695,019	837,076	1.50%
Finance, insurance, & real estate	155,961	290,903	247,437	446,889	3.57%
Services	573,075	1,180,316	1,206,898	1,753,512	3.80%
Government and govt enterprises	1,091,513	1,652,554	1,973,401	2,095,425	2.20%

Footnotes for tables 3-4 and 3-5 (all figures are in 2000 dollars):

[1] Farm income consists of proprietors' income; the cash wages, pay-in-kind, and other labor income of hired farm workers; and the salaries of officers of corporate farms.
[2] Personal contributions for social insurance are included in earnings by type and industry but they are excluded from personal income.
[3] The adjustment for residence is the net inflow of the earnings of interarea commuters.
[4] Rental income of persons includes the capital consumption adjustment.
[5] Proprietors' income includes the inventory valuation adjustment and capital consumption adjustment.
[6] "Other" consists of wage and salary disbursements to U.S. residents employed by international organizations and foreign embassies and consulates in the United States.

(D) Not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals.

*REIS, Regional Economic Information System 1969-98, U.S. Department of Commerce, Economics and Statistics Administration, Bureau of Economic Analysis

Per Capita Income

Per capita income provides a good indicator of the economic well being of an area. Teton County has, by a large margin, the highest per capita income in the state of Wyoming, with a 2000 per capita income of $50,913. Per capita income in Teton County is 86% higher than for the state of Wyoming for the year 2000 (Table 3-6).

TABLE 3-6
PER CAPITA INCOME, TETON COUNTY AND WYOMING

	2000
Wyoming	27,372
Albany	23,772
Big Horn	19,884
Campbell	27,601
Carbon	23,434
Converse	23,381
Crook	22,846
Fremont	22,267
Goshen	22,921
Hot Springs	23,393
Johnson	24,381
Laramie	28,035
Lincoln	20,980
Natrona	32,112
Niobrara	23,355
Park	26,686
Platte	23,984
Sheridan	28,221
Sublette	26,927
Sweetwater	29,125
Teton	50,913
Uinta	22,042
Washakie	25,428
Weston	26,280

Summary

The population growth in Teton County increases the demand for access to public land along the Snake River corridor. Additionally, the growth in tourism increases the demand for access to these same public lands. No other lands along the Snake River in Teton County provide the type of river access, close to town and residences, available on the public lands in the planning area.

The importance of tourism to the Teton County economy points out the consequence of recreational expenditures to the overall vitality of the county's economy. One way of examining these recreational expenditures is to identify the new money coming into the local economy as a result of tourism, and then use a regional model, such as an Input/Output model, to quantify the direct, indirect and induced impacts associated with a particular alternative. However, for this RMP EIS, the analysis will focus on the non market values of the public lands along the Snake River corridor as they relate to the different management alternatives being considered. The public lands in the Snake River planning area are influenced by the private real estate market. However, in addition to the high land prices in Teton County, there are additional values attached to these public lands that are not measured in the private market. Non-market values of the BLM parcels were further studied in a Contingent Valuation Methodology study conducted in 2001 (see Appendix 6).

Soils

Soils found along the Snake River floodplain generally are dark, poorly drained, and have a fine sandy loam surface about 24 to 30 inches thick overlying extremely gravelly loamy sand to a depth of 60 inches or more. These soils are characterized by a fluctuating water table between 3 feet and the surface from May through July and are subject to flooding from May through June.

The plant community is dominated by species that tolerate a high water table. Cottonwood, willow, hawthorn, buffaloberry, silverberry, and currant are common woody species.

Flooding and high water tables put severe limitations on building site development, sanitary facilities, and permanent recreational facilities. Wildlife habitat potential is good and the potential as a gravel source is good. These soils are a poor source for topsoil and for material with which to construct dikes, embankments, or levees.

Upland areas, with slopes from 10 to 90%, are dominated by dark, well drained, silt loam or loam soils greater than 60 inches to bedrock. Some areas have rock fragments throughout the soil profile.

The plant community is characterized by sagebrush along with bitterbrush, serviceberry and snowberry, and grasses in the open areas, while lodgepole pine and Douglas fir are often found on forested hillsides.

Steep slopes are the main limitation to building site development, sanitation facilities, and permanent recreational facilities. Wildlife habitat potential is fair to good. These soils are a poor source for gravel or topsoil.

Detailed soils information for this area can be found in: Soil Survey of Teton County, Wyoming, Grand Teton National Park Area, 1982, USDA-Natural Resource Conservation Service.

Special Status Plant Species

Complete floristic inventories have not been conducted on a large scale in the Bureau; information available on each species varies, as do potential threats and opportunities for management and protection. Site specific and general inventories have been conducted for some species; however, areas inventoried but having no candidate plants frequently were not mapped and/or the information was never placed in reports that could be referenced. Permanent transects and baseline information have been gathered for other species. Complete information is lacking for many of the species.

The BLM is required by law to protect and manage for threatened, endangered, proposed, and candidate species identified by the U.S. Fish and Wildlife Service (USFWS). Four plants known to occur in Wyoming have been listed as threatened or endangered under the Federal Endangered Species Act. BLM is also required to protect and manage for state listed species. The State of Wyoming does not have an official list of rare, threatened, or endangered plant species. Wyoming BLM has established a list of BLM state sensitive species. BLM is required to protect

these plants at the minimum level of protection as a federal candidate species. State and federal agencies have historically given these species special consideration until their status is accurately assessed.

Federally Listed Species

The planning area has one known federally listed plant species near its boundaries. The other listed or proposed species are located in the central and eastern portions of Wyoming.

Ute Ladies'-tresses (*Spiranthes diluvialis*), an orchid listed ad threatened, has been located along the South Fork of the Snake River in Idaho, and similar habitat occurs along the Snake River corridor in Wyoming. Several searches have found suitable habitat but no individuals within the planning area. A survey conducted for the Fall Creek Road improvement project also found no individuals of this species. This species does not produce growth every year, so it is possible that the species does occur and has not been found yet; however, the elevation of Jackson Hole is thought to be too high for the species. The likelihood that the Ute ladies'-tresses occurs in the planning area is low.

BLM Sensitive Species

The Pinedale Field Office has six BLM sensitive species within its boundary. Their habitat is not found within the Snake River Corridor and the species are not expected to be found in the planning area. Table 3-7 lists the species and their associated habitats.

TABLE 3-7
SENSITIVE SPECIES

Common Name	Scientific Name	Habitat
meadow pussytoes	*Antennaria arcuata*	Moist, hummocky meadows, seeps or springs surrounded by sage/grasslands 4,950-7,900'
Trelease's milkvetch	*Astragalus racemosus var. treleasei*	Sparsely vegetated sagebrush communities on shale or limestone outcrops and barren clay slopes at 6,500-8,200'
Cedar Rim thistle	*Cirsium aridum*	Barren, chalky hills, gravelly slopes, and fine textured, sandy-shaley draws 6,700-7,200'
large-fruited bladderpod	*Lesquerella macrocarpa*	Gypsum-clay hills and benches, clay flats, and barren hills 7,200-7,700'
Beaver Rim phlox	*Phlox pungens*	Sparsely vegetated slopes on sandstone, siltstone, or limestone substrates 6,000-7,400'
tufted twinpod	*Physaria condensata*	Sparsely vegetated shale slopes and ridges 6,500-7,000'

Vegetation

General Description

Most plants found on the Snake River floodplain are intricately related to sediment deposition and water discharge patterns over time. Sediment deposition provides the substrate (soil) for plants, while water levels relative to sediment surfaces provide water for growth of established plants and seed germination (Merigliano 1996).

The U.S. Army Corps of Engineers has developed generalized categories in which to group the vegetation cover types of the Snake River in Jackson Hole. These are: Riparian Forested, Riparian Shrubland, Riparian Grassland, Upland and Palustrine, and Riverine. While all of these types may occur to some degree along the river reaches under BLM's jurisdiction, the principal cover type is the Riparian Forested.

The Riparian Forested cover type within the river corridor is dominated by a narrow-leaf cottonwood riparian complex. Common riparian plants found along the Snake River include:

Canada goldenrod (*Solidago canadensis*)
Douglas fir (*Pseudotsuga menziesii*)
Engelmann spruce (*Picea engelmannii*)
goldenaster (*Heterotheca villosa*)
Kentucky bluegrass (*Poa pratensis*)
licorice root (*Glycorrhiza lepidota*)
lodgepole pine (*Pinus contorta*)
narrow-leaf cottonwood (*Populus angustifolia*)
quaking aspen (*Populus tremuloides*)
red-osier dogwood (*Cornus stolonifera*)
redtop (*Agrostis stolonifera*)
reed canarygrass (*Phalaris arundinacea*)
sandbar willow (*Salix exigua*)
silverberry (*Elaeagnus commutata*)
subalpine fir (*Abies lasiocarpa*)
water birch (*Betula occidentalis*)
western serviceberry *(Amelanchier alnifolia*)
western wheatgrass (*Elymus smithii*)
yellow willow (*Salix lutea*).

This vegetation screens much of the river corridor from human intrusions and alterations. However, land uses are occurring along much of the river's edge which are altering the natural vegetation.

Condition

In 1990, the USFWS predicted a declining trend for the cottonwood forests along the Snake River corridor due to a lack of overbank flooding necessary for new stand stimulation. Cover type mapping performed by the U.S. Army Corps of Engineers supports this hypothesis. Long-term replacement of these stands depends on periodic habitat conditions caused by flooding and floodplain scouring. The declining trend in vegetation condition is likely to continue with the operation and maintenance of the flood-control levees.

Disturbances, such as maintenance and construction of levees, open large areas for colonization by opportunistic species. The disturbance reduces or eliminates other plant species and allows for exploitation of the resources present. The levees, and activities associated with them, create a corridor of disturbance that initiates a shift in the herbaceous species composition from one dominated by natives to one dominated by exotic (and noxious) weeds.

Noxious weeds common to the Snake River corridor include: spotted knapweed (*Centaurea maculosa*), Dalmatian toadflax (*Linaria dalmatica*), houndstongue (*Cynoglossum officinale*), Canada thistle (*Cirsium arvense*), and musk thistle *(Carduus nutans*).

Present Use

The mature riparian forests are beneficial to many wildlife species. These stands provide hiding, nesting and thermal cover for a broad variety of birds and mammals. The vegetation communities provide forage for domestic livestock and for native wildlife. The cottonwood forests provide aesthetically pleasing stop-over areas for river floaters. Mushroom hunters search for morels under cottonwood stands during the spring and early summer.

Visual Resources

The Snake River and its cottonwood forest, backed by the Teton, Gros Ventre, and Snake River mountain vistas, provides some of the greatest scenic values in Wyoming. This scenery is also integral to the recreation and tourism-based economy of Jackson and Teton County. Several of the public land parcels provide views of the Grand Teton and other peaks in the Teton Range. The river and cottonwood forests provide scenic backdrop to many homes in the area.

A visual resource inventory and classification process was performed for the planning area as viewed from the riparian corridor of the Snake River, where most human activity on public lands occurs. A visual resource inventory provides 1) an inventory tool that portrays the relative visual quality of a landscape, and 2) a management tool that delineates visual protection standards by which surface disturbing activities may occur and establishes guidelines for the rehabilitation of existing projects, facilities and disturbances. The visual resource inventory and classification process is based upon a qualitative analysis of like scenery, as observed from appropriate distance zones and with consideration of the public's sensitivity to viewshed modification. The inventory unit for this RMP effort included the foreground-middle ground distance zone, as viewed from the riparian corridor. The public lands within this inventory unit were classified as visual resource inventory class II.

The visual resource management classes are assigned through decisions made in the RMP process. Visual resource management classes are determined with consideration for other natural resource values, land uses, and viewshed manageability. Land uses common to this inventory unit include light industrial, residential, commercial, agricultural, concentrated and dispersed recreation activities, and wildlife management. The objectives for visual resource classes are as follows:

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

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

- Class III: Partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract the attention 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: Provide for management activities which require major modification of the existing landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

Watershed

The planning area is located in the upper reaches of the Columbia River Basin. The area includes approximately 23 miles of the Snake River, 4 miles of the Gros Ventre River, and associated wetlands.

Both rivers can provide sizeable amounts of water and sediment. The Snake River was traditionally a wide, sometimes braided channel with multiple overflow channels. The Jackson Lake Dam and the almost continuous levee system have altered the flow of water and sediment in the system to the point that the land form between the levees is rapidly changing. The levee system has reduced the river's access to many of its historic overflow channels. This has resulted in changes to the channel system, as well as changes in sediment and energy transport and distribution.

The Snake River Water Catchment above the confluence with the Gros Ventre River is larger and has a greater volume of flow than the Gros Ventre River (Table 3-8).

TABLE 3-8
WATER FLOW OF THE SNAKE AND GROS VENTRE RIVERS

USGS Water Monitoring Station	Water Catchment Area (mi^2)	Minimum Flow (Ft^3/sec)	Mean Flow (Ft^3/sec)	Maximum Flow (Ft^3/sec)
Snake River at Moose WY - #13013650	1,697	3,720	4,010	4,360
Gros Ventre at Zenith WY - #13015000	683	1.2	91	287

The Jackson Lake Dam, originally constructed in 1910-1911, provides some moderating influence on flow fluctuations in the Snake River. It can also maintain high flows for extended periods of time. The Gros Ventre River has few significant artificial flow restricting structures, and thus has a more variable, but lower total volume, flow. The effect that this difference has upon sediment transport is unknown at this time.

The Snake River channel primarily consists of material from glacial outwash deposits from the upstream portion of the Snake, and landslide material from the Gros Ventre and other landslides located along the two rivers.

Prior to 1955, there were a few short, unconnected levees along the Snake River. There were some minor bank structures as early as 1947. Between 1955 and 1964, about 13 miles of continuous levees were constructed. The levee system was expanded in later years and levee construction continues, although at a slower rate. Currently, the system encompasses about 20 miles of channel. Land use and property values have virtually assured the maintenance and expansion of the levee system in the future.

Analysis of pre-1955 photographs suggests that approximately 1/4 of the land that is currently within the levee system consisted of wooded islands. The percentage of wooded islands between the levees is considerably less at this time. Many of the islands have been completely removed while others are actively eroding. There is little evidence of island building.

Within the levee system, the average slope of the river is about 18 to 25 feet of channel drop per mile of channel length. Up and down stream from the levee system the river is less steep, with channel drops averaging between 13 and 22 feet per mile. This results in an overall greater amount of kinetic energy within the leveed portions of the channel.

The higher energies within the leveed reaches of the river have created an overall erosion of the stream channel. If the movement of material between the levees was uniform, the overall loss of material would be about 0.85 feet between 1954 (prior to major levee construction) and 1988.

The distribution of the material between the levees is not even. Some areas have dropped while others have gained in elevation. Some stream reaches have shown a fluctuation in the elevation of the deepest portion of the channel (thalweg) varying from 7 feet below to 9 feet above the 1954 survey level. There are theories for this uneven distribution of material, the most likely being constrictions within the channel restricting the flow of bedload material. Continued building up of the gravel substrate in some portions of the river could create a risk of floods or damage to

highway bridges. The channel's shape is still changing, so it is not known if the current patterns will remain constant over time.

As a result of the high bed load and high flows, the thread of the river tends to switch channels frequently. This, in combination with the artificially confined nature of the channel, has created some concern for the remaining islands within the levee system as well as for the stability of the levee system itself. The Snake River Restoration Project has been proposed by Teton County and the U.S. Army Corps of Engineers to help address this situation.

The BLM manages a relatively small amount of land within the Wyoming portion of the Snake River corridor. This, in combination with the high percentage of private land, the levee system, and efforts to manipulate the channel within the levees suggests that the overall effect on water quality from activities taking place on BLM managed lands is minor in comparison to the potential presented by the surrounding lands Recreation related activities and unauthorized dumping are the actions that are most likely to take place on BLM managed lands that could directly affect water quality. Sanitation facilities at key recreation sites and site visits to BLM parcels by land managers help to reduce negative impacts but cannot prevent all undesirable activities.

The Snake River on the BLM parcels was assessed for Proper Functioning Condition on August 15, 1996. On all parcels, the river was determined to be in nonfunctioning condition, primarily because the river levees prevent its access to its natural floodplain, prevent regeneration of the cottonwood stands along its banks, and channelize the flow.

The BLM parcels contain some lentic surface water features, such as oxbow lakes and wetlands, that have water tables closely tied to the stage of the river. These features are generally located away from the main recreation corridor. Within the levee system, movements of the main channel and efforts to restrain this movement can have a marked effect on the water quality of an individual water body through both erosion and stagnation behind newly constructed features. Given the comparatively small size of these water bodies, the effect that they have on water quality in the Snake River is most likely undetectable.

Water features that exist on BLM parcels outside of the levee system appear to have water levels closely tied to the level of the Snake River. Seeps and springs that have other water sources may exist but they are not immediately evident. Conditions of the water features outside the levees tend to be less disturbed than those within. Conditions also appear to be closely tied to the level of grazing and recreational activity associated with the area.

Wild and Scenic Rivers

Assessment of the parcels for eligibility and suitability under the Wild and Scenic Rivers (WSR) Act has been conducted. All the parcels on the Snake River were found to be eligible for inclusion in the Wild and Scenic Rivers system, due to their importance for recreation and wildlife habitat and valuable scenic qualities. However, the parcels were not found suitable for inclusion in the Wild and Scenic Rivers system, chiefly due to their small size and orientation along one side only of the river, leading to difficulty of managing them as part of the Wild and Scenic Rivers system.

Wildlife and Fisheries

The ribbon of cottonwood riparian forest surrounded by sagebrush or open field creates extremely important habitat for a diversity of wildlife (Brinson, et al. 1981; Brockmann 1993; Cerovski, et al. 2001; Oneale 1993; Simpson, et al. 1982). The Snake River riparian corridor is a major migration route and breeding area for migratory songbirds and raptors (Minta and Campbell 1991a). The productivity of bald eagle (*Haliaetus leucocephalus*) nests along the Snake River is credited for the recovery of the entire Greater Yellowstone region (Swenson, et al. 1986). This area is not identified as a major waterfowl flyway, though many species do nest or transition through the corridor (Bellrose 1976). The river corridor supports migration routes for elk (*Cervus elaphus*) and mule deer (*Odocoileus hemionus*), as well as limited crucial winter range for these species and the moose (*Alces shirasi*). The planning area includes two elk feedgrounds. Teton County (1994) identifies a variety of wildlife as "Species of Special Concern (SSC)" from the investigation conducted by Biota Research and Consulting, Inc. (Minta and Campbell 1991a,b). Some of these species are considered because of their dependence on the river for survival (obligates), others are chosen due to their use of a habitat which provides a range of desired conditions, i.e., cover, forage, a zone free of human disturbance or influence.

The wildlife resources are dependent on a functioning environment, which provides all of the elements for survival in the proper balance, and the riparian system is considered the most valuable (Bull 1977; Carothers and Johnson 1975). Human activities, i.e., "channel alteration, ground water pumping, surface diversion, impoundment, direct removal of riparian vegetation, alteration of flooding regimes, and urbanization...contaminants, recreation, grazing, and habitat fragmentation..." are having a detrimental impact to the riparian corridors of the Snake River which is resulting in degradation and losses of wildlife habitats (Cerovski, et al. 2001; USFWS 1986b, 1992). The current levee system has resulted in a reduction in riparian/wetland habitats which in turn is changing the composition of species (UW undated). Key to the survival of all the wildlife species that use the Snake River corridor for some or all of their life-cycle is the need for protection from encroachment by human factors, i.e., direct presence (close interactions, pets, off-road vehicle use), and human-made altering of the habitat (levees/channelization, fences, vegetative manipulations-tree/snag removal) (Bull 1977; Cerovski, et al. 2001; Edwards 1978; Minta and Campbell 1991a,b; Olendorff and Kochert 1992; Teton County 1994). The relationship of healthy, productive and diverse wildlife populations to their habitats is specifically recognized in the WGFD Strategic Plan (WGFD 1998). Within "Goal 1" of this Plan is the intent to "maintain and enhance terrestrial wildlife habitats...[and] minimize loss of habitats through protection...."

Terrestrial Resources - Avian

Over 400 avian fauna species have been documented in Wyoming, and 73 of these use riparian habitats (Cerovski, et al. 2001). Grand Teton National Park reports over 300 species of birds within its boundaries (NPS 1997). Grand Teton National Park has been "accepted, contacted but permission pending" for inclusion in the National Audubon Society's Important Bird Area program which is confirmation of the avian values associated with the Yellowstone/Jackson ecosystem. The variety of birds throughout the planning area exceeds 150 species. Nearly 80% of these species breed along the Snake River corridor. The remaining species make use of the cottonwood-riparian habitat type for foraging and as an interlude on the spring and fall migrations, and some can be found as winter inhabitants. The vast majority (75%) of the avian species are classified as passerine or songbirds and over half of these are considered year-round

residents (USFWS 1990, 1991, 1992). The cottonwood-willow dominated lands of the riparian corridor are critical to sustaining avian biodiversity (Finch 1986; USFWS 1990). Degradation in the quantity and quality of avian habitats, principally riparian types, has led to declines in species diversity on a national scale (Olendorff and Kochert 1992; Pashley, et al. 2000). USFS (undated) notes that "24 of 53 avian species listed in the "'blue list"' were recorded during the summer of 1977 along the Snake River." This "blue list" is identified as a nationwide listing of birds with evidence of "population declines" as reported by the Audubon Society in the Journal of American Birds.

Protection for most avian species comes under the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-711)(CFR 2001). Adherence to the MBTA and participation in various avian conservation programs was emphasized in Executive Order 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds (66 FR [Federal Register] 3853)*, dated January 10, 2001. Federal agencies are directed to focus on such things as restoring and enhancing habitat as well as avoiding or minimizing adverse impacts to migratory bird populations.

Raptors find the habitat along the Snake River corridor an ideal area for seasonal use, migration interludes and year-round dwelling (USFWS 1992). The foraging opportunities are plentiful for species that rely on a diet of fish, waterfowl, or small animals that occupy the riparian habitat. The cottonwood canopy provides excellent perching and nesting sites, and the heavier vegetated areas limit the amount of human disturbance. In the food-chain hierarchy, raptors are considered at the top among avian species and are a representative indicator species of environmental condition (USFWS 1999). "Habitat is the key to managing raptor populations!" (Olendorff and Kochert 1992). Protecting nesting habitat and ensuring an adequate, "uncontaminated" food supply is crucial to sustaining a raptor population (Redig 1979). Raptors that utilize the Snake River corridor include: falcons - American kestrel (*Falco sparverius*), merlin (*F. columbiaris*), prairie falcon (*F. mexicanus*), and the peregrine falcon (*F. Peregrinus*); hawks - red-tailed (*Buteo jamaicensis*), Swainson's (*B. swainsonii*), sharp-tailed (*Accipiter striatus*), Cooper's (*A. cooperi*), and northern goshawk (*A. gentilis*); and owls - the western screech-owl (*Otus asio*), great horned owl (*Bubo virginianus*), long-eared owl (*Asio otus*), and northern saw-whet owl (*Aegolius acadicus*), and the great gray owl (*Stix nebulosa*) (COE 1989; USFWS 1990, 1991).

The fish-rich Snake River system provides an ideal habitat for the fish-dependant osprey (*Pandion haliaetus*). This species in particular finds the partially dead or dead-standing trees along the river readily available for nesting and perching, though snags are valuable habitat components for other wildlife species (Bull 1977; Brockmann 1993; Miller 1977). Artificial nesting structures have been located along the river which serve as alternate, as well as convenient, nesting sites. The dependence of the osprey on the river system for most phases of its life-cycle is complicated by its vulnerability to human disturbance during nesting, incubation and the early nestling period. The impact seems to depend on the timing and frequency of human activity, and the degree to which the osprey habituate to the disturbance early in the mating cycle (Zarn 1974).

Golden eagles (*Aquila chrysaetos*) and the federally threatened bald eagle (see Threatened and Endangered section) are year-long residents. Golden eagles are observed more often outside of the flood-plain, while bald eagles use the riparian corridor extensively for nesting, perching and feeding (USFWS 1990, 1991).

The Snake River and its tributaries are prime habitats for resident and migratory waterfowl during spring/fall staging, breeding, nesting, brood rearing, and wintering (Fralick 1989). Duck species include the dabbling ducks: mallard (*Anas platyrhynchos*) and American widgeon (*Mareca americana*); and the sea ducks: Barrow's goldeneye (*Bucephala islandica*), common goldeneye (*B. clangula*), ring-necked duck (*Aythya collaris*) and hooded merganser (*Lophodytes cucullatus*) (USFWS 1991). Canada geese (*Branta canadensis*) find the islands along the Snake River which are not subject to inundation by high water to provide nesting habitat among log debris and willows, while affording protection from some predators (USFWS 1990). The most important nesting areas for Canada geese on the Snake River are south of the Wilson Bridge to the South Park Bridge, with an average of 2.0 pairs per mile (COE 1989; Fralick 1989; USFS undated; USFWS 1991). This area is a major fall staging and migration route (USFWS 1990). The North American Waterfowl Management Plan (NAWMP) (USFWS 1986a) states that habitat conservation, maintenance and improvement are imperative to succeed with the goals of the Plan. The overall North American population trend for waterfowl is showing a positive response (increasing or stable) to the management strategies of the NAWMP. By monitoring the population trends in specific wetland areas, it may be possible to detect factors which are or could adversely affect waterfowl, as well as other wildlife (USFWS 1998b).

Wading birds observed in the planning area include the greater sandhill crane (*Grus canadensis*) and the great blue heron (*Ardea herodias*). Both species utilize beaver ponds and seasonally flooded emergent wetland habitats; cranes use these areas as suitable nesting habitat, and herons for a varied available diet of aquatic insects, amphibians, reptiles and small mammals (USFWS 1990, 1991). The surrounding hay meadows provide cranes with foraging areas. The southern planning area serves as a staging area for the crane's fall migration, and as a spring migration stopover. The National Elk Refuge, which adjoins the planning area, serves as a "major staging area" (USFWS 1990). The largest Wyoming great blue heron rookery is located in the South Park area (COE 1989; USFWS 1990). Freedom from human disturbance and sustained foraging areas are critical to maintaining a heronry (Minta and Campbell 1991b). Heron overwintering may occur in the planning area (USFWS 1990, 1991).

Terrestrial Resources - Mammals

Populations of small mammals are cyclic in nature, with densities varying by season. However, if sufficient habitat is available, populations are relatively high (Clark and Stromberg 1987). A diversity in vegetative cover-types found in viable riparian systems provides a preferred habitat for small mammals (Snyder 1980). Predators in the area, such as hawks, owls, long-tailed weasels (*Mustela frenata*), red fox (*Vulpes vulva*), bobcat (*Lynx rufus*), and coyote (*Canis latrans*) all prey on these small mammals.

The small mammal group includes the bats. Four species found in the planning area include the hoary (*Lasiurus cinereus cinereus*), the silver-haired (*Lasionycterus noctivagans*), the long-eared (*Myotis evotis evotis*), and the little-brown (*M. lucifugus carissima*). The abundance of insects along the riparian bottoms makes for a reliable food source for bats (USFWS 1990, 1991).

Furbearers found in the planning area include the mink (*Mustela vison*), muskrat (*Ondatra zibethicus*), river otter (*Lutra canadensis*), and beaver (*Castor canadensis*). Mink densities are low in the planning area. Muskrats inhabit ponds, oxbows, and spring creeks, and feed on aquatic vegetation. Their population numbers generally have not been considered a threat to maintaining

wetland habitat in Wyoming (Oneale 1993). This species is a harvested furbearer within and adjacent to the planning area (USFWS 1991).

The Snake River is identified as one of the most significant areas in Wyoming for the river otter (Rudd, et al. 1986; USFWS 1991), as it provides excellent denning (stream banks, beaver lodges, log jams and piles) and foraging habitat (pools and oxbows) with adequate populations of fish. Those reaches of the Snake River that are constrained by levees do not provide suitable otter habitat (COE 1989), thus the tributaries and areas free of human disturbance are more common locales (GTNP 2000b). Alterations in habitat, including "development of waterways for recreational or industrial uses" can adversely impact otter populations (NYROP 1984). Otters are protected by State law and are not harvested.

Beavers principally inhabit river tributaries, side channels and oxbows. They utilize the cottonwoods outside of the levee-system for constructing lodges and dams, while relying on the willow-shrub understory for food. Beaver activity has improved riparian/wetlands by retarding the effects of flood control projects. Where beaver ponds are created, there is an increase in wildlife biodiversity when the shrub and other riparian vegetation components are established (Olsen and Hubert 1994). This furbearer is harvested, with the annual take being controlled by the WGFD.

The elk population in the Jackson Hole area (which includes Yellowstone National Park) is one of the largest in North America, with a summer population up to 15,000 elk that inhabit over 1,000 square miles (COE 1989; USFWS 1990, 1991). Portions of the herd summer in southern Yellowstone National Park, then migrate south as far as 60 miles to their winter range (Clark 1981). The planning area north of the Wilson Bridge lies within the WGFD Jackson Elk Herd Unit (JE) while the area to the south is within the WGFD Fall Creek Elk Herd Unit (FCE). These herd units consist mostly of large areas outside the planning area. With the recommendations from the WGFD, the Wyoming Game and Fish Commission sets big game population and annual harvest objectives. The elk herd population objective for JE is 11,029 animals, and the estimated post-2000 hunt population was 14,300 (WGFD 2001). The number of elk from the JE that use the planning area is low during the spring to fall seasons. The principal activity comes during the migration across parcels adjacent to Grand Teton National Park en route to and from the National Elk Refuge, which provides both natural and enhanced winter range with supplemental feeding over its 24,000 acres (USFWS 1991). Approximately one-quarter of the FCE inhabits the WGFD South Park Habitat Unit. The planning area south of the Wilson Bridge has some elk that summer primarily on private lands, but the principal summer range lies to the west in the surrounding mountains (USFWS 1991). The FCE objective is 4392 animals, with the estimated population at 4849, post-hunt 2000. The South Park elk feedground falls within the FCE (quota: 1000) and 1,112 animals were counted in 2000 (WGFD 2001). Elk move to the South Park feedground using BLM parcels south of the Wilson Bridge (Andrews 2000, personal observation). Elk parturition on BLM parcels in the planning area is not documented.

Moose are found throughout the Snake River planning area in the WGFD's Jackson Moose Herd (north of the Wilson Bridge) and Sublette Moose Herd (south of the Wilson Bridge) Units (JM and SM, respectively). There is a year-round population of moose in the river and creek bottoms, which increases during winter as moose migrate from the National Parks and surrounding National Forest land (NPS 2000). The WGFD has designated portions of each of these herd units as crucial winter range (Map 17). The JM population objective is 3,600 moose. Because only a small portion of the SM falls within the planning area, it is not feasible to assign a population

objective over this segment. However, the number of moose that use this stretch of the Snake River varies from 15-30, depending on the forage demand and winter conditions (Fralick 2002, personal communication). Moose densities (1982-89) range from 4.3 per mile in the SM to 6 per mile in the JM (USFWS 1990, 1991).

Mule deer herds in the planning area include the Jackson Deer Herd Unit (JD) which is north of Wilson Bridge and the Sublette Deer Herd Unit (SD) to the south. Most of the seasonal use is spring, summer and fall in both units (COE 1989; USFWS 1990). Only a small area in the JD includes designated crucial winter range (Map 17). Wintering areas outside of the planning area include the traditional west-facing slopes. The SD within the planning area contains very little crucial winter range, as the winter range for these deer is in the Green River basin; however, a few animals have been observed to over-winter (USFWS 1990; WGFD 2001). Mule deer migration patterns exhibit a movement through the planning area to winter ranges on the east side of the Snake River (USFWS 1991).

Some white-tailed deer (*O. virginianus*) have been observed in the Snake River drainage but their numbers are low and the animals are widely dispersed (USFWS 1990, 1991).

Pronghorn antelope (*Antilocapra americana*) are not a common animal within the planning area. They use the flood plain and sagebrush benches of the Upper Snake River drainage, outside the planning area, during the summer (USFWS 1990).

Bison (*Bison bison*) in the Jackson Bison Herd (JB) inhabit the National Elk Refuge and uplands of Grand Teton National Park. The JB management population objective is 400 animals (winter population). The population in this herd was 552 during the winter of 2000-2001 (WGFD 2001). Bison would probably not be affected by this management plan.

Bighorn sheep (*Ovis canadensis canadensis*) seasonal ranges lie outside of the planning area (WGFD 2001; USFWS 1990). The Jackson Bighorn Sheep Herd Unit would not be affected by this management plan. Big game crucial winter ranges are shown on Map 17.

Black bears are intermittent users in the planning area, principally in areas adjacent to Grand Teton National Park were there is a lower level of human disturbance (Minta and Campbell 1991b). Mountain lions are not likely users of the BLM parcels; they are rare in Grand Teton National Park, even in the appropriate habitat (GTNP 2000a). However, lions are present on the National Elk Refuge and occasionally in or near the town of Jackson. The actions of this management plan would not affect these species due to the diversity and size of their home ranges.

Terrestrial Resources - Amphibians and Reptiles

Forty-two varieties of amphibians and reptiles have been noted in Wyoming (Baxter and Stone 1980). Only a few have geographic ranges into the planning area: tiger salamander (*Ambystoma tigrinun*), Western (boreal) toad (*Bufo boreas boreas*), northern leopard frog (*Rana pipiens*), Columbia spotted frog (*R. luteiventris) [previously known as the spotted frog* (*R. pretiosa*)], boreal chorus frog (*Pseudacris triseriata maculata*), wandering garter snake (*Thamnophis elegans vagrans*), valley garter snake (*T. sirtalis fitchi*), rubber boa (*Charina bottae*), and

bullsnake (*Pitophis melanoleucas*) (NPS 1997; USFWS 1990, 1991; Van Kirk, et al. 2000). As identified in Van Kirk, et al. (2000), "Amphibian population distribution and abundance may shed light on the health and connectedness of GYE [Greater Yellowstone Ecosystem] wetlands and riparian habitats."

Fisheries

The Snake River through Jackson Hole is designated as a Class 1 or blue-ribbon trout stream by the WGFD. This designation indicates that the river is of national importance as a trout stream. Among the many game and nongame fish species present, the indigenous fine-spotted cutthroat trout (*Oncorhynchus clarki* ssp.2) is economically the most important species, as it is the major game fish sought by anglers in the Snake River. The fine-spotted cutthroat trout is a self-sustaining (naturally reproducing) subspecies found only in the Snake River drainage from Palisades Reservoir in Idaho, upstream to the headwaters in Yellowstone National Park. This wild stock maintains its current population by spawning in suitable habitat, regionally known as "spring creeks," without stocking of juvenile or adult fish to the river system. This trout supplies the major sport fishery in the Snake River, from Jackson Lake Dam down through the canyon area of the Snake River above Palisades Reservoir. Spring creeks cross BLM parcels 20 (Cottonwood Creek) and 23 (Butler Creek).

Spawning, rearing, and overwintering habitat are considered to be the major limiting factors for fine-spotted cutthroat trout. Most fine-spotted cutthroat trout spawning occurs during the period from March through June in the spring creeks that enter the river. Openings to many of these spring creeks are currently blocked by levees, making them inaccessible to the fish. Little or no spawning habitat exists in the main river due to large sediment bedloads and turbidity in the springtime flows (during the spawning period), human-induced modifications to the channel, and a cobble substrate that is typically too large for fine-spotted cutthroat trout spawning. Sloughs and side channels are important sources of rearing and overwintering habitat, particularly for young age classes of fine-spotted cutthroat trout.

The once braided, multi-channel system with its diverse adjacent habitats has been replaced with a single or double channel and cobbled shoreline. The value of the shoreline and the diversity of the braided river channel has changed significantly. As the leveed reach has become increasingly less diverse, overwintering habitat has become a significant limiting factor for some species. Survival through the harsh low-flow winter months is a critical life cycle period. Harsh winter temperatures and low flows limit fine-spotted cutthroat trout survival. During the winter months, trout can survive only in pools that provide protection from ice and predators. Winter predators such as bald eagles, river otters, and fish-eating waterfowl can easily prey on the trout within their restricted areas of habitation.

Other trout species found in this region of the river are less abundant. They include brook (*Salvelinus fontinalis*), rainbow (*Oncorhynchus mykiss*), brown (*Salmo trutta*), and lake (*Salvelinus namaycush*) trout (which may pass through Jackson Lake Dam). Another game species that is apparently abundant but little utilized by anglers is mountain whitefish (*Prosopium williamsoni*).

Nongame fish species include suckers (an important food source for bald eagles), and five species of the minnow (Cyprinidae) family. These are represented primarily by Utah suckers

(*Catostomus ardens*), Bonneville redside shiners (*Richardsonius balteatus*), and sculpins (*Cottus* spp.). Small fish may be used as prey by fine-spotted cutthroat trout.

Levee construction and other human activities have led to significant decreases in the amount and quality of spawning, rearing, and overwintering habitat for aquatic species. Increases in these resource types will be needed to promote the future viability of game and nongame fish.

Threatened and Endangered Species

Threatened and Endangered Species are protected under the Endangered Species Act of 1973 (16 U.S.C. [United States Code] 1513 *et seq*.), as amended. In accordance with the Code of Federal Regulations (CFR), 50 CFR 17, the Canada lynx (*Lynx canadensis*) is listed as a Federally Endangered species; the grizzly bear (*Ursus arctos horribilis*) and the bald eagle are listed as Federally Threatened species; the whooping crane (*Grus americana*) and the gray wolf (*Canis lupus*) are listed as Federally Endangered and Federally Threatened "nonessential experimental populations," respectively.

The presence of Canada lynx is unlikely in the planning area due to the lack of suitable habitat (spruce/fir/late-seral conifer forest on slopes of 8-12 degrees), poor abundance of its principal prey species (the snowshoe hare [*Lepus americanus]* and red squirrel [*Tamiasciurus hudsonicus]*) and the high level of human disturbance (Beauvais, et al. 2001;, NPS 2000; Ruediger, et al. 2000). A single, radio-collared lynx (now deceased) had been documented to travel the area from the northern Bridger-Teton National Forest to the lower extent of the Wyoming Range but his location on parcels in this management plan is not confirmed (Laurion and Oakleaf undated). The USFWS issued a Biological Opinion on October 25, 2000, regarding the effects on Canada lynx of BLM land use plans. For those existing plans, the determination was make that there were no actions "likely to jeopardize the continued existence of the lynx." The alternatives in this management plan are not expected to alter that determination.

The grizzly bear recovery zone, now identified as the "Primary Conservation Area" lies beyond the planning area (USFWS 1990, 1991, 2000). Due to the general lack of suitable forage in areas also free of high human disturbance, it is not anticipated that grizzly bears will inhabit the limited areas covered by this management plan (COE 1989; Moody, et al. 2002). In accordance with 50 CFR 17, if a grizzly bear encounter poses an immediate human threat, then the offending bear may be taken; actions other than killing may be required when the threat is not "immediate."

Special protection is afforded the bald eagle through the Bald Eagle Protection Act (16 U.S.C. 668-668d). Bald eagle reproduction along the Snake River corridor has been exceptional, with one area in the management plan being identified as "some of the most important eagle habitat on the entire upper Snake River" (WGFD 1993). From 1982-88, 6 bald eagle pairs located on the Snake River between Moose and the South Park bridge produced 50 young, or 41 percent of the total production (Minta and Campbell 1991b; Swenson, et al. 1986). Under the Pacific Bald Eagle Recovery Plan (USFWS 1986b) the Upper Snake River (WY) Key Area is within Recovery Zone 18, which contained 17 nesting territories and a wintering population of 40-60 birds. The availability of food early in the nesting season, tree size in relationship to the surrounding trees, and areas where the river lacks restriction are factors in nest area selection (Swenson, et al.1986; USFWS 1986b, 1990, 1991). Human disturbance is known to affect the entire nesting chronology: nest tree selection, nest building, breeding, egg laying and incubation, brood rearing

and fledging (GYBEWG 1996; Harmata 1989; Swenson, et al. 1986; USFWS 1986b). Fall and winter use includes both resident bald eagles and an influx of migrants (NPS 2000). Bald eagle food habits are highly dependent on the availability of fish, which account for over 60 percent of the annual diet (Harmata 1989; Swenson, et al. 1986). This food abundance also impacts reproductive success (GYBEWG 1996). Foraging success is influenced by the condition of the river (water turbidity, velocities), the quantity of fish occupying accessible river reaches, and the level of human disturbance on the river (floaters/rafters and those fishing) (Stalmaster 1976). Other food sources include ungulate carrion during the winter, and waterfowl during the spring runoff (COE 1989; Swenson, et al. 1986; USFWS 1986b).

Whooping cranes have been observed during the spring months in the river-bottom areas along the Snake River and Spring Creek and often accompany sandhill cranes when migrating, as both species utilize similar habitats: seasonally flooded wetlands, open water marshes, ponds, oxbows, upland meadows and irrigated hay fields (COE 1989; Lockman, et al. 1985; NPS 1997; USFWS 1991). The experimental flock that was established in 1975 at Grays Lake National Wildlife Refuge, Idaho, is reported to have only 8 whooping crane survivors (USFWS 1995). It is possible that some of these birds are those occasionally observed in the planning area.

The gray wolf has been observed on the National Elk Refuge. Two monitored wolf packs are located east of the planning area on the Gros Ventre River and the northeastern corner of GTNP. Based on the occurrence of wolves following and killing elk on winter feedgrounds (USFWS, et al. 2002), it is possible that wolves could travel through some of the management parcels to reach either the National Elk Refuge or the WGFD South Park elk feedground. Nearly 90 percent of the wolf diet in this area is reported as elk. In accordance with 50 CFR 17.84, actions to control, or take, wolves in this population are specifically limited (USFWS 1998a). Based on the success of the wolf introduction program it is possible that the USFWS may consider "delisting" in 2003 (USFWS, et al. 2002).

BLM Sensitive Species List

In April 2001, BLM Wyoming prepared a Sensitive Species List and guidance for inclusion of these species "when undertaking actions on public lands" (BLM 2001). The intent of this List is to "ensure actions authorized, funded, or carried out by BLM do not contribute to the need for any species to become listed as a candidate, or for any candidate species to become listed as threatened or endangered." This List is in compliance with BLM Manual 6840, Special Status Species Management, Release 6-121, January 19, 2001. Species on this list which might occur in the area of this plan include Mammal: long-eared myotis; Birds: trumpeter swan, northern goshawk, peregrine falcon, yellow-billed cuckoo (*Coccyzus americanus*) and loggerhead shrike (*Lanius ludovicianus*); and Amphibians: northern leopard frog and Columbia spotted frog (listed as spotted frog) (BLM 2001; USFWS 1990). Also on the list of species in the area of the Snake River corridor and the BLM's Sensitive Species List are the ferruginous hawk (*Buteo regalis*) and Brewer's sparrow (*Spizella breweri*) (USFWS 1990). However, the appropriate habitats for these two species are not believed to occur in the planning area.

Trumpeter swans (*Olor buccinator*) are common winter residents in the planning area (USFWS 1990). Crucial winter habitat for trumpeter swans is primarily located downstream from the Wilson Bridge. The spring fed tributaries and wintering areas (South Park, Fish Creek, and Lower Flat Creek) account for nearly 35 percent of the swan winter-use areas, with Fish Creek

being the prime location (USFWS 1990, 1991; WGFD 1993). The planning area and surrounding river corridor areas included within Grand Teton National Park do not provide suitable nesting habitat for swans (COE 1989; NPS 1997).

The yellow-billed cuckoo is a candidate species for listing under the Endangered Species Act (65 *FR* 8104). Breeding has been documented in Grand Teton National Park and the cottonwood-willow riparian corridor of the Snake River is suitable breeding habitat. However, selection of an area may depend on size (to as large as 100 acres) and an adequate food supply. Fragmentation of the cuckoo's habitat is a serious problem (Hughes 1999). The western United States population is being adversely impacted by a loss of riparian breeding habitat (USFWS 2001).

Information on the Snake River fine-spotted cutthroat trout (*Oncorhynchus clarki* ssp[2]) is found in this chapter under the "Fisheries" section.

Human-Wildlife Interaction

Within the scope of the RMP is the goal to provide a quality recreational experience while protecting the varied wildlife and fragile habitats. Human-wildlife conflicts sometimes occur. In cases where these interactions pose a threat to human health and safety, it may be necessary to involve the WGFD or the USDA-Animal and Plant Health Inspection Service-Wildlife Services (WS) office to rectify the situation. The BLM and WS have a Memorandum of Understanding (MOU), dated April 3, 1995, to address potential conflicts. The MOU is updated through an annual Work Plan (WS and BLM 2002). The BLM parcels occur within designated Human Safety Zones as identified in the Work Plan, thereby restricting corrective measures to emergency situations. WS also has agreements with the Wyoming Game and Fish Department and USFWS to take the actions necessary when human health and safety are a concern in dealing with predators or threatened and endangered species (WS and BLM 2002). Whenever possible, a non-lethal resolution to the conflict is the preferred outcome.

CHAPTER 4

ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This chapter presents the environmental consequences of management actions described in Chapter 2. Both beneficial and adverse effects (impacts) are described.

Assumptions used in analyzing the environmental consequences are described in this chapter and are based on previous events, experience of personnel, and knowledge of the resources in the planning area.

Impacts described in this chapter are estimates based on the alternatives. In some cases, existing data were used; in others, very little data were available. Lack of data has contributed a degree of uncertainty to the impact estimates. The alternatives, however, include professional judgments and projections of anticipated actions and levels that provide an adequate and reasonable range for analysis.

This chapter addresses impacts to all resource elements for each particular alternative. As in Chapter 2, the impacts related to the Preferred Alternative are listed first. Actions Common to All Alternatives were taken into account in analyzing the impacts for each alternative. In addition, impact causes and relationships common to all alternatives are included within this analysis.

For the purpose of analysis, short-term impacts described in this document are those that would last less than 10 years; long-term impacts would last 10 years or more. Irreversible or irretrievable commitments of resources and unavoidable adverse effects are discussed in the analysis if they would occur. Similarly, effects on a given environmental component caused by a particular management action are discussed if they would occur. Otherwise, such effects are not discussed.

The following resources are not present in the planning area and are not addressed in this RMP EIS: Prime and Unique Farmlands, Wilderness, Wild Horses, and Forestry (marketable timber). In addition, no areas have been determined to meet the criteria for designation as Areas of Critical Environmental Concern or other special management area designation.

ASSUMPTIONS AND ASSESSMENT GUIDELINES

Assumptions used for analysis of environmental consequences are listed in Table 4-1.

Table 4-1
Assumptions for Analysis by Alternative

Pages 85-97

IMPACT ANALYSIS

The comparative analysis of environmental consequences of the alternatives is found in Table 4-2.

For the Preferred Alternative and Alternative D, the impact analysis is focused on those impacts that would occur after the parcels are transferred or sold out of BLM ownership.

Table 4-2
Comparison of Environmental Consequences

Pages 99-153

CUMULATIVE IMPACTS OF THE ALTERNATIVES

INTRODUCTION

Cumulative effects are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions (40 CFR 1508.7). Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

The Bureau of Land Management (BLM) is a minority landowner in Jackson Hole. The public land parcels cover less than 10% of the length of the Snake River between Grand Teton National Park and the South Park Bridge (about 20 miles; see Map 1). For this reason, the cumulative impacts of BLM actions that would be taken under these alternatives are minor in proportion to potential impacts from actions on private lands in the Valley.

However, BLM does control the majority of public access to the river corridor. Public land parcels are located at both highway bridges over the Snake River, and at other points that allow a substantial amount of public access and recreation use. The wildlife habitat value of the public land parcels is also important, as undeveloped areas usable by certain wildlife species, particularly bald eagles, are located mostly on the BLM parcels.

This section will analyze differences between the alternatives and the overall impacts associated with implementing each alternative. It is assumed that there would be impacts from many other activities (i.e., residential and commercial development, new roads, increased traffic) in the valley outside of the control of BLM, but these activities are not specifically addressed.

Preferred Alternative

The Preferred Alternative assumes that the BLM would transfer the public land parcels to another government land managing agency, or a private entity with interests in preserving lands undeveloped for open space. While no specific restrictions for management would be placed on the parcels as they are transferred, acquiring agencies or entities would be required to manage the parcels to preserve public access, recreation use, open space, and wildlife habitat values.

Existence of the public land parcels is instrumental in maintaining public access to this section of the river. Ensuring that the parcels remain open for public use would positively benefit recreation users. Limited overnight camping could be provided on public lands, and the number and type of river floaters could be regulated through a permit process. This would result in improved facilities for river users, but also may cause conflicts if users cannot get a river permit or if campgrounds do not have the capacity to answer the demand. Signs and interpretive facilities on public land parcels could enable users to locate and use the parcels with less likelihood of trespassing on adjacent private lands. However, increasing the numbers of users on the parcels also could cause an increase in incidental trespass.

This alternative limits access to minerals. Public lands and mineral estate would be closed to leasing for oil and gas and other leasable minerals. These areas also would be closed to locatable mineral (gold, silver, diamonds) entry. Salable minerals, in particular sand and gravel, would be available only in the active river channel; access to sand and gravel would be subject to provisions to protect sensitive resources. These actions would benefit the river system, wildlife habitats, and the recreation experience. The extractive mineral industry in general, and local prices for and availability of construction materials, would be negatively impacted to the extent that materials from BLM-administered mineral estate contribute to the overall availability on mineral materials in Teton County.

The Preferred Alternative would maintain or increase the amount of land in Jackson Hole that is managed by two or more entities. The BLM would retain all federal mineral estate; thus all minerals management activities, particularly gravel sales, would be carried out in the Pinedale BLM office. In addition, if conservation easements are retained on any parcels that are sold or transferred, a layer of bureaucracy would also be added to the management of those parcels.

Alternative A

Alternative A, Continuation of Existing Management, would continue current management practices based on compliance with federal laws, regulations, and BLM policy, as well as adherence to court decisions granting recreational access and allocating livestock grazing within the Snake River corridor. Alternative A would provide for the retention of public lands for public purposes and would allow the current levels of recreational activity to continue and expand to the possible detriment of wildlife and the recreational experience. Generally, mineral development would be prohibited, although mining for mineral materials, such as sand and gravel, would be allowed case-by-case. There would be little active management, although some restrictions would exist where necessary to protect sensitive resources.

Overnight camping would continue to be prohibited on the parcels, and no access fee or recreation permit system would be established. Retaining the parcels for public use would positively benefit recreation users. This alternative would result in fewer facilities and options for river users, but also would not limit use of the river. A continued lack of signs and interpretive facilities on public land parcels would result in continued confusion about the location of and access to the parcels. Conflicts and trespass would increase. The cumulative effects of no management would negatively impact important resources.

Impacts of this alternative on mineral development would be similar to those listed for the Preferred Alternative.

This alternative does not include the option of sale or transfer of public lands out of public ownership (with the exception of parcel 27, the trash transfer station). The lands may be transferred to another public agency, with the requirement that the lands remain open for public use. This may allow for some opportunity to provide improved access or better protection to some parcels; however, much of the opportunity to affect consolidation or better access to the parcels through private exchange would be lost. It is likely that the current configuration of parcel locations, sizes, and access would continue under this alternative.

Alternative B

Alternative B would reduce the level of land use restrictions while providing for higher levels of mineral development and recreational use. The development of two primitive, boat-in campsites, the construction of a new boat and river access site, and the posting of interpretive and directional signs would emphasize recreation. Under Alternative B, some lands could be removed from public ownership and use.

Alternative B emphasizes the development and consumptive use of non-renewable resources and increased recreation. Negative impacts to visual, wildlife, vegetation, and watershed resources would be greatest under this alternative. Access to mineral resources would be greatest, providing for local sources of minerals and limited economic development.

Because Alternative B allows for the sale of parcels into private ownership, there could be a loss of areas available for recreation use. Overnight camping would be provided on public lands, and the number and type of both private and commercial river floaters would be regulated through a permit process. This would result in improved facilities for river users, but may also cause conflicts if users cannot get a river permit or if campgrounds do not have the capacity to answer the demand. Signs and interpretive facilities on public land parcels would enable users to locate and use the parcels with less likelihood of trespassing on adjacent private lands. However, increasing the numbers of users on the parcels also could cause an increase in incidental trespass and may be reflected in additional adverse human-wildlife interactions.

This alternative emphasizes access to minerals. Public lands and mineral estate outside the river corridor would be opened to leasing for oil and gas, and all public mineral estate would be opened to leasing for other leasable minerals. The areas also would be opened to locatable mineral (gold, silver, diamonds) entry after expiration of the withdrawal in 2005. Salable minerals, in particular sand and gravel, would be available on federal mineral estate throughout the planning area. These actions would impact the river system, wildlife habitats, and the recreation experience. The extractive mineral industry in general, and local prices for and availability of construction materials, could be positively impacted to the extent that these materials contribute to the overall availability in Teton County.

The opportunity remains to provide improved access or better protection to some parcels, through exchange or transfer of public land parcels. Transfer of any parcels out of public ownership likely would result in loss of public access in an area where access to the river is already limited; however, some exchanges could result in improved river access at another point, better management of other parcels, or other public benefits.

Wildlife, vegetation and watershed resources would experience the most negative impacts under this alternative.

Alternative C

Alternative C is a resource protection alternative. The protection of wildlife habitat and a more isolated recreational experience would be pursued through a reduced level of river floating. Public education would be highlighted through the use of interpretive signs. Generally, Alternative C would provide for the retention and possible consolidation of public lands. In cases where lands might be removed from public ownership and use, these parcels would be protected from development through the use of conservation easements.

Recreation uses on or originating from public lands would be limited, as camping would be prohibited, as well as commercial, competitive, and organized recreational events. This would adversely affect access to the river, especially for residents of Jackson Hole, who might be less likely to use organized guide services operating out of Grand Teton National Park or the Bridger-Teton National Forest.

In addition to the limitations on access to minerals of the Preferred Alternative, Alternative C disallows access to salable minerals. No minerals could be developed from federal mineral estate in the planning area under this alternative. Impacts would be similar to those listed for the Preferred Alternative, with slightly more negative impact on the availability and price of construction material.

Alternative C is similar to the Preferred Alternative in its approach to sale, exchange, or transfer of public land parcels. Impacts would be similar to those listed for the Preferred Alternative.

Alternative C is a resource protection alternative that includes the greatest provisions for the protection of wildlife habitats, fisheries, vegetation and watershed health, while keeping the parcels available for recreation to the extent possible. Wildlife, vegetation and watershed resources would benefit under this alternative because of the mitigating measures and restrictions on surface-disturbing and consumptive uses.

Alternative D

Alternative D is a disposal alternative. Under Alternative D, BLM would seek to end its management responsibility for surface lands and resources in the planning area. Other agencies or private individuals would manage the parcels (except for the mineral estate, which would be retained by the BLM). Protective restrictions put in place by BLM under other alternatives in this EIS would no longer apply to management of the parcels. Protections required by law, such as cultural resource inventories prior to land disposal, would apply.

Transfer or sale of the parcels into private ownership would greatly impact recreation use of the river, especially for local residents. There would be no public camping, boat launching, or other recreational facilities. Access to the river between Grand Teton National Park and the South Park bridge would be controlled by private individuals, with the potential for all access to be lost, or for high access fees to be charged. This would change the recreation dynamic for many residents of the valley, for whom the river levees are a primary source of recreation. Congestion at other recreation sites in the valley, including walking paths and parks, would increase.

This alternative is similar to the Preferred Alternative in management of federal mineral resources. Impacts would be similar to those listed for the Preferred Alternative. In addition, with loss of public access across the BLM land parcels, gaining access to lands containing federal sand and gravel resources could become more difficult.

All opportunities for the BLM to provide access to or protection of the parcels would be lost. Access to the Snake River through Jackson Hole would become extremely limited. There may be some opportunity for private conservation groups or other agencies to acquire and protect some parcels; however, this cannot be predicted.

It is difficult to predict impacts on wildlife, vegetation, and watershed resources. While reduction of public access may be a benefit to wildlife, this effect would be countered by the potential for development of some of the last remaining undeveloped parcels of wildlife habitat along the river. Vegetation and watersheds would also be impacted if the parcels were developed after sale. Sale of the parcels into private ownership could fundamentally change the character of the river corridor, in regard to public access, wildlife habitat, and recreation opportunities.

Alternative E

Alternative E is similar to the Preferred Alternative, with the exception that management would be carried out by the BLM. For that reason, impacts would, for the most part, be similar to those listed for the Preferred Alternative.

Alternative E is a resource protection alternative that includes greater provisions for the protection of wildlife habitats, fisheries, cultural resources, recreation use and public access to the parcels. Impacts from surface-disturbing activities, such as mineral extraction, would be reduced. In general, there would be more active management of the parcels, with recreation fee programs, informational signs and interpretive facilities, limitations on livestock grazing, and restrictions on activities that would impact sensitive resources.

The opportunity remains to provide improved access or better protection to some parcels, through exchange or transfer of public land parcels. Transfer of any parcels out of public ownership likely would result in loss of public access in an area where access to the river is already limited; however, some exchanges could result in improved river access at another point, better management of other parcels, or other public benefits.

This alternative limits access to minerals. Public lands and mineral estate would be closed to leasing for oil and gas and other leasable minerals. These areas also would be closed to locatable mineral (gold, silver, diamonds) entry. Salable minerals, in particular sand and gravel, would be available only in the active river channel; access to sand and gravel would be subject to provisions to protect sensitive resources. These actions would benefit the river system, wildlife habitats, and the recreation experience. The extractive mineral industry in general, and local prices for and availability of construction materials, would be negatively impacted to the extent that materials from BLM-administered mineral estate contribute to the overall availability on mineral materials in Teton County.

Existence of the public land parcels is instrumental in maintaining public access to this section of the river. Ensuring that the parcels remain open for public use would positively benefit recreation users. Limited overnight camping could be provided on public lands, and the number and type of river floaters could be regulated through a permit process. This would result in improved facilities for river users, but also may cause conflicts if users cannot get a river permit or if campgrounds do not have the capacity to answer the demand. Signs and interpretive facilities on public land parcels could enable users to locate and use the parcels with less likelihood of trespassing on adjacent private lands. However, increasing the numbers of users on the parcels also could cause an increase in incidental trespass.

Wildlife, vegetation and watershed resources would benefit under this alternative because of the mitigating measures and restrictions on surface-disturbing and consumptive uses. However, development of additional recreation facilities could have negative impacts on some wildlife species and habitats.

CHAPTER 5

CONSULTATION AND COORDINATION

The Snake River RMP EIS was prepared by an interdisciplinary team of specialists from the Pinedale Field Office, the Rock Springs Field Office, and the Wyoming State Office of the BLM (Table 5-1). Reviews for accuracy and consistency were provided by both the field office and state office staffs.

TABLE 5-1
SNAKE RIVER RMP LIST OF PREPARERS

NAME	JOB TITLE	RMP RESPONSIBILITY
Pinedale Field Office		
Prill Mecham	Field Manager	Team Supervision, RMP Oversight
Kellie M. Roadifer	Planning and Environmental Specialist	Team Leader, Livestock Grazing
Martin Hudson	Outdoor Recreation Planner	Technical Coordinator, Off-road Vehicles, Recreation, Visual Resource Management, Wild and Scenic Rivers
Keith J. Andrews	Wildlife Biologist	Wildlife, Raptors, Big Game
Rosalie Bennett	Office Automation Clerk	Support
Steve Laster	Rangeland Management Specialist	Vegetation, Sensitive Plants, Livestock Grazing
Karen Rogers	GIS Specialist	Maps
Dave Vlcek	Archeologist	Cultural, Historic, Native American Concerns
Bill Wadsworth	Realty Specialist	Lands, Access, Transportation, Land Ownership
Frank Bain	Geologist (2002)	Minerals, Paleontology, Geology
Phil Howland	Geologist (1999-2001)	Minerals, Paleontology, Geology
Rock Springs Field Office		
Renee Dana	Resource Advisor	Coordination, NEPA, Assistant Team Leader
Dennis Doncaster	Hydrologist	Watershed, Hydrology
Jim Glennon	Botanist	Vegetation, Sensitive/T&E plants
John Henderson	Fisheries Biologist	Fish, Riparian, Wetlands
John MacDonald	Natural Resource Specialist	Soils
Angelina Pryich	Writer/Editor	Editing

NAME	JOB TITLE	RMP RESPONSIBILITY
Wyoming State Office		
Alan Kesterke	Acting State Director	Decision Maker
Joe Patti	Natural Resource Specialist Field Planning Coordinator	Planning process guidance; technical review and training; Field/WSO coordination
Roy Allen	Economist	Socioeconomics
Susan Caplan	Physical Scientist	Air Quality
Sheri Morris	Printing Technician	Publications Preparation
Roger Alexander	Webmaster	Website Maintenance
Tamera Hammack	Web Specialist	Website Maintenance
Esther Simons	Supervisory Cartography Technician	GIS Assistance
Zach Puls	Cartography Technician	GIS Assistance

Consultation, coordination, and public involvement have occurred throughout the process through public meetings, informal meetings, individual contacts, surveys, comment periods, news releases, and *Federal Register* notices.

The process began in the 1980s after the settlement of lawsuits dealing with ownership of the lands along the Snake River. A charter for preparation of the Snake River RMP was finalized in 1999.

PUBLIC PARTICIPATION

Public participation was addressed in the project charter to ensure that the public would have numerous opportunities to be actively involved in the planning and environmental process. Formal and informal input has been encouraged and used.

A public meeting was held on January 27, 2000, to gather comments and input on the Management Situation Analysis, released in December, 1999. A Contingent Valuation Methodology study was conducted during the summer and fall of 2000, to identify non-market values associated with the public land parcels. Representatives of the Pinedale Field Office continue to meet regularly with the Teton County Commission and other area government agencies at a monthly Interagency Breakfast. Formal public comments were received on the Scoping Letter and Notice of Intent (December 1999), the preliminary Planning Criteria and Planning Issues (May 2000), and the Management Situation Analysis (February 2001), and the Preliminary Alternatives (January 2002).

BLM personnel have met formally or informally with many members of the outfitting and ranching industries and the general public.

CONSISTENCY

Coordination with other agencies and consistency with other plans was accomplished through frequent communications and cooperative efforts between the BLM and involved federal, state, and local agencies and organizations (Table 5-2).

TABLE 5-2
KEY COORDINATION ACTIONS

AGENCY	COORDINATION/RESPONSIBILITY
FEDERAL AGENCIES **U.S. Department of the Interior**	
Fish and Wildlife Service	Review actions affecting threatened or endangered species of fish, wildlife, or plants.
Geological Survey	Review of RMP for consistency with USGS planning.
Minerals Management Service	Review of RMP for consistency with MMS planning.
U.S. Department of Agriculture	
Animal and Plant Health Inspection Service, Wildlife Services	Review of RMP for consistency with Wyoming Predator Damage Management Plan as it relates to resolving conflicts in human-wildlife interactions; i.e., presence of grizzly bears and gray wolves.
Forest Service	Review of RMP for consistency with the management actions. The proposed actions would also be discussed with the Wyoming State Forestry Division and other agencies involved in wild land fire management.
TETON COUNTY	Review RMP for consistency; zoning; access permits.

The Wyoming Governor's Clearinghouse receives 18 copies of this draft document for review to ensure consistency with ongoing State plans. The RMP team has reviewed the Teton County plan to ensure consistency. Meetings are held with the respective county planners and commissioners to promote greater understanding of goals, objectives, and resources of both the county and the BLM.

CONSULTATION AND COORDINATION

Members of the RMP team have consulted formally or informally with numerous agencies, groups, and individuals in the RMP development process. The following list is representative of the businesses, agencies, organizations, and individuals who have indicated an interest in the Snake River RMP and who have been contacted during the planning process. This list is not all inclusive. A complete list is on file in the Pinedale Field Office of the BLM.

Federal Agencies

Department of the Interior
- Bureau of Indian Affairs
- Bureau of Land Management

Fish and Wildlife Service
Geological Survey
National Park Service
Office of Environmental Affairs

Department of Agriculture
Animal and Plant Health Inspection Service, Wildlife Services
Forest Service
Natural Resources Conservation Service
Department of Commerce
Department of Defense
Department of Energy
Department of Housing and Urban Development
Department of Transportation
Environmental Protection Agency

State of Wyoming

Department of Environmental Quality
Game and Fish Department
Geological Survey of Wyoming
Governor of Wyoming
State Clearinghouse
State Engineer
State Highway Department
State Historic Preservation Office
Wyoming Recreation Commission

Federal Elected Officials

Congresswoman Barbara Cubin
Senator Mike Enzi
Senator Craig Thomas

State Elected Officials

Senators and Representatives of Teton and Sublette Counties

Local Governments

County governments of Teton and Sublette Counties

Mayors' offices of Jackson, Pinedale, Afton, Alpine, Wilson, Moose, Teton Village

Tribal Councils

Arapaho
Bannock
Shoshoni
Ute

Industry

EOG Resources
ExxonMobil
Evans Gravel Co.
Independent Petroleum Association of Mountain States
Klabzuba Oil and Gas
Marathon Oil Co.
Pacificorp
Petroleum Association of Wyoming
Petroleum Information Corp.
Questar Gas Management Co.
Southwest Wyoming Industrial Association
Southwest Wyoming Mineral Association
Walters Ready Mix Inc.
Western Gas Resources
Wexpro Company
Wyoming Mining Association
Wyoming Oil and Gas Conservation Commission

Associations and Interest Groups

American Wildlands
Biodiversity Conservation Alliance
Defenders of Wildlife
Environmental Defense Fund
Friends of Pathways
Greater Yellowstone Coalition
Humane Society of the United States
Jackson Hole Alliance for Responsible Planning
Jackson Hole Conservation Alliance
Munger Mountain Home Owners

National Wildlife Federation
Natural Resources Defense Council
Oregon and California Trails Association - Wyoming
People for the West
Sierra Club Wyoming Chapter
Southwest Wyoming Mule Deer Foundation
The Fund for Animals
The Nature Conservancy Public Lands Program
Trout Unlimited
Western Wyoming Mule Deer Foundation
Wyoming Association of Professional Archeologists
Wyoming Association of Professional Historians
Wyoming Outdoor Council
Wyoming Public Lands Council
Wyoming Wildlife Federation

Others

Many individuals were contacted, including all adjacent landowners, grazing lessees, and known recreation outfitters.

REFERENCES

AIR QUALITY REFERENCES

BLM 1999a: DEIS Continental Divide/Wamsutter II Natural Gas Project, Sweetwater and Carbon Counties, Wyoming

BLM 1999c: Pinedale Anticline Oil and Gas Exploration and Development Project DEIS Technical Report

Martner, Brooks E. Wyoming Climate Atlas. University of Nebraska Press. 1986

Seinfeld, John H. Atmospheric Chemistry and Physics of Air Pollution. John Wiley & Sons, New York. 1986.

Stern, Arthur C, Henry C. Wohlers, Richard W. Boubel and William P. Lowry. Fundamentals of Air Pollution. Academic Press, New York. 1973.

Trewartha, Glenn T. and Lyle H. Horn, An Introduction to Climate. McGraw-Hill, New York, 1980

Western Regional Climate Center: http://www.wrcc.dri.edu

CULTURAL REFERENCES

Butler, B. Robert 1983. "The Quest for the Historic Fremont". Occasional Papers of the Idaho Museum of Natural History, Number 33. Pocatello.

Connor, Melissa; Kenneth P. Cannon, Stephen E. Matz, Denise C. Carlevato and Colleen A. Winchell 1991. Jackson Lake Archaeological Project: The 1987 and 1988 Field Work. United States Department of the Interior, National Park Service, Midwest Archaeological Center, Lincoln.

National Park Service 1997. Snake River Management Plan. Grand Teton National Park, Jackson.

Rollins, Philip Ashton, Editor 1935. The Discovery of the Oregon Trail. Robert Stuart's Narratives of His Overland Trip Eastward from Astoria in 1812-13. Bison Books, University of Nebraska Press, Lincoln and London.

Schoen, Jamie 1997. "High Altitude Site Locations in the Bridger, Gros Ventre and Teton Wilderness". Paper presented at the Third Biennial Rocky Mountain Anthropological Conference, Bozeman, MT.

Vlcek, David "A Class III Inventory of the South Park Bridge Area, Teton County, Wyoming". Report of File, BLM Pinedale and SAPO Records Section, Laramie.

Wilson, Charles Alma 1985. The Return of the White Indian. A Sequel to "The White Indian Boy among the Shoshones".

FIRE REFERENCE

U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (2002, September). Fire Effects Information System, [Online]. Available: http://www.fs.fed.us/database/feis/

MINERALS REFERENCES

Beeman, W.R., Obuch, R.C., and Brewton, J.D. 1996. Digital map data, text, and graphical images in support of the 1995 National Assessment of United States oil and gas resources: U.S Geological Survey Digital Data Series 35.

Blackstone, D.L. Jr. 1993. Precambrian basement map of Wyoming: outcrop and structural configuration **in** Snoke, A.W., and others, editors, Geology of Wyoming: Geological Survey of Wyoming Memoir No. 5, Maps Folder.

Blackstone, D.L. Jr., De Bruin, R.H. 1987. Tectonic map of the overthrust belt, western Wyoming, northwestern Utah, and southeastern Idaho, showing oil and gas fields and exploration wells in the overthrust belt and adjacent Green River Basin: Geological Survey of Wyoming Map Series 23.

Cox, E.R. 1976. Water resources of northwestern Wyoming: U.S. Geological Survey in cooperation with Wyoming State Engineer, Hydrologic Investigations Atlas HA-558.

Good, J.M., Pierce, K.L. 1996. Interpreting the Landscape, Recent and ongoing geology of Grand Teton and Yellowstone National Parks: Grand Teton Natural History Association.

Law, B.E. 1995. Southwestern Wyoming province (037); in Gautier, D.L., Dolton, G.L., Takahashi, K.I., and Varnes, K.L., eds., 1995, National assessment of the United States oil and gas resources - results, methodology, and supporting data; available online at

http:/energy.cr.usgs.gov/oilgas/noga/assessments/bybasin.htm

Love, J.D., Albee, H.F. 1972. Geologic map of the Jackson Quadrangle, Teton Co., Wyoming: U.S. Geological Survey Map I-769A.

Love, J.D., Love, J.M. 1997. Geologic road log, Jackson to Dinwoody and return: Wyoming State Geological Survey Public Information Circular No. 20.

Love, J.D., Reed, J.C. Jr., Christiansen, A.C. 1992. Geologic Map of Grand Teton National Park, Teton County, Wyoming: U.S. Geological Survey Map I-2031.

Love, J.D., Reed, J.C. Jr., Christiansen, R.L., Stacy, J.R. 1973. Geologic block diagram and tectonic history of the Teton region, Wyoming-Idaho: U.S. Geological Survey Map I-730.

Reagor, B.G., Stover, C.W., Algermissen, S.T. 1985. Seismicity map of the state of Wyoming: U.S. Geological Survey Map MF-1793.

Roberts, Sheila. 1989. Wyoming Geomaps: Geological Survey of Wyoming Educational Series 1.

Smith, R.B., Byrd, J.O.D., Susong, D.D. 1993. The Teton fault, Wyoming: seismotectonics, Quaternary history, and earthquake hazards **in** Snoke, A.W., and others, editors, Geology of Wyoming: Geological Survey of Wyoming Memoir No. 5.

U.S. Army Corps of Engineers, Walla Walla District. 1989. Jackson Hole Wyoming, Environmental Assessment, Snake-Gros Ventre Rivers, Debris clearance project: Walla Walla, Washington.

SOCIOECONOMIC REFERENCES

State of Wyoming, Department of Administration and Information, Division of Economic Analysis, March 27, 2001. Wyoming Cost of Living for the Fourth Quarter of 2000.

Wyoming Department of Administration and Information, Division of Economic Analysis (2/24/2000).

SOILS REFERENCE

USDA-Natural Resource Conservation Service 1982. Soil Survey of Teton County, Wyoming, Grand Teton National Park Area.

VISUAL RESOURCE MANAGEMENT REFERENCE

BLM 2001. Interim Visual Resource Management Objectives for Scenic Quality Rating Unit 01 (SQRU) Located in the Snake River Valley. On file in Pinedale Field Office.

WATERSHED REFERENCES

Army Corps of Engineers (ACOE) 6/11/93 Report 04290A Jackson Hole Flood Damage Reduction Fish and Wildlife Habitat Restoration Reconnaissance Report

Army Corps of Engineers (ACOE) photo archive. Website Address:
www.nww.usace.army.mil/html/pub/pi/piphotos/wilson1.htm

Environmental Protection Agency (EPA) National Watershed Database http://www.epa.gov/surf/

Martner, Brook E. Wyoming Climate Atlas 1986 University of Nebraska Press

Teton County Natural Resource District 125 E. Pearl St. Jackson WY 83001, Private Conversations John Craymore, Rick Gay

United States Geological Survey (USGS) Wyoming Database http://wyoming.usgs.gov/welcome.html

WILDLIFE REFERENCES

Andrews, Keith J. 2000. Personal observation. Wildlife Biologist, BLM Pinedale Field Office.

Baxter, G.T., and M.D. Stone. 1980. Amphibians and reptiles in Wyoming. Wyoming Game and Fish Department. 137pp.

Beauvais, G.P., D. Keinath, J. Ratner. 2001. Habitat Mapping and Field Surveys for Lynx (*Lynx canadensis*) on Lands Administered by the USDI-Bureau of Land Management in Wyoming. Wyoming Natural Diversity Database, University of Wyoming. 51pp.

Bellrose, F.C. 1976. Ducks, Geese & Swans of North America. Stackpole Books, Harrisburg, PA. 540pp.

Brinson, M.M., B.L. Swift, R.C. Plantico, and J.S. Barclay. 1981. Riparian ecosystems: their ecology and status. U.S. Fish and Wildlife Service Office, Biological Service. Publication FWS/OBS 81-17. 155pp.

Brockmann, S. 1993. Improving Streamside Wildlife Habitats, Habitat Extension Bulletin No. 9. Wyoming Game and Fish Department, Habitat Extension Services. 4pp.

Bull, E.L. 1977. Specialized habitat requirements of birds: snag management, old growth, and riparian habitat. In Proc. Workshop on Nongame Bird Habitat Management in the Coniferous Forests of the Western United States. R.M. DeGraaf, Tech. Coord., USDA, For. Serv. Tech. Rep. PNW-64, 100pp.

Bureau of Land Management (BLM). 2001. BLM Wyoming, Sensitive Species Policy and List. U.S. Department of Interior, Bureau of Land Management, Cheyenne, WY. 11pp.

Carothers, S.W. and R.R. Johnson. Water management practices and their effects on nongame birds in range habitats. In Proc. Symp. On Management of Forest and Range Habitats for Nongame Birds. D.R. Smith, Tech. Coord., USDA, For. Serv. Gen. Tech. Rep. WG-1, 343pp.

Cerovski, A., M. Gorges, T. Byer, K. Duffy, and D. Felley (eds). 2001. Wyoming Bird Conservation Plan, Version 1.0. Wyoming Partners In Flight. Wyoming Game and Fish Department, Lander, WY. 339pp.

Clark, T.W. 1981. Ecology of Jackson Hole, Wyoming, a primer. Paragon Press. Salt Lake City, Utah.

Clark, T.W., and M.R. Stromberg. 1987. Mammals of Wyoming. University of Kansas Press Publication. Lawrence, Kansas. 314pp.

Code of Federal Regulations (CFR). 2001. Code of Federal Regulations, Title 50, Wildlife and Fisheries. Office of the Federal Register, National Archives and Records Administration. Washington, D.C. October 1, 2001.

Edwards, M.G. 1978. Raptor Management. In Proc. Workshop on Management of Southern Forests for Nongame Birds. R.M. DeGraaf, Tech. Coord., USDA, For. Serv. Gen. Tech. Rep. SE-14, 176pp.

Finch, D.M. 1986. Similarities in riparian bird communities among elevational zones in southeastern Wyoming. Pages 105-110. In D.J. Brosz and J.D. Rogers, (eds). Wyoming water and streamside zones conference, April 28-30, 1986, Casper Wyoming. Wyoming Water Resources Center, University of Wyoming, Laramie, Wyoming.

Fralick, G. 1989. Snake river levee system and general effects on terrestrial resources of the Snake river ecosystem. Unpublished Report. Prepared for the U.S. Fish and Wildlife Service. Wyoming Game and Fish Department, Cheyenne, Wyoming. 26pp.

Fralick, Gary 2002. Personal communication 2002. Wildlife Biologist, Wyoming Game and Fish Department, Pinedale Regional Office.

Grand Teton National Park (GTNP). 2000a. Mammal-Finding Guide. From web site: www.nps.gov/grte/pubs/brochures/mam00.pdf

Grand Teton National Park (GTNP). 2000b. Plant & Wildlife Communities. From web site: www.nps.gov/grte/pubs/newspaper/teewi05.pdf

Greater Yellowstone Bald Eagle Working Group (GYBEWG). 1996. Greater Yellowstone bald eagle management plan: 1995 update. Greater Yellowstone Bald Eagle Working Group, Wyoming Game and Fish Department, Lander, WY. 47pp.

Harmata, A. 1989. Bald eagle movement and habitat use. Job Completion Report. Wyoming Game and Fish Department. Unpublished Report.

Hughes, J.M. 1999. Yellow-billed Cuckoo (*Coccyzus americanus*). In The Birds of North America No. 418 (A. Poole and F. Gill, eds.) The Birds of North America, Inc., Philadelphia, PA. 28pp.

Lockman, D., C. Rowland, and R. Drewein. 1985. Wyoming Sandhill Crane and Whooping Crane Progress Report. Wyoming Game and Fish Department. Cheyenne, WY.

Laurion, T. and B. Oakleaf. Undated. Wyoming Lynx Inventories Completion Report, 15 April 1999- 14 April 2000. Wyoming Game and Fish Department, Nongame Mammals. 20pp.

Miller, R. Guidelines for wildlife management in western coniferous forests. In Proc. Workshop on Nongame Bird Habitat Management in the Coniferous Forests of the Western United States. R.M. DeGraaf, Tech. Coord., USDA, For. Serv. Tech. Rep. PNW-64, 100pp.

Minta, S.C. and T.M. Campbell III. 1991a. Wildlife-Habitat Assessment and Analysis with Reference to Human Impacts in Jackson Hole, Wyoming. Teton County Work Contract; Biota Research and Consulting, Inc. 173pp.

Minta, S.C. and T.M. Campbell III. 1991b. Recommendations for Wildlife and Habitat Protection, Teton County, Wyoming. Prepared for Teton County Board of County Commissioners. Biota Research and Consulting, Inc. 20pp.

Moody, D., D. Hammer, M. Bruscino, D. Bjornlie, R. Grogan, and B. Debolt. 2002. Wyoming Grizzly Bear Management Plan. Wyoming Game and Fish Department. Cheyenne, WY. 48pp.

National Park Service (NPS). 1997. Snake River Management Plan, Grand Teton National Park.

National Park Service (NPS). 2000. Winter Use Plans, Final Environmental Impact Statement for the Yellowstone and Grand Teton National Parks and John D. Rockefeller, Jr. Memorial Parkway. U.S. Department of Interior, National Park Service. October, 2000. 1353pp.

New York River Otter Project (NYROP). 1984. New Your Wildlife Resources, Department of Natural Resources, New York State College of Agriculture and Life Sciences. Ithaca, NY. Web site: www.nyotter.org

Olendorff, R.R. and M.N. Kochert. 1992. Raptor Habitat Management on Public Lands, A Strategy for the Future. U.S. Department of Interior, Bureau of Land Management. Fish and Wildlife 2000, National Strategy Plans. Washington, D.C.. 52pp.

Oneale, E. 1993. Wetland Wildlife Management, Habitat Extension Bulletin No. 8. Wyoming Game and Fish Department, Habitat Extension Services. 6pp.

Pashley, D.N., C.J. Beardmore, J.A. Fitzgerald, R.P. Ford, W.C. Hunter, M.S. Morrison, and K.V. Rosenberg. 2000. Partners In Flight, Conservation of the Land Birds of the United States. American Bird Conservancy. The Plains, VA. 93pp.

Redig, P.T. 1979. Raptor management and rehabilitation. In Proc. Workshop on Management of North Central and Northeastern Forests for Nongame Birds. R.M. DeGraaf, Tech. Coord., USDA, For. Serv. Gen. Tech. Rep. NC-51, 268pp.

Rudd, W., L. Forrest, F. Lindzey, and S.W. Buskirk. 1986. River otters in Wyoming: distribution, ecology and potential impacts from energy development. Wyoming Cooperative Resource Unit, University of Wyoming. Unpublished Report. 86-02.

Ruediger, B., J. Claar, S. Gniadek, B. Holt, L. Lewis, S. Mighton, B. Naney, G. Patton, T. Rinaldi, J. Trick, A. Vandehey, F. Wahl, N. Warren, D. Wenger, and A. Williamson. 2000. Canada Lynx Conservation Assessment and Strategy. USDA Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management, and USDI National Park Service. Forest Service Publication #R1-00-53. Missoula, MT. 142pp.

Simpson, P.W., J.R. Newman, M.A. Keirn, R.M. Matter, and P.A. Gutherie. 1982. Terrestrial and riparian systems. In Manual of Stream Channelization Impacts on Fish and Wildlife. U.S. Fish and Wildlife Service. Office Biological Services Publication FWS/OBS 82-24.

Snyder, J. 1980. Draft. The functional dynamics of cottonwood-willow riparian ecosystems. Pages 10-40. In Managers' handbook for lowland river and stream riparian habitat (Draft).

Stalmaster, M.V. 1976. Winter Ecology and Effects of Human Activity on Bald Eagles in the Nooksack River Valley, Washington. M.S. Thesis, West Washington State Coll., Bellingham, WA. 100pp.

Swenson, J.E., K.L. Alt, and R.L. Eng. 1986. Ecology of Bald Eagles in the Greater Yellowstone Ecosystem. Wildlife Manager 95:1-46.

Teton County. 1994. Jackson/Teton County Comprehensive Plan. Teton County Board of Commissioners. May 9, 1994.

University of Wyoming (UW). Undated. Natural Environment and Habitat, The Operation and Management of Jackson Lake Dam. Website: http://www.src.uwyo.edu/corridor/bdyIssures.htm. 5pp.

U.S. Army Corps of Engineers (COE). 1989. Jackson Hole, Wyoming, Environmental Assessment, Snake-Gros Ventre Rivers, Debris Clearance Project. Walla Walla District. April 1989.

U.S. Fish and Wildlife Service (USFWS). 1986a. North American Waterfowl Management Plan, A Strategy for Cooperation. U.S. Fish and Wildlife Service, Arlington, VA. 22pp.

U.S. Fish and Wildlife Service (USFWS). 1986b. Recovery Plan for the Pacific Bald Eagle. U.S. Fish and Wildlife Service, Portland, OR. 160pp.

U.S. Fish and Wildlife Service (USFWS). 1990. Fish and Wildlife Coordination Act Report for the Jackson Hole Snake River Flood Protection/Levee Maintenance Project, Teton County, Wyoming. Wyoming State Office, Fish and Wildlife Enhancement, Region 6. April 1990.

U.S. Fish and Wildlife Service (USFWS). 1991. Planning Aid Letter, Jackson Hole Flood Protection Project, 1135(b) Demonstration Project. Prepared for U.S. Army Corps of Engineers, Walla Walla, Washington. October 1991.

U.S. Fish and Wildlife Service (USFWS). 1992. Assessment of Habitat of Wildlife Communities on the Snake River, Jackson, Wyoming. Resource Publication 1990. Washington, D.C. 22pp.

U.S. Fish and Wildlife Service (USFWS). 1995. Biologue, Whooping crane (Grus americana). Internet web page: http://species.fws.gov/bio_whoo.htm. 3pp.

U.S. Fish and Wildlife Service (USFWS). 1998a. Biologue, Gray Wolf (Canis lupus). Internet web page: http://species.fws.gov/bio_gwol.htm. 4pp.

U.S. Fish and Wildlife Service (USFWS). 1998b. North American Waterfowl Management Plan, 1998 Update, Expanding the Vision. U.S. Fish and Wildlife Service, Arlington, VA. 44pp.

U.S. Fish and Wildlife Service (USFWS). 1999. Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances. U.S. Fish and Wildlife Service, Utah Field Office, Salt Lake City, UT. 44pp.

U.S. Fish and Wildlife Service (USFWS). 2000. Draft Conservation Strategy For The Grizzly Bear in the Yellowstone Area. Interagency Conservation Strategy Team. Missoula, MT. 138pp.

U.S. Fish and Wildlife Service (USFWS). 2001. Habitat Destruction Puts Songbird At Risk in the West, News Release 01-94. U.S. Fish and Wildlife Service, California/Nevada Operations Office, Sacramento, CA. 2pp.

U.S. Fish and Wildlife Service (USFWS), Nez Perce Tribe, National Park Service, and USDA Wildlife Service. 2002. Rocky Mountain Wolf Recovery 2001 Annual Report. T. Meir, ed. USFWS, Ecological Services, 100 N. Park, Suite 320, Helena, MT. 43pp.

U.S. Forest Service (USFS). Undated. Snake River - Wyoming, A Potential Wild and Scenic River, Final Statement and Report. Final Environmental Statement for Wild and Scenic River Study of the Snake River of Wyoming. Bridger-Teton National Forest. Jackson, WY. 59pp.

Van Kirk, R., L. Benejamin, and D. Patla. 2000. Riparian Area Assessment and Amphibian Status in the Watersheds of the Greater Yellowstone Ecosystem. Greater Yellowstone Coalition, Bozeman, MT. 102 pp.

Wildlife Services (WS) and Bureau of Land Management (BLM). 2002. Rock Springs BLM Zone Annual Predator Damage Management Plan 2002. Pinedale, WY. 12pp.

Wyoming Game and Fish Commission (WGFC). 1998. Wyoming Game and Fish Department, Strategic Plan. Cheyenne, WY. 88pp.

Wyoming Game and Fish Department (WGFD). 1993. Comment letter on Snake River Recreation Area Management Plan/BLM. From Dan Stevenson (trumpeter swan and bald eagle biologist) to Steve Kilpatrick (WGFD-Jackson, WY). August 11, 1993.

Wyoming Game and Fish Department (WGFD). 2001. Annual Big Game Herd Unit Reports, 2000. Wyoming Game and Fish Department, Cheyenne, WY.

Zarn, M. 1974. Osprey. Habitat management series for unique or endangered species: Technical Note No. 254, U.S. Bureau of Land Management, Denver Service, Denver, CO.

GLOSSARY

Activity Plan: Site-specific plan which precedes actual development. This is the most detailed level of BLM planning.

Actual Use: The amount of animal unit months consumed by livestock based on the numbers of livestock and grazing dates submitted by the livestock operator and confirmed by periodic field checks by the BLM.

Air Quality: Refers to standards for various classes of land as designated by the Clean Air Act of 1978.

All-Terrain Vehicle: A wheeled or tracked vehicle, other than a snowmobile or work vehicle, designed primarily for recreational use or for the transportation of property or equipment exclusively on undeveloped road rights of way, marshland, open country or other unprepared surfaces.

Allotment: An area of land where one or more livestock operators graze their livestock. Allotments generally consist of BLM lands but may also include other federally managed, state owned, and private lands. An allotment may include one or more separate pastures. Livestock numbers and periods of use are specified for each allotment.

Allotment Categorization: Grazing allotments and rangeland areas used for livestock grazing are assigned to an allotment category during resource management planning. Allotment categorization is used to establish priorities for distributing available funds and personnel during plan implementation to achieve cost-effective improvement of rangeland resources. Categorization is also used to organize allotments into similar groups for purposes of developing multiple use prescriptions, analyzing site-specific and cumulative impacts, and determining trade-offs. The three categories, in order of priority for management, are I (improve), M (maintain), and C (custodial).

Allotment Management Plan: A written program of livestock grazing management, including supportive measures if required, designed to attain specific management goals in a grazing allotment.

Alluvium: Any sediment deposited by flowing water, as in a river bed, floodplain, or delta.

Amendment: The process for considering or making changes in the terms, conditions, and decisions of approved Resource Management Plans or Management Framework Plans using the prescribed provisions for resource management planning appropriate to the proposed action or circumstances. Usually only one or two issues are considered that involve only a portion of the planning area.

Animal Unit Month: A standardized measurement of the amount of forage necessary for the sustenance of one cow unit or its equivalent for 1 month. Approximately 800 pounds of forage.

Assessment: The act of evaluating and interpreting data and information for a defined purpose.

Avoidance Areas: Areas with sensitive resource values where rights-of-way and Section 302 permits, leases, and easements would be strongly discouraged. Authorizations made in avoidance areas would

have to be compatible with the purpose for which the area was designated and not be otherwise feasible on lands outside the avoidance area.

Basalt: Fine-grained, dark-colored igneous rock that is extrusive, high in mafic minerals, and low in silica.

Bedload: Sediment in a stream that moves by sliding, rolling, or bouncing on or near the streambed.

Big Game: Large species of wildlife that are hunted, such as elk, mule or white-tailed deer, moose, bighorn sheep, and pronghorn antelope.

Biological Assessment: The gathering and evaluation of information on endangered and threatened species and designated critical habitat. Required when a management action potentially conflicts with endangered or threatened species, the biological assessment is the way federal agencies enter into formal consultation with the USFWS and describe a proposed action and the consequences to the species the action would affect.

Cambrian: The oldest of the periods of the Paleozoic Era; also the system of strata deposited during that period.

Candidate Species: Any species included in a *Federal Register* notice of review that are being considered for listing as threatened or endangered by the USFWS.

Canopy: The uppermost layer consisting of the crowns of trees or shrubs in a forest or woodland.

Channel: An open conduit either naturally or artificially created which periodically or continuously contains moving water or forms a connecting link between two bodies of water.

Clean Air Act: Federal legislation governing air pollution. Prevention of Significant Deterioration above legally established levels include the following:

Closed: Generally denotes that an area is not available for a particular use or uses; refer to specific definitions found in law, regulations, or policy guidance for application to individual programs.

Closed Area or Trail: Designated areas and trails where the use of off-road vehicles are permanently or temporarily prohibited. The use of off-road vehicles in closed areas may be allowed only with the approval of the authorized officer.

Closed Road: A road or segment which is restricted from certain types of use during certain seasons of the year. The prohibited use and the time period of closure is specified.

Code of Federal Regulations: The official, legal tabulation or regulations directing federal government activities.

Community: An assemblage of plant and animal populations in a common spatial arrangement.

Conformance: That a proposed action shall be specifically provided for in the land use plan or, if not specifically mentioned, shall be clearly consistent with the goals, objectives, or standards of the approved land use plan.

Consistency: The proposed land use plan does not conflict with officially approved plans, programs, and policies of tribes, other Federal agencies, and State, and local governments to the extent practical within Federal law, regulation, and policy.

Council on Environmental Quality: An advisory council to the President of the United States established by the National Environmental Policy Act of 1969. It reviews Federal programs for their effect on the environment, conducts environmental studies, and advises the President on environmental matters.

Cover: Any form of environmental protection that helps an animal stay alive (mainly shelter from weather and concealment from predators).

Critical Habitat: An area occupied by a threatened or endangered species "on which are found those physical and biological features (1) essential to the conservation of the species, and (2) which may require special management considerations or protection."

Cultural Resources: Nonrenewable elements of the physical and human environment including archaeological remains (evidence of prehistoric or historic human activities) and sociocultural values traditionally held by ethnic groups (sacred places, traditionally utilized raw materials, etc.).

Cumulative Impact: The impact on the environment that results from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Designated Roads and Trails: Specific roads and trails where some type of motorized vehicle use is allowed either seasonally or year-long.

Discharge (Water): The rate of flow or volume of water flowing in a stream at a given place or within a given period of time.

Discharged Use: A cultural property category indicating that the property has no remaining identifiable use (BLM Manual 8110.42).

Discovery: Knowledge of the presence of valuable minerals within the lines of a location, or in such proximity thereto as to justify a reasonable belief in their existence. Discovery is an extremely important to public lands mining because the Mining Law of 1872 provides that mining claims can be located only after a discovery is made.

Dispersed/Extensive Recreation: Recreation activities of an unstructured type which are not confined to specific locations such as recreation sites. Example of these activities may be hunting, fishing, off-road vehicle use, hiking, and sightseeing.

Diurnal: Describes a cyclic event recurring daily; or the nature or habit of an organism to be active during daylight hours.

Diversity: The relative abundance of wildlife species, plant species, communities, habitats, or habitat features per unit of area.

Easement: A right afforded a person or agency to make limited use of another's real property for access or other purposes.

Ecosystem: A complete, interacting system of living organisms and the land and water that make up their environment; the home places of all living things, including humans.

Endangered Species: A plant or animal species whose prospects for survival and reproduction are in immediate jeopardy, as designated by the Secretary of the Interior, and as is further defined by the Endangered Species Act.

Environmental Assessment: A concise public document that analyzes the environmental impacts of a proposed federal action and provides sufficient evidence to determine the level of significance of the impacts.

Environmental Impact Statement: A detailed written statement required by the National Environmental Policy Act when an agency proposes a major federal action significantly affecting the quality of the human environment.

Erosion: The wearing away of the land surface by running water, wind, ice, or other geological agents.

Exclusion Area: Areas with sensitive resource values where rights-of-way and 302 permits, leases, and easements would not be authorized.

Extensive Recreation Management Area: Areas where significant recreation opportunities and problems are limited and explicit recreation management is not required. Minimal management actions related to the Bureau's stewardship responsibilities are adequate in these areas.

Federal Land Policy and Management Act of 1976: Public Law 94-579. October 21, 1976, often referred to as the BLM' s "Organic Act," which provides the majority of the BLM's legislated authority, direction, policy, and basic management guidance.

Federal Register: A daily publication which reports Presidential and Federal Agency documents.

Fishery: Habitat that supports the propagation and maintenance of fish.

Flood Plain: The relatively flat area or lowlands adjoining a body of standing or flowing water which has been or might be covered by floodwater.

Forage: All browse and herbaceous foods available to grazing animals, which may be grazed or harvested for feeding.

Goal: A broad statement of a desired outcome. Goals are usually not quantifiable and may not have established time frames for achievement.

Grazing System: The manipulation of livestock grazing to accomplish a desired result.

Guidelines: Actions or management practices that may be used to achieve desired outcomes, sometimes expressed as best management practices. Guidelines may be identified during the land use planning process, but they are not considered a land use plan decision unless the plan specifies that they are mandatory.

Habitat: A specific set of physical conditions that surround a species, group of species, or a large community. In wildlife management, the major constituents of habitat are considered to be food, water, cover, and living space.

Herbaceous: Pertaining to or characteristic of an herb (fleshy-stem plant) as distinguished from the woody tissue of shrubs and trees.

Historic: Period wherein nonnative cultural activities took place, based primarily upon European roots, having no origin in the traditional Native American culture(s).

Home Range: The area in which an animal travels in the scope of natural activities.

Impact: A modification of the existing environment caused by an action (such as construction or operation of facilities).

Impacts (or Effects): Environmental consequences (the scientific and analytical basis for comparison of alternatives) as a result of a proposed action. Effects may be either direct, which are caused by the action and occur at the same time and place, or indirect, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable, or cumulative.

Implementation Plan: A site-specific plan written to implement decisions made in a land use plan. An implementation plans usually selects and applies best management practices to meet land use plan objectives. Implementation plans are synonymous with "activity" plans. Examples of implementation plans include interdisciplinary management plans, habitat management plans, and allotment management plans.

Interdisciplinary Team: A group of individuals with different training, representing the physical sciences, social sciences, and environmental design arts, assembled to solve a problem or perform a task. The members of the team proceed to a solution with frequent interaction so that each discipline may

provide insights to any stage of the problem and disciplines may combine to provide new solutions. The number and disciplines of the members preparing the plan vary with circumstances. A member may represent one or more discipline or Bureau program interest.

Interior Board of Land Appeals: The Department of the Interior, Office of Hearings and Appeals board that acts for the Secretary of the Interior in responding to appeals of decisions on the use and disposition of public lands and resources. Because the Interior Board of Land Appeals acts for and on behalf of the Secretary of the Interior, its decisions usually represent the Department's final decision but are subject to the courts.

Jurisdiction: The legal right to control or regulate use of a transportation facility. Jurisdiction requires authority, but not necessarily ownership.

Land Use Plan: A set of decisions that establish management direction for land within an administrative area, as prescribed under the planning provisions of FLPMA; an assimilation of land-use-plan-level decisions developed through the planning process, regardless of the scale at which the decisions were developed.

Leasable Minerals: Those minerals or materials designated as leasable under the Mineral Leasing Act of 1920. They include coal, phosphate, asphalt, sulphur, potassium, and sodium minerals, and oil, gas, and geothermal.

Limited Areas or Trails: Designated areas or trails where the use of off-road vehicles is subject to restrictions, such as limiting the number or types or vehicles allowed, dates and times of use (seasonal restrictions), limiting use to existing roads and trails, or limiting use to designated roads and trails. Under the designated roads and trails designation, use would be allowed only on roads and trails that are signed for use. Combinations of restrictions are possible, such as limiting use to certain types of vehicles during certain times of the year.

Limits of Acceptable Change: A framework for establishing acceptable and appropriate resource and social conditions in recreation settings. A system of management planning.

Locatable Minerals: Minerals subject to exploration, development, and disposal by staking mining claims as authorized by the Mining Law of 1872, as amended. This includes deposits of gold, silver, and other uncommon minerals not subject to lease or sale.

Management Decision: A decision made by the BLM to manage public lands. Management decisions include both land use plan decisions and implementation decisions.

Management Situation Analysis: Assessment of the current management direction. It includes a consolidation of existing data needed to analyze and resolve identified issues, a description of current BLM management guidance, and a discussion of existing problems and opportunities for solving them.

Mineral Entry: The filing of a claim on public land to obtain the right to any locatable minerals it may contain.

Mineral Estate: The ownership of minerals, including rights necessary for access, exploration, development, mining, ore dressing, and transportation operations.

Mineral Materials: Materials such as common varieties of sand, stone, gravel, pumice, pumicite, and clay, that are not obtainable under the mining or leasing laws but that can be acquired under the Mineral Materials Act of 1947, as amended.

Mineral Withdrawal: A formal order that withholds federal lands and minerals from entry under the Mining Law of 1872 and closes the area to mineral location (staking mining claims) and development.

Mining Claim: A parcel of land that a miner takes and holds for mining purposes, having acquired the right of possession by complying with the Mining Law and local laws and rules. A single mining claim may contain as many adjoining locations as the locator may make or buy. There are four categories of mining claims: lode, placer, millsite, and tunnel site.

Moraine: An accumulation of boulders, stones, and other earth debris carried and deposited by a glacier.

Multiple Use: The management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people; making the most judicious use of the lands for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; the use of some lands for less than all of the resources; a combination of balanced and diverse resource uses that takes into account the long term needs of future generations for renewable and nonrenewable resources, including but not limited to, recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific and historical values; and harmonious and coordinated management of the various resources without permanent impairment of the productivity of the lands and the quality of the environment with consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or greatest unit output.

National Ambient Air Quality Standards: The allowable concentrations of air pollutants in the ambient (public outdoor) air. National ambient air quality standards are based on the air quality criteria and divided into primary standards (allowing an adequate margin of safety to protect the public health) and secondary standards (allowing an adequate margin of safety to protect the public welfare). Welfare is defined as including (but not limited to) effects on soils, water, crops, vegetation, human-made materials, animals, wildlife, weather, visibility, climate, and hazards to transportation, as well as effects on economic values and on personal comfort and well-being.

National Environmental Policy Act of 1969: An Act that encourages productive and enjoyable harmony between man and his environment and promotes efforts to prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; enriches the understanding or the ecological systems and natural resources important to the Nation, and establishes the Council on Environmental Quality.

National Register of Historic Places: A register of districts, sites, buildings, structures, and objects, significant in American history, architecture, archaeology and culture, established by the "Historic Preservation Act" of 1966 and maintained by the Secretary of the Interior.

National Wild and Scenic Rivers System: A system of nationally designated rivers and their immediate environments that have outstanding scenic, recreational, geologic, fish and wildlife, historic, cultural, and other similar values and are preserved in a free-flowing condition. The system consists of three types of streams: (1) recreation—rivers or sections of rivers that are readily accessible by road or railroad and that may have some development along their shorelines and may have undergone some impoundments or diversion in the past, (2) scenic—rivers or sections of rivers free of impoundments with shorelines or watersheds still largely undeveloped but accessible in places by roads, and (3) wild—rivers or sections of rivers free of impoundments and generally inaccessible except by trails, with watersheds or shorelines essentially primitive and waters unpolluted.

Noxious Weeds: A plant species designated by Federal or State law as generally possessing one or more of the following characteristics: aggressive and difficult to manage; parasitic; a carrier or host of serious insects or disease; or nonnative, new, or not common to the United States.

Objective: A description of a desired condition for a resource. Objectives can be quantified and measured and, where possible, have established time frames for achievement.

Open: Generally denotes that an area is available for a particular use or uses. Refer to specific program definitions found in law, regulations, or policy guidance for application to individual programs.

Off-Highway Vehicle (off-road vehicle): Any motorized vehicle capable of, or designed for, travel on or immediately over land, water, or other natural terrain, excluding: (1) Any nonamphibious registered motorboat; (2) Any military, fire, emergency, or law enforcement vehicle while being used for emergency purposes; (3) Any vehicle whose use is expressly authorized by the authorized officer, or otherwise officially approved; (4) Vehicles in official use; and (5) Any combat or combat support vehicle when used in times of national defense emergencies.

Official Use: Use by an employee, agent, or designated representative of the Federal Government or one of its contractors, in the course of his employment, agency, or representation.

Open Areas and Trails: Designated areas and trails where off-road vehicles may be operated, subject to operating regulations and vehicle standards or an area where all types of vehicle use is permitted at all times, subject to standards.

Outstandingly Remarkable River Values: Values among those listed in Section 1(b) of the Wild and Scenic Rivers Act are "scenic, recreational, geological, fish and wildlife, historical, cultural, or other similar values. . . ." Other similar values that may be considered include botanical, hydrological, paleontological, or scientific. Professional judgment is used to determine whether values exist to an outstandingly remarkable degree.

Overstory: The layer of foliage in a forest canopy.

Paleontological Resources (Fossils): The physical remains of plants and animals preserved in soils and sedimentary rock formations. Paleontological resources are important for understanding past environments, environmental change, and the evolution of life.

Particulate Matter: Fine liquid or solid particles suspended in the air and consisting of dust, smoke, mist, fumes, and compounds containing sulfur, nitrogen, and metals.

Passerine Birds: Birds of the order Passeriformes, which includes perching birds and songbirds such as blackbirds, jays, finches, warblers, and sparrows. More than half of all birds belong to this order.

Personal Income: The sum of wage and salary disbursements, other labor income, proprietors' income, rental income of persons, personal dividend income, personal interest income, and transfer payments to persons, less personal contributions for social insurance.

pH: A measure of acidity or hydrogen ion activity. Neutral is pH 7.0. All values below 7.0 are acidic, and all values above 7.0 are alkaline.

Plan: A document that contains a set of comprehensive, long-range decisions concerning the use and management of Bureau-administered resources in a specific geographic area.

Planning Area: A geographical area for which land use and resource management plans are developed and maintained.

Planning Criteria: The standards, rules, and other factors developed by managers and interdisciplinary teams for their use in forming judgments about decision making, analysis, and data collection during planning. Planning criteria streamline and simplify the resource management planning actions.

Planning Base: Includes law, regulation, policy, land use plan decisions (e.g., Resource Management Plans, Resource Management Plan Amendments, and Management Framework Plan Amendments), National Environmental Policy Act documents (e.g., Environmental Impact Statements, Administrative Determinations, Environmental Assessments and Categorical Exclusion Reviews), and supporting data (e.g., automated data bases, research and evaluations).

Population: Within a species, a distinct group of individuals that tend to mate only with members of the group. Because of generations of inbreeding, members of a population tend to have similar genetic characteristics.

Potential Wild and Scenic River: A flowing body of water or estuary or a section, portion, or tributary thereof, including rivers, streams, creeks, runs, kills, rills, and small lakes.

Precambrian Era: The earliest era of geological history, extending from 4.5 billion to 540 million years ago and encompassing 7/8 of the earth's history. Just before the end of the Precambrian, complex multicellular organisms, including animals, evolved.

Prehistoric: Refers to the period wherein Native American cultural activities took place which were not yet influenced by contact with historic nonnative culture(s).

Prescribed Fire: The introduction of fire to an area under regulated conditions for specific management purposes.

Public Land: Land or interest in land owned by the United States and administered by the Secretary of the Interior through the BLM, except lands located on the Outer Continental Shelf, and land held for the benefit of Indians, Aleuts, and Eskimos.

Range Trend: The direction of change in range condition.

Raptor: Bird of prey with sharp talons and strongly curved beaks such as hawks, owls, vultures, and eagles.

Recreation Opportunity Spectrum: A planning process that provides a framework for defining classes of outdoor recreation environments, activities, and experience opportunities. The settings, activities, and opportunities for experiences are arranged along a continuum or spectrum of six classes: primitive, semi-primitive nonmotorized, semiprimitive motorized, roaded natural, rural, and urban. The resulting analysis defines specific geographic areas on the ground, each of which encompasses one of the six classes.

Recreational River Areas: Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

Resource Management Plan: A land use plan as prescribed by the Federal Land Policy and Management Act which establishes, for a given area of land, land-use allocations, coordination guidelines for multiple-use, objectives and actions to be achieved.

Right-of-way: A permit or an easement which authorizes the use of public lands for certain specified purposes, commonly for pipelines, roads, telephone lines, electric lines, reservoirs, etc.; also, the lands covered by such an easement or permit.

Riparian Area: A form of wetland transition between permanently saturated wetlands and upland areas. Riparian areas exhibit vegetation or physical characteristics that reflect the influence of permanent surface or subsurface water. Typical riparian areas include lands along, adjacent to, or contiguous with perennially and intermittently flowing rivers and streams, glacial potholes, and the shores of lakes and reservoirs with stable water levels. Excluded are ephemeral streams or washes that lack vegetation and depend on free water in the soil.

River Eligibility: Qualification of a river for inclusion into the National Wild and Scenic Rivers System through the determination (professional judgment) that it is free-flowing and, with its adjacent land area, possesses at least one river-related value considered to be outstandingly remarkable.

Runoff: The water that flows on the land surface from an area in response to rainfall or snowmelt.

Salable Minerals: Common variety minerals on the public lands, such as sand and gravel, which are used mainly for construction and are disposed of by sales to the general public, or special permits to local governments and non-profit organizations.

Scenic Quality: The degree of harmony, contrast, and variety within a landscape.

Scenic River: A river or section of a river that is free of impoundments and whose shorelines are largely undeveloped but accessible in places by roads.

Scoping: The process of identifying the range of issues, management concerns, preliminary alternatives, and other components of an environmental impact statement or land-use planning document. It involves both internal and public viewpoints.

Sensitive Species: All species that are under status review, have small or declining populations, live in unique habitats, or need special management. Sensitive species include threatened, endangered, and proposed species as classified by the USFWS and National Marine Fisheries Service.

Shrub: A low, woody plant, usually with several stems, that may provide food and/or cover for animals.

Spawning Gravels: Stream-bottom gravels where fish deposit and fertilize their eggs. The covering of these gravels with silt can block the supply of oxygen to the eggs or serve as a cementing agent to prevent fry from emerging.

Special Recreation Management Area: Areas which require explicit recreation management to achieve recreation objectives and provide specific recreation opportunities.

Special Status Species: Includes proposed species, listed species, and candidate species under the Endangered Species Act; State-listed species; and BLM State Director-designated sensitive species (see BLM Manual 6840 - Special Status Species Policy).

Standard: A description of the physical and biological conditions or degree of function required for healthy, sustainable lands (e.g., land health standards).

Substrate: The mineral or organic material that forms the bed of a stream; the base upon which an organism lives; the surface on which a plant or animal grows or is attached.

Take: As defined by the Endangered Species Act, "to harass, harm, pursue, hunt, shoot, wound, kill, capture, or collect, or attempt to engage in any such conduct."

Thermal Cover: Vegetation or topography that prevents radiational heat loss, reduces wind chill during cold weather, and intercepts solar radiation during warm weather.

Threatened Species: Any plant or animal species defined under the Endangered Species Act as likely to become endangered within the foreseeable future throughout all or a significant portion of its range; listings are published in the *Federal Register*.

Thrust Fault: A reverse fault that is characterized by a low angle of inclination with reference to a horizontal plane.

Turbidity: Interference to the passage of light through water due to insoluble particles of soil, organics, microorganisms, and other materials.

Uplands: Lands at higher elevations than alluvial plains or low stream terraces; all lands outside the riparian-wetland and aquatic zones.

Utilization (rangeland): The proportion of the current year's forage production that is consumed or destroyed by grazing animals. Utilization is usually expressed as a percentage.

Visual Resources: The visible physical features of a landscape (topography, water, vegetation, animals, structures, and other features) that constitute the scenery of an area.

Visual Resource Management Classes (definition of).

Class I. The objective of this class is to maintain a landscape setting that appears unaltered by humans. It is applied to designated wilderness areas, wilderness study areas, some natural areas, wild portions of the wild scenic rivers, and other similar situations where management activities are to be restricted.

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

Class III. The objective of this class is to design proposed alterations so as to partially retain the existing character of the landscape. Contrasts to the basic elements (form, line, color, and texture) caused by a management activity may be evident and begin to attract attention in the characteristic landscape. Structures located in the foreground distance zone (0 to ½ mile) often create a contrast that exceeds the VRM class, even when designed to harmonize and blend with the characteristic landscape. This may be especially true when a distinctive architectural motif or style is designed. Approval by the Field Manager is required on case-by-case basis to determine whether the structure(s) meet the acceptable VRM class standards, and if not, whether they add acceptable visual variety to the landscape.

Class IV. The objective of this class is to provide for management activities which require major modification of the existing character of the landscape. Contrasts may attract attention and be a dominant feature of the landscape in terms of scale however, the change should repeat the basic elements (form, line, color, and texture) inherent in the characteristic landscape. Structures located in the foreground distance zone (0 to ½ mile) often create a contrast that exceeds the VRM class, even when designed to harmonize and blend with the characteristic landscape. This may be especially true when a distinctive architectural motif or style is designed. Approval by the Field Manager is required on a case-by-case basis to determine whether the structure(s) meet the acceptable VRM class standards, and if not, whether they add acceptable visual variety to the landscape.

Rehabilitation Area. Change is needed or change may add acceptable visual variety to an area. This class applies to areas where the naturalistic character has been disturbed to a point where rehabilitation is needed to bring it back into character with the surrounding landscape. This class would apply to areas identified in the scenic evaluation where the quality class has been reduced because of unacceptable cultural modification. The contrast is inharmonious with the characteristic landscape. It may also be applied to areas that have the potential for enhancement; i.e., add acceptable visual variety to an area or site. It should be considered an interim or short-term classification until one of the other VRM class objectives can be reached through rehabilitation or enhancement. The desired visual resource management class should be identified.

Water Table: The surface in a groundwater body where the water pressure is atmospheric. It is the level at which water stands in a well that penetrates the water body just far enough to hold standing water.

Watershed: All lands that are enclosed by a continuous hydrologic drainage divide and lie upslope from a specified point on a stream.

Wetlands: Areas that are inundated or saturated by surface or ground water often and long enough to support and under normal circumstances do support a prevalence of vegetation typically adapted for life in saturated soil conditions.

Wild, Scenic or Recreational River: The three classes of what is traditionally referred to as a "Wild and Scenic River." Designated river segments are classified as wild, scenic, or recreational, and the segments cannot overlap.

Wilderness: A congressionally designated area of undeveloped federal land retaining its primeval character and influence, without permanent improvements or human habitation, that is protected and managed to preserve its natural conditions and that (1) generally appears to have been affected mainly by the forces of nature, with human imprints substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least 5,000 acres or is large enough to make practical its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historic value.

Wild River: Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.

Wildland Fire: Any nonstructure fire, other than prescribed fire, that occurs in the wildland.

Winter Range: Habitat used by wildlife during winter.

Withdrawal: An action that restricts the use of public lands by removing them from the operation of some or all of the public land or mining laws.

ACRONYMS

µg/m3	micrograms per cubic meter
APHIS	USDA-Animal and Plant Health Inspection Services
ATV	all-terrain vehicle
AUM	animal unit month
BLM	Bureau of Land Management
CASTNet	Clean Air Status and Trends Network
CEQ	Council of Environmental Quality
CFR	Code of Federal Regulations
cfs	cubic feet per second
COE	U.S. Army Corps of Engineers
CVM	Contingent Valuation Model
DEIS	Draft Environmental Impact Statement
DEQ	Department of Environmental Quality (State of Wyoming)
dV	deciview
EIS	environmental impact statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FLPMA	Federal Land Policy and Management Act of 1976
FR	Federal Register
FS	Forest Service
GTNP	Grand Teton National Park
IMPROVE	Interagency Monitoring of Protected Visual Environments
LAC	limits of acceptable change
MBTA	Migratory Bird Treaty Act
MOU	Memorandum of Understanding
NAAQS	National Ambient Air Quality Standards
NADP	National Atmospheric Deposition Program
NAWMP	North American Waterfowl Management Plan
NEPA	National Environmental Policy Act of 1969
NER	National Elk Refuge
NPS	National Park Service
NYROP	New York River Otter Project
OHV	off-highway vehicle
PCA	Primary Conservation Area (grizzly bear)
PFO	Pinedale Field Office
PLO	Public Land Order
$PM_{2.5}$	fine particulate matter
PM_{10}	particulate matter
ppb	parts per billion

R&PP	Recreation and Public Purposes Act
RAMP	Recreation Area Management Plan
RFD	reasonably foreseeable development
RMP	resource management plan
ROS	recreation opportunity spectrum
SRMA	special recreation management area
TCP	traditional cultural properties
TES	threatened and endangered species
U.S.C.	United States Code
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound
WAAQS	Wyoming Ambient Air Quality Standards
WARMS	Wyoming Air Resources Monitoring System
WGBMP	Wyoming Grizzly Bear Management Plan
WGFD	Wyoming Game and Fish Department
WS	USDA-APHIS-Wildlife Services
WSR	Wild and Scenic Rivers
WTP	willingness to pay
WYDOT	Wyoming Department of Transportation
YNP	Yellowstone National Park

APPENDIX 1

STANDARDS FOR HEALTHY RANGELANDS AND GUIDELINES FOR LIVESTOCK GRAZING MANAGEMENT FOR THE PUBLIC LANDS ADMINISTERED BY THE BUREAU OF LAND MANAGEMENT IN THE STATE OF WYOMING

INTRODUCTION

According to the Department of the Interior's final rule for grazing administration, effective August 21, 1995, the Wyoming Bureau of Land Management (BLM) State Director is responsible for the development of standards for healthy rangelands and guidelines for livestock grazing management on 18 million acres of Wyoming's public rangelands. The development and application of these standards and guidelines are to achieve the four fundamentals of rangeland health outlined in the grazing regulations (43 CFR 4180.1). Those four fundamentals are: (1) watersheds are functioning properly; (2) water, nutrients, and energy are cycling properly; (3) water quality meets State standards; and (4) habitat for special status species is protected.

Standards address the health, productivity, and sustainability of the BLM administered public rangelands and represent the minimum acceptable conditions for the public rangelands. The standards apply to all resource uses on public lands. Their application will be determined as use-specific guidelines are developed. Standards are synonymous with goals and are observed on a landscape scale. They describe healthy rangelands rather than important rangeland by-products. The achievement of a standard is determined by observing, measuring, and monitoring appropriate indicators. An indicator is a component of a system whose characteristics (e.g., presence, absence, quantity, and distribution) can be observed, measured, or monitored based on sound scientific principles.

Guidelines provide for, and guide the development and implementation of, reasonable, responsible, and cost-effective management practices at the grazing allotment and watershed level. The guidelines in this document apply specifically to livestock grazing management practices on the BLM administered public lands. These management practices will either maintain existing desirable conditions or move rangelands toward statewide standards within reasonable timeframes. Appropriate guidelines will ensure that the resultant management practices reflect the potential for the watershed, consider other uses and natural influences, and balance resource goals with social, cultural/historic, and economic opportunities to sustain viable local communities. Guidelines, like standards, apply statewide.

Implementation of the Wyoming standards and guidelines will generally be done in the following manner: Grazing allotments or groups of allotments in a watershed will be reviewed based on the BLM's current allotment categorization and prioritization process. Allotments with existing management plans and high-priority allotments will be reviewed first. Lower priority allotments will be reviewed as time allows or when it becomes necessary for BLM to review the permit/lease for other reasons such as permit/lease transfers, permittee/lessee requests for change in use, etc. The permittees and interested publics will be

notified when allotments are scheduled for review and encouraged to participate in the review. The review will first determine if an allotment meets each of the six standards. If it does, no further action will be necessary. If any of the standards aren't being met, then rationale explaining the contributing factors will be prepared. If livestock grazing practices are found to be among the contributing factors, corrective actions consistent with the guidelines will be developed and implemented before the next grazing season in accordance with 43 CFR 4180. If a lack of data prohibits the reviewers from determining if a standard is being met, then a strategy will be developed to acquire the data in a timely manner.

On a continuing basis, the Standards for Healthy Rangelands will direct on-the-ground management on the public lands. They will serve to focus the on-going development and implementation of activity plans toward the maintenance or the attainment of healthy rangelands.

Quantifiable resource objectives and specific management practices to maintain or achieve the standards will be developed at the local BLM District and Resource Area levels and will consider all reasonable and practical options available to achieve desired results on a watershed or grazing allotment scale. The objectives shall be reflected in site-specific activity or implementation plans as well as in livestock grazing permits/leases for the public lands. These objectives and practices may be developed formally or informally through mechanisms available and suited to local needs (such as Coordinated Resource Management (CRM) efforts).

The development and implementation of standards and guidelines will enable on-the-ground management of the public rangelands to maintain a clear and responsible focus on both the health of the land and its dependent natural and human communities. This development and implementation will ensure that any mechanisms currently being employed or that may be developed in the future will maintain a consistent focus on these essential concerns. This development and implementation will also enable immediate attention to be brought to bear on existing resource concerns.

These standards and guidelines are compatible with BLM's three-tiered land use planning process. The first tier includes the laws, regulations, and policies governing BLM's administration and management of the public lands and their uses. The previously mentioned fundamentals of rangeland health specified in 43 CFR 4180.1, the requirement for BLM to develop these State (or regional) standards and guidelines, and the standards and guidelines themselves, are part of this first tier. Also part of this first tier are the specific requirements of various Federal laws and the objectives of 43 CFR 4100.2 that require BLM to consider the social and economic well-being of the local communities in its management process.

These standards and guidelines will provide for statewide consistency and guidance in the preparation, amendment, and maintenance of BLM land use plans, which represent the second tier of the planning process. The BLM land use plans provide general allocation decisions concerning the kinds of resource and land uses that can occur on the BLM administered public lands, where they can occur, and the types of conditional requirements under which they can occur. In general, the standards will be the basis for development of planning area-specific management objectives concerning rangeland health and productivity, and the guidelines will direct development of livestock grazing management actions to help accomplish those objectives.

The third tier of the BLM planning process, activity or implementation planning, is directed by the applicable land use plan and, therefore, by the standards and guidelines. The standards and guidelines, as BLM statewide policy, will also directly guide development of the site-specific objectives and the methods and practices used to implement the land use plan decisions. Activity or implementation plans contain objectives which describe the site-specific conditions desired. Grazing permits/leases for the public lands contain terms and conditions which describe specific actions required to attain or maintain

the desired conditions. Through monitoring and evaluation, the BLM, grazing permittees, and other interested parties determine if progress is being made to achieve activity plan objectives.

Wyoming rangelands support a variety of uses which are of significant economic importance to the State and its communities. These uses include oil and gas production, mining, recreation and tourism, fishing, hunting, wildlife viewing, and livestock grazing. Rangelands also provide amenities which contribute to the quality of life in Wyoming such as open spaces, solitude, and opportunities for personal renewal. Wyoming's rangelands should be managed with consideration of the State's historical, cultural, and social development and in a manner which contributes to a diverse, balanced, competitive, and resilient economy in order to provide opportunity for economic development. Healthy rangelands can best sustain these uses.

To varying degrees, BLM management of the public lands and resources plays a role in the social and economic well-being of Wyoming communities. The National Environmental Policy Act (part of the above-mentioned first planning tier) and various other laws and regulations mandate the BLM to analyze the socioeconomic impacts of actions occurring on public rangelands. These analyses occur during the environmental analysis process of land use planning (second planning tier), where resource allocations are made, and during the environmental analysis process of activity or implementation planning (third planning tier). In many situations, factors that affect the social and economic well-being of local communities extend far beyond the scope of BLM management or individual public land users' responsibilities. In addition, since standards relate primarily to physical and biological features of the landscape, it is very difficult to provide measurable socioeconomic indicators that relate to the health of rangelands. It is important that standards be realistic and within the control of the land manager and users to achieve.

STANDARDS FOR HEALTHY PUBLIC RANGELANDS

STANDARD #1

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

THIS MEANS THAT:
The hydrologic cycle will be supported by providing for water capture, storage, and sustained release. Adequate energy flow and nutrient cycling through the system will be achieved as optimal plant growth occurs. Plant communities are highly varied within Wyoming.

INDICATORS MAY INCLUDE BUT ARE NOT LIMITED TO:

- Water infiltration rates;
- Soil compaction;
- Erosion (rills, gullies, pedestals, capping);
- Soil micro-organisms;
- Vegetative cover (gully bottoms and slopes); and
- Bare ground and litter.

The above indicators are applied as appropriate to the potential of the ecological site.

STANDARD #2

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

THIS MEANS THAT:
Wyoming has highly varied riparian and wetland systems on public lands. These systems vary from large rivers to small streams and from springs to large wet meadows. These systems are in various stages of natural cycles and may also reflect other disturbance that is either localized or widespread throughout the watershed. Riparian vegetation captures sediments and associated materials, thus enhancing the nutrient cycle by capturing and utilizing nutrients that would otherwise move through a system unused.

INDICATORS MAY INCLUDE BUT ARE NOT LIMITED TO:

- Erosion and deposition rate;
- Channel morphology and flood plain function;
- Channel succession and erosion cycle;
- Vegetative cover;
- Plant composition and diversity (species, age class, structure, successional stages, desired plant community, etc.);
- Bank stability;
- Woody debris and instream cover; and
- Bare ground and litter.

The above indicators are applied as appropriate to the potential of the ecological site.

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 disturbance.

THIS MEANS THAT:
In order to maintain desirable conditions and/or recover from disturbance within acceptable timeframes, plant communities must have the components present to support the nutrient cycle and adequate energy flow. Plants depend on nutrients in the soil and energy derived from sunlight. Nutrients stored in the soil are used over and over by plants, animals, and micro organisms. The amount of nutrients available and the speed with which they cycle among plants, animals, and the soil are fundamental components of rangeland health. The amount, timing, and distribution of energy captured through photosynthesis are fundamental to the function of rangeland ecosystems.

INDICATORS MAY INCLUDE BUT ARE NOT LIMITED TO:

- Vegetative cover;
- Plant composition and diversity (species, age class, structure, successional stages, desired plant community, etc.);
- Bare ground and litter;
- Erosion (rills, gullies, pedestals, capping); and
- Water infiltration rates.

The above indicators are applied as appropriate to the potential of the ecological site.

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.

THIS MEANS THAT:
The management of Wyoming rangelands will achieve or maintain adequate habitat conditions that support diverse plant and animal species. These may include listed threatened or endangered species (U.S. Fish and Wildlife-designated), species of special concern (BLM-designated), and other sensitive species (State of Wyoming-designated). The intent of this standard is to allow the listed species to recover and be delisted, and to avoid or prevent additional species becoming listed.

INDICATORS MAY INCLUDE BUT ARE NOT LIMITED TO:

- Noxious weeds;
- Species diversity;
- Age class distribution;
- All indicators associated with the upland and riparian standards;
- Population trends; and
- Habitat fragmentation.

The above indicators are applied as appropriate to the potential of the ecological site.

STANDARD #5

Water quality meets State standards.

THIS MEANS THAT:
The State of Wyoming is authorized to administer the Clean Water Act. BLM management actions or use authorizations will comply with all Federal and State water quality laws, rules and regulations to address water quality issues that originate on public lands. Provisions for the establishment of water quality standards are included in the Clean Water Act, as amended, and the Wyoming Environmental Quality Act, as amended. Regulations are found in Part 40 of the Code of Federal Regulations and in *Wyoming's Water Quality Rules and Regulations*. The latter regulations contain Quality Standards for Wyoming Surface Waters.

Natural processes and human actions influence the chemical, physical, and biological characteristics of water. Water quality varies from place to place with the seasons, the climate, and the kind substrate through which water moves. Therefore, the assessment of water quality takes these factors into account.

INDICATORS MAY INCLUDE BUT ARE NOT LIMITED TO:

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

STANDARD #6

Air quality meets State standards.

THIS MEANS THAT:
The State of Wyoming is authorized to administer the Clean Air Act. BLM management actions or use authorizations will comply with all Federal and State air quality laws, rules, regulations and standards. Provisions for the establishment of air quality standards are included in the Clean Air Act, as amended, and the Wyoming Environmental Quality Act, as amended. Regulations are found in Part 40 of the Code of Federal Regulations and in *Wyoming Air Quality Standards and Regulations*.

INDICATORS MAY INCLUDE BUT ARE NOT LIMITED TO:

- Particulate matter;
- Sulfur dioxide;
- Photochemical oxidants (ozone);
- Volatile organic compounds (hydrocarbons);
- Nitrogen oxides;
- Carbon monoxide;
- Odors; and
- Visibility.

BLM WYOMING GUIDELINES FOR LIVESTOCK GRAZING MANAGEMENT

1. Timing, duration, and levels of authorized grazing will ensure that adequate amounts of vegetative ground cover, including standing plant material and litter, remain after authorized use to support infiltration, maintain soil moisture storage, stabilize soils, allow the release of sufficient water to

maintain system function, and to maintain subsurface soil conditions that support permeability rates and other processes appropriate to the site.

2. Grazing management practices will restore, maintain, or improve riparian plant communities. Grazing management strategies consider hydrology, physical attributes, and potential for the watershed and the ecological site. Grazing management will maintain adequate residual plant cover to provide for plant recovery, residual forage, sediment capture, energy dissipation, and ground water recharge.

3. Range improvement practices (instream structures, fences, water troughs, etc.) in and adjacent to riparian areas will ensure that stream channel morphology (e.g., gradient, width/depth ratio, channel roughness and sinuosity) and functions appropriate to climate and landform are maintained or enhanced. The development of springs, seeps, or other projects affecting water and associated resources shall be designed to protect the ecological and hydrological functions, wildlife habitat, and significant cultural, historical, and archaeological values associated with the water source. Range improvements will be located away from riparian areas if they conflict with achieving or maintaining riparian function.

4. Grazing practices that consider the biotic communities as more than just a forage base will be designed in order to ensure that the appropriate kinds and amounts of soil organisms, plants, and animals to support the hydrologic cycle, nutrient cycle, and energy flow are maintained or enhanced.

5. Continuous season-long or other grazing management practices that hinder the completion of plants' life-sustaining reproductive and/or nutrient cycling processes will be modified to ensure adequate periods of rest at the appropriate times. The rest periods will provide for seedling establishment or other necessary processes at levels sufficient to move the ecological site condition toward the resource objective and subsequent achievement of the standard.

6. Grazing management practices and range improvements will adequately protect vegetative cover and physical conditions and maintain, restore, or enhance water quality to meet resource objectives. The effects of new range improvements (water developments, fences, etc.) on the health and function of rangelands will be carefully considered prior to their implementation.

7. Grazing management practices will incorporate the kinds and amounts of use that will restore, maintain, or enhance habitats to assist in the recovery of Federal threatened and endangered species or the conservation of federally-listed species of concern and other State-designated special status species. Grazing management practices will maintain existing habitat or facilitate vegetation change toward desired habitats. Grazing management will consider threatened and endangered species and their habitats.

8. Grazing management practices and range improvements will be designed to maintain or promote the physical and biological conditions necessary to sustain native animal populations and plant communities. This will involve emphasizing native plant species in the support of ecological function and incorporating the use of non-native species only in those situations in which native plant species are not available in sufficient quantities or are incapable of maintaining or achieving properly functioning conditions and biological health.

9. Grazing management practices on uplands will maintain desired plant communities or facilitate change toward desired plant communities.

DEFINITIONS FOR STANDARDS AND GUIDELINES

ACTIVITY PLANS
Allotment Management Plans (AMPs), Habitat Management Plans (HMPs), Watershed Management Plans (WMPs), Wild Horse Management Plans (WHMPs), and other plans developed at the local level to address specific concerns and accomplish specific objectives.

COORDINATED RESOURCE MANAGEMENT (CRM)
A group of people working together to develop common resource goals and resolve natural resource concerns. CRM is a people process that strives for win-win situations through consensus-based decision making.

DESIRED PLANT COMMUNITY
A plant community which produces the kind, proportion, and amount of vegetation necessary for meeting or exceeding the land use plan/activity plan objectives established for an ecological site(s). The desired plant community must be consistent with the site's capability to produce the desired vegetation through management, land treatment, or a combination of the two.

ECOLOGICAL SITE
An area of land with specific physical characteristics that differs from other areas both in its ability to produce distinctive kinds and amounts of vegetation and in its response to management.

EROSION
(v.) Detachment and movement of soil or rock fragments by water, wind, ice, or gravity. (n.) The land surface worn away by running water, wind, ice, or other geological agents, including such processes as gravitational creep.

GRAZING MANAGEMENT PRACTICES
Grazing management practices include such things as grazing systems (rest-rotation, deferred rotation, etc.), timing and duration of grazing, herding, salting, etc. They do not include physical range improvements.

GUIDELINES (For Grazing Management)
Guidelines provide for, and guide the development and implementation of, reasonable, responsible, and cost-effective management actions at the allotment and watershed level which move rangelands toward statewide standards or maintain existing desirable conditions. Appropriate guidelines will ensure that the resultant management actions reflect the potential for the watershed, consider other uses and natural influences, and balance resource goals with social, cultural/historic, and economic opportunities to sustain viable local communities. Guidelines, and therefore, the management actions they engender, are based on sound science, past and present management experience, and public input.

INDICATOR
An indicator is a component of a system whose characteristics (e.g., presence, absence, quantity, and distribution) can be observed, measured, or monitored based on sound scientific principles. An indicator can be evaluated at a site- or species-specific level. Monitoring of an indicator must be able to show change within timeframes acceptable to management and be capable of showing how the health of the ecosystem is changing in response to specific management actions. Selection of the appropriate indicators to be observed, measured, or monitored in a particular allotment is a critical aspect of early communication among the interests involved on-the-ground. The most useful indicators are those for

which change or trend can be easily quantified and for which agreement as to the significance of the indicator is broad based.

LITTER
The uppermost layer of organic debris on the soil surface, essentially the freshly fallen or slightly decomposed vegetal material.

MANAGEMENT ACTIONS
Management actions are the specific actions prescribed by the BLM to achieve resource objectives, land use allocations, or other program or multiple use goals. Management actions include both grazing management practices and range improvements.

OBJECTIVE
An objective is a site-specific statement of a desired rangeland condition. It may contain either or both qualitative elements and quantitative elements. Objectives frequently speak to change. They are the focus of monitoring and evaluation activities at the local level. Monitoring of the indicators would show negative changes or positive changes. Objectives should focus on indicators of greatest interest for the area in question.

RANGE IMPROVEMENTS
Range improvements include such things as corrals, fences, water developments (reservoirs, spring developments, pipelines, wells, etc.) and land treatments (prescribed fire, herbicide treatments, mechanical treatments, etc.).

RANGELAND
Land on which the native vegetation (climax or natural potential) is predominantly grasses, grass-like plants, forbs, or shrubs. This includes lands revegetated naturally or artificially when routine management of that vegetation is accomplished mainly through manipulation of grazing. Rangelands include natural grasslands, savannas, shrublands, most deserts, tundra, alpine communities, coastal marshes, and wet meadows.

RANGELAND HEALTH
The degree to which the integrity of the soil and ecological processes of rangeland ecosystems are sustained.

RIPARIAN
An area of land directly influenced by permanent water. It has visible vegetation or physical characteristics reflective of permanent water influence. Lakeshores and streambanks are typical riparian areas. Excluded are such sites as ephemeral streams or washes that do not have vegetation dependent on free water in the soil.

STANDARDS
Standards are synonymous with goals and are observed on a landscape scale. Standards apply to rangeland health and not to the important by-products of healthy rangelands. Standards relate to the current capability or realistic potential of a specific site to produce these by-products, not to the presence or absence of the products themselves. It is the sustainability of the processes, or rangeland health, that produces these by-products.

TERMS AND CONDITIONS
Terms and conditions are very specific land use requirements that are made a part of the land use authorization in order to assure maintenance or attainment of the standard. Terms and conditions may

incorporate or reference the appropriate portions of activity plans (e.g., Allotment Management Plans). In other words, where an activity plan exists that contains objectives focused on meeting the standards, compliance with the plan may be the only term and condition necessary in that allotment.

UPLAND
Those portions of the landscape which do not receive additional moisture for plant growth from run-off, streamflow, etc. Typically these are hills, ridgetops, valley slopes, and rolling plains.

APPENDIX 2

WYOMING BUREAU OF LAND MANAGEMENT (BLM) MITIGATION GUIDELINES FOR SURFACE-DISTURBING AND DISRUPTIVE ACTIVITIES

INTRODUCTION

These guidelines are primarily for the purpose of attaining statewide consistency in how requirements are determined for avoiding and mitigating environmental impacts and resource and land use conflicts. Consistency in this sense does not mean that identical requirements would be applied for all similar types of land use activities that may cause similar types of impacts. Nor does it mean that the requirements or guidelines for a single land use activity would be identical in all areas.

There are two ways the mitigation guidelines are used in the resource management plan (RMP) and environmental impact statement (EIS) process: (1) as part of the planning criteria in developing the RMP alternatives, and (2) in the analytical processes of both developing the alternatives and analyzing the impacts of the alternatives. In the first case, an assumption is made that any one or more of the mitigations will be appropriately included as conditions of relevant actions being proposed or considered in each alternative. In the second case, the mitigations are used (1) to develop a baseline for measuring and comparing impacts among the alternatives; (2) to identify other actions and alternatives that should be considered, and (3) to help determine whether more stringent or less stringent mitigations should be considered.

The EIS for the RMP does not decide or dictate the exact wording or inclusion of these guidelines. Rather, the guidelines are used in the RMP EIS process as a tool to help develop the RMP alternatives and to provide a baseline for comparative impact analysis in arriving at RMP decisions. These guidelines will be used in the same manner in analyzing activity plans and other site-specific proposals. These guidelines and their wording are matters of policy. As such, specific wording is subject to change primarily through administrative review, not through the RMP EIS process. Any further changes that may be made in the continuing refinement of these guidelines and any development of program-specific standard stipulations will be handled in another forum, including appropriate public involvement and input.

PURPOSE

The purposes of the "Wyoming BLM Mitigation Guidelines" are (1) to reserve, for the BLM, the right to modify the operations of all surface and other human presence disturbance activities as part of the statutory requirements for environmental protection, and (2) to inform a potential lessee, permittee, or operator of the requirements that must be met when using BLM-administered public lands. These guidelines have been written in a format that will allow for (1) their direct use as stipulations, and (2) the addition of specific or specialized mitigation following the submission of a detailed plan of development or other project proposal, and an environmental analysis.

Those resource activities or programs currently without a standardized set of permit or operation stipulations can use the mitigation guidelines as stipulations or as conditions of approval, or as a baseline for developing specific stipulations for a given activity or program.

Because use of the mitigation guidelines was integrated into the RMP EIS process and will be integrated into the site-specific environmental analysis process, the application of stipulations or mitigation requirements derived through the guidelines will provide more consistency with planning decisions and plan implementation than has occurred in the past. Application of the mitigation guidelines to all surface and other human presence disturbance activities concerning BLM-administered public lands and resources will provide more uniformity in mitigation than has occurred in the past.

MITIGATION GUIDELINES

1. Surface Disturbance Mitigation Guideline

Surface disturbance will be prohibited in any of the following areas or conditions. The Authorized Officer may approve exception, waiver, or modification of this limitation in writing, including documented supporting analysis.

a. Slopes in excess of 25 percent.

b. Within important scenic areas (Class I and II Visual Resource Management Areas).

c. Within 500 feet of surface water and/or riparian areas.

d. Within either one-quarter mile or the visual horizon (whichever is closer) of historic trails.

e. Construction with frozen material or during periods when the soil material is saturated or when watershed damage is likely to occur.

Guidance

The intent of the SURFACE DISTURBANCE MITIGATION GUIDELINE is to inform interested parties (potential lessees, permittees, or operators) that when one or more of the five (1a through 1e) conditions exist, surface-disturbing activities will be prohibited unless or until a permittee or his designated representative and the surface management agency (SMA) arrive at an acceptable plan for mitigation of anticipated impacts. This negotiation will occur prior to development.

Specific criteria (for example, 500 feet from water) have been established based upon the best information available. However, such items as geographical areas and seasons must be delineated at the field level.

Exception, waiver, or modification of requirements developed from this guideline must be based upon environmental analysis of proposals (for example, activity plans, plans of development, plans of operation, applications for permit to drill) and, if necessary, must allow for other mitigation to be applied on a site-specific basis.

2. Wildlife Mitigation Guideline

a. To protect important big game winter habitat, activities or surface use will not be allowed from November 15 to April 30 within certain areas encompassed by the authorization. The same criteria apply to defined big game birthing areas from May 1 to June 30.

Application of this limitation to operation and maintenance of a developed project must be based on environmental analysis of the operational or production aspects.

The Authorized Officer may approve exception, waiver, or modification of this limitation in any year in writing, including documented supporting analysis.

b. To protect important raptor and/or sage and sharp-tailed grouse nesting habitat, activities or surface use will not be allowed from February 1 to July 31 within certain areas encompassed by the authorization. The same criteria apply to defined raptor and game bird winter concentration areas from November 15 to April 30.

Application of this limitation to operation and maintenance of a developed project must be based on environmental analysis of the operational or production aspects.

The Authorized Officer may approve exception, waiver, or modification of this limitation in any year in writing, including documented supporting analysis.

c. No activities or surface use will be allowed on that portion of the authorization area identified within (legal description) for the purpose of protecting (for example, sage/sharp-tailed grouse breeding grounds, and/or other species/activities) habitat.

The Authorized Officer may approve exception, waiver, or modification of this limitation in any year in writing, including documented supporting analysis.

d. Portions of the authorized use area legally described as (legal description), are known or suspected to be essential habitat for (name) which is a threatened or endangered species. Prior to conducting any onsite activities, the lessee/permittee will be required to conduct inventories or studies in accordance with BLM and U.S. Fish and Wildlife Service guidelines to verify the presence or absence of this species. In the event that (name) occurrence is identified, the lessee/permittee will be required to modify operational plans to include the protection requirements of this species and its habitat (for example, seasonal use restrictions, occupancy limitations, facility design modifications).

Guidance

The WILDLIFE MITIGATION GUIDELINE is intended to provide two basic types of protection: seasonal restriction (2a and 2b) and prohibition of activities or surface use (2c). Item 2d is specific to situations involving threatened or endangered species. Legal descriptions will ultimately be required and should be measurable and legally definable. There are no minimum subdivision requirements at this time. The area delineated can and should be defined as necessary, based upon current biological data, prior to the time of processing an application and issuing the use authorization. The legal description must eventually become a part of the condition for approval of the permit, plan of development, and/or other use authorization.
The seasonal restriction section identifies three example groups of species and delineates three similar time frame restrictions. The big game species including elk, moose, deer, antelope, and bighorn sheep, all require protection of crucial winter range between November 15 and April 30. Elk and bighorn sheep also require protection from disturbance from May 1 to June 30, when they typically occupy distinct calving and lambing areas. Raptors include eagles, accipiters, falcons (peregrine, prairie, and merlin), buteos (ferruginous and Swainson's hawks), osprey, and burrowing owls. The raptors and sage and sharp-tailed grouse require nesting protection between February 1 and July 31. The same birds often require protection from disturbance from November 15 through April 30 while they occupy winter concentration areas.

Item 2c, the prohibition of activity or surface use, is intended for protection of specific wildlife habitat areas or values within the use area that cannot be protected by using seasonal restrictions. These areas or

values must be factors that limit life-cycle activities (for example, sage grouse strutting grounds, known threatened and endangered species habitat).

Exception, waiver, or modification of requirements developed from this guideline must be based upon environmental analysis of proposals (for example, activity plans, plans of development, plans of operation, applications for permit to drill) and, if necessary, must allow for other mitigation to be applied on a site-specific basis.

3. Cultural Resource Mitigation Guideline

When a proposed discretionary land use has potential for affecting the characteristics which qualify a cultural property for the National Register of Historic Places (National Register), mitigation will be considered. In accordance with Section 106 of the Historic Preservation Act, procedures specified in 36 CFR 800 will be used in consultation with the Wyoming State Historic Preservation Officer in arriving at determinations regarding the need and type of mitigation to be required.

Guidance

The preferred strategy for treating potential adverse effects on cultural properties is "avoidance." If avoidance involves project relocation, the new project area may also require cultural resource inventory. If avoidance is imprudent or unfeasible, appropriate mitigation may include excavation (data recovery), stabilization, monitoring, protection barriers and signs, or other physical and administrative measures.

Reports documenting results of cultural resource inventory, evaluation, and the establishment of mitigation alternatives (if necessary) shall be written according to standards contained in BLM Manuals, the cultural resource permit stipulations, and in other policy issued by the BLM. These reports must provide sufficient information for Section 106 consultation. The appropriate BLM cultural resource specialist shall review reports for adequacy. If cultural properties on, or eligible for, the National Register are located within these areas of potential impact and cannot be avoided, the Authorized Officer shall begin the Section 106 consultation process in accordance with the Wyoming Protocol to the National Programmatic Agreement.

Mitigation measures shall be implemented according to the mitigation plan approved by the BLM Authorized Officer. The land use applicant according to BLM specifications usually prepares such plans. Mitigation plans will be reviewed as part of Section 106 consultation for National Register eligible or listed properties. The extent and nature of recommended mitigation shall be commensurate with the significance of the cultural resource involved and the anticipated extent of damage. Reasonable costs for mitigation will be borne by the land use applicant. Mitigation must be cost effective and realistic. It must consider project requirements and limitations, input from concerned parties, and be BLM approved or BLM formulated.

Mitigation of paleontological and natural history sites will be treated on a case-by-case basis. Factors such as site significance, economics, safety, and project urgency must be taken into account when making a decision to mitigate. Authority to protect (through mitigation) such values is provided for in FLPMA, Section 102(a)(8). When avoidance is not possible, appropriate mitigation may include excavation (data recovery), stabilization, monitoring, protection barriers and signs, or other physical and administrative protection measures.

4. Special Resource Mitigation Guideline

To protect (resource value), activities or surface use will not be allowed (that is, within a specific distance of the resource value or between date to date) in (legal description).

Application of this limitation to operation and maintenance of a developed project must be based on environmental analysis of the operational or production aspects.

The Authorized Officer may approve exception, waiver, or modification of this limitation in any year in writing, including documented supporting analysis.

Example Resource Categories (Select or identify category and specific resource value):

a. Recreation areas.

b. Special natural history or paleontological features.

c. Special management areas.

d. Sections of major rivers.

e. Prior existing rights-of-way.

f. Occupied dwellings.

g. Other (specify).

Guidance

The SPECIAL RESOURCE MITIGATION GUIDELINE is intended for use only in site-specific situations where one of the first three general mitigation guidelines will not adequately address the concern. The resource value, location, and specific restrictions must be clearly identified. A detailed plan addressing specific mitigation and special restrictions will be required prior to disturbance or development and will become a condition for approval of the permit, plan of development, or other use authorization.

Exception, waiver, or modification of requirements developed from this guideline must be based upon environmental analysis of proposals (for example, activity plans, plans of development, plans of operation, applications for permit to drill) and, if necessary, must allow for other mitigation to be applied on a site-specific basis.

5. No Surface Occupancy Guideline

No Surface Occupancy will be allowed on the following described lands (legal description) because of (resource value).

Example Resource Categories (Select or identify category and specific resource value):

a. Recreation Areas (for example, campgrounds, historic trails, national monuments).

b. Major reservoirs/dams.

c. Special management area (for example, known threatened or endangered species habitat, areas suitable for consideration for wild and scenic rivers designation).

d. Other (specify).

Guidance

The NO SURFACE OCCUPANCY (NSO) MITIGATION GUIDELINE is intended for use only when other mitigation is determined insufficient to adequately protect the public interest and is the only alternative to "no development" or "no leasing." The legal description and resource value of concern must be identified and be tied to an NSO land use planning decision.

Waiver of, or exception(s) to, the NSO requirement will be subject to the same test used to initially justify its imposition. If, upon evaluation of a site-specific proposal, it is found that less restrictive mitigation would adequately protect the public interest or value of concern, then a waiver or exception to the NSO requirement is possible. The record must show that because conditions or uses have changed, less restrictive requirements will protect the public interest. An environmental analysis must be conducted and documented (for example, environmental assessment, environmental impact statement, etc., as necessary) in order to provide the basis for a waiver or exception to an NSO planning decision. Modification of the NSO requirement will pertain only to refinement or correction of the location(s) to which it applied. If the waiver, exception, or modification is found to be consistent with the intent of the planning decision, it may be granted. If it is found inconsistent with the intent of the planning decision, a plan amendment would be required before the waiver, exception, or modification could be granted.

When considering the "no development" or "no leasing" option, a rigorous test must be met and fully documented in the record. This test must be based upon stringent standards described in the land use planning document. Since rejection of all development rights is more severe than the most restrictive mitigation requirement, the record must show that consideration was given to development subject to reasonable mitigation, including "no surface occupancy." The record must also show that other mitigation was determined to be insufficient to adequately protect the public interest. A "no development" or "no leasing" decision should not be made solely because it appears that conventional methods of development would be unfeasible, especially where an NSO restriction may be acceptable to a potential permittee. In such cases, the potential permittee should have the opportunity to decide whether or not to go ahead with the proposal (or accept the use authorization), recognizing that an NSO restriction is involved.

APPENDIX 3

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.

POLLUTANTS

Air Pollutants addressed in this study include criteria pollutants, hazardous air pollutants (HAP) and sulfur and nitrogen compounds.

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), ozone (O_3), sulfur dioxide (SO_2), particulate matter (PM_{10}, $PM_{2.5}$), and lead (Pb).

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

NO_2 is a red-brown gas formed during the 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 and 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.

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 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.

SO_2 forms during combustion from trace levels of sulfur in coal or diesel fuel, and can convert to ammonium sulfate (SO_4^-) and sulfuric acid (H_2SO_4), which can cause visibility impairment and acid rain. Volcanoes are a natural source of SO_2.

Particulate matter (i.e., soil particles, hair, pollen, etc.) is essentially the small particles suspended in the air, which 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. These particles are also the main cause of visibility impairment.

Hazardous Air Pollutants

There are a wide variety of hazardous air pollutants including N-hexane, ethylbenzene, toluene, xylene, formaldehyde and benzene. Although hazardous air pollutants do not have federal standards, they do have "significance thresholds" set by various States and are typically evaluated for potential chronic inhalation and cancer risks.

Hazardous air pollutant emissions are associated with industrial activity, including oil and gas operations, refineries, paint facilities, wood working shops and dry cleaners.

Sulfur and Nitrogen Compounds

Sulur 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, and petroglyphs.

Ammonium (NH_4) is associated with feedlots and agricultural fertilization. Deposition of NH_4 can affect vegetation. While deposition may be beneficial as a fertilizer, it can adversely affect the timing of plant growth and dormancy.

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. Short averaging times (1, 3, and 24 hours) address short-term exposure, while the annual standards address long-term exposure. Annual standards are set to lower allowable concentrations than are short-term standards to recognize the cumulative effects of long-term exposure.

TABLE 1
NATIONAL AND WYOMING AIR QUALITY STANDARDS
FOR CRITERIA POLLUTANTS

Pollutant	Averaging Time	NAAQS (mg/m^3)	WAAQS (mg/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	
	8 hour	157	157
Particulate matter (PM_{10})	24 hour	150	150
	Annual	50	50
Fine particulate matter ($PM_{2.5}$)	24 hour	65	
	Annual	15	

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:

- 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.

TABLE 2
PSD INCREMENTS

Pollutant	Averaging Time	PSD Increment (mg/m^3)	
		Class I	Class II
Nitrogen dioxide (NO_2)	Annual	2.5	25
Sulphur 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

PSD Class I areas in the Snake River region include the Bridger, Fitzpatrick and Washakie Wilderness Areas and Grand Teton and Yellowstone National Parks. Special status Class II areas include the Popo Agie Wilderness Area and the Wind River Roadless Area. The Snake River project area is also classified as PSD Class II.

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. Consumption analyses are applied to large industrial sources and are solely the responsibility of the State and the Environmental Protection Agency.

REGIONAL HAZE REGULATIONS

Visibility impairment is an indicator of air pollution concentration. Visibility can be defined as the furthest distance at which one can perceive color, contrast and detail. Fine particulate matter ($PM_{2.5}$) is the main cause of visibility impairment. 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 would 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 and improve visibility in PSD Class I areas across the United States, so that visibility in these areas is returned to natural conditions. These regulations require States to demonstrate reasonable progress in maintaining or improving visibility in PSD Class I areas.

APPENDIX 4

DESCRIPTION OF THE PUBLIC LAND PARCELS

Parcels are listed and numbered from north to south. Acreages are estimated as closely as possible given the changing nature of the river. Boundary lines for these parcels include the thread of the Snake River, which regularly changes; as a result, the parcels shrink and grow in size with changes in river morphology. Parcels without realty case numbers are U.S. surface that was not included in the litigation of ownership of riparian lands along the river. Case number 111691 includes all lands adjacent to State of Wyoming lands, and includes several parcels along the length of the river.

Parcel Number	Realty Case Number	Location	Size (approx)	Description
1	WYW-111703	T42N, R116W, Sec 9, 10	19 acres	This parcel lies mostly between the levees along the right bank of the Snake River. It lies within the boundary of Grand Teton National Park, and is over 1 mile long. The parcel became part of GTNP in the ownership litigation.
2	WYW-111691	T42N, R116W, Sec. 16 NW	178 acres	The parcel lies completely inside the levee along the right bank. This parcel lies adjacent to a parcel of State land within the boundary of Grand Teton National Park, and directly west of the Jackson Hole Airport. The parcel became part of GTNP in the ownership litigation.
3	WYW-111691	T42N, R116W, Sec 20, 21	12 acres	Lies between the levees, along the right bank and adjacent to the south boundary of GTNP. Contains cottonwood trees and grassy and gravelly openings. Wildlife and visual resource values. Access is from the river or through the Park. A portion of parcel 3 lies inside the boundary of GTNP and became part of GTNP in the ownership litigation. (Map 3)
4	No case number	T42N, R116W, Sec. 20 NESE	5 acres	Lies inside the levee along the right bank. This parcel appears to be U.S. property that was not litigated in the 1970's suits. Consists mostly of a gravel bar. Access is from the river. (Map 3)
5	111691	T42N, R116W, Sec. 20 SESE	0 acres	Lies inside the levee along the right bank, and adjacent to approximately 40 acres of State land. The parcel has been eroded away. (Map 3)
6	WYW-121768, 121769, 121770	T42N, R116W, Sec 29 NE	25 acres	Portions of two large islands. Much of the area is gravel bar and subject to annual flooding. Some cottonwood trees are present on the south end. Access is from the river only. (Map 3)

7	WYW-111693	T41N, R116W, Sec 5,6	78 acres	Lies both within and outside the levee along the right bank, at the confluence of the Gros Ventre River. Includes a portion of a large island, and about 30 acres of uplands outside the levee; a portion of this area is marshy and provides good wildlife habitat. Many cottonwood trees on uplands and the island. Some cold springs. The boundaries of this parcel were fixed in the judgment. Access is from the river only. (Map 4)
8	No case number	T42N, R116W, Sec 34	41 acres	This parcel lies on the left bank of the Gros Ventre river, adjacent to Grand Teton National Park and across the river from the Jackson Hole Country Club. It was not disputed in the 1979 suits. Cottonwood riparian area. A portion of the area has been mined for gravel. Provides scenic backdrop to the river as viewed from the golf course. Access is through the Park or from the river. Some historical ranching and rural trash dumps. The fence is not on line, and livestock have grazed part of the parcel. (Map 4)
9	WYW-112092	T41N, R116W, Sec. 6, 7, 12, 13	295 acres	Lies within and outside the levee along the left bank, beginning below the confluence of the Gros Ventre in section 6 and extending almost to the Wilson Bridge; about 3 miles in length. Known as the Walton Greenway or Rabbit Flats. A large area outside the levee contains extensive cottonwood woodland. The Walton Ranch holds a grazing authorization on this parcel. The parcel did not meet Standard #3. A quarry on the north end of the area on private land generates fairly heavy truck traffic. This parcel is very popular with local people as a recreation area for hiking, dog walking, cross country skiing, etc. Adjacent to Emily Stevens Park at the south end. Access is available for foot traffic from Wyoming Highway 22; the levee road is gated and locked and allows only quarry traffic and other authorized vehicles. The south boundary line of the parcel is fixed in accordance with the judgment. The judgment also specified the closing of the levee road, and that the United States would maintain the parcel "in an optimum condition for the protection and preservation of aquatic and wildlife habitat". Mineral extraction is prohibited, and a portion of the parcel is closed to gravel extraction, in accordance with the judgment. There are patches of young to middle-aged cottonwoods within the levees. There is a potentially significant historic site, consisting of an old roadbed and causeway. (Map 5)
10	WYW-111691	T41N, R117W, Sec. 13 NENE	25 acres	Lies along the left bank, adjacent to a parcel that was State land at the time of the judgments, about in the middle of the Walton Greenway. Characteristics, access, and condition similar to that of the Walton Greenway. (Map 5)

11	WYW-111695	T41N, R117W, Sec. 24 NWNW	3 acres	Lies along the right bank, both inside and outside the levee. This is the northernmost "rabbit ear" of Rabbit Flats. Cottonwood riparian; a small channel runs through it. Boundary line is fixed in the judgment. Access from the levee from the Wilson Bridge boat ramp. (Map 5)
12	WYW-111710	T41N, R 117W, Sec. 24	6 acres	Lies along the right bank, both inside and outside the levee. The southern "rabbit ear". Characteristics, access, and condition similar to those of the northern rabbit ear. There is a gravel processing operation on private land adjacent to this parcel. (Map 5)
13	WYW-112088	T41N, R117W, Sec. 23-24	11 acres	Lies along the right bank, outside the levee. Just north of the Wilson bridge. Access from a road off of the Teton Village road. This parcel contains the Wilson Bridge boat ramp. Public land extends to the levee only, not to the water's edge. The easement is limited to boat launching and takeout only. This boat ramp is a major river access point both for leaving the river and for launching. Parking at the area is very limited. (Map 5)
14	WYW-121762	T41N, R117W, Sec. 24	5 acres	Lies along the left bank, north of the Wilson bridge and adjacent to Emily Stevens Park. Cottonwood riparian area. Access from Wyoming Highway 22. (Map 5)
15	WYW-121772	T41N, R117W, Sec. 26	21 acres	Lies along the left bank, south of the Wilson bridge. Wooded islands. This area is under grazing lease to the R. Bruce Porter Estate. Cottonwood riparian area with grassy meadow openings. Access is from the river only. (Map 6)
16	WYW-111714	T41N, R117W, Sec. 26, 35	51 acres	Lies along the left bank, inside the levee. Adjacent to and under grazing lease with parcel 15. Similar conditions and uses exist. Access from the river only. (Map 6)
17	WYW-111713	T41N, R117W, Sec. 26	19 acres	Lies along the right bank in the center of section 26, inside and outside the levee. The cottonwood and understory shrub condition is very good. Access from the levee south from Wilson Bridge. (Map 6)
18	WYW-121767	T41N, R117W, Sec 26	25 acres	Lies along the right bank, inside and outside the levee. Condition similar to parcel 17. The south boundary of the parcel is fixed in the judgment. Access from the levee south from Wilson Bridge. There has been unauthorized camping on the parcel in the past. (Map 6)
19	WYW-111691	T41N, R117W, Sec. 35	144 acres	Lies along the right bank, mostly outside the levee. Both north and south boundaries are fixed. Cottonwood riparian area, with several channels and old oxbows present. Access from the levee south from Wilson Bridge. Popular with locals for recreation, horse trails, ATV trails. (Map 6)
20	No case number	T40N, R117W, Sec. 10	58 acres	Lies along the right bank. Access from the river only. Includes upland area and a bluff above the river. Cottonwood trees. (Map 7)

21	WYW-111691	T40N, R117W, Sec. 14	61 acres	Lies on the left bank, mostly outside the levee; extends for about ½ mile east of the river. Cottonwood riparian area with several channels (spring creeks) across area. Access from the river only. Elk migration route to the South Park feedground. Did not meet land health Standard #3; cause not yet determined or verified. (Map 7)
22	WYW-115113	T40N, R117W, Sec. 14	34 acres	Lies along the right bank, inside and outside the levee. Lowland area with many river channels present and a bluff above the river. Access from the river only. (Map 7)
23	WYW-111715	T40N, R117W, Sec. 24, 25	89 acres	Consists of 2 parcels lying along the right bank, mostly outside the levee. Good condition cottonwood lowland, with channels running through. Parcel under grazing lease to Snake River Ranch Co. There is access from the Fall Creek Road, a Teton County road. This parcel was resurveyed in 1998. This parcel met the land health standards. A couple small buildings and several corrals are located on the parcel. (Map 8)
24	No case number	T40N, R117W, Sec. 25; T40N, R116W, Sec. 30	2 acres	Lies along the right bank. Access from the river only. There is no levee in this area. Former size about 150 acres; most of this has been lost due to erosion by the shifting riverbed. The parcel may have eroded completely away. (Map 8)
25	WYW-111691	T40N, R116W, Sec. 28, 29, 32, 33, 34	210 acres	Lies along the left bank, just upstream of the South Park bridge, and extends for about 1.5 miles. The parcel has been transferred to the Wyoming Game and Fish Department through the R&PP process and is now a part of the South Park Elk Feedground. (Map 9)
26	No case number	T40N, R116W, Sec. 34	23 acres	Lies along the right bank, on both sides of U.S. Highway 191/189 at the South Park Bridge. Grassy meadow, cottonwood trees, and willow bars. Supports some recreation from the adjacent Evans trailer park. Gravel extraction from the river is taking place just downstream of this parcel. Access from U.S. Highway 191/189 and the Munger Mountain road. The area on the west side of U.S. Highway 189/191 is a popular vehicle access for shore fishing. (Map 9)
27	No case number	T40N, R116W, Sec 27 SESW	40 acres	Parcel is not on the river; this is the trash transfer station site. Access on U.S. Highway 191/189. (Map 9)

APPENDIX 5

DISPOSAL CRITERIA

The Federal Land Policy Act of 1976 provides for retention of the public lands in federal ownership and management by BLM for multiple use and sustained yield of the lands and resources, with environmental integrity. Public lands may be transferred from BLM to other federal agencies for management. Disposal by sale, exchange or Recreation and Public Purpose patent remains an option if such an action will serve an important objective and have a public benefit.

Prior to any disposal, a site-specific analysis must determine that the lands considered contain no significant wildlife, recreation, or other resource values the loss of which cannot be mitigated; have no overriding public values; and represent no substantial public investments. Disposal must serve the public interest.

EXCHANGES

The policy is to promote land exchanges that serve the national interest and are beneficial to BLM programs or which support the programs of other agencies (reference Sections 102, 205, and 206 or FLPMA).

Transfer of leasable minerals out of Federal ownership should be avoided except where non-Federal leasable minerals are to be received in return. It is preferable to trade both surface and subsurface (mineral) estates.

Exchanges should involve lands similar in character and/or value. Proposals will not be considered where it is the intent to transfer acquired lands out of Federal ownership or control.

Exchanges should not be made solely for the purpose of blocking up Federal land ownership.

SALES

Public land sale proposals are the result of either a BLM initiative or in response to expressed public interest or need. Lands to be considered for disposal, at a minimum, must meet the following criteria as outlined in Section 203 of the Federal Land Policy and Management Act.

1. They are difficult and uneconomical to manage, and are not suitable for management by another Federal agency.

2. Disposal would serve important public objectives, including but not limited to community expansion or economic development that could not be achieved prudently or feasibly on land other than public lands and which outweigh other public objectives or values.

3. Such tract was acquired for a specific purpose, and the tract is no longer required for that purpose or any other Federal purpose.

SALES/EXCHANGES INVOLVING WETLANDS

Bureau policy is to retain wetlands in Federal ownership unless Federal, State, public and private institutions, and parties have demonstrated the ability to maintain, restore, and protect wetlands and riparian habitats on a continuous basis (BLM Manual 6740). Sales/exchanges may be authorized when:

1. The tract of public wetlands is either so small or remote that it is uneconomical to manage.

2. The tract of public wetlands is not suitable for management by another Federal agency.

3. The patent contains restrictions of uses and prohibited by identified Federal, State, or local wetlands regulations.

4. The patent contains restrictions and conditions that ensure the patentee can maintain, restore, and protect the wetlands on a continuous basis.

RECREATION AND PUBLIC PURPOSES LEASE/PATENT

The objective of the R&PP act is to meet the needs of State and local governmental agencies and other qualified organizations for public lands required for recreational and public purposes. Use of the R&PP Act protects public values in the land through its reversionary provisions and helps qualified entities obtain the more liberal pricing authorized under the act.

Public lands shall be conveyed or leased only for an established or definitely proposed project for which there is a reasonable timetable of development and satisfactory development and management plans. No more land that is reasonably necessary for the proposed use shall be conveyed.

APPENDIX 6

CONTINGENT VALUATION METHODOLOGY STUDY

BACKGROUND

BLM commissioned a report, authored by Dr. John Loomis, to use a Contingent Valuation Methodology approach to determine the public's willingness to pay for public resources under four different management strategies. The report is entitled BLM UPPER SNAKE RIVER, CONTINGENT VALUATION METHODOLOGY, published in April of 2001. A copy is located at the Pinedale Field Office, BLM. The study was conducted to determine non-market values for resources and uses of the public land parcels in the Snake River planning area.

To gather the necessary data to be used in the report, a 12-page survey was developed and given to a random sample of visitors at four locations along the Snake River corridor in Jackson Hole. The fieldwork for the report was conducted during the summer of 2000, over a 21-day period between August and the Labor Day weekend. A total of 655 surveys were handed out to river visitors during this time period.

Most visitors who received the surveys took them home to give their answers some careful thought and then return the surveys. They were also asked for their name and address so a follow up contact could be made in the event they did not return the survey. Of the 655 surveys handed out, 418 were returned, constituting a 65.2% response rate (Table 1).

TABLE 1
BLM SURVEY RESPONSE RATE

	Teton County	Rest of WY	Rest of U.S	Visitors	Total
Surveys Mailed	800	800	800	657	3,057
Undeliverable	165	50	44	16	275
Deceased	4	10	6	0	20
Net Sample	631	740	750	641	2,762
Returned	372	386	254	418	1,430
Response Rate	**59.0%**	**52.2%**	**33.9%**	**65.2%**	**51.8%**

In addition to the visitor survey, there were three random surveys mailed to households in Teton County, Rest of Wyoming, and throughout the rest of the United States. There were 800 surveys mailed to each of these geographic areas for a total of 2,400 surveys. Table 1 indicates the specifics of each mailing and depicts the response rates for all three.

As expected, the response rate was highest for the visitors who were personally handed a survey, and the lowest for the random sample sent out to the rest of the United States. But overall, the response rate amounted to nearly 52%, which provided a good representation of those surveyed and could be used to draw meaningful conclusions regarding the management strategies being examined.

WILLINGNESS TO PAY

The survey was based on four Management Strategies:

Management Strategy A: Sale of Lands to Private Landowners
Management Strategy B: Increased Recreation Use
Management Strategy C: Retention of Public Lands and Increased Wildlife Habitat Management to Maintain Habitat
Management Strategy D: Sand and Gravel Mining and Expanded Livestock Grazing

Respondents were asked to vote on Management Strategy comparisons where Strategy A was compared to Strategies B, C, and D. All Management Strategies, other than A, required payment of higher annual taxes. Depending on the survey respondents received, the annual tax increase in their survey ranged from a low of $2 to a high of $295.

The results of the voting are illustrated in Table 2. Notice the Willingness to Pay (WTP) is the highest for Management Strategy C vs. A across all samples. For example, the WTP for C vs. A ranges from a high of $288 for Visitors to a low of $52 for the Rest of WY. It is important to note that while the WTP for Rest of WY and Rest of U.S. is relatively low compared to the WTP for Visitors and Teton County Residents, the number of households in the U.S. is much greater. When the WTP is extrapolated over approximately 100 million households nationwide, the value for Management Strategy C vs. A becomes substantial.

TABLE 2
ESTIMATES OF WILLINGNESS TO PAY (WTP)

	Strategy	Median WTP
Visitors	B vs. A	$202
	C vs. A	$288
	D vs. A	$39
Teton County Residents	B vs. A	$177
	C vs. A	$245
	D vs. A	$37
Rest of Wyoming	B vs. A	$49
	C vs. A	$52
	D vs. A	($47)
Rest of United States	B vs. A	$5
	C vs. A	$68
	D vs. A	($108)

Numbers in parentheses are negative

MANAGEMENT STRATEGY PREFERENCE

In addition to the WTP questions in the survey, respondents were asked which of the four Management Strategies they preferred if there were no cost associated with any of the choices. The results of the voting are illustrated in Table 3.

Strategy A, involving the sale of the BLM-administered land, was the least popular choice across all samples. The most popular choice was Management Strategy C, which emphasized retention of public lands, wildlife protection at the expense of slightly lower recreation use, elimination of livestock grazing,

and the prohibition of sand and gravel mining. The second most popular choice was Management Strategy B, emphasizing increased recreation use in conjunction with more recreation facilities. The third most popular choice was Management Strategy D, which favored sand and gravel mining and expanded livestock grazing.

TABLE 3
MANAGEMENT STRATEGY PREFERENCE

Strategy	Visitors	Teton County Residents	Rest of Wyoming	Rest of US
A	2.4%	2.4%	4.0%	5.7%
B	29.0%	25.4%	29.1%	26.0%
C	59.5%	54.9%	45.1%	55.1%
D	9.1%	17.4%	21.7%	13.2%
Total	100%	100%	100%	100%

SUMMARY

The study entitled BLM UPPER SNAKE RIVER, CONTINGENT VALUATION METHODOLOGY points out one common theme. That theme is that the public lands being considered in this RMP represent a valuable resource that has a non-market component that greatly exceeds the private market value of the lands. The resource is not only valuable to the visitors and residents of Teton County, but to the nation as a whole. Moreover, it is clear from the study that the preference of the public is to keep the parcels in public ownership.

Another interesting observation pointed out in the BLM UPPER SNAKE RIVER study is derived from the random selection of respondents living in the Rest of WY and Rest of U.S. Many of the respondents from this sample set have never visited the Jackson Hole area, but are still willing to pay to have it maintained in public ownership. The public's willingness to pay to maintain these lands in public ownership emphasizes the importance of this area from a national preservation standpoint. Also, it further illustrates the importance of the non-market component of value for these lands.

Given the scope of the study, it is not possible to accurately quantify the WTP of each of the alternatives being evaluated in the SRRMP. With that said, a subjective analysis will be used to examine the salient features of each alternative and determine whether the WTP is expected to go up or down based on the responses in the BLM UPPER SNAKE RIVER study. Following that discussion, a subjective comparative analysis will be used to rank the WTP associated with each alternative.

The BLM UPPER SNAKE RIVER study is available for review. By reviewing that document, the reader will have access to the details of the study that have been summarized in this appendix. For a more thorough understanding of this study, please refer to the report entitled BLM UPPER SNAKE RIVER, CONTINGENT VALUATION METHODOLOGY published in April of 2001.

APPENDIX 7

PUBLIC LAND ORDER 7143

43 CFR Public Land Order 7143 [WY-930-1430-01; WYW-128871]

Withdrawal of Public Lands and Federal Minerals for the Snake River Riparian Lands; Wyoming

AGENCY: Bureau of Land Management, Interior

ACTION: Public land order.

SUMMARY: This order withdraws from mineral or surface entry, for a period of 10 years, a total of 5,937 acres of public lands, 663 acres of lands as to which the United States owns both the surface and mineral estate, 1,993 acres of lands as to which the United States owns only the surface estate, and 3,281 arcres of lands as to which the United States owns only the mineral estate, except that such public lands may be exchanges or sold pursuant to the Federal Land Policy and Management Act of 1976, 43 U.S.C. 1701 (1988), or conveyed pursuant to the Recreation and Public Purposes Act, 43 U.S.C. 869 (1988). The lands are collectively known as the Snake River Riparian Lands, located in Teton County, near Jackson, Wyoming. This action will protect and preserve highly significant recreation, scenic, riparian, and wildlife resources until land use planning for the area can be completed. The lands have been and will remain open to mineral leasing.

EFFECTIVE DATE: June 1, 1995.

FOR FURTHER INFORMATION CONTACT: Tamara Gertsch, Wyoming State Office, P.O. Box 1828, Cheyenne, Wyoming 82003, 307-775-6115.

By virtue of the authority vested in the Secretary of the Interior by Section 204 of the Federal Land Policy and Management Act of 1967, 43 U.S.C. 1714 (1988), it is ordered as follows:

1. To protect significant recreation, scenic, riparian and wildlife resources, the public lands, including lands as to which the United states owns both the surface and mineral estate, the surface estate only, and the mineral estate only, found within the following described areas are hereby withdrawn, subject to valid existing rights, from settlement, location, or entry, including entry under the mining laws of the United States (30 U.S.C. Ch 2(1988)), but not from leasing pursuant to applicable mineral leasing laws, exchange or sale pursuant to the Federal Policy and Management Act of 1976, 43 U.S.C. 1701 (1988), or conveyance pursuant to the Recreation and Public Purpose Act, 43 U.S.C. 869 (1988):

Sixth Principal Meridian

T. 40N., R. 116 W., Secs. 28, 29, 30, 31, 32, 33, and 34.
T. 40N., R 117 W., Secs. 3, 10, 11, 14, 23, 24, and 25.
T. 41N., R 116 W., Secs. 5, 6, 7, and 18.
T. 41 N., R 117 W., Secs. 12, 13, 23, 24, 25, 26, 34, and 35.
T. 42 N., R 116 W., Secs. 20, 21, 29, 32, and 34.

The areas described contain a total of 5,937 acres of public lands in Teton County, 663 acres of lands as to which the United States owns both the surface and the mineral estate, 1,993 acres of lands as to which the United States owns only the surface estate, and 3,281 acres of lands as to which the United States owns only the mineral estate.

2. The withdrawal made by this order does not alter the applicability of those public land laws governing the use of the lands under lease, license, or permit, or governing the disposal of their mineral or vegetative resources other than under the mining laws.

3. This withdrawal will expire 10 years from the effective date of this order unless, as a result of a review conducted before the expiration date pursuant to Section 204(f) of the Federal Land Policy and Management Act of 1976, 43 U.S.C. 1714(f) (1988), the Secretary determines that the withdrawal shall be extended.

Map 1
General Location and Land Status

Map 2
Federal Mineral Estate

Map 3
Parcels 3-6

Map 4
Parcels 7-8

Map 5
Parcels 9-14

Map 6
Parcels 15-19

Map 7
Parcels 20-22

Map 8
Parcels 23-24

Map 9
Parcels 25-27

Map 10
Mineral Withdrawal PLO 7143

Map 11
Areas Closed to Mineral Leasing, Alternative B

Map 12
Right-of-Way Exclusion Areas, Alternative C

Map 13
Right-of-Way Avoidance Areas, Preferred Alternative and Alternatives A and E

Map 14
Grazing Allotments

Map 15
Designated Roads, Preferred Alternative and Alternatives C and E

Map 16
Recreation Opportunity Spectrum

Map 17
Big Game Crucial Winter Range