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DRAFT BIOLOGICAL ASSESSMENT

Pinedale Resource Management Plan/ Draft Environmental Impact Statement

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LIST OF TABLES

ACRONYMS

2-D	Two-Dimensional
3-D	Three-Dimensional
ACEC	Area of Critical Environmental Concern
AMP	Allotment Management Plan
APD	Application for Permit to Drill
APHIS-WS ADC	Animal and Plant Health Inspections Service—Wildlife Services, Animal Damage Control
APLIC	Avian Power Line Interaction Committee
AQTSD	Air Quality Technical Support Document
AUM	Animal Unit Month
BA	Biological Assessment
BAER	Burned Area Emergency Rehabilitation
BI	Beneficial Impact
BLM	Bureau of Land Management
BO	Biological Opinion
BOR	Bureau of Reclamation
BRD	Biological Resources Division
BTNF	Bridger-Teton National Forest
CBM	Coalbed Methane
CCC	Civilian Conservation Corps
CFR	*Code of Federal Regulations*
CO	Carbon Monoxide
COA	Condition of Approval
CSU	Controlled Surface Use
DEIS	Draft Environmental Impact Statement
DPS	Distinct Population Segments
EA	Environmental Assessment
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FHA	Federal Highway Administration
GIS	Geographic Information System
GTNP	Grand Tetons National Park
GYA	Greater Yellowstone Area
IGBC	Interagency Grizzly Bear Committee
LAA	*likely to adversely affect*
LAU	Lynx Analysis Unit
LCAS	Lynx Conservation Assessment Strategy
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
NAAQS	National Ambient Air Quality Standards
NE	No Effect
NEPA	National Environmental Policy Act
NER	National Elk Refuge
NFWF	National Fish and Wildlife Foundation
NHPA	National Historic Preservation Act
NJ	Not Likely to Jeopardize the Continued Existence
NLAA	Not Likely to Adversely Affect
NMFS	National Marine Fisheries Service

NOI	Notice of Intent
NO_X	Nitrogen Oxide
NRCS	National Resource Conservation Service
NSO	No Surface Occupancy
OHV	Off-Highway Vehicle
PAH	Polyaromatic Hydrocarbons
PCA	Primary Conservation Area
PFC	Proper Functioning Condition
PFO	Pinedale Field Office
PSD	Prevention of Significant Deterioration
R&PP	Recreation and Public Purposes
RAMP	Recreation Area Management Plan
RMP	Resource Management Plan
ROD	Record of Decision
ROW	Right-of-Way
SO_2	Sulfur Dioxide
SRMA	Special Recreation Management Area
T&E	Threatened and Endangered
U.S.C.	United States Code
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
VRM	Visual Resource Management
WAAQS	Wyoming Ambient Air Quality Standards
WDEZ-AQD	Wyoming Department of Environmental Quality–Air Quality Division
WGFD	Wyoming Game and Fish Department
WSA	Wilderness Study Area
WSR	Wild and Scenic River
WYNDD	Wyoming Natural Diversity Database
YNP	Yellowstone National Park

1.0 INTRODUCTION

This biological assessment (BA), prepared for the Draft Environmental Impact Statement (EIS), describes the comprehensive analysis of alternatives for the planning and management of public lands and resources administered by the Bureau of Land Management (BLM) in the Pinedale area of Wyoming. The public lands and federal mineral estate within the Pinedale planning area are the subject of the planning effort (Draft EIS) and this document. This document, a component of the RMP/EIS, is prepared in compliance with the National Environmental Policy Act (NEPA). The Act requires that an EIS be prepared for any federal actions that might significantly affect the human environment. The preparation and adoption of an RMP by BLM is such a federal action.

Under provisions of the federal Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. Section 1531, et seq.), federal agencies are directed to conserve threatened and endangered (T&E) species and the habitats in which these species are found. Section 7(c) of the ESA requires the BLM Pinedale Field Office (PFO) to complete a BA to determine the effects of implementing the RMP on listed and proposed species, based on compliance with Section 102 of NEPA. Federal agencies are required to consider, avoid, or prevent adverse impacts to fish and wildlife species. Federal agencies are also required to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of T&E species or their Critical Habitat. The ESA requires action agencies, such as BLM, to not only consult or confer with the U.S. Fish and Wildlife Service (USFWS) when there is discretionary federal involvement or control over the action but also ensure that resources are afforded adequate consideration and protection. Formal consultation becomes necessary when the action agency requests consultation after determining that the proposed action is likely to adversely affect listed species or Critical Habitat, or the aforementioned federal agencies do not concur with the action agency's finding (USFWS, Consultation Handbook, 1998). In addition, under the 1994 Memorandum of Understanding (MOU) and the 2000 Memorandum of Agreement (MOA) among BLM, U.S. Forest Service (USFS), USFWS, and National Marine Fisheries Service (NMFS), all four agencies agreed to promote the conservation of candidate and proposed species (Special Status) and streamline the Section 7 consultation and coordination process.

This programmatic BA provides documentation and analysis for the proposed action to meet the federal requirements and agreements set forth among the federal agencies. It addresses federally listed T&E, candidate, and proposed species, and it has been prepared under the 1973 ESA Section 7 regulations, in accordance with not only the 1998 procedures set forth by USFWS and NMFS but also the 1994 and 2000 MOU and MOA, respectively. The BLM PFO and contractor wildlife biologists, in coordination with the USFWS wildlife biologist, conducted an analysis regarding the effects of the Draft EIS preferred alternative on listed species. Site-specific evaluations would be conducted for activities authorized under the RMP, and consultation or conference would occur with the USFWS for those activities that may affect T&E, candidate, or proposed species. In addition, BLM would evaluate site-specific activities that may affect BLM Wyoming Sensitive Species (Sensitive Species), in compliance with BLM Manual 6840. This BA will not address Sensitive Species; these are addressed in the Draft EIS.

As part of this BA, BLM requests formal consultation for proposed actions that would lead to water depletion (consumption) in the Colorado River systems. This consultation is required for the four federally listed species of fish in the upper Colorado River system: endangered Colorado pikeminnow (*Ptychocheilus lucius*), endangered humpback chub (*Gila cypha*), endangered bonytail chub (*Gila elegans*), and endangered razorback sucker (*Xyrauchen texanus*).

In addition, formal consultation and conferencing are requested for the federally endangered black-footed ferret (*Mustela nigripes*), endangered Kendall Warm Springs dace (*Rhinichthys osculus thermalis*), threatened Canada lynx (*Lynx canadensis*), threatened bald eagle (*Haliaeetus leucocephalus*), threatened

Ute ladies' tresses plant (*Spiranthes diluvialis*), threatened grizzly bear (*Ursus arctos horribilis*), and threatened (experimental population) gray wolf (*Canis lupus*).

BLM also requests recommendations from the USFWS on the management of habitat for candidate Western yellow-billed cuckoo (*Coccyzus americanus*). Thi species, which is a candidate for listing as T&E, may occur within the planning area. BLM has a requirement under BLM Manual 6840 to protect candidate species from further population declines.

1.1 DESCRIPTION OF THE PREFERRED ALTERNATIVE (ALTERNATIVE 4)

Alternative 4 is designed to evaluate the impacts of optimizing production of oil and gas resources while providing the appropriate level of environmental protection for all competing resources. BLM would develop and implement performance-based objectives and operating standards that would provide the appropriate flexibility to adapt management decisions to changing and uncertain environmental conditions on the ground while ensuring appropriate mitigation. The performance-based objectives and standards, which are presented in Appendix 3, provide setbacks, consultation, guidance, and limitations on all aspects of oil and gas related activities. In addition, land allocations and areas unavailable for oil and gas leasing would be implemented. Additional goals of Alternative 4 are to protect and sustain resources and land uses, such as livestock grazing and recreation, in the planning area. To meet these additional goals, BLM would implement objectives and management actions that include restrictions and protective mitigation for each resource and land use.

1.1.1 Minerals

Alternative 4 would make available approximately 1,024,880 acres for oil and gas leasing and development (Draft EIS Table 2-32, p. 2-167). The planning area would be divided into four areas for management of oil and gas leasing and development (Draft EIS Map 2-8). "Intensively Developed Fields" would be managed for intensive oil and gas activities while protecting wildlife habitats to the extent practicable. "Minimally Developed Areas" would be managed for protection of important values during oil and gas exploration but would provide an opportunity for intensive oil and gas activities. "Large Block NSO Areas" would be managed for protection of wildlife habitats through offering oil and gas leases with No Surface Occupancy (NSO) stipulations. "Unavailable Areas" would be managed for protection of wildlife habitats through indefinitely postponing the availability of lands for oil and gas leasing. Transportation planning would be required in all areas to reduce road density, duplication of routes, and unnecessary routes. Sensitive aquatic species habitats would be maintained or improved. In addition, 13,770 acres (New Fork Potholes and Trapper's Point Areas of Critical Environmental Concern [ACEC], Civilian Conservation Corps [CCC] Ponds Special Recreation Management Area [SRMA], East Fork River Unit Wild and Scenic River [WSR], and several sensitive cultural sites) would be withdrawn from locatable mineral entry and land disposal.

1.1.2 Other Resources

The integrity of the visual setting of national historic trails would be protected from surface disturbing activities by relocating or redesigning projects within 2 miles of either side of the trail to conform to a Visual Resource Management (VRM) Class II designation. The Preferred Alternative would also provide for prescribed and natural wildfire management to emulate historic natural fire regimes. The current permitted animal unit months (AUM) for livestock grazing would be maintained unless monitoring indicates a need for adjustment. The Preferred Alternative would limit off-highway vehicle (OHV) use in the Desert General Use area to existing roads and trails. BLM would complete Recreation Area Management Plans (RAMP) to provide an array of outdoor recreation activities, settings, and experiences on public lands for local residents and visitors. The Green and New Fork Rivers and CCC Ponds SRMAs

would be established. Transportation planning would be conducted to not only provide access to and across public lands but also control the density and distribution of roads. Vegetation would be managed to support wildlife habitat and livestock grazing needs, control soil erosion and provide riparian stability, control noxious weeds, and protect Special Status Species. The number of acres in VRM Class IV would be reduced to 249,940, and the number of acres in classes II and III would be increased. Soil erosion and impacts to riparian areas would be limited by working with the State to prohibit the discharge of produced waters to streams or other non-isolated surface features. The use of high-quality produced waters to assist in reclamation could be considered on a case-by-case basis, would be limited in scope, and would be governed by numerous operating standards (Appendix 3). Proposals for alternative energy development would be considered on a case-by-case basis.

1.2 SPECIAL MANAGEMENT AREAS

The Rock Creek and Beaver Creek ACECs would be retained. New ACECs would be designated in the Trapper's Point and New Fork Potholes areas (5,980 acres). The Miller Mountain, Ross Butte, and Wind River Front Management Areas would be established (303,350 acres). Four river units would be managed as suitable for inclusion in the WSR System: East Fork, Scab Creek, Silver Creek, and upper Green River (10,440 acres).

2.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT

2.1 DESCRIPTION OF THE PLANNING AREA

The Pinedale planning area comprises approximately 922,880 acres of BLM-administered public land surface and 1,199,280 acres of federal mineral estate in portions of Sublette and Lincoln counties in southwestern Wyoming. The towns of Pinedale, Boulder, Cora, and Daniel are located in the northern portion of the planning area; Big Piney and Marbleton in the central area; and La Barge in the southern portion. The planning area is located about 100 miles south of Yellowstone National Park. Teton and Bridger National Forests bound the planning area on the north and west, and Bridger National Forest and Bridger Wilderness Area bound the area on the east. The Gros Ventre Range is north of the planning area, the Wind River Mountains are on the east, and the Wyoming and Hoback Ranges are on the west. The area varies in elevation from about 6,500 feet in the southwestern corner up to 9,500 feet along some of the mountain fronts. Mesas and buttes form the most common topographic expressions across most of the planning area. This BA provides specific management direction to not only prevent or address potential conflicts among energy resources development, recreational activities, livestock grazing, important wildlife habitat, and other important land and resource uses in the planning area but also determine the appropriate levels and timing of these activities. Decisions made as a result of the Record of Decision (ROD) for this Pinedale RMP will result in replacing the existing Pinedale RMP (December 1988).

2.2 LISTING STATUS AND RECOVERY PLANS

Table 1 lists species identified as federally listed within Sublette and Lincoln counties within BLM-administered lands addressed in the RMP.

Table 1. Species List for Pinedale Resource Management Plan

Common Name	Scientific Name	Status	Recovery Plan or Outline? (Y/N)
Mammals			
Black-footed ferret	*Mustela nigripes*	Endangered	Y
Grizzly bear	*Urus arctos horribilis*	Threatened	Y
Canada lynx	*Lynx canadensis*	Threatened	Y
Gray wolf	*Canis lupus*	Non-essential Experimental, formally threatened	Y
Avifauna			
Bald eagle	*Haliaeetus leucocephalus*	Threatened	Y
Whooping crane*	*Grus americana*	Endangered	Y
Interior Least tern*	*Sterna antillarum*	Endangered	Y
Piping plover*	*Charadrius melodus*	Threatened	Y
Eskimo curlew*	*Numenius borealis*	Endangered	N
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	Candidate	N/A
Fish			
Kendall Warm Springs dace	*Rhinichthys osculus thermalis*	Endangered	Y
Colorado pikeminnow**	*Ptychocheilus lucius*	Endangered	Y
Humpback chub**	*Gila cypha*	Endangered	Y
Bonytail chub**	*Gila elegans*	Endangered	Y
Razorback sucker**	*Xyrauchen texanus*	Endangered	Y
Pallid sturgeon*	*Scaphirhynchus albus*	Endangered	Y
Plants			
Ute ladies' tresses	*Spiranthes diluvialis*	Threatened	Y
Western prairie fringed orchid*	*Patanthera praeclara*	Threatened	Y
* Platte River system species ** Colorado River system species			

The following information identifies biological data on listed species, including Special Status Species that are present, or have the potential to be present, within the planning area. Information includes the listing status, species description, life history, population distribution, field office distribution, reproduction and survivorship, and threats from human activity.

2.2.1 Mammals

2.2.1.1 Black-footed Ferret (*Mustela nigripes*)

Listing Status: Federal—Endangered, 1967

Species Description

The black-footed ferret is a member of the weasel family (Mustelidae), which includes the skunk, badger, fisher, marten, otter, mink, wolverine, and weasel. Black-footed ferrets have a long thin body, short legs, and a very flexible spine, enabling them to run through small tunnels and turn in tight spaces. Adults are 18 to 22 inches (.46 to .55m) long, and weigh between 1 and 2½ pounds (.450 to 1.135 kg). Ferrets live alone, except during the breeding season. The kits are born in May or June, usually in litters of three or four.

Larger than weasels, black-footed ferrets are long, slender-bodied animals similar in size to minks. The ferret is characterized by a brownish-black mask across the face, a brownish head, black feet and legs, and a black tip on the tail. The middle of the back has brown-tipped guard hairs that create the appearance of a dark saddle.

Life History

The black-footed ferret is closely associated with prairie dogs, depending almost entirely on the prairie dog for its survival. The black-footed ferret's diet may also contain some other small mammals and birds. Potential areas of ferret habitat can be delineated because of the ferret's association with prairie dogs. The planning area is within the range of white-tailed prairie dogs, and ferrets may occur within colonies of this species.

Their body adaptations allow them to live underground in prairie dog colonies where the temperature is more uniform than on the surface, it is easier to conserve water, and they are protected from surface predators. Potential predators include badgers, coyotes, bobcats, golden eagles, great-horned owls, ferruginous hawks, and domestic dogs. Primarily nocturnal, ferrets spend much of their time below ground and are rarely seen during daylight hours. This behavior is probably one reason for so few sightings recorded in this planning area and elsewhere. Black-footed ferrets are strong and limber, enabling them to catch and kill prey larger than themselves.

The USFWS has determined that, at a minimum, potential habitat for the black-footed ferret must include a single white-tailed prairie dog town or complex of greater than 200 acres (80.9 hectares), or a complex of two or more neighboring prairie dog towns, each less than 4.3 miles (6.9 km) from the other and totaling 200 acres (80.9 hectares) for white-tailed prairie dogs, and whose density meets or exceeds 8 burrows per acre (.4047 hectares) (USFWS 1989). Black-footed ferret habitats are directly associated with the presence of prairie dog colonies. Grassland plains are the predominant habitats associated with the ferret and prairie dog.

Population Distribution

Black-footed ferrets are the only ferrets native to North America. They have lived in North America for at least 30,000 years and have lived everywhere that prairie dogs have lived. At one time, black-footed ferrets and prairie dogs ranged throughout the Great Plains and intermountain basins of the Rockies, from Canada to Mexico. The present range is unknown, but it is certainly much smaller than the historic range. Records (mostly unverified) from Montana, North Dakota, South Dakota, Nebraska, Oklahoma, Kansas, Colorado, Wyoming, and New Mexico were reported in the 1973 Proceedings of the Black-footed Ferret and Prairie Dog Workshop–September 4-6 (Clark 1973).

Black-footed ferrets were considered extinct until a small population was discovered near Meeteetse, Wyoming, in 1981. Following outbreaks of distemper, surviving black-footed ferrets were brought into captivity, and a captive breeding program was initiated. Black-footed ferrets were reintroduced in the Shirley Basin of central Wyoming in 1991 (see Black-footed Ferret Nonessential Experimental Population in Shirley Basin). This reintroduction effort continues with the aid of supplemental releases, when possible.

Field Office Distribution

Populations of black-footed ferrets are undetermined in the planning area. Two Partially buried black-footed ferret skulls were discovered in 2001 and 2002 at different locations on the Anticline Project Area–Natural Gas Project Environmental Impact Statement area (Mesa area), located west of Pinedale, Wyoming.

Black-footed ferret surveys have been conducted throughout the field office area for a diversity of proposed projects and are on file at the PFO. These surveys include, but are not limited to, projects for 3-D seismic lines, access roads, well pads, reserve pits, water pipelines, ancillary facilities for oil and gas development, and U.S. Bureau of Reclamation (BOR) lands. The Wyoming Game and Fish Department (WGFD) has compiled black-footed ferret sighting reports, which include areas within the planning area. Surveys that have been conducted within the planning area, from 2001–2006, are summarized in Table 2 and have resulted in a range of findings. Generally, no black-footed ferrets or ferret signs have been found; however, occasionally, biologists have found skulls that have been identified as black-footed ferret.

Table 2. Black-footed Ferret Surveys in the Pinedale Field Office Area 2001–2006

Project Location	Date of Survey	Survey Method	Survey Results
Section 13, 24, 26, 27 T28N, R109W	July 2006	Nocturnal Spotlight	No ferret or sign found
Section 5, 7, 17, 18, T28N, R108W	July 2006	Nocturnal Spotlight	No ferret or sign found
Sections 15, 16, 21, 22, 28, 33 and 34, T29N R108W	July 2006	Nocturnal Spotlight	No ferret or sign found
Section 11, T31N, R112W	July 2006 and July 2005	Nocturnal Spotlight	No ferret or sign found
Section 25, T31N, R109W	October 2004	Nocturnal Spotlight	No ferret or sign found
Section 33 and 34, T32N, R109W	October 2003	Nocturnal Spotlight	No ferret or sign found
Section 14, 23, and 24 T31N, R109W	July 2002	Nocturnal Spotlight	No ferret or sign found. Skull, possible scat, fur, and trenches observed before the survey.
Section 3 and 5 T31N, R109W; Sections 33 and 34 T32N, R109W	September 2002	Nocturnal Spotlight	No ferret or sign found. Skull, possible scat, fur, and trenches observed before the survey.
Sections 21, 20, 28, and 29, T28N, R109W	July 2001	Nocturnal Spotlight	No ferret or sign found.
Section 1, T28N, R110W, and Section 6 and 7, T28N, R109W	July 2001	Nocturnal Spotlight	No ferret or sign found.
Sections 29 and 30, T29N, R 108W	July 2001	Nocturnal Spotlight	No ferret or sign found.

Project Location	Date of Survey	Survey Method	Survey Results
Section 16, T29N, R108W	July 2001	Nocturnal Spotlight	No ferret or sign found.
Section 15, T29N, R109W	July 2001	Nocturnal Spotlight	No ferret or sign found.
Sec. 2, T31N,R109W	July 2001	Nocturnal Spotlight	No ferret or sign found.

Reproduction and Survivorship

Black-footed ferrets have not been observed mating in the wild, but captive black-footed ferrets have been observed breeding in March and early April. Support for believing wild black-footed ferrets breed during this period comes from an adult male black-footed ferret road-killed in early March in northwestern Wyoming. That ferret showed spermatogenesis. Further evidence comes from winter snow tracking information that indicated significant increases in movements by individuals during this period.

The time of parturition is also unknown but is suspected to occur in May and early June. Captive black-footed ferrets have a known gestation period of 42–45 days, and litter size ranged between three and four in Wyoming and between three and five in South Dakota. In Wyoming, black-footed ferret family units remain together until late August. At present juveniles still rely on their dam for food to some extent but are frequently separated from siblings in different burrows. The young spend more and more time on their own and are independent by mid-September (Clark 1973).

Threats From Human Activity

Past animal damage control programs probably have had the greatest impact on ferret mortality. From the 1920s until the mid-1970s, predator control through trapping and poisoning resulted in significant black-footed ferret mortality (67 percent of positive ferret reports). Secondary poisoning of ferrets is also known to have occurred from highly toxic rodenticides (or predicides) used in prairie dog eradication programs. Widespread poisoning of prairie dogs and conversion of their habitat to agricultural cultivation drastically reduced prairie dog abundance and distribution in the last century. This severe decline of prairie dogs resulted in a concomitant and near-fatal decline in ferrets.

Varmint hunters seek out prairie dog colonies for target shooting. Because few people can distinguish among a ferret, a burrowing owl, or a prairie dog peering over a prairie dog mound, it is assumed that target shooters have accidentally killed some black-footed ferrets.

Land use activities such as rights-of-way (ROW), energy developments, use permits, urban expansion, mineral extraction, and grazing projects can reduce or fragment ferret habitat and therefore require inventory and clearances. Habitat losses have been minimized through coordination and management prescriptions requiring surveys and avoidance of potential black-footed ferret habitat.

2.2.1.2 Grizzly Bear (*Urus arctos horribilis*)

Listing Status: Federal–Threatened, July 1975

Through the Wyoming Game and Fish Commission, the State of Wyoming adopted a Wyoming Grizzly Bear Management Plan in 2002 as a requirement of the USFWS before delisting (Moody et al. 2002). The planning area is not within the Primary Conservation Area (PCA) for grizzly bear, however it is within the Grizzly Bear Data Analysis Unit (derived by the WGFD) and is considered an ecosystem transitional zone containing the southern most portion of known grizzly bear activity in the Greater Yellowstone Ecosystem (Moody et al. 2005). Information for this section was derived from the Grizzly Bear Recovery Plan (USFWS 1993), draft Conservation Strategy for the Grizzly Bear in the Yellowstone Area (USFWS

2000), Interagency Grizzly Bear Guidelines (USFS 1986), and Wyoming Grizzly Bear Management Plan (Moody et al. 2002).

Species Description

The grizzly bear (hereafter referred to as grizzly) is one of the largest North American land mammals and is the largest North American omnivore. Male grizzlies stand about 8 feet tall, 3.5 to 4.5 feet at the hump when on all fours, and weight from 400 to 600 pounds (and occasionally more than 800). Females are smaller, usually weighing between 250 and 350 pounds. Although a standing grizzly is commonly perceived to be in a threatening pose, grizzlies stand when they are simply curious or surveying their surroundings. Otherwise, they generally remain on all fours. Unlike the black bear (*Ursus americanus*), the grizzly has a rather concave face, high-humped shoulders, and long, curved claws. The grizzly's thick fur, which varies from light brown to nearly black, sometimes appears frosty—hence, the name "grizzly," or the less common "silvertip." The grizzly has shorter, rounder ears than the black bear.

Life History

Key habitat characteristics include the following: 1) availability of preferred foods—i.e., whitebark pine (*Pinus albicaulis*) seeds, army cutworm moths (*Euxoa auxiliaries*), large ungulates (newly born young and winter kills), and spawning cutthroat trout (*Oncorhynchus clarki*) (Mattson et al. 1991); 2) sufficient cover for bedding and security (Moody et al. 2002; USFWS 1993); and 3) denning locations (USFWS 1993).

The previously mentioned *preferred foods* provide some of the highest sources of digestible energy to grizzlies in the Yellowstone area (Mealey 1975; Servhenn et al. 1986). These foods are so specific to the grizzly diet that monitoring programs focus specifically on these items. However, grizzlies are opportunistic feeders and the search for food has a major influence on a grizzly's movements. Because of an inability to digest cellulose, herbaceous plants are eaten as they emerge when content is highest in starch, sugars, and protein. Other sources of protein include roots, bulbs, tubers, fungi, tree cambium, berries, nuts, and fish (Stebler 1972; Mealey 1975; Hamer et al. 1977).

There is a high preference for forested habitat that provides protection from threats and disturbances. Most suitable grizzly habitat, biologically and socially, is in areas with large tracts of undisturbed habitat and minimal human disturbance (Moody et al. 2002). Less than 10 percent of bedding areas are farther than a couple of yards from desirable cover (Blanchard 1978).

Winter hibernation, which lasts about 5 months, is brought on by the decreasing length of daylight and inclement weather. In preparation for this period, grizzlies excavate dens that are usually found at high elevation, on steep slopes where wind and topography cause an accumulation of deep snow, and well away from areas of human activity (USFWS 1993).

Adult grizzlies are generally solitary except when caring for young or during breeding periods. Strict territoriality is unknown, with intraspecific defense limited to specific food concentrations, defense of young, and surprise encounters. However, each bear appears to have a minimum distance within which another bear or person must not enter; any intrusion of this distance may evoke a threat or an attack (Mundy and Flook 1973; Herrero 1978; USFWS 1993). Mating season is the only time that adult males and females tolerate one another, and then it is only during the estrous period. Other social affiliations are generally restricted to family groups of mother and offspring, siblings that may stay together for several years after being weaned, and an occasional alliance of subadults or several females and their offspring (Murie 1944; Jonkel and Cowan 1971; Craighead 1976; Egbert and Stokes 1976; Glenn et al. 1976; Herrero 1978).

Home ranges of adult males are generally two to four times larger than that of females (Pearson 1975; Craighead 1976; Herrero 1978; Servheen and Lee 1979; Aune and Kasworm 1989). These home ranges vary in relation to food availability, weather conditions, and interactions with other bears. Thus, the home range may vary seasonally or from year to year (Jonkel and Cowan 1971; Greer 1972; Craighead 1976; Rogers 1977; Russell et al. 1978).

Population Distribution

The range of grizzly bears in North America before European settlement extended south from Alaska to northern Mexico and east from the Pacific coast to the Canadian Prairies and U.S. Great Plains west of the Mississippi River (Hall and Kelson 1959, Schwartz et al. 2003). Historically, grizzly bears occurred throughout most of Wyoming (Long 1965). Unfortunately, grizzly bear populations have been eliminated from more than 98% of their historic range in the lower 48 States and their distribution is patchy and fragmented. Only five remnant populations remain below the Canadian border: the Cabinet-Yaak population in extreme northwest Montana and northeast Idaho, the Selkirk population in extreme northwest Idaho and extreme northeast Washington, the northern Cascades population in Washington, the Northern Continental Divide Ecosystem (NCDE) population in northcentral Montana, and the GYA population in eastern Idaho, southwestern Montana, and northwestern Wyoming (Servheen 1999). In Wyoming and elsewhere the grizzly bear has expanded its range in the past two decades and has reoccupied historic habitats. Current range expansion of the GYA population is particularly evident in the southern portion of the ecosystem in Wyoming (Schwartz et al. 2002).

The general current extent of the grizzly bear's range in Wyoming includes Grand Teton National Park, YNP, and portions of adjacent national forest and private lands to the south and east extending to the eastern edge of the Absaroka Mountains, the western portion of the Owl Creek Mountains, south in the Gros Ventre Range to the Pinnacle Peak area, and south in the Wind River Range to the Green River Lakes area (Moody et al. 2002, Schwartz et al. 2002).

Field Office Distribution

The planning area is not within the Primary Conservation Area (PCA) for grizzly bear, however it is within the Grizzly Bear Data Analysis Unit (derived by the WGFD) and is considered an ecosystem transitional zone containing the southern most portion of known grizzly bear activity in the Greater Yellowstone Ecosystem (Moody et al. 2005).

Reproduction and Survivorship

Mating appears to occur from late May through mid-July, with a peak in mid-June; and estrus lasts from a few days to more than a month (Craighead et al. 1969; Herrero and Hamer 1977). Age of first reproduction varies from 3.5 to 8.5 years, and litter size varies from one to four cubs; both may be related to nutritional state. Reproductive intervals for females average 3 years, and animals that lose young early in the year may come into estrus and breed again that same year. Males are believed to mature sexually at 4.5 years (Hornocker 1962).

Threats From Human Activity

Federal law permits the legal take of any grizzly that is an immediate threat to human safety. Authorized State and federal agency personnel also may take grizzlies for chronic livestock depredations, property damage, or threat to public safety. On average, 2.6 grizzlies have been taken by the public in self-defense situations per year from 1990 to 2002. Management removals and illegal losses have averaged 1.0 grizzly per year during the same period (Moody et al. 2002). Currently, State regulation prohibits hunting of grizzly bears.

A major cause of grizzly population decline is habitat loss. This results from conversion of native vegetation, depletion of preferred food resources, disturbance, displacement from human developments and activities, and fragmentation of habitat into increasingly small blocks that are inadequate to maintain viable populations. Roads are a major factor in displacing grizzlies, especially the level of traffic associated with a road. Grizzlies living near roads have a higher probability of human-caused mortality as a consequence of illegal shooting, control actions influenced by attraction to unnatural food sources, and vehicle collisions (Moody et al. 2002).

2.2.1.3 Canada lynx (*Lynx canadensis*)

Listing Status: Federal—Threatened, March 2000

The Canada lynx (hereafter referred to as "lynx") was listed as a federally "threatened" species on April 24, 2000, pursuant to the ESA (the Act). Critical Habitat has not been designated. A civil suit has been filed in Federal District Court against the USFWS for not designating Critical Habitat for lynx. Depending on the court ruling in this matter, the issue of Critical Habitat may be readdressed later.

A Biological Assessment of the Effects of National Forest Land and Resource Management Plans and Bureau of Land Management Land Use Plans on Canada Lynx (Canada Lynx BA) (Hickenbottom et al. 1999) was prepared and submitted to the USFWS in December 1999. An Interagency Lynx Biology Team was selected to prepare the Canada Lynx Conservation Assessment Strategy (LCAS), which was completed in January 2000. The USFWS then issued a Biological Opinion (BO) in October 2000.

Species Description

The lynx is a medium-sized cat with long legs; large, well-furred paws; long tufts on the ears; and a short, black-tipped tail (McCord and Cardoza 1982). Adult males weigh an average of 22 pounds and are generally 33.5 inches in length (head to tail); females average 19 pounds and are generally 32 inches in length (Quinn and Parker 1987). The long legs and large feet of the lynx make this cat highly adapted for hunting in deep snow.

The bobcat (*Lynx rufus*) is a North American relative of the lynx. Compared with the lynx, the bobcat has smaller paws, shorter ear tufts, and a more spotted pelage (coat), and only the top of the tip of the tail is black. The paws of the lynx have twice the surface area of those of the bobcat (Quinn and Parker 1987). The lynx also differs in its body proportions from the bobcat. Lynx have longer legs, with hind legs that are longer than the front legs, giving the lynx a "stooped" appearance (Quinn and Parker 1987). Bobcats are largely restricted to habitats where deep snows do not accumulate (Koehler and Hornocker 1991).

Life History

In the contiguous United States, the distribution of the lynx is associated with the southern boreal forest, composed of subalpine coniferous forest in the west (Aubry et al. 2000). At its southern margins, the boreal forest becomes naturally fragmented into patches of varying size as it transitions into other vegetation types. These southern boreal forest habitat patches are small relative to the extensive northern boreal forest, which constitutes the majority of the lynx range. Many of these southern boreal forest patches can support resident populations of lynx and their primary prey species, the snowshoe hare (*Lepus americanus*). It is likely that some of the habitat patches act as sources where lynx recruitment is greater than mortality, and lynx are able to disperse and potentially colonize other patches (McKelvey et al. 2000). Other habitat patches act as "sinks," where lynx mortality is greater than recruitment and lynx are lost from the overall population. The ability of naturally dynamic habitat to support lynx populations may change as the habitat undergoes natural succession following natural or manmade disturbances (e.g., fire and clearcutting).

Lynx use large woody debris, such as downed logs and windfalls, to provide denning sites with security and thermal cover for kittens (McCord and Cardoza 1982; Koehler 1990; Koehler and Brittell 1990; Squires and Laurion 2000). For lynx den sites, the age of the forest stand does not seem as important as the amount of downed, woody debris available (Mowat et al. 2000). A den site in Wyoming was located in a mature subalpine fir/lodgepole pine forest with abundant downed logs and a high amount of horizontal cover (Squires and Laurion 2000).

The size of lynx home ranges varies by the animal's gender, abundance of prey, season, and the density of lynx populations (Koehler 1990; Poole 1994; Slough and Mowat 1996; Aubry et al. 2000; Mowat et al. 2000). Preliminary research supports the hypothesis that lynx home ranges at the southern extent of the species' range are generally large compared with those in the northern portion of the range (Koehler and Aubry 1994; Squires and Laurion 2000).

Lynx are highly specialized predators that have evolved to survive in areas that receive deep snow (Bittner and Rongstad 1982). Snowshoe hares use forests with dense understories that provide forage, cover to escape from predators, and protection during extreme weather (Wolfe et al. 1982; Monthey 1986; Hodges 2000). Generally, earlier successional forest stages have greater understory structure than do mature forests and therefore support higher hare densities (Hodges 2000). However, mature forests also can provide snowshoe hare habitat as openings develop in the canopy when trees succumb to disease, fire, wind, and the understory grows (Buskirk et al. 2000). Lynx concentrate their hunting activities in areas where hare activity is relatively high (Koehler et al. 1979; Parker 1981; Ward and Krebs 1985; Major 1989; Murray et al. 1994).

The association between lynx and snowshoe hare is considered a classic predator-prey relationship (Saunders 1963; Van Zyll de Jong 1966; Quinn and Parker 1987). Generally, researchers believe that when hare populations are at their cyclic high, depletion of food resources, exacerbated by predation, cause hare populations to decline drastically (Buehler and Keith 1982; Krebs et al. 1995; O'Donoghue et al. 1997). Snowshoe hare provide the quality prey necessary to support high-density lynx populations (Brand and Keith 1979). Lynx also prey opportunistically on other small mammals and birds, particularly when hare populations decline (Nellis et al. 1972; Brand et al. 1976; McCord and Cardoza, 1982). Red squirrels (*Tamiasciurus hudsonicus*) are an important alternative prey (O'Donoghue 1997; Aubry et al. 2000; Apps 2000). However, a shift to alternative food sources may not compensate for the decrease in hares consumed (Koehler and Aubry 1994). Koehler (1990) suggested that a diet of red squirrels alone might not be adequate to ensure lynx reproduction and survival of kittens.

Relative snowshoe hare densities at southern latitudes are generally lower than those in the north, which has led to differing interpretations of population dynamics of snowshoe hare populations. Snowshoe hares are generally associated with conifer forest cover types (Hodges 2000). In the southern boreal forest, relatively low snowshoe hare densities are likely a result of the naturally patchy, transitional boreal habitat that prevents hare populations from achieving densities similar to those of the expansive northern boreal forest (Wolff 1980; Buehler and Keith 1982). In addition, the presence of more predators and competitors of hares at southern latitudes may inhibit the potential for high-density populations with extreme cyclic fluctuations (Wolff 1980).

Population Distribution

The complexities of lynx life history and population dynamics, combined with a general lack of reliable historic and current lynx data for the contiguous United States, make it difficult to ascertain the past or present population status of lynx. Because of the naturally fragmented habitat and lower density hare populations in the contiguous United States, lynx are expected to occur at naturally lower densities than in the north.

Historic lynx data in the contiguous United States are scarce and exist primarily in the form of trapping records. Many states did not differentiate between bobcats and lynx in trapping records. Therefore, long-term lynx trapping data are unavailable for most states. Surveys designed specifically for lynx were rarely conducted, and many reports (e.g., visual observations, snow tracks) of lynx were collected incidental to other activities. The reliability of many of these records is unknown; trapping records may have errors, track identification is extremely difficult, and observations may be wrong.

Within the contiguous United States, the lynx range extends into different regions that are separated from each other by ecological barriers consisting of unsuitable lynx habitat. Wyoming lies within the Northern Rocky Mountains/Cascades region. Most historical and recent records of lynx in Wyoming are from the northwestern mountain ranges (Reeve et al. 1986; McKelvey et al. 2000). McKelvey et al. 2000 located only 30 verified records statewide since 1856. Until 1957, lynx had bounties placed on them. After 1973, the lynx was listed as a protected non-game species, and harvest was closed.

Field Office Distribution

In 1996, the WGFD began a lynx study in west-central Wyoming. Kittens were documented in 1998 (Squires and Laurion 2000), which may indicate the presence of a resident population in this local area (Ruggiero et al. 2000). However, using available information, the status or trend of lynx throughout Wyoming was not possible. A radio-collared female, which produced the previously noted kittens, died of starvation in winter 2000. A radio-collared male lynx (who died of starvation in winter 2002) was documented has having traveled the area from the northern Bridger Teton National Forest to the lower extent of the Wyoming Range (Laurion and Oakleaf 1998). Other lynx have been documented in Wyoming, including Yellowstone National Park (YNP) (Reeve et al. 1986).

Reproduction and Survivorship

The availability of prey can influence the time of first breeding; if forage is plentiful, then breeding may begin at 1 year of age. Otherwise, 2 years of age is more common (Ruediger et al. 2000; WI-DNR, undated). Breeding occurs from January or February in the southern region, to March or April in the north. Gestation is 60 to 65 days, and litters range from one to four kittens whose eyes remain closed for 8 to 10 days post-partum. The male does not tend to the kittens (Eisenburg, 1986; Ruediger et al. 2000; WI-DNR, undated). Fecundity and kitten survival also appears to have a relationship to prey status (Ruediger et al. 2000).

In northern study areas during the low phase of the hare cycle, few if any kittens are born, and few yearling females conceive. In the far north, some lynx recruitment occurs when hares are scarce, and this may be important in lynx population maintenance during low hare cycles. During periods of hare abundance in the northern taiga, litter size of adult females averages four to five kittens (Ruediger et al. 2000).

Reported causes of lynx mortality vary among studies. The most commonly reported causes include starvation of kittens and human-caused mortality (fur trapping). Various studies in the northern taiga have shown that, during periods of low snowshoe hare numbers, starvation can account for up to two-thirds of all natural lynx deaths. Trapping mortality may be additive rather than compensatory during the low period of the snowshoe hare cycle. Hunger-related stress, which induces dispersal, may increase the exposure of lynx to other forms of mortality such as trapping and highway collisions. Predation on lynx by mountain lion, coyote, wolverine, gray wolf, and other lynx has been documented and confirmed (Ruediger et al. 2000).

Threats From Human Activity

The Canada lynx BA cites the following risk factors (Ruediger et al. 2000) for the Northern Rockies geographic area:

- Timber Management—harvest and precommercial thinning that reduce denning or foraging habitat or converts habitat to less desirable tree species
- Wildland Fire Management—where exclusion changes the vegetation mosaic maintained by natural disturbance processes
- Livestock Grazing—where forage for lynx prey is reduced
- Recreation—where roads and winter recreation trails facilitate access to historical lynx habitat by competitors
- Incidental trapping and shooting
- Predation
- Highways—vehicle strikes or obstructions to lynx movements
- Development of private lands.

Factors affecting lynx habitat include human alteration of the distribution and abundance, species composition, successional stages, and connectivity of forests, and the resulting changes in the forest's capacity to sustain lynx populations. People change forests through timber harvest, fire suppression, and conversion of forestlands to agriculture. Forest fragmentation may eventually become severe enough to isolate habitat into small patches, thereby reducing the viability of wildlife that depend on larger areas of forest habitat (Litvaitis and Harrison 1989). In all regions of the lynx range in the contiguous United States, timber harvest and its related activities are a predominant land use affecting lynx habitat. Timber harvest and associated forest management can be benign, beneficial, or detrimental to lynx, depending on harvest methods, spatial and temporal specifications, and the inherent vegetation potential of the site.

A primary reason for listing the lynx was the conclusion that the low numbers in the contiguous United States were the residual effect of overtrapping, which was believed to have occurred in the 1970s and 1980s. This trapping occurred in response to unprecedented high pelt prices. Human-induced mortality was often believed to be the most significant source of lynx mortality (Ward and Krebs 1985). Trapping mortality was considered to be entirely additive (i.e., in addition to natural mortality) rather than compensatory (taking the place of natural mortality) (Brand and Keith 1979). However, Canadian researchers determined that natural mortality during the declining phase of the lynx cycle is high; therefore, trapping mortality during some portions of the cyclic decline may compensate for natural mortality (Poole 1994; Slough and Mowat 1996). Thus, trapping of lynx can be additive and compensatory, depending on when it occurs in the cycle.

Lynx movements may be negatively influenced by high traffic volume on roads that bisect suitable lynx habitat. Given the distances and locations where known lynx within the southern boreal forest have moved, lynx successfully cross many types of roads, including unpaved forest roads, secondary paved roads, and interstate highways (Mech 1980; Smith 1984; Brainerd 1985; Squires and Laurion 2000). Highways with high volumes of traffic and associated suburban developments inhibit lynx home range movement and dispersal and may contribute to a loss of habitat connectivity. However, no information exists to determine the level at which traffic volume or roadway design may influence lynx movements or

create an impediment to movement. Roads do not appear to be a significant direct cause of lynx mortality (Staples 1995; Ruggiero et al. 2000).

Disease and predation are not known to be factors threatening lynx.

Evidence indicates that lynx tolerate some level of human disturbance (Staples 1995; Aubry et al. 2000; Mowat et al. 2000). For most areas of the contiguous United States, no evidence exists that human-caused factors have significantly reduced the ability of lynx to disperse or have resulted in the loss of genetic interchange. Likewise, no evidence exists that human presence displaces lynx. Lynx have been documented using some types of roads for hunting and travel (Parker 1981; Koehler and Brittell 1990; Koehler and Aubry 1994). No information is available demonstrating that forest roads negatively impact resident lynx populations.

Lynx are taken during legal trapping and hunting for other species, such as wolverine and bobcat (McKay 1991; Staples 1995). Although lynx were likely captured incidentally in the past during regulated and unregulated trapping for other predators, the lynx have persisted throughout much of their historic range.

Coyote, bobcat, and mountain lion are hypothesized to be potential lynx competitors (Brocke 1982; McCord and Cardoza 1982; Parker et al. 1983; Quinn and Parker 1987; Aubry et al. 2000; Buskirk et al. 2000; Ruggiero et al. 2000). In Wyoming, the ranges of these species overlap. Lynx are highly evolved for hunting in deep snow; they have a morphological advantage because they are able to walk on snow rather than sink into it as other species with higher foot loads do (Murray and Boutin 1991; Buskirk, et al. 2000). Traditionally, where these species' ranges overlap with that of lynx, snow conditions exclude them from the winter habitats occupied by lynx (McCord and Cardoza 1982; Parker et al. 1983; Buskirk et al. 2000). However, snow trails packed by humans (i.e., by snowmobiles, cross-country skiing) or snowplowing have facilitated the movement of potential lynx competitors into the deep snow habitats of the lynx (USFS and BLM 1999). Yet, a lack of evidence exists that competition with coyotes, mountain lions, or bobcats is negatively affecting lynx on a population-level scale. Direct lynx mortality from mountain lions is reported by Squires and Laurion (2000). Other potential predators include the gray wolf (*Canis lupus*) and wolverine (*Gulo gulo*) (Poole 1994; Slough and Mowat 1996; O'Donoghue et al. 1997; Apps 2000; Squires and Laurion 2000).

The USFWS concluded in the *Federal Register* Canada lynx listing document that the single factor threatening the contiguous United States, Distinct Population Segments (DPS) of lynx is the inadequacy of existing regulatory mechanisms—specifically, the lack of guidance for conservation of lynx in National Forest Land and Resource Plans and BLM Land Use Plans. Until plans adequately address risks like those identified in the LCAS (Ruediger et al. 2000), a significant threat to the contiguous DPS of lynx will exist.

2.2.1.4 Gray Wolf (*Canis lupus*)

Listing Status: Nonessential Experimental; Formerly Threatened

On November 22, 1994, the USFWS published (*Federal Register* 59, p. 60252) special rules to establish nonessential experimental populations of gray wolves in YNP and central Idaho. The nonessential experimental population areas include all of Wyoming, most of Idaho, and much of central and southern Montana. In June 1998, the USFWS announced that it would review the species' status and consider delisting or reclassifying specific wolf populations where appropriate (USFWS 1998). The USFWS established criteria for delisting consideration. The population portion of these criteria was satisfied in 1999 (USFWS 2000). Wolf management plans must be approved in Wyoming, Idaho, and Montana such that the guidelines will provide for a viable wolf population, while minimizing wolf-human conflicts once

the wolf is removed from federal protection under ESA. The Wyoming Gray Wolf Management Plan was approved and signed by the governor in March 2003. At present, the USFWS is reviewing it for adequacy.

Species Description

Gray wolves are the largest wild members of the Canidae, or dog family, with adults ranging from 80 to 110 pounds, depending on gender. Height averages 26 to 32 inches at the shoulder, and length typically measures 4.5 to 6.5 feet from nose to tail tip. The approximate track size is 4 inches wide by 5 inches long. Pelt color can be highly variable, ranging from white to black, with grizzled gray or black being most common in the northern Rocky Mountains (USFWS 1994a).

Life History

Wolf research, as well as the expansion of the wolf range over the last two decades, has indicated that wolves can successfully occupy a wide range of habitats and are not dependent on wilderness areas for their survival. In the past, gray wolf populations occupied nearly every type of habitat north of mid-Mexico that contained large ungulate prey species. An inadequate prey density and a high level of human persecution apparently are the only factors that limit wolf distribution (USFWS 2000).

The Greater Yellowstone Area (GYA) and central Idaho areas are primarily composed of public lands. These areas of potential wolf habitat are secure, and there are no foreseeable habitat-related threats that would prevent them from supporting a wolf population that exceeds recovery levels (USFWS 2000). The ungulate populations in these areas are the principal prey, although prey preference appears related to prey size and availability. Order of preference and prey availability in the GYA has been elk (*Cervus elphus*) at >85 percent, followed by bison (*Bison bison*), moose (*Alces shirasi*), mule deer (*Odocoileus hemionus*), and pronghorn (*Antilocapra americana*) (Jaffe 2001; Mech et al. 2001; Smith et al. 2002; USFWS et al. 2002).

Wolves form family groups referred to as packs. A pack consists of at least two individuals of the opposite sex that breed and produce pups. Wolves are sexually mature at 22 months of age (Mech 1970). The dominant male and female in the pack produce most of the young, although packs may contain two or more adult females that produce (Mech 1991). Breeding occurs during February or March, and pups are born after a 63-day gestation in April or May. Litter sizes in Wyoming have averaged roughly five pups from 1997–2001 (USFWS et al. 2002). Pups remain at a den site for about 6 weeks until they are weaned. The pack then moves to rendezvous sites (home sites) until the pups are old enough to hunt with the pack (e.g., September or October). Once pups begin hunting, these rendezvous sites are no longer used, and the pack ranges throughout its territory.

Yearlings tend to leave the pack during fall to find a mate and develop a new territory and pack (Fritts and Mech 1981); however, some individuals stay with the pack longer. Pack territories are defended against other wolves. Territory location is advertised to other wolves through scent marking and howling. Territory size appears related to prey density (Ballard et al. 1987; Fuller 1989); GYA territory sizes are averaging 200 mi^2. Pack sizes typically range from 2 to 16 wolves, but it appears pack size may be related to size of prey species. The average size of the 8 wolf packs in Wyoming outside of YNP in 2001 was 8.7 (range 2–12) (USFWS et al. 2002).

Population Distribution

As recently as the mid-nineteenth century gray wolves existed throughout most of North America exclusive of the Gulf Coast region where the red wolf (*Canis rufus*) was found (Nowak 1983, Young and Goldman 1944). Wolves were present throughout the northern Rocky Mountain region prior to

colonization by Europeans which resulted in reduction of native ungulate populations, introduction of livestock, and persecution of wolves (Lopez 1978, Young 1944). By the 1940s, wolves persisted only in isolated locations in the United States. In the late 1970s wolves were dispersing into the mountainous areas near Glacier-Waterton Lakes National Parks in Alberta, Canada, just across the border (Ream and Mattson 1982). And then in 1985 a pack of 12 wolves crossed the border from Alberta to Glacier National Park (Robbins 1986). Breeding was documented in 1986, for the first time in 50 years in the U.S. (Ream et al. 1989), and by 1992 at least 50 individuals were known to reside in at least four packs along the continental divide of Montana (Fritts et al. 1995, Pletscher et al. 1997, Ream et al. 1991). Wolves were documented from Idaho since the early 1980s. Prior to reintroduction, lone wolves have ventured into the GYA on a number of occasions (USFWS 1994), and a single wolf was documented in northwestern Wyoming in 1992 (Fritts et al. 1995).

After many years of effort and planning, wolves were reintroduced into the Greater Yellowstone Area (GYA) in 1995-1996 (USFWS 1994). This effort targeted large tracts of federal public lands (Yellowstone National Park (YNP) and the surrounding U.S. Forest Service wilderness areas) that supported large populations of wild ungulates and had a relatively low likelihood for wolf-human conflicts. Today wolves are found in the northwestern portion of Wyoming, largely in the GYA. There are 14 packs in YNP and 7 that spend most of their time in Wyoming (WGFD 2003). Numerous sightings of wolves suggest that they roam over much of western Wyoming. The known distributional extent of these wandering wolves is the Bighorn Mountains and Ten Sleep to the east, Morgan, Utah (outside Ogden) to the south, and into Idaho to the west (Jimenez 2004). Wolves have been sighted southwest of Meeteetse and around Worland and Thermopolis. Wolves are also routinely seen around Kemmerer and Cokeville, and Lander, and have shown up east of Rock Springs.

Field Office Distribution

Gray wolves have been documented in the planning area on the NER. 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 while following the elk migration or to reach either the NER or the WGFD South Park elk feedground. The potential for interactions with humans would be highest along the route to South Park but the level of these encounters is not possible to predict. In accordance with 50 CFR 17.84, actions to control, or take, wolves in this population are specifically limited (USFWS 1998). The planning area, exclusive of the NER, will be included under State jurisdiction for wolf management upon delisting according to the existing Wyoming Gray Wolf Management Plan. In April 2004, BLM Range Specialists observed four gray wolves on the Square Top. Local residents in the Boulder area have also given anecdotal accounts of the presence of gray wolves.

After the wolf has been delisted, the Gray Wolf Management Plan, as signed by the governor, will classify wolves as trophy animals in YNP and GTNP, the John D. Rockefeller Jr. Memorial Parkway, and the wilderness areas of the Shoshone National Forest and BTNF, and as predatory animals elsewhere in Wyoming. Only packs outside YNP, GTNP, and the National Elk Refuge (NER) and within the defined wilderness areas will fall under the jurisdiction of the WGFD. If the number of packs in Wyoming are reduced to 10 or fewer, management strategies would revert to the same provisions used to recover the wolf population before delisting (WGFD 2002a).

Reproduction and Survivorship

Wolves have a high reproductive potential, and populations can sustain moderate levels of mortality. Unexploited wolf populations may increase 28 to 35 percent annually. From 1998 to 2002, the wolf population in the GYA increased an average of 22 percent/year. Mortality rates in unexploited wolf

populations average 45 percent for yearlings and 10 percent for adults (USFWS 1994b). Annual mortality rates of 30 to 40 percent may suppress wolf population growth (Ballard et al. 1987; Fuller 1989; Keith 1993).

Wolves form family groups referred to as packs. A pack consists of at least two individuals of the opposite sex that breed and produce pups. Wolves are sexually mature at 22 months of age (Mech 1970). The dominant male and female in the pack produce most of the young, although packs may contain two or more adult females that produce (Mech 1991). Breeding occurs during February or March, and pups are born after a 63-day gestation in April or May. Litter sizes in Wyoming have averaged roughly five pups from 1997–2001 (USFWS et al. 2002). Pups remain at a den site for about 6 weeks until they are weaned. The pack then moves to rendezvous sites (home sites) until the pups are old enough to hunt with the pack (e.g., September or October). Once pups begin hunting, these rendezvous sites are no longer used, and the pack ranges throughout its territory.

Threats From Human Activity

Human exploitation is often the greatest cause of mortality. Since 1995, 53 percent of documented wolf mortalities in the GYA have been human caused (Smith and Guernsey, 2002). In areas in which human exploitation is low, disease, starvation, and killing by other wolves are the primary causes of wolf mortality.

2.2.2 Avifauna

2.2.2.1 Bald Eagle (*Haliaeetus leucocephalus*)

Listing Status: Federal—Threatened, July 1995

Species Description

The bald eagle has a conspicuous white head and tail, a blackish-brown back and breast, and yellow feet and bill. The distinctive white plumage on the head and tail, for which the species is named, is not attained until 5 or more years of age. The female bald eagle is about 35 to 37 inches (.89 to .94 m) long with a wingspan from 79 to 90 inches (2.1 to 2.28 m). The male bald eagle is slightly smaller than the female, with a body length of 30 to 34 inches (.76 to .86 m) and a wingspan of 72 to 85 inches (1.8 to 2.2 m). Wild bald eagles may live as long as 30 years, but the average lifespan is probably about 15 to 20 years.

Life History

Bald eagles are found usually near large rivers, streams, and lakes. Habitat consists of nesting habitat, communal winter roosting habitat, and foraging habitat that is located in some areas within the PFO area.

Bald eagles are found primarily along surface water sources (e.g., rivers, lakes, and coasts) where their nests are usually located in large trees. They often use and rebuild the same nest each year, which is typically about 5 feet in diameter. Nest trees are usually close to water, afford a clear view of the surrounding area, and often provide sparse cover above the nest.

During winter, bald eagles congregate near rivers and reservoirs with open water and often near large concentrations of waterfowl. Wintering eagles usually occupy river habitats between mid-November and late-April and use large cottonwoods, poplars, and other riparian trees as daytime perches and night roosts. They usually perch within a riparian corridor or along lakeshores and prefer areas with limited human activity.

The BLM has conducted bald eagle winter concentration surveys each January from 2004 to present. These efforts were conducted using roadside observations along river corridors and riparian habitats to identify if winter concentrations of bald eagles occur in the planning area. Through these efforts approximately 38 bald eagles have been observed each year. This effort will continue to monitor bald eagle activity in the planning area.

Feeding areas, diurnal perches, and night roosts are fundamental elements of bald eagle winter range. Wintering bald eagles primarily occur where all three elements are in proximity, although they will fly up to 15 miles where these elements are sparsely distributed across the landscape (Swisher 1964).

Food availability is probably the single most important factor affecting winter bald eagle distribution and abundance (Steenhof 1976). Fish and waterfowl are the primary sources of food for bald eagles, but they will also feed on rabbits, carrion, and small rodents. The hunting area or home range patrolled by a bald eagle varies from 1,700 to 10,000 acres (688 to 4047 hectares). Home ranges are smaller where food is present in great quantity.

Population Distribution

Bald eagles occur over most of North America at some time during the year, and breed across at least half of the continent. The largest populations occur in the Pacific Northwest, western Canada, and southern Alaska.

Field Office Distribution

Ten bald eagle nests are known to occur within the Pinedale planning area. Six of these nests are located on privately owned surface lands, three are located within BLM land, and one is on State managed land. These nests occur within riparian habitats associated with several creeks and rivers, including the Green River and the New Fork River.

Reproduction and Survivorship

Breeding for bald eagles typically begins in February or March, and the female eagle lays a clutch ranging from one to three eggs in March or April. Both the male and female incubate the eggs for about 35 to 40 days, resulting in usually one or two eaglets produced by the pair (Stalmaster 1987). Young eagles remain in the nest for about 75 days. After the breeding season, bald eagles congregate where food is plentiful, and they may continue to roost near the nest tree.

Threats From Human Activity

The accelerated decline in numbers of the species since World War II has been attributed to several factors, including unauthorized poison baits on public lands, shooting, electrocution, and chemicals in the environment.

2.2.2.2 Western Yellow-billed Cuckoo (*Coccyzus americanus*)

Listing Status: Federal Candidate, July 2001

Species Description

The western population of the yellow-billed cuckoo (cuckoo) is a slender, long-tailed, robin-sized bird, about 12 inches long, with a moderately long, down-curved bill. It is brownish gray with white under-parts and a striking yellow base of the lower mandible for which the species is named. The outer tail feathers have distinctive broad white tips, giving an appearance of six large white spots on the underside.

Life History

Cuckoos are primarily found in open, streamside deciduous woodland with low, scrub vegetation. They generally prefer large tracts of deciduous riparian woodlands; cottonwood stands for foraging and willow thickets for nesting. They also require relatively large riparian tracks below 7,000 feet (2,134 m) for breeding, which is severely limited in Wyoming (WYNDD 2002). Canopy cover of at least 50 percent in the understory and overstory is preferred according to habitat models established for the western population. Cuckoos generally are absent from heavily forested and urban areas.

Although more than 75 percent of the cuckoo's diet comprises grasshoppers and caterpillars, they have been known to eat beetles, cicadas, wasps, flies, lacewings, mosquito hawks, and other insects. They have also been known to take eggs and the young of other birds. Sometimes they will eat small fruits and nuts.

Population Distribution

The cuckoo formerly ranged across southern Canada, the United States, and northern Mexico. It has been nearly extirpated in the West and is restricted to small isolated populations. It is considered extremely rare in the Northern Rockies and Great Plains. An estimated 90 percent of the bird's riparian habitat in the West has been destroyed or degraded as a result of human activity (e.g., conversion to agriculture, dams and river flow management, bank protection, overgrazing, and competition from exotic plants such as tamarisk) (Laymon and Halterman 1987, Laymon 2000; Hughes 1999). The species is no longer found in British Columbia, Washington, Oregon, or Nevada.

Little is known about the historic distribution of cuckoos in Wyoming; relatively few reported observations have occurred. Breeding pairs may be found in the Green River and Powder River basins, along the North Platte River to Casper, and along the Henry's and Black's Fork Rivers. One observation of the cuckoo in 1994 was made at Seedskadee National Wildlife Refuge, which is west of the planning area.

Field Office Distribution

Population status and trends of the cuckoo in Wyoming are unknown. Suitable cottonwood/willow riparian habitat is very limited and not adequately surveyed. Breeding is considered unconfirmed, although observations and other anecdotal evidence suggests that breeding may occur in the Green River Basin and along the Snake River (in Wyoming). Element occurrence records within the Wyoming Natural Diversity Database (WYNDD) support five occurrences of this subspecies in southwestern Wyoming. All of these occurrences were made during Breeding Bird Surveys from 1977 to 1981. Existence was documented with three sightings on the Seedskadee National Wildlife Refuge; two of the observations reported pairs exhibiting courtship behavior. On June 26, 1980, one adult was observed in the vicinity of Beaver Creek (a tributary of the Henry's Fork of the Green River) in Uinta County; this individual was demonstrating courtship behavior. The fifth record occurred in the vicinity of Abert Creek, Uinta County, approximately 1 to 1.5 miles southeast of Interstate 80 and 3 miles east of Duncomb Hollow on July 5, 1979; this is the only verified report of the cuckoo on BLM land in Wyoming.

Reproduction and Survivorship

Cuckoos arrive on their western breeding grounds in mid-June and leave for South America by late August. Breeding often coincides with the appearance of large numbers of spring insects. Cuckoos have the shortest combined incubation and nesting period of any bird species. Clutch size usually ranges between three and five, and males and females share egg incubation. Though unable to fly, the newly fledged young are adept crawlers, traveling up to 150 feet (45.7 m) on their first day out of the nest. After 3 to 4 weeks, they are able to begin their migration to South America (Center for Biological Diversity 2001).

Mating of cuckoos begins with the female raising and lowering her tail several times when a male is nearby. The male then snaps off a twig and brings it to her, landing directly on her back. The male places the twig crosswise in the female's bill at which point copulation begins, and ends seconds later.

Threats From Human Activity

Loss of habitat is probably the greatest threat facing the cuckoo. Dams and river flow management, overgrazing, land conversions associated with agriculture, and infestations of exotic plants have severely impacted riparian habitat throughout the West, including Wyoming (Laymon and Halterman 1987; Hughes 1999; UDSI USFWS 2000, 2001).

2.2.3 Fish

2.2.3.1 Kendall Warm Springs Dace (*Rhinichthys osculus thermalis*)

Listing Status: Federal—Endangered, October 1970

The Kendall Warm Springs dace is a subspecies of the speckled dace. The Kendall Warm Springs dace does not occur on BLM-administered lands within the planning area. Only one population is known to exist within the USFS Bridger Teton National Forest Pinedale Field Office. Management actions, analysis and conservation measures are being implemented in the forest plan written and implemented by that office. The BLM assists with the subsurface mineral management and any mineral related actions would be consulted on with the USFWS; therefore, the Kendall Warm Springs dace will not be considered further in this document.

2.2.4 Plants

2.2.4.1 Ute Ladies' Tresses Orchid (*Spiranthes diluvialis*)

Listing Status: Federal Threatened, February 1992

Species Description

The Ute ladies' tresses orchid is a perennial, terrestrial orchid with erect, glandular-pubescent stems 8 to 20 inches (12 to 50 cm) tall arising from tuberous-thickened roots. Its narrow leaves are about 11 inches (28 cm) long at the base of the stem and become reduced in size going up the stem. This species flowers from late July to September. Plants probably do not flower every year and may remain dormant below ground during drought years. The flowers consist of 3 to 15 small white to ivory colored flowers clustered into a spike arrangement at the top of the stem. Whitish, stout, ringent flowers characterize the species. The sepals and petals, except for the lip, are rather straight, although the lateral sepals are variably oriented, with these often spreading abruptly from the base of the flower. Sepals are sometimes free to the base. The lip lacks a dense cushion of trichomes on the upper surface near the apex. The rachis is sparsely to densely pubescent with the longest trichomes 0.008 inches (0.2mm) or longer.

Life History

The Ute ladies' tresses orchid typically blooms from late July through August, occasionally through September. Blooms were recorded as early as early July and as late as early October. Reproduction is strictly sexual. Reproductively mature plants do not flower every year. These plants may need 5 to 10 years to reach reproductive maturity.

The Ute ladies' tresses orchid is endemic to moist soils in mesic or wet meadows, subirrigated or seasonally flooded soils in valley bottoms, gravel bars, old oxbows, or floodplains bordering springs,

lakes, rivers, or perennial streams between 1,780 and 6,800 feet in elevation (542 to 2,074 m) (Fertig and Beauvais, 1999). The species occurs primarily in areas in which the vegetation is relatively open and not overly dense, overgrown, or overgrazed. Populations have been documented from alkaline sedge meadows, riverine floodplains, flooded alkaline meadows adjacent to ponderosa pine-Douglas fir woodlands, sagebrush steppe, and streamside floodplains.

Known sites of this species often have low vegetative cover and may be subject to periodic disturbances (e.g., flooding or grazing). Populations are often dynamic and shift within a watershed as disturbances create new habitat or succession eliminates old habitat (Fertig and Beauvais, 1999). The Ute ladies' tresses orchid is well adapted to disturbances from stream movement and is tolerant of other disturbances, such as light grazing, that are common to grassland riparian habitats and that reduce competition between the orchid and other plants (USFWS, 1995). It is known to establish in heavily disturbed sites, such as revegetated gravel pits, heavily grazed riparian edges, and along well-traveled foot trails (USFWS, 1995).

Population Distribution

The Ute ladies' tresses orchid occurs from western Nebraska, southeastern Wyoming, north-central Colorado, northeastern and southern Utah, east-central Idaho, southwestern Montana, and north-central Washington (Moseley, 1998). The total population is roughly 20,500 individuals.

In Wyoming, Ute ladies'tresses orchid populations are presently known from four locations. BLM-authorized searches (1994–2001) for the species have been performed at several locations in Wyoming with no additional populations being located. In 1998–1999, Fertig revisited all four populations and documented 800 to 1,200 individuals in a total area smaller than 10 acres. Most of the populations in Wyoming occur in moist meadow communities dominated by *Agrostis stolonifera, Elymus repens, Juncus balticus, Panicum virgatum,* and *Hordeum jubatum* within a narrow band between emergent aquatic vegetation and adjacent dry upland prairie. Vegetative cover is typically 75 to 90 percent, but is usually short (under 45 cm tall) (Fertig, 2000). The only exception is the Converse County population, which is associated with a cattail marsh, among tall, dense grasses..

Field Office Distribution

To date, no populations of Ute ladies' tresses orchids are known to occur on public lands within the PFO.

Reproduction and Survivorship

The species is threatened primarily by habitat loss and modification, although its small populations and low reproductive rate make it vulnerable to other threats. The riparian and wetland habitats required by this species have been heavily impacted by urban development, heavy grazing, stream channelization, water diversions, and other watershed and stream alterations that reduce the natural dynamics of the stream system, recreation, and invasion of habitat by exotic plant species (USFWS, 1995).

Wyoming's populations of Ute ladies' tresses orchids are largely unthreatened under current management, but they could become threatened by changes in land uses (Fertig, 2000). The following potential threats have been identified in the literature that may affect survivorship: (1) urbanization, (2) grazing, (3) mowing, (4) flood control, (5) pesticide use, (6) competition from introduced weeds, (7) natural herbivory, (8) loss of pollinators, (9) recreation, and (10) over-collection.

Threats from Human Activity

This species is threatened primarily by habitat loss and modification, although its small populations and low reproductive rate make it vulnerable to other threats.

The riparian and wetland habitats required by this species have been heavily impacted by urban development, heavy grazing, stream channelization, water diversions, and other watershed and stream alterations that reduce the natural dynamics of the stream system, recreation, and invasion of habitat by exotic plant species (USFWS, 1995).

The effects of grazing are largely unknown. The largest populations of the species, in Utah and Colorado, are grazed during the winter, when the plant is dormant, with no noticeable effect on the species. It is plausible that moderate winter grazing may be beneficial to the species.

Because of its low reproductive rate, any loss of individual plants attributed to collection could have a major effect on the species' survival. Collection of individual plants or flowers could cause significant harm to the reproductive potential of the affected population.

2.2.5 Colorado River Species

Several avian and fish species, and one plant species, occurring as residents or migrants in the Colorado River basins (inclusive of major tributaries), have experienced material declines in abundance, distribution, and the availability of suitable habitats since the turn of the 20th century. The reasons for these declines in abundance, distribution, and availability of suitable habitats are multifarious, but the two most pervasive and encompassing reasons are (1) the effects of water developments, including dam construction, diversion and consumptive use of water, and concomitant changes in river flow and channel characteristics; and (2) introductions of non-native aquatic species.

Water developments such as dams, reservoirs, and irrigation diversions have altered natural surface-water hydrographs (i.e., timing, magnitude, and duration). Altered hydrographs can indicate negative effects on the ecosystems of river-dependent species (e.g., interior least tern and pallid sturgeon). Changes in the relative magnitudes of regulated flows, before nesting versus during nesting, have resulted in more frequent inundation of the nests of federally listed avian species (e.g., piping plover and interior least tern). Too little water at certain times of the year can subject federally listed birds to excessive predation during periods of nesting and roosting (Gordon et al. 1992); this condition can also limit the availability of forage fish to the pallid sturgeon (found within the Platte River System on the northern boundary of the Rock Springs and southern boundary of the PFO). In addition, reductions in the magnitude and frequency of high flows can adversely impact the characteristics of flood-prone areas and wetlands and the ecological benefits they provide to federally listed species; these conditions can allow vegetation to encroach on less vegetated areas, resulting in a narrowing of relatively open channels (Gordon et al. 1992).

Habitat alterations and habitat fragmentation resulting from dams, reservoirs, and regulated flows have resulted in changes in habitat availability, habitat distribution, and habitat quality. In addition, introductions of non-native fishes, such as rainbow trout and brown trout, have resulted in competitive exclusion and diminished abundance of native fishes in much of their historic ranges. Similar impacts have reduced populations of federally listed fishes in the upper Colorado River basin, such as the Colorado pikeminnow. Finally, the inundation or diminution of wetland habitats resulting from flow regulation and reduced water availability can negatively impact wetland plants. In the planning area, water depletions—even if they occur hundreds of miles upstream—can affect population abundance and the availability of suitable habitats for federally listed birds, fishes, and one plant in the upper Colorado River basins.

BLM has historically authorized several types of activities and associated infrastructure within the planning area that constitute water depletions in the Colorado River basins; a depletion to river flows occurs when tributary surface water or groundwater is removed from its source—to the extent that some

of the water is not returned to its source—to be used elsewhere for a beneficial use. These activities include the development of livestock watering facilities, irrigation projects, wetlands, reservoirs for recreational fisheries, habitat restoration projects, as well as fire suppression and oil and gas development.

Four endangered fish found in the Colorado River in Colorado may be affected by BLM authorized actions within the planning area: endangered Colorado pikeminnow (*Ptychocheilus lucius*), endangered razorback sucker (*Xyrauchen texanus*), endangered bonytail chub (*Gila elegans*), and endangered humpback chub (*Gila cypha*).

2.2.5.1 Consultation History and Historic Depletions

BLM has previously been issued a BO on Colorado River Depletions Resulting from Reauthorization of Livestock Watering Facilities, Wyoming on September 21, 2000. In addition, BLM has been issued a BO for Colorado River Depletions for the Pinedale Anticline on September 26, 2000. Table 3 summarizes the Historic and Post-Formal Consultation Water Depletions and Table 4 summarizes Future Water Depletions.

Table 3. Historic and Post-Formal Consultation Water Depletions 1983–1999 and 2002–Present

Action	Number	Water Use Per Action (acre-feet)	Total Water Use (acre-feet)	Years
Water developments	95 8 1	3.7 3.7 5.3	399.83 29.6 15.9	1988–1993 2000–2003 2004-2006
Well construction activities	1,273	3.2	4,073.6	1953–2003
Total	**1,376**	**6.9**	**4,503.03**	**59**

Water Use Per Action was taken from the BO for Colorado River Depletions for the Pinedale Anticline and the BO on Colorado River Depletions Resulting from Reauthorization of Livestock Watering Facilities, Wyoming, issued by the USFWS.

Table 4. Future Water Depletions

Action	Number	Water Use Per Action (acre-feet)	Total Water Use (acre-feet)	Years
Water developments	30	5.3	159	unknown
Well construction activities	8,383	4.64	38,897.12	2001-2020
Wildlife suppression	Unknown	Unknown	0.31	unknown
Total	**8,413**	**9.94**	**39,056.12**	**2001-2020**

2.2.5.2 Colorado Pikeminnow (*Ptychocheilus lucius*)

Listing Status: Federal—Endangered

Species Description

The Colorado pikeminnow (formerly, Colorado squawfish) is listed as endangered under the Endangered Species Act of 1973. In addition, the Colorado pikeminnow is listed as threatened by the State of Colorado and is legally protected by the State of Utah. The Colorado pikeminnow was historically abundant in the Colorado River and most of its major tributaries such as the Yampa River and the Green River.

Life History

The Colorado pikeminnow prefers eddies and pools in large, deep rivers such as the Colorado River and the Green River. The USFWS has designated Critical Habitat for the Colorado pikeminnow as follows: the Yampa River (Moffat County, Colorado) and its 100-year floodplain from State Highway 394 bridge, T.6 N., R.91 W., sec. 1, to its confluence with the Green River, T.7 N., R. 103 W., sec. 28 (6th Principal Meridian); Green River and its 100-year floodplain from its confluence with the Yampa River (Uintah, Carbon, Grand, Emery, Wayne, San Juan, counties and Moffat County, Colorado), to the confluence with the Colorado River, T.30 S., R.19 E., sec.7 (Salt Lake Meridian); White River (Rio Blanco County, Colorado) and its 100-year floodplain from Rio Blanco Lake Dam, T.1 N., R.96 W., sec. 6 (6th Principal Meridian) to the confluence with the Green River (Uintah County, Utah) in T.9, R.20 E., sec. 4 (Salt Lake Meridian); Gunnison River (Delta and Mesa counties, Colorado) and its 100-year floodplain from its confluence with the Uncomphagre River in T.15 S., R.96 W., sec. 11 (6th Principal Meridian) to the confluence with the Colorado River in T.1 S., R.1 W., sec. 22 (Ute Meridian); Colorado River (Mesa and Garfield counties, Colorado, and Grand, San Juan, Wayne, Garfield counties, Utah) and its 100-year floodplain from the Colorado River bridge at Exit 90, north off Interstate 70 (river mile 238) in T.6 N., R.93 W., sec. 16 (6th Principal Meridian) to North Wash, including the Dirty Devil arm of Lake Powell, up to the full-pool elevation in T.33 S., R.14 E., sec.29 (Salt Lake Meridian); and the San Juan River (San Juan County, New Mexico and Utah) and its 100-year floodplain from the State Route 371 bridge in T.29N., R.13 W., sec. 17 (New Mexico Meridian) to Neskahai Canyon in the San Juan arm of Lake Powell in T.41 S., R11 E., sec. 26, up to the full-pool elevation.

Population Distribution

Colorado pikeminnow populations have been dramatically reduced throughout their historic range as a result of past and present human activities. Pervasive threats to this species are attributed to habitat alterations resulting from water development and diversions. However, non-native fish introductions are the most pressing impediment to the recovery of this species; predatory, non-native fishes profoundly affect recruitment by consuming juveniles (Minckley et al. 2003). Recovery efforts, however, are expanding the abundance and distribution of this species where the effects of habitat fragmentation and habitat alteration can be directly addressed.

Field Office Distribution

Although a single individual was collected in 1990 from the Little Snake River, Colorado pikeminnow are now thought to be extirpated from Wyoming.

Reproduction and Survivorship

Both historical water depletions and any new water depletions are likely to negatively affect population and habitat conditions downstream, although assessing the effects on species viability may be difficult.

The cumulative effects on the Colorado pikeminnow are attributed to activities that occur on public and private lands in the upper Colorado River basin (Wyoming only) are real and may be measurable. The cumulative effects to this species are primarily the result of water developments and water uses in the basin. Introduced species, such as rainbow trout, also are an important component of the cumulative effects that impact the Colorado pikeminnow; exotic trout tend to prey on young age classes of the pikeminnow.

Threats From Human Activity

Colorado pikeminnow populations have been dramatically reduced throughout their historic range as a result of past and present human activities. Pervasive threats to this species are habitat alterations

resulting from water development and diversions. However, non-native fish introductions are the most pressing impediment to the recovery of this species; predatory, non-native fishes profoundly affect recruitment by consuming juveniles (Minckley et al. 2003). Recovery efforts, however, are expanding the abundance and distribution of this species where the effects of habitat fragmentation and habitat alteration can be directly addressed.

2.2.5.3 Razorback sucker (*Xyrauchen texanus*)

Listing Status: Federal—Endangered

Species Description

The razorback sucker was historically well distributed in the Colorado River and in many of its major tributaries. At present, the razorback sucker is listed as endangered under the Endangered Species Act of 1973. In addition, the razorback sucker is listed as endangered in the State of Colorado and is legally protected by the State of Utah.

Life History

The Razorback sucker prefers fast, turbid waters in large rivers, such as the Colorado River and Green River. The USFWS has designated the following Critical Habitats for the razorback sucker: Yampa River (Moffat County, Colorado) and its 100-years floodplain from the mouth of Cross Mountain Canyon in T.6 N., R.98 W., sec. 23 (6th Principal Meridian) to its confluence with the Green River in T.7 N., R. 103 W., sec. 28 (6th Principal Meridian); Green River (Uintah County, Utah, and Moffat County, Colorado) and its 100-years floodplain and its confluence with the Yampa River in T.7 N., R.103 W., sec. 28 (6th Principal Meridian) to Sand Wash at river mile 96 in T.11 S., R.18 E., sec. 20 (6th Principal Meridian); Green River and its 100-years floodplain from Sand Wash at river mile 96 in T.11 S., R.18 E., sec. 20 (6th Principal Meridian) to the confluence to the Colorado River in T.30 S., R.19 E., sec.7 (6th Principal Meridian); White River (Uintah County, Utah) and its 100-years floodplain from the boundary of the Uintah and Ouray Indian Reservations at river mile 18 in T.9 S., R.22 E., sec. 21 (Salt Lake Meridian) to its confluence with the Green River in T.9 S., R.20 E., sec.4 (Salt Lake Meridian); Duchesne River (Uintah County, Utah) and its 100-years floodplain from river mile 2.5 in T.4 S., R.3 E., sec.30 (Salt Lake Meridian) to its confluence with the Green River in T.5 S., R.3 E., sec. 5 (Uintah Meridian); Gunnison River (Delta and Mesa counties, Colorado) and its 100-years floodplain from its confluence with the Uncompahgre River in T.15 N., R.96 W., sec.11 (6th Principal Meridian) to Redlands Diversion Dam in T.1 S., R.1 W., sec. 27 (Ute Meridian); Colorado River (Mesa and Garfield counties, Colorado) and its 100-years floodplain from Colorado River bridge at Exit 90, north of Interstate 70 in T.6 S., R.93 W., sec.16 (6th Principal Meridian) to Westwater Canyon in T.20 S., R.25 E., sec.12 (Salt Lake Meridian), including the Gunnison River and its 100-years floodplain from the Redlands Diversion Dam in T.1 S., R.1 W., sec.27 (Ute Meridian) to its confluence with the Colorado River in T.1 S., R.1 W., sec. 22 (Ute Meridian); Colorado River (Grand, San Juan, Wayne, and Garfield counties, Utah) and its 100-years floodplain from Westwater Canyon in T.20 S., R.25 E., sec.12 (Salt Lake Meridian) to full-pool elevation upstream of North Wash, including the Dirty Devil arm of Lake Powell in T.33 S., R.14 E., sec.29 (Salt Lake Meridian); and, the San Juan River (San Juan County, New Mexico, and San Juan County, Utah) and its 100-years floodplain from the Hogback Diversion in T.29 N., R.16 W., sec.9 (New Mexico Meridian) to the full-pool elevation at the mouth of Neskahai Canyon on the San Juan arm of Lake Powell in T.41 S., R.11 E., sec.26 (Salt Lake Meridian).

Population Distribution

The abundance and distribution of the razorback sucker have been dramatically reduced because of water developments such as dams and water diversions. In addition, the introduction of non-native trout into the

historical habitats of the razorback sucker has almost eliminated their recruitment and survival (Minckley et al. 2003). Incidental catch by recreational anglers may pose a threat as a result of stress-caused direct and delayed mortality.

Field Office Distribution

The razorback sucker does not occur within the planning area.

Reproduction and Survivorship

Water-development projects and activities, such as dam construction/operation and water diversions, have materially altered the preferred habitat conditions of the razorback sucker. Dams have altered the timing, magnitude, and duration of flows that characterize the variation in annual runoff in unaltered, large rivers; altered flows resulting from dam operation can also affect the abundance and distribution of spawning and rearing habitats preferred by the razorback sucker. Historical water depletions and any new water depletions are likely to negatively affect population and habitat conditions downstream, although assessing the effects on species viability may be difficult.

The cumulative effects on the razorback sucker attributed to activities occurring on public and private lands in the upper Colorado River basin (Wyoming only) are real and may be measurable. Cumulative effects that may negatively impact this species are primarily the result of water developments and water uses in the basin.

Threats From Human Activity

The abundance and distribution of the razorback sucker have been dramatically reduced because of water developments such as dams and water diversions. In addition, the introduction of non-native trout to the historical habitats of the razorback sucker has almost eliminated their recruitment and survival (Minckley et al. 2003). Incidental catch by recreational anglers may pose a threat resulting from stress-caused direct and delayed mortality.

2.2.5.4 Bonytail (*Gila elegans*)

Listing Status: Federal—Endangered

Species Description

The bonytail is listed as endangered under the Endangered Species Act of 1973. In addition, the bonytail is listed as endangered in the State of Colorado, and it is legally protected by the State of Utah. Historically, the bonytail was abundant in the Colorado River and in its major tributaries such as the Green River and the Yampa River. At present, the bonytail is precariously extant in the Colorado River downstream of Lake Powell; the bonytail is nearly extinct upstream of Lake Powell.

Life History

The bonytail prefers fast-flowing, turbid waters in large, deep rivers in the upper Colorado River basin such as the Green River and Colorado River. The USFWS has designated the following Critical Habitats for the bonytail: Yampa River (Moffat County, Colorado) from the boundary of the Dinosaur National Monument in T.6 N., R.99 W., sec. 27 (6th Principal Meridian) to its confluence with the Green River in T.7 N., R.103 W., sec. 28 (6th Principal Meridian); Green River (Uintah County, Utah, and Moffat County, Colorado) from its confluence with the Yampa River in T.7 N., R.103 W., sec. 28 (6th Principal Meridian) to the boundary of Dinosaur National Monument in T.6 N., R. 24 E., sec. 30 (Salt Lake Meridian); Green River (Uintah and Grand counties, Utah) (Desolation and Gray Canyons) from

Sumner's Amphitheater in T.12 S., R.18 E., sec. 5 (Salt Lake Meridian) to Swasey's Rapid (river mile 12) in T.20 S., R.16 E., sec. 3 (Salt Lake Meridian); Colorado River (Grand County, Utah, and Meas County, Colorado) in T.10 S., R.104 W., sec. 25 (6th Principal Meridian) to Fish Ford in T.21 S., R.24 E., sec. 35 (Salt Lake Meridian); and, Colorado River (Garfield and San Juan counties, Utah) from Brown Betty Rapid in T.30 S., R.18 E., sec. 34 (Salt Lake Meridian) to Imperial Canyon in T.31 S., R.17 E., sec. 28 (Salt Lake Meridian).

Population Distribution

The bonytail is the most imperiled fish among the federally listed fish species native to the Colorado River drainage. Water development projects and activities, such as dams and water diversions, have caused a nearly catastrophic decline in bonytail populations and in preferred habitats. In addition, the introductions of non-native trout in the Colorado River drainage have contributed to the decline in bonytail abundance and distribution attributed to predation.

Field Office Distribution

The bonytail does not occur in the planning area.

Reproduction and Survivorship

Both historical water depletions and any new water depletions are likely to negatively affect population and habitat conditions downstream, although assessing the effects on species viability may be difficult.

The cumulative effects on the bonytail resulting from activities that occur on public and private lands in the upper Colorado River basin (Wyoming only) are real and may be measurable. Cumulative effects that may negatively impact this species are the primarily the result of water developments and water uses in the basin. Introduced species, such as rainbow trout, are a component of the cumulative effects; also, exotic trout tend to prey on young age classes of bonytail.

Threats From Human Activity

The bonytail is the most imperiled fish among the federally listed fish species native to the Colorado River drainage. Water development projects and activities, such as dams and water diversions, have caused a nearly catastrophic decline in bonytail populations and in preferred habitats. Further, the introduction of non-native trout in the Colorado River drainage has contributed to the decline in bonytail abundance and distribution as a result of predation.

2.2.5.5 Humpback chub (*Gila cypha*)

Listing Status: Federal—Endangered

Species Description

The humpback chub is listed as endangered under the Endangered Species Act of 1973. In addition, the humpback chub is listed as endangered by the State of Colorado, and it is legally protected by the State of Utah. Historically, the humpback chub was abundant in the canyons of the Colorado River and in the canyons of four tributaries: Green River, Yampa River, White River, and Little Colorado River. In present, two stable populations of humpback chubs exist, both near the Colorado/Utah border: Westwater Canyon (Utah) and Black Rocks (Colorado). The largest known population of humpback chubs exists in the Little Colorado River in the Grand Canyon. Smaller populations of humpback chubs can be found in the main stem of the Colorado River (Arizona) and in sections of its tributaries such as the Green River (Utah and Colorado) and the Yampa River near Dinosaur National Monument.

Life History

The humpback chub prefers fast waters in habitats such as the riffles and rapids of river canyons and their tributaries (canyon sections) in the Colorado River basin. The USFWS has designated the following Critical Habitats for the humpback chub: Yampa River (Moffat County, Colorado) from the boundary of Dinosaur National Monument in T.6 N., R.103 W., sec. 27 (6th Principal Meridian) to its confluence with the Green River in T.7 N., R. 103 W., sec. 28 (6th Principal Meridian); Green River (Uintah County, Utah, and Moffat County, Colorado) from its confluence with the Yampa River in T.7 N., R.103 W., sec.28 (6th Principal Meridian) to the southern boundary of Dinosaur National Monument in T.6 N., R. 24 E., sec.30 (Salt Lake Meridian); Green River (Uintah and Grand counties, Utah) (Desolation and Gray Canyons) from Summers Amphitheater in T.12 S., R.18 E., sec.5 (Salt Lake Meridian) to Swasey's Rapid in T.20 S., R.18 E., sec.3 (Salt Lake Meridian); Colorado River (Grand County, Utah, and Mesa County, Colorado) from Black Rocks in T.10 S., R.104 W., sec.25 (6th Principal Meridian) to Fish Ford in T.21 S., R.24 E., sec.35 (Salt Lake Meridian); and, Colorado River (Garfield and San Juan counties, Utah) from the Brown Betty Rapid in T.30 S., 18 E., sec.34 (Salt Lake Meridian) to Imperial Canyon in T.30 S., R.17 E., sec.28 (Salt Lake Meridian).

Population Distribution

The humpback chub is not as abundant as it was historically. Water development and introduced trout have affected the abundance and distribution of the humpback chub. Dams have altered the timing, duration, and magnitude of annual flows that provided suitable and preferable habitats for the humpback chub. In addition, non-native trout have affected humpback chub abundance as a result of predation.

Field Office Distribution

The humpback chub does not occur in the planning area.

Reproduction and Survivorship

Water developments and introduced fishes are the primary threats to the viability of humpback chub populations. Providing adequate spring-runoff conditions, establishing additional populations, and the reducing the stocking of non-native trout are all conducive to maintaining viable populations of humpback chub. Historical water depletions and any new water depletions are likely to negatively affect population and habitat conditions downstream, although assessing the effects on species viability may be difficult.

The cumulative effects on the humpback chub resulting from activities that occur on public and private lands in the upper Colorado River basin (Wyoming only) are real and may be measurable. Cumulative effects that may negatively impact this species are primarily the result of water developments and water uses in the basin. Introduced species such as rainbow trout also are an important component of the cumulative effects; exotic trout tend to prey on young age classes of humpback chubs.

Threats From Human Activity

The humpback chub is not as abundant as it was historically as a result of water development and introduced trout that have also affected the distribution of the humpback chub. Dams have altered the timing, duration, and magnitude of annual flows that provided suitable and preferable habitats for the humpback chub. Further, non-native trout have affected humpback chub abundance as a result of predation.

2.2.6 Platte River System Species

Seven species in the Platte River system are federally listed as threatened or endangered. They are the endangered whooping crane (*Grus americana*), endangered interior population of least tern (*Sterna antillarum*), threatened piping plover (*Charadrius melodus*), endangered pallid sturgeon (*Scaphirhynchus albus*), endangered Eskimo curlew (*Numenius borealis*), and the threatened western prairie fringed orchid (*Platanthera praeclara*). In addition, depletions may contribute to the destruction or adverse modification of designated critical habitat for the whooping crane, and proposed critical habitat for the northern Great Plains breeding population of the piping plover.

The Platte River system is located east of the Wind River mountain range outside of the Pinedale Field Office boundary and within the Bridger-Teton National Forest (BTNF) Pinedale Office boundary. The Pinedale Field assists in the management of the federal mineral estate, however the BLM does not have jurisdiction on Forest Management plans, mineral leasing, or any other NEPA documents that would pertain to this area. The BTNF solely contains these rights and authorities; therefore, the Platte River system species will not be considered further in this document.

3.0 METHODS AND CONTEXT OF THE ANALYSIS

3.1 ACTIVITY DESCRIPTIONS

The following discussion is a qualitative overview and summarization of the Pinedale RMP activity programs and potentially authorized activities of BLM that may affect endangered, threatened, proposed, and candidate species now or in the foreseeable future. Manpower and budgetary restrictions, and changes in biological and technological information, may affect the extent to which the PFO may engage in the following program activities. Therefore, the likelihood of these potentially authorized activities occurring is largely undeterminable at this scale over the life of the plan. Site-specific analysis and determinations would be conducted on a case-by-case basis throughout the life of the plan.

3.1.1 Air Quality

Air quality management objectives are to maintain or enhance air quality and minimize emissions that could result in atmospheric deposition (acid rain), violations of air quality standards, or reduced visibility. Laws controlling air pollutants in the United States are the Clean Air Act of 1970 and its amendments, and the 1999 Regional Haze Regulations. The concentrations of air contaminants in the planning area need to be within limits of Wyoming ambient air quality standards (WAAQS) and national ambient air quality standards (NAAQS). WAAQS and NAAQS are legally enforceable standards for PM_{10}, NO_2, ozone, SO_2, and CO.

In addition to complying with NAAQS and WAAQS, major new sources of pollutants or modifications to sources must comply with the New Source Performance Standards and Prevention of Significant Deterioration (PSD). The PSD increments measure PM_{10}, SO_2, and NO_2. The PSD program is used to measure air quality to ensure that areas with clean air do not significantly deteriorate while a margin for industrial growth is maintained.

A qualitative emission comparison approach was selected for analysis of impacts to air quality. This approach was used because (1) no specific data were available on future projects, (2) limited time was available to complete the analysis, (3) quantitative analysis will be required as development projects are

defined in the future, and (4) Wyoming Department of Environmental Quality–Air Quality Division (WDEQ-AQD) will require demonstration of compliance with federal and State air quality regulations and standards for any future development projects. Given the uncertainties concerning the number, nature, and specific location of future emission sources and activities, the emission comparison approach provides a sound basis to compare the potential impacts under the various alternatives. A more detailed justification and a detailed list of all assumptions used in this impact assessment are presented in the Air Quality Technical Support Document (AQTSD).

Wildland fires and prescribed burns would result in emissions of particulates and polyaromatic hydrocarbons (PAH), as well as reduced visibility. Vehicular activity would also produce emissions that would degrade air quality. Permitted stationary sources of air emissions would continue to contribute to cumulative impacts to regional air quality.

Given the low ambient concentrations that exist in the Pinedale area for some of the pollutants, it is expected that the increase in emissions, under any of the alternatives, of carbon monoxide (CO), nitrogen oxides (NOx), sulfur dioxide (SO_2), PM10, and PM2.5 would not cause any exceedance of State or federal ambient air quality standards. Because it is unknown whether a quantitative relationship exists between expected air emissions and the subsequent potential impacts to the air quality values of ambient criteria pollutant concentration, visibility, atmospheric deposition, or ozone, conclusions cannot be drawn concerning potential impacts to these air quality values from the various alternatives.

3.1.2 Cultural Resources

BLM performs a variety of activities to preserve, protect, and restore cultural and historical resources. The prehistoric and historic resources, primarily archaeological sites, date from 11,500 years before present (B.P.) to the 1950s. Native American resources include prehistoric and historic archaeological sites with particular characteristics, as well as locations historically and/or presently considered sacred by Native American groups.

During inventory activities, BLM inventories, categorizes, and preserves cultural resources; conducts field activities; performs excavations; maps and collects surface materials; researches records; and photographs sites and cultural resources. Temporary campgrounds may be authorized for these activities. Inventory data collection activities are used for documentation and development of mitigation plans before other resource program surface disturbing activities begin. Inventory activities commonly entail the use of hand tools. Data recovery activities occasionally entail the use of power tools and heavy equipment. BLM's cultural resource land management activities involve managing sites for scientific, public, and sociocultural use; developing interpretive sites; restricting certain land uses; closing certain areas to exploration; prohibiting some surface disturbing activities; and preparing interpretive materials. BLM also seeks listing of eligible sites on the National Register of Historic Places, installs protective fencing of trail segments and other cultural resources, stabilizes deteriorating buildings and resources, acquires access to sites when necessary, performs data recovery excavations, pursues withdrawal of areas from exploration and development of locatable minerals, designates avoidance areas, pursues cooperative agreements, and identifies and interprets historic trails.

BLM performs cultural resource inventories normally in response to other surface disturbing activities. Inventories include transects set 30 meters (100 feet) apart from each other.

3.1.3 Forestry

BLM's forestry program includes various activities, most of which involve timber harvesting. Other activities involve managing the forest for other uses including recreation, livestock grazing, wildlife

habitat, and prescribed burning. During forestry activities for timber production in the preharvest phase, BLM allows the cutting and removal of diseased trees and disease treatment by spraying. BLM allows precommercial thinning, chaining, and shearing. During actual harvesting activities, BLM allows timber harvesting; permits clear-cuts (e.g., stand replacements), permits selective cutting, ensures slash disposal occurs, and allows commercial thinning, logging, and skidder-type yarding and cable yarding. BLM permits the construction of roads and landings for use in timber harvesting operations. Slash is to be lopped and scattered, roller chopped, or burned. BLM also permits helicopter logging. Noncommercial timber harvest involves the collection and cutting of firewood, Christmas trees, posts, poles, and wildlings. During restoration efforts following timber harvesting, BLM ensures site regeneration (natural), artificial regeneration (planting harvested areas, including new seedlings), and stand replacements; fences regenerated areas; and conducts rehabilitation surveys.

3.1.4 Lands and Realty

The Lands and Realty program seeks to support multiple-use management goals of BLM resource programs; respond to public requests for land use authorizations, sales, and exchanges; and acquire and designate ROW access to serve administrative and public needs. The Pinedale RMP addresses only those lands within Sublette and Lincoln counties that are administered by BLM (about 922,880 surface acres and 1,199,280 acres of federal mineral estate).

ROWs granted by BLM are used for access roads, well pads, pipelines, communication sites, ditches and canals, buried telephone lines and fiber optic lines, reservoirs, compressor stations and other facilities, and electrical distribution lines (power lines) associated with proposed projects and/or activities. In addition, BLM authorizes ROWs and leases for utility transportation corridors. A ROW is generally issued for a 30-year term and may be extended with the right of renewal.

Land tenure adjustment requests such as disposals of, transfer, or acquisition of public lands are also reviewed. Public lands have potential for disposal when they are isolated and/or difficult to manage. Disposal actions usually occur in response to a public request or application that results in a title transfer, wherein the lands leave the public domain. All disposal actions are coordinated with adjoining landowners, local governments, and current land users. Acquisition of nonfederal lands would be pursued, if needed, to accomplish multiple use management objectives.

Withdrawals are initiated 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 be used to transfer jurisdiction to other federal land-managing agencies.

In addition, the Lands and Realty program authorizes wind energy development. Wind energy development projects are considered on a case-by-case basis. Wind turbines authorized by BLM are typically up to 180 feet high, with an 80-foot turbine diameter. Each turbine would encompass approximately 1.2 acres. Ancillary uses would include meteorological towers, roads, and power lines.

3.1.5 Livestock Grazing

The Wyoming Standards for Rangeland Health and Guidelines for Livestock Grazing Management would apply to all livestock grazing activities on public lands. Numerous activities make up BLM's livestock management program, including livestock grazing management, vegetation treatments, and range improvements.