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Ecological Services
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Memorandum

To: Jeff Carroll, Threatened & Endangered Species Coordinator, Bureau of Land Management, State Office, Cheyenne, Wyoming

From: Michael M. Long, Field Supervisor, U.S. Fish and Wildlife Service, Wyoming Field Office, Cheyenne, Wyoming /s/ Robin R. Bown *for*

Subject: Response to Wyoming Bureau of Land Management determination of proposed activities effects on the Whooping Crane

This document transmits the U.S. Fish and Wildlife Service's (Service) response to the Bureau of Land Management (BLM) effects determination for proposed BLM activities in Wyoming on the federally endangered Whooping Crane in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

This response is based on information provided in the Wyoming Bureau of Land Management Statewide Programmatic Biological Assessment (BA) for Whooping Cranes (*Grus americana*) dated July 2002, conversations with experts, and documents held at the office of the Service in Cheyenne, Wyoming.

Based on all information examined, the Service concurs with the determination that current BLM activities are not likely to adversely affect the whooping crane in Wyoming. This opinion is held primarily due to the fact that there currently is no whooping crane population inhabiting Wyoming. The Rocky Mountain experimental nonessential population of the whooping crane has never been self-sustaining. The sandhill crane/whooping crane cross-fostering program which maintained the Rocky Mountain experimental nonessential population was disbanded in 1989. Since that time, whooping cranes from the Rocky Mountain experimental nonessential population have experienced steady mortality rates. The last remaining whooping crane of this population was not witnessed in the flock in the Spring of 2002 and has not been seen since 2001. It is considered highly unlikely that this remaining bird is alive. Thus, as of July 2002 (Personal Communication, Tom Stehn, Service Whooping Crane Coordinator), the Rocky Mountain Population of the whooping crane is now considered to contain no remaining whooping cranes. Furthermore, the Aransas-Wood Buffalo Population of the whooping crane, during its fall and spring migration route, inhabits wetlands and rivers far to the east of

Wyoming occurring in sections of the Platte River in central Nebraska. It is considered highly unlikely that any whooping cranes from the Aransas-Wood Buffalo Population will use Wyoming habitats (Personal Communication, Wally Jobman, Service Wildlife Biologist).

If you have further questions regarding this Service concurrence to the BLM effects determination, please contact Alex Schubert of my staff at the letterhead address or phone (307) 772-2374, extension 38.

cc: Director, WGFD, Cheyenne, WY
Statewide Habitat Protection Coordinator, Cheyenne, WY
Nongame Coordinator, WGFD, Lander, WY

WYOMING BUREAU OF LAND MANAGEMENT STATEWIDE PROGRAMMATIC BIOLOGICAL ASSESSMENT FOR WHOOPING CRANES (*Grus americana*)

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For the

United States Department of the Interior
Bureau of Land Management
Cheyenne, Wyoming

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1.0 INTRODUCTION

A diversity of wildlife habitats are within the boundaries of federal lands managed by the Bureau of Land Management (BLM) in Wyoming. BLM operations have varying degrees of impacts, some positive and some potentially negative, on these habitats.

The Endangered Species Act (ESA) of 1973, as amended, mandates interagency cooperation. Section 7 (a) of the ESA states "all other federal agencies shall, in consultation with and with the assistance of the Secretary of the Interior, utilize their authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of endangered species and threatened species listed pursuant to section 4 of this act."

Section 7(a) (2) states: "Each federal agency shall, in consultation with and with the assistance of the Secretary, insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined by the Secretary, after consultation as appropriate with affected States, to be critical, unless such agency has been granted an exemption for such action by the Committee pursuant to subsection (h) of this section."

Under the ESA, each federal agency is required to confer with the U.S. Fish and Wildlife Service (USFWS) on any agency action that is likely to jeopardize the continued existence of any species proposed to be listed or listed as threatened or endangered.

This Biological Assessment (BA) examines the biological needs of the endangered whooping crane (*Grus americana*) and how those needs may be impacted by proposed BLM management of public lands.

2.0 ENDANGERED SPECIES ACT

The ESA was originally passed in 1973. It provides for the designation and protection of invertebrates, wildlife, fish, and plant species that are in danger of becoming extinct and conserves the ecosystems on which such species depend.

The ESA defines an endangered species as any species that is in danger of becoming extinct throughout all or a significant portion of its range. The ESA excludes recognized insect pests from this definition. A threatened species is one that is likely to become endangered in the foreseeable future. The ESA makes it illegal for any individual to kill, collect, remove, harass, import, or export an endangered or threatened species without a permit from the Secretary of the Department of the Interior. The U. S. Fish and Wildlife Service (USFWS) performs most administrative and regulatory actions under the ESA. The National Marine Fisheries Service in the U.S. Department of Commerce deals with actions affecting marine species.

The ESA directs the Secretaries of Interior and Commerce to establish programs to conserve fish, wildlife, and plants, including endangered and threatened species. Also, the Department of Agriculture oversees the import and export of endangered and threatened species. Implementation of such programs usually includes acquisition of lands under the ESA itself and under the Fish and Wildlife Coordination Act of 1958, as amended; the Fish and Wildlife Act of 1956, as amended; and the Migratory Bird Conservation Act of 1929, as amended.

The ESA mandates cooperation between the U.S. federal, U.S. state, and foreign governments. All federal agencies must utilize their authorities to carry out programs for the conservation of endangered and threatened species. Regulations promulgated under Section 7 of the ESA define the process whereby proposed federal actions that may affect threatened or endangered species are approved, disapproved, and appealed.

Section 7 of the ESA states:

> "Each Federal agency shall, in consultation with and with the assistance of the Secretary [of DOI], insure that any action authorized, funded, or carried out by such agency . . . is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined by the Secretary . . . to be critical. [ESA Section 7(a)(2)].

Section 7 of the Endangered Species Act, 16 U.S.C. Section 1536(a)(2), requires all federal agencies to consult with the National Marine Fisheries Service for marine and anadromus species, or the United States Fish and Wildlife Services for fresh-water and wildlife, if they are proposing an "action" that may affect listed species or their designated habitat. Action is defined broadly to include funding, permitting and other regulatory actions (See 50 CFR §402.02). For local governments, any project that requires a federal permit or receives federal funding is subject to Section 7.

Each federal agency is to insure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. This is done through consultation. If such species may be present, the local government must conduct a biological assessment for the purpose of analyzing the potential effects of the project on listed species and critical habitat in order to establish and justify an "effect determination." The federal agency reviews the BA and, if it concludes that the project may adversely affect a listed species or their habitat, it prepares a "biological opinion." The biological opinion may recommend "reasonable and prudent alternatives" to the proposed action to avoid jeopardizing or adversely modifying habitat. These so-called "RPAs" carry great weight with other federal agencies and are often treated as binding requirements.

3.0 BLM RESOURCE MANAGEMENT PLANS

The Federal Land Policy and Management Act (FLPMA) and the regulations at 43 CFR part 1600 require the Bureau of Land Management to prepare Resource Management Plans (RMPs) to provide management direction for the public lands. The objective of land use planning is to ensure that BLM lands are managed under the principles of multiple use and sustained yield (FLPMA, sec. 102 (a) (7)); in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archaeological values; that, where appropriate, will preserve and protect certain public lands in their natural condition; that will provide food and habitat for fish and wildlife and domestic animals; and that will provide for outdoor recreation and human occupancy and use (FLPMA, sec. 102(a)(8)); and in a manner that recognizes the Nation's need for domestic sources of minerals, food, timber, and fiber from the public lands (FLPMA, sec. 102 (a) (12)).

In addition to serving as BLM's primary tool for determining resource protection and allocations in the management of the public lands, RMPs provide the public a voice in BLM's land and resource management programs. They establish goals and objectives for resource management, measures needed to achieve them, and parameters for use.

Six BLM RMPs cover lands with potential whooping crane habitat. These include RMPs from the Kemmerer, Lander, Pinedale, Rawlins and Rock Springs Field Offices (FOs). The Pinedale FO has two RMPs including the Pinedale and Snake River RMPs. A brief description of the area covered by each of the RMPs is provided below.

3.1 Kemmerer Field Office

The Kemmerer RMP Record of Decision was published in June 1986 (BLM 1986). The RMP provides the management direction for approximately 1.63 million acres of public land and 1.87 million acres of federal mineral estate. The resource area administrative boundary includes portions of Sublette, Lincoln, and Fremont counties.

The Kemmerer RMP states:

> "No activities that would jeopardize the continued existence of threatened and endangered species will be allowed in habitat for those species. The Wyoming Game and Fish Department and the U.S. Fish and Wildlife Service will be contacted prior to implementing projects that may affect habitat for threatened and endangered species, if a "may effect" situation is identified, a biological assessment will be prepared and formal consultation with the USFWS will be initiated."

3.2 Lander Field Office

The Lander RMP Record of Decision was published in June 1987 (BLM 1987). The RMP provides the management direction for approximately 2.7 million acres of public land administered by the BLM in the Lander Resource Area. The resource area administrative boundary includes portions of

Sublette, Fremont, Natrona, and Hot Springs counties.

3.3 Pinedale Field Office

The Pinedale RMP Record of Decision was published in December 1988 (BLM 1988) but is currently under review for revisions. Although the RMP has been updated several times since 1988, new issues and concerns have arisen over the years, necessitating a review of the RMP to determine to what extent it needs to be further updated or modified. The RMP provides the management direction for approximately 931,000 acres of public surface and 1,185,000 acres of federal mineral estate administered by the BLM in the Pinedale Resource Area. The resource area administrative boundary includes portions of Sublette, Lincoln, Teton, and Fremont counties.

The Snake River RMP is also administered through the Pinedale field office and that plan is currently under revision and the Record of Decision is scheduled for completion in September 2003.

The Pinedale RMP states:

> "Threatened and endangered (T&E) species and their habitats will be protected. Actions, which would degrade habitat to a point of jeopardizing the continued existence of a T&E species, will not be allowed.
>
> The U.S. Fish and Wildlife Service will be consulted on any action with reasonable potential to affect endangered species or their habitats. A biological assessment will be prepared on all proposals where T&E species habitat will or may be affected and a biological opinion will be requested from the USFWS.
>
> All actions will include consideration for T&E plant and animal species. The Pinedale Resource Area will continue to be inventoried to identify potential habitat and occurrence of T&E species. Identification of habitat occupied by T&E species and habitat with potential to help support these species would be managed in accordance with the national recovery plans. Potential habitat includes… wetlands for whooping cranes."

3.4 Rawlins Field Office

The Great Divide Resource Area RMP Record of Decision was published in November 1990 (BLM 1990) but is currently under review for revisions. Although the RMP has been updated several times since 1990, new issues and concerns have arisen over the years, necessitating a review of the RMP to determine to what extent it needs to be further updated or modified.

The RMP provides the management direction for approximately 4.0 million acres of public land surface and 5.0 million acres of federal mineral estate administered by the BLM in the Rawlins District Office. The resource area administrative boundary includes portions of Carbon, Albany, Sweetwater, and Laramie counties in south central Wyoming.

3.5 Rock Springs Field Office

The Green River Resource Management Plan Record of Decision was published in August 1997 (BLM 1997). The RMP provides the management direction for approximately 3.5 million acres of public surface and 3.5 million acres of federal mineral estate administered by the BLM in the Rock Springs District Office. The resource area administrative boundary includes portions of Sweetwater, Lincoln, Sublette, Fremont, and Uinta counties in southwestern Wyoming.

4.0 WHOOPING CRANE NATURAL HISTORY

The Whooping Crane is the rarest of the world's 15 crane species. The species' historic decline, near extinction, and gradual recovery is among the best known and documented cases in the annals of conservation. Over the last fifty years, a combination of strict legal protection, habitat preservation, and continuous international cooperation between Canada and the United States has allowed the only remaining wild population to increase steadily from a historic low of just 15 known individuals in 1940-41 to more than 285 at present (Meine and Archibald 1996).

4.1 Morphological Description

Whooping cranes are the tallest of all birds in North America. An adult male stands 1.5 meters (4.9 feet) tall, weighs as much as 7.5 kg (16.5 lbs), and has a wingspan up to 2.5 meters (8.2 feet) wide. Males are larger than females with the females weighing approximately 6.4 kg (14.1 lbs). Despite their size, cranes average a flight speed of about 45 km/h (28.0 mph) (USGS 1997).

Adult plumage is snowy white with black wingtips that are visible only when the wings are extended (descriptions compiled from Sibley 2000, Dorn and Dorn 1990, Nebraska Game and Parks 2002, and USGS 1997). The neck is long, the bill is long, dark and pointed, and the legs are long, thin and black. There is a patch of reddish-black bristly feathers on the top and back of the head. Black feathers on the side of the head below the yellow eye look like a long, dark moustache. The whooping crane is the only large white bird with black wingtips that flies with its neck straight out in front, the legs trailing far behind. It also is the only one that walks or stands on long thin legs and does not swim.

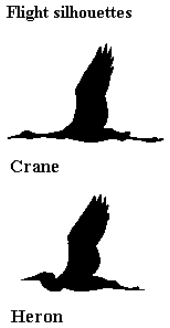
Photo from the Nebraska Game and Parks Commission (2002).

Plumage of the juvenile whooping crane is a rusty or cinnamon brown color. At about four months of age, white feathers begin to appear on the neck and back. Young in their first fall migration usually have a brown head and neck and a mixture of brown and white on the body. The plumage is

predominantly white by the following spring.
Several birds may be misidentified as whooping Cranes (Lewis 1995). Sandhill cranes (*Grus canadensis*) are primarily gray but sometimes appear whitish in bright sunlight. Their gray primaries and secondaries are evident when the wings are extended in flight. Sandhill cranes with wingspans less than 1.6 m (5.2 ft) are smaller than whooping cranes.

Snow geese (*Chen caerulescens*) and white pelicans (*Pelecanus erythrorhynchos*) are white, smaller than whooping cranes, have black wing tips and short legs that do not extend beyond the tail in flight. Snow geese have rapid wing beats and often occur in large flocks. White pelicans fly with the neck folded and are smaller than whooping cranes. Wood storks (*Mycteria americana)* are white with outer and trailing edges of the wings black, black undertail, and dark head and upper neck.

Adult tundra (*Olor columbianus*), trumpeter (*O. buccinator*) and mute swans (*Cygnus olor*) lack the black wing feathers and fly with the neck extended straight forward and legs not extended beyond the tail.



4.2 Taxonomy and Distribution

The whooping crane occurs exclusively in North America and was likely never very common in historic times. The total population prior to 1870, when European settlement began to have a significant impact on the species and its habitats, has been variously estimated at between 500 and 1400 (Allen 1952, Banks 1978, Lewis 1995b). The principal historic breeding range stretched across central North America from central Alberta through southern Saskatchewan and Manitoba, northeastern North Dakota, western Minnesota, southern Wisconsin, northern Iowa, and northern Illinois (Allen 1952) (Figure 4-1).

Wintering grounds included southwestern Louisiana, the Gulf Coast of Texas, interior west Texas, the highlands of northern Mexico, and Atlantic coastal areas of New Jersey, Delaware, South Carolina, and Georgia (Allen 1952, Howell and Webb 1995). Non-migratory populations were found in coastal Louisiana, and possibly in other portions of the southeastern United States (Nesbitt 1982, Gomez 1992, USFWS 1994).

Figure 4-1. Map of current and former whooping crane migration routes and breeding and wintering grounds (map from U.S. Geological Survey Northern Prairie Wildlife Research Center, 1997).

The species' range shrank rapidly in the second half of the 19th century, and by the 1890s it was extirpated from the U.S. portion of the historic breeding range (Allen 1952, McNulty 1966). Nesting in the aspen parklands of Canada was last observed in 1929, with unconfirmed reports continuing into the early 1930s (Hjertaas 1994).

By the late 1930s, only two breeding populations remained: a remnant non-migratory population around White Lake in southwestern Louisiana, and a migratory population that wintered in coastal Texas but whose breeding grounds were unknown. Birds in the Louisiana population last nested in 1939. A hurricane in August 1940 reduced this population from 13 to 6 individuals. The last member of this flock was taken into captivity in 1950.

4.2.1 The Aransas-Wood Buffalo Flock

The only remaining flock of wild whooping cranes is the Aransas – Wood Buffalo Flock. The wintering population in coastal Texas, reached a low of 15 birds in the winter of 1941-42, and hovered between the low 20s and mid 30s over the next two decades (Boyce 1987, USFWS 1994).

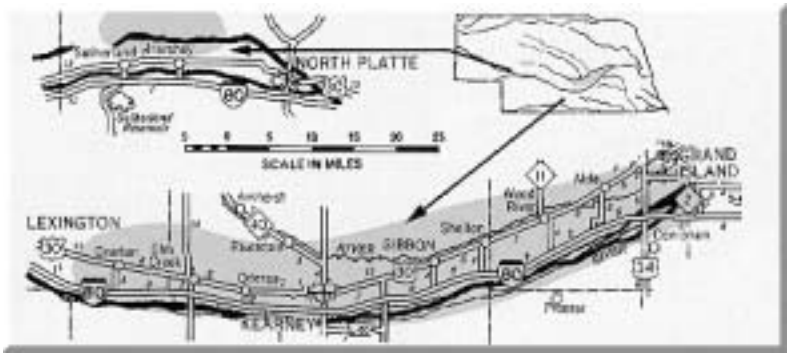
Efforts to locate the flock's breeding grounds intensified following World War II. Evidence of breeding was first reported in 1954, when several adults and pre-fledged juveniles were observed in Wood Buffalo National Park (WBNP) in Northwest Territories, Canada. Researchers were able to locate the first nests the following year (Allen 1956). The inaccessibility of the breeding grounds, protection of the wintering grounds, and extensive public education campaigns have contributed to the population's increase. Since 1967, biologists have removed single eggs from two-egg clutch nests of the population, using these eggs in establishing captive and experimental wild populations (Erickson 1976, Kuyt 1993, Edwards et al. 1994).

The Aransas-Wood Buffalo flock remains the only self-sustaining wild population. The breeding pairs nest almost exclusively within the borders of WBNP. The wintering grounds are found within and near the Aransas National Wildlife Refuge (ANWR) in Texas.

The 2,400-mile migration route generally cuts across northeastern Alberta and southwestern Saskatchewan, through northeastern Montana, the western half of North Dakota, central South Dakota, Nebraska and Oklahoma and east-central Texas.

The primary migration route through Nebraska is a narrow swath approximately 140 miles wide (Figure 4-2). Migration may take two to six weeks. Whooping cranes migrate in the daytime and make regular stops for the night to feed and rest. Some stopovers last only one night, others up to four weeks. Whooping cranes migrate as individuals, pairs, family groups or small flocks of up to 11 birds.

Figure 4-2. The primary migration route through Nebraska.[1]



[1] Map from the Nebraska Game and Parks (2002)

4.2.2 The Rocky Mountain Experimental Flock

In 1975, the U.S. Fish and Wildlife Service and Canadian Wildlife Service began an experiment to create a new flock of whooping cranes in the wild. Dr. Rod Drewien substituted whooping crane

eggs into the nests of sandhill cranes nesting at Grays Lake National Wildlife Refuge (NWR) in Idaho, near Yellowstone National Park.

The goal of this cross-fostering experiment was to have the sandhills hatch and rear their larger cousins, then lead the young whoopers on migration to safe wintering grounds at Bosque del Apache National Wildlife Refuge in New Mexico. The 850-mile migration route along the Rio Grande in central New Mexico is shorter and easier than the 2,500 miles traveled by the Aransas/Wood Buffalo flock.

In the beginning, this cross-fostering program looked promising, but eventually it proved unsuccessful. Even so, much valuable information was learned. The sandhill cranes hatched and raised the whooping crane chicks, and the whoopers migrated with their new parents, but when the whoopers reached breeding age they did not pair with other whooping cranes. The whooper chicks probably imprinted on their sandhill crane foster parents. This "identity crisis" disrupted their ability to later pair and breed with other whooping cranes.

The Rocky Mountain population peaked at 33 birds in 1984-85. After the introduction of 289 eggs, further additions were stopped in 1989. By February 1999, a total of four whoopers remained in the Rocky Mountains.

Two adults survived from the experimental flock, and two more were added in 1997 as a result of an experimental migration using an ultralight aircraft, which led the whoopers to the wintering grounds at Bosque del Apache. In addition, in 1999 there was one whooper x sandhill hybrid (a "whoophill") living among the wild sandhills.

By summer of 2001 only two whooping cranes remained from the experimental population (personal communication with Mike Fisher, Grays Lake NWR, 2002). In 2001, one of the birds summered in Idaho, approximately 20 miles north of Soda Springs. The other bird summered at Red Rock Lake in southwestern Montana.

4.2.3 Release Programs

In January 1980, the USFWS developed a Whooping Crane Recovery Plan (USFWS 1980). In December 1986, a revised Whooping Crane Recovery Plan was adopted by crane biologists and officials from the United States and Canada (USFWS 1986). The Recovery Plan calls for increasing the Aransas/ Wood Buffalo flock to a minimum of 40 nesting pairs, and also to establish two other independent wild flocks of 25 pairs each.

The Whooping Crane Recovery Plan also calls for approximately 20 chicks to be released into Florida each year, forming the nucleus of a non-migratory population of whooping cranes. Since 1993, over 135 whooping cranes reared in captivity have been released into south-central Florida's Kissimmee Prairie (Meine and Archibald 1996).

Although high mortality from predation by bobcats was experienced in the initial years that cranes were released, modification of rearing techniques and relocation of release sites helped reduce this problem. Approximately 75 of the released birds survived as of September 2001.

Because the cranes were raised in captivity by adult whoopers or by humans dressed in a crane costume, researchers do not expect the pairing problems that the whooping cranes at Grays Lake experienced. In 1996, two of the oldest whoopers (both 4 years old at the time) established a breeding territory, from which they excluded the locally abundant sandhill cranes and in which they built several nests. In 2000 the first eggs were laid in whooping crane nests in Florida, and in 2001 the first chicks were hatched. Neither chick survived, although one was raised almost to fledging before being lost to a predator.

The Florida whoopers do not migrate, since they have no role model to teach them a route. By avoiding migration, they also avoid hazards such as power lines, hunters, and a lack of suitable stopover areas.

The team's efforts to establish a non-migratory whooping crane flock began in Florida in 1993, using cranes hatched in captivity. In September 1999, after searching for the best possible location to establish a second migratory flock, the team recommended that the flock be taught a migration route with central Wisconsin as the northern terminus and the west coast of Florida as the wintering location (Operation Migration 2002). The Whooping Crane Recovery Team sanctioned Operation Migration's ultralight-led migration technique as the main reintroduction method.

4.2.4 Ultralight Migration

On October 15, 2001 a small flock of experimental whooping cranes departed Necedah National Wildlife Refuge in Wisconsin on the longest human-led migration in history. Three ultralight aircraft led the birds along a new migration route to Chassahowitzka National Wildlife Refuge in Florida, a journey of nearly 1,200 miles through seven states.

The whooping crane ultralight-led migration from Wisconsin to Florida was successfully completed on Dec. 3, 2001 (Operation Migration 2002). The young cranes are spending the winter at Chassahowitzka National Wildlife Refuge in Florida. After wintering in Florida, the cranes are expected to return to Wisconsin on their own next spring. If successful, migrating whooping cranes will be restored to eastern North American for the first time in over 100 years.

4.2.5 Captive Breeding Programs

In 1967, efforts were initiated to develop a captive flock of whooping cranes. A captive flock saves the species from extinction should it be extirpated from the wild and can be used to bolster the wild population through captive propagation and release of captive-produced stock. There are now five breeding populations of whooping cranes in captivity: at the Patuxent Wildlife Research Center in Maryland, at the International Crane Foundation in Wisconsin, at the Calgary Zoo in Alberta, at the San Antonio Zoological Gardens in Texas, and at the Audubon Institute in New Orleans, Louisiana.

The total number of birds in captivity is 110. This means that the total number of whoopers in the entire world is 395. There are more pandas alive today than cranes. Cranes continue to be one of the most endangered families of birds in the world.

4.2.6 Population Totals

As of the winter of 2001-2002, the worldwide population of whooping cranes was at 395 birds. This includes 285 wild birds and 110 captive birds. Table 4-1 lists the number of birds in each of the wild and captive populations.

Table 4-1. Whooping Crane Populations in the Winter of 2001-2002.

Population	**Number**	**Adult**	**Young**
Wild			
Wood Buffalo/ Aransas Flock	176	161	15
Rocky Mountain	2[2]	2[2]	0
Florida	107	87	20[1]
Total Wild	**285**		
Captive			
Patuxent	53		
International Crane Foundation	28		
Calgary Zoo	19		
San Antonio Zoo	4		
Audubon Institute	6		
Total Captive	**110**		

[1] From releases in winter 2001-2002
[2] By Spring 2002, this number was suspected to be down to 1 bird remaining (Tom Stehn, personal communication).

4.3 Habitat Requirements

Whooping cranes continue to use ancestral breeding areas, migration routes and wintering grounds. Over the last 50 years, there has been little natural dispersal of the species. Low population numbers likely have contributed to this lack of dispersal into new habitats and territories.

No evidence suggests that growth of wild populations is limited by habitat. Thousands of acres of unoccupied, apparently similar habitat is available adjacent to existing occupied habitat.

4.3.1 Breeding Habitat

The breeding habitat within Wood Buffalo National Park is poorly drained wetlands in the headwaters of the Nyarling, Sass, Klewi, and Little Buffalo rivers. The area is poorly drained and interspersed with numerous shallow-water wetlands of various sizes, shapes, and depths. The

wetlands are separated by narrow ridges that support an overstory of white spruce (*Picea glauca*), black spruce (*P. mariana*), tamarack (*Larix laricina*), and willows (*Salix* spp.) and an understory of dwarf birch (*Betula glandulosa*), Labrador tea (*Ledum groenlandicum*), and bear berry (*Arctostaphylos uvalursi*). Bulrush (*Scirpus validus*) is the dominant emergent in the potholes used for nesting, although cattail (*Typha* spp.), sedge (*Carex aquatilis*), musk-grass (*Chara* spp.), and other aquatic plants are common (Lewis 1995).

Average precipitation in the area is 33 cm (11.2 inches) and the birds appear to favor wetlands with a pH of 7.6 to 8.3.

Habitat used by the cross-fostered Rocky Mountain population from April through September is along the shore of Grays Lake National Wildlife Refuge in eastern Idaho, near the Wyoming border. The site is a marsh surrounded by agricultural fields. Habitat used by the introduced Florida population is open saw-palmetto (*Serenoa repens*) prairie interspersed with shallow wetlands and lakes.

4.3.2 Migration Habitat

The Aransas/Wood Buffalo population is flexible in its use of migration habitat (Howe 1989, Kuyt 1992). Radio-telemetry of whooping cranes aided in assessment of habitat use (Kuyt 1992). The radio-telemetered cranes fed in a variety of croplands and roosted in freshwater inland, shallow wetlands.

4.3.3 Wintering Habitat

Most of the winter is spent in the brackish bays, estuarine marshes, and tidal flats of the Gulf of Mexico in and near Aransas NWR in Texas (Allen 1952, Stehn and Johnson 1987). These are dominated by salt grass (*Distichlis spicata*), smooth cordgrass (*Spartina alterniflora*), glasswort (*Salicornia* spp.), and sea ox-eye (*Borrichia frutescens*). Inland margins of the flats are dominated by Gulf cordgrass (*Spartina spartinae*). Interior portions of the refuge are gently rolling and sandy, characterized by oak brush, grassland, swales, and ponds. Typical plants include live oak (*Quercus virginiana*), redbay (*Persea borbornia*), and bluestem (*Adropogon* spp.) (Stevenson and Griffith 1946, Allen 1952, Labuda and Butts 1979).

The Rocky Mountain population winters along the middle Rio Grand Valley, primarily at Bosque del Apache National Wildlife Refuge in New Mexico. At the refuge, whooping cranes roost on the Rio Grande or on managed wetlands and they feed in wetlands, pasture, and fields of corn and alfalfa.

4.3.4 Area Requirements

The male of a whooping crane pair is the primary defender of territory and family. Nesting territories vary considerably in size but range from 1.3 to 47.1 sq. km (0.5 to 18.2 sq. miles) (Kuyt 1976). Whooping crane pairs attack and chase other whoopers trespassing into their territories.

Whooping cranes occupy winter quarters for almost half the year. They tolerate close association

with conspecifics at times on the wintering grounds, but pairs and family groups typically occupy and defend relatively discrete territories. Territory size is declining as the population increases, averaging 117 ha (349.8 acres) in the 1980s (Stehn and Johnson 1987). Subadult and unpaired adults form small flocks and use areas outside occupied territories, near territories where they spent their first winter (Blankinship 1976, Bishop and Blankinship 1982).

4.4 Reproduction and Survivorship

Whooping cranes mate for life. Breeding behavior, phenology, and territoriality are described below.

4.4.1 Breeding Behavior

Pair formation begins when the birds are 2 to 3 years old (Kuyt 1981). Occasionally 3-year-olds nest but the average age of first egg production is slightly greater than 4 years. Pair formation can be a lengthy process, developing over 1 to 3 winters from associations in subadult flocks on wintering grounds (Bishop 1984). Individuals will re-mate, sometimes within only a few weeks, following the death of their mate (Blankenship 1976, Stehn 1992b).

As a pair forms, the future mates associate continuously and perform several social and maintenance activities together that involve dancing and vocalizations. In early spring, adult pairs display elaborate courtship rituals, bobbing, weaving, jumping and calling with their mates.

The female lays two large eggs and both adults incubate them for the next month. The eggs hatch at different times and the second chick is often pushed out of the nest or starved. Chicks can swim as soon as they hatch and they can fly within 80 to 90 days.

4.4.2 Breeding Phenology

In early spring, while still on the wintering grounds, pairs of cranes whoop and dance as part of courtship. Dancing intensifies until the migrants depart in mid-March. The breeding pairs begin arriving in northern Wood Buffalo National Park during the third week in April, and each pair establishes a territory. Nest building occurs shortly after territory establishment. Eggs are normally laid in late April to mid May.

The incubation period is 29 to 30 days, and both parents share the task of incubating the eggs in the nest. Few eggs are lost to predators thanks, in part, to the vigil of the adult birds. The reddish orange young hatch during the last week in May or the first week in June. From then on, the parents are kept busy feeding their chicks.

Chicks are capable of sustained flight at the age of 80 to 100 days. By the end of September or early October the young birds are ready to migrate to the Texas winter range. On the way south, the birds spend one to five weeks feeding in their staging areas in Saskatchewan. In these areas, undisturbed whoopers may spend the entire one- to five-week staging period on the same quarter or half-section

of land. Here the birds fatten up on waste barley and wheat in stubble fields, and roost during the night in nearby wetlands.

4.4.3 Fecundity and Survivorship

Whooping cranes survive up to 24 years in the wild. Young whooping cranes typically nest for the first time at 4 years of age, although some have been known to nest at 3 years of age. A pair usually has two eggs. Both eggs generally hatch, but if both eggs are left in the nest, usually only one chick survives. The reason for this is unclear but may be related to a food shortage, particularly when wet areas begin to dry out and terrestrial predators, such as the gray wolf, are able to penetrate the cranes' nesting marshes.

4.5 Food Habits

Whooping cranes are omnivorous, obtaining foods from soil, water, and vegetation. On breeding grounds, they feed primarily on mollusks, crustaceans, aquatic insects, minnows, frogs, and snakes (Allen 1956, Novakowski 1966). During migration, frogs, fish, plant tubers, crayfish, insects, and waste grains in harvested fields comprise the whooper's diet.

In winter, the whooping cranes feed primarily on crabs and clams. They'll wander into upland areas following flooding by rain to feed on acorns, snails, mice, voles, crayfish, grasshoppers, and snakes (Bishop and Blankinship 1982, Hunt 1987).

4.5.1 Foraging Strategy and Flexibility

Whooping cranes forage in substrate and subsurface in shallow fresh and brackish waters, along the margins of wetlands, in harvested grain fields and pastures and in burned upland fields. The birds probe in loose, flooded, or sandy soils for subsurface insects, amphibians, reptiles, mice, voles and on low vegetation for insects, berries, and seeds.

The whooping crane feeds on the ground, in water or it plucks berries, seeds, or insects from vegetation. It stabs large food items such as blue crabs or snakes and it forces its bill into the ground to find plant or animal matter. Other forage habits include pecking to grasp grain seeds, nibbling parts of large food items, and striking or shaking objects (e.g., snakes).

4.5 Movement and Activity Patterns

The current breeding distribution of wild whooping cranes is restricted to a small area in the northern part of Wood Buffalo National Park near Fort Smith, Northwest Territories. The population is migratory and winters in and around the Aransas National Wildlife Refuge on the gulf coast of Texas (Figure 4-3).

The whoopers spend spring and summer in Wood Buffalo National Park, in Canada. After breeding and raising their chicks there, they then migrate 2,700 miles to the Aransas National Wildlife Refuge, in Texas, on the Gulf Coast to spend the fall and winter. The United States and Canada

have long been partners in saving the whooper.

In 1975, experimental efforts to establish a second migratory wild flock through cross-fostering began at Grays Lake National Wildlife Refuge in southeastern Idaho. Eggs were transferred from the nests of the Wood Buffalo/Aransas population. Efforts were unsuccessful, however, and only two birds remained by summer 2001.

Figure 4-3. Migration route of the primary whooping crane population.

A second experimental population was started in central Florida. Since 1993, over 135 whooping cranes reared in captivity have been released into south-central Florida's Kissimmee Prairie. Although high mortality from predation by bobcats was experienced in the initial years that cranes were released, modification of rearing techniques and relocation of release sites helped reduce this problem. Approximately 75 of the released birds survived as of September 2001.

In 2000 the first eggs were laid in whooping crane nests in Florida, and in 2001 the first chicks were hatched. Neither chick survived, though one was raised almost to fledging before being lost to a predator. The Florida whoopers do not migrate, since they have no role model to teach them a route. By avoiding migration, they also avoid hazards such as power lines, hunters, and a lack of suitable stopover areas.

In 2001, ten young whooping cranes were lead, via ultralight aircraft from Wisconsin's Necedah National Wildlife Refuge to Florida's Chassahowitzka National Wildlife Refuge (NWR). Plans call for the same procedure to be used for four more years or until a self-sustaining flock of migrating whooping cranes is established. The recovery goal is 25 nesting pairs.

4.7 Conservation Concerns

Reasons for the initial decline in the whooping crane population include habitat loss from draining and clearing wetlands and human disturbance in breeding areas and along the migration routes. Conversion of wetlands and prairie to hay and grain production made much of the original habitat unsuitable for whooping cranes. More human presence interfered with the continued use of prairies and wetlands by breeding and migrating whooping cranes. Birds were once shot for their feathers and as meat for the table (Lewis 1995).

Most deaths, other than those of chicks, occur during migration and in the summer. Deaths from April through November are three times greater than deaths on the wintering grounds. Whooping cranes are exposed to a variety of hazards such as collision with obstructions, predators, disease and illegal shooting (USGS 1997). Snow and hailstorms, low temperatures and drought can present navigational handicaps or reduce food availability. Collision with powerlines is the No. 1 known cause of death for whooping cranes, accounting for the death or serious injury of at least 19 whooping cranes since 1956. The frequent stopovers necessary during migration become increasingly perilous as more land is developed for agriculture, industry or habitation, and fewer suitable resting sites remain.

The only self-sustaining wild population of whooping cranes is vulnerable to destruction through a chemical contaminant spill on the wintering grounds (USGS 1997). Barge traffic on the Gulf International Waterway, primarily transporting petrochemical products, is among the heaviest on any waterway in the world. Hurricanes could place the birds at risk from high winds. Drought decreases the availability and abundance of the natural food supply.

Several natural factors limit whooping cranes numbers. Although they have a long life span, sexual maturity is delayed for at least three years. A pair produces only two eggs and raises but one chick. The low number of breeding pairs further limits the number of young that can be produced.

Since the current northern breeding ground has an ice-free season of only four months, there is rarely time for a second clutch of eggs if the first clutch fails. Under those conditions, even a healthy population will grow very slowly.

4.7.1 Conservation Status

The whooping crane is legally protected at the international level under the Migratory Bird Treaty Act (1916) and the Convention on International Trade in Endangered Species (1975). At the national level, legal protection is provided by the U. S. Migratory Bird Treaty Act (1918), the Canadian National Parks Act (1930), the Canada Wildlife Act (1972), the U. S. Endangered Species Act (1973), and the Canadian Migratory Birds Convention Act (1994). Although the species no longer occurs in Mexico, it is legally protected there.

4.8 Biological Conservation Factors

The U.S. Endangered Species Act (1973) provides for the development and implementation of recovery plans for endangered species. These plans are prepared and periodically updated by

recovery teams appointed by the U.S. Secretary of the Interior. The U.S. Whooping Crane Recovery Team was appointed in 1976 and the USFWS published its first Whooping Crane Recovery Plan in 1980. Since then, the plan has been revised twice, in 1986 and 1994. The Canadian Whooping Crane Recovery Team was established in 1987 to define and coordinate recovery activities within Canada. Its first plan was published in 1988 (Cooch et al. 1988) and revised in 1994 (Edwards et al. 1994).

Recovery activities have been closely coordinated between the two nations, and the 1995 MOU on Conservation of the Whooping Crane calls for the preparation of a combined plan and the formation of a single recovery team comprising five U.S. and five Canadian members.

4.8.1 Protected Areas

Much of the critical nesting, migration, and wintering habitat of the Aransas-Wood Buffalo population is contained within protected areas (USGS 1997). The main nesting grounds are located within Wood Buffalo National Park (established in 1922). Many of the population's migration stopovers and staging areas are protected within federal, state, and provincial wildlife refuges, waterfowl management districts, and other designated conservation areas. Several whooping crane staging areas are protected under Saskatchewan's Wildlife Habitat Protection Act of 1992. Saskatchewan's Last Mountain Lake National Wildlife Area (established in 1887) also protects a significant stopover site. In the U. S., migrating whooping cranes utilize approximately twenty national wildlife refuges in eleven states (Lewis 1991). The Cheyenne Bottoms State Wildlife Area in Kansas is an important stopover point. The Aransas NWR, established in 1937, protects the main wintering grounds. The U.S. government and the state of Texas have purchased additional habitat surrounding Aransas NWR with the assistance of The Nature Conservancy (Doughty 1989). The National Audubon Society has also entered into leasing arrangements on lands outside Aransas.

The Rocky Mountains population is concentrated at Grays Lake NWR in the breeding season and Bosque del Apache NWR in the winter, and utilizes several other state and federal wildlife refuges (especially Ouray NWR in Utah and Monte Vista and Alamosa NWRs in Colorado) during migration.

The core of the area where the experimental Florida population has been established consists of state wildlife management areas and parklands, as well as several large and small private holdings (including lands owned by the National Audubon Society) (Lewis 1995b).

4.8.2 Habitat Protection and Management

In addition to the establishment of the protected areas noted above, extensive habitat protection and management activities have been undertaken. These include the following.

- Under the provisions of the U.S. Endangered Species Act, the U.S. Fish and Wildlife Service in 1978 designated nine sites in six states as critical habitat for whooping cranes.
- At Aransas NWR and adjacent Matagorda Island, special habitat protection and management

measures include: artificial impoundment of freshwater in ponds; prescribed burning of upland habitats to improve cover characteristics and enhance food production (principally acorns); continuing efforts to halt and mitigate the loss of shoreline to erosion; and experimental efforts to create wetlands using dredge material (Hunt 1987, USFWS 1994, Lewis 1995b).

- In 1993, the USFWS developed contingency plans for responding to oil spills at Aransas NWR (Robertson et al. 1993).
- Since the early 1980s, the Platte River Whooping Crane Habitat Maintenance Trust has been actively restoring critical roosting habitat along the Platte River (Strom 1987, Currier 1991).
- Tests of special utility line marking devices to reduce crane collisions have been undertaken using sandhill cranes as a surrogate species. Techniques identified in these tests have reduced collisions by 40 to 60% (Morkill and Anderson 1993, Brown and Drewien 1995).
- At a number of national refuges and state wildlife management areas, habitat conditions have been enhanced through water management and the planting of food crops (corn, barley, wheat, and field peas) (Lewis 1995b).
- Parks Canada has launched a project to identify the extent of suitable unoccupied habitat within WBNP.

4.8.3 Surveys/Censuses/Monitoring

All three populations of the species are closely monitored. The Aransas-Wood Buffalo population (AWP) has been counted annually on its wintering grounds since 1938. The AWP has been monitored on the breeding grounds by the Canada Wildlife Service (CWS) since 1966 (Novakowski 1966, Kuyt 1993). The USFWS initiated a migration monitoring program in 1975 to compile information on sightings and stopover points. The program has been expanded and coordinated with information gathering activities of the CWS and states and provinces along the migration corridor. Aerial surveys of the breeding grounds are undertaken each spring to determine the number of breeding pairs and their nesting success. Annual productivity in the population is determined through surveys conducted annually at the Aransas NWR by the USFWS (Binkley and Miller 1983, Boyce and Miller 1985, Boyce 1987, and Nedelman et al. 1987).

From 1977-1988, a color banding program undertaken at Wood Buffalo National Park allowed U.S. and Canadian biologists to identify and study individual birds, yielding valuable information on many aspects of the population's demographics, migration behavior, and habitat use (Kuyt 1992). Radio telemetry studies of the local movements and migration patterns of the cross-fostered Rocky Mountain population were carried out from 1979 to 1982. Similar studies of the AWP were undertaken from 1981-83. These studies were especially useful in providing information on migration dynamics and causes of mortality (Drewien and Bizeau 1981, Drewien et al. 1989, Kuyt 1992).

4.8.4 Whooping Crane Research

Since the 1940s, the whooping crane has benefited from intensive research on virtually all aspects of its biology, life history, and ecology. These efforts were first carried out under the Cooperative Whooping Crane Project (Allen 1952, 1956). Since then scientists have built upon this foundation with wide-ranging studies of demographics, genetics, reproductive biology, migration, food habits,

environmental threats, behavior, habitat ecology and restoration, captive propagation, health management, and reintroduction. This information has been summarized in several publications, including Walkinshaw (1973), Johnsgard (1983), Doughty (1989), Mirande et al. (1993), USFWS (1994), and Lewis (1995b). Recent research topics include studies of historical summer and breeding records, winter habitat and ecology, breeding range expansion, new reintroduction and release techniques, potential release sites, the availability of migration habitat, and conservation genetics (e.g., Armbruster 1990, Ellis et al. 1992, Kuyt 1993, Hjertaas 1994, Snowbank 1995).

4.8.5 Population Viability Assessment

A population viability assessment workshop for the whooping crane was conducted in August 1991. The workshop included representatives of the U.S. and Canadian Whooping Crane Recovery Teams, the USFWS and CWS, International Crane Foundation, other captive breeding programs, and the International Union for the Conservation of Nature/Species Survival Commission Conservation Breeding Specialist Group. The final report (Mirande et al. 1993) analyzed genetic and demographic characteristics of both the wild and captive populations. Its findings included the following:

- Approximately 87% of the species' pre-1938 genetic diversity persisted as of 1990 (the cumulative genetic loss being equivalent to that which would be expected from one generation of mating between half-siblings).
- At the time the captive population was established, it retained about 96% of the wild population's genetic diversity. With improved genetic representation, this may reach 98.6%.
- Based on extrapolations of existing data, the AWP has a very low probability of extinction over the next 100 years (<1%), although temporary declines are likely.
- Assuming (optimistically) no further habitat limitations or effects of inbreeding depression, the AWP was projected to reach 500 individuals in about 27 years and 1000 individuals in about 42 years.
- Even if the reproductive and survival rates of the Rocky Mountain population improve, the population is unlikely to become self-sustaining.
- Based on preliminary modeling, Florida should be able to support a self-sustaining population of whooping cranes (assuming releases of 10 or 20 birds per year for ten years).
- With improved management, it will be possible for the captive population to sustain planned release efforts. (Subsequent improvements in propagation programs have validated this conclusion).

5.0 POTENTIAL IMPACTS

5.1 Distribution in Wyoming

The Wyoming Natural Diversity Database (WYNDD) was accessed to determine all whooping cranes sightings reported in Wyoming. The bulk of whooping crane observations in Wyoming are in the northwest corner of the state (Figure 5-1). The only observation in the eastern part of the state was near Torrington in 1950.

Of the 30 remaining Wyoming whooping crane observations, all but one was recorded between 1979 and 1992. These observations coincide with the start of the Grays Lake NWR cross-fostering program. The first eggs were put into sandhill crane nests at Grays Lake in 1975. The Rocky Mountain population peaked at 33 birds in 1984-85. After the introduction of 289 eggs, further additions were stopped in 1989. It is likely all 30 whooping crane observations were birds from the cross-fostering experiment.

Federal and state agency wildlife biologists were contacted to determine if any additional whooping cranes were observed in Wyoming but not included in the Wyoming Natural Diversity Database records. Wildlife biologists with the BLM, USFS, National Wildlife Refuge System, and Wyoming Game and Fish Department were contacted to ensure the completeness of the WYNDD records (Table 5-1). None of the biologists contacted reported observations of whooping cranes within the past five years.

Mike Fisher, refuge manager at the Grays Lake National Wildlife Refuge, said only two birds returned to the lake vicinity in 2001. One whooper summers approximately 20 miles north of Soda Springs near China Hat, Idaho. He said this bird is from the ultralight migration project conducted in 1997. The second whooper is older and originated from the cross-fostering project. This bird summers at Red Rock Lake in southwestern Montana.

The whooping cranes from the cross-fostering population never reproduced. The primary theory is that the birds mis-imprinted due to being raised by sandhill rather than whooping cranes. Fisher said the project also had difficulty keeping female cranes at the lake with the males. The females tended to take off and summer in high meadows while the males stayed at the lake.

The whooping crane population at Grays Lake is designated as an experimental/non-essential population. With this designation, no critical habitat is delineated and the birds are not fully protected under the Endangered Species Act. In contrast, the whooping cranes with the Aransas – Buffalo Wood flock are listed as endangered and are fully protected under the act.

Table 5-1. Wildlife Biologists Contacted to Update Whooping Crane Sighting Records.

Name	Position	Agency/Organization	Location
Dr. Gary Beauvais	Director	Wyoming Natural Diversity Database	Laramie
Doug Keinath	Zoologist	Wyoming Natural Diversity Database	Laramie
Jason Bennett	Research Zoologist	Wyoming Natural Diversity Database	Laramie
Rebekah S. Smith	Database Technician	Wyoming Natural Diversity Database	Laramie
Mary Jennings	Wildlife Biologist	U.S. Fish and Wildlife Service	Cheyenne
Brad Rogers	Wildlife Biologist	U.S. Fish and Wildlife Service	Cheyenne
Alec Shubert	Wildlife Biologist	U.S. Fish and Wildlife Service	Cheyenne
Jim Wright	Wildlife Biologist	BLM – Kemmerer Field Office	Kemmerer
Andy Pils	Wildlife Biologist	BLM – Kemmerer Field Office	Kemmerer
John Westbrook	Wildlife Biologist	BLM – Pinedale Field Office	Pinedale
Monty Barker	Wildlife Biologist	USFS – Shoshone National Forest	Cody
Frank Blomquist	Wildlife Biologist	BLM – Rawlins Field Office	Rawlins
Lorrain Keith	Wildlife Biologist	BLM – Rock Springs Field Office	Rock Springs
Mike Fisher	Refuge Manager	Grays Lake National Wildlife Refuge	Grays Lake, ID
Carol Cunningham	Wildlife Biologist	Grand Teton National Park	Moose
John McCleary	Biological Tech	Seedskadee National Wildlife Refuge	Seedskadee
Barb Franklin	Wildlife Biologist	USFS – Pinedale Office, Teton National Forest	Big Piney
Sue Oberlie	Wildlife Biologist	BLM – Lander Field Office	Lander
Tom Stehn	Wildlife Biologist	Whooping Crane Recovery Coordinator	Aransas NWR, Texas
Glenn Plumb	Wildlife Biologist	Yellowstone National Park	Yellowstone

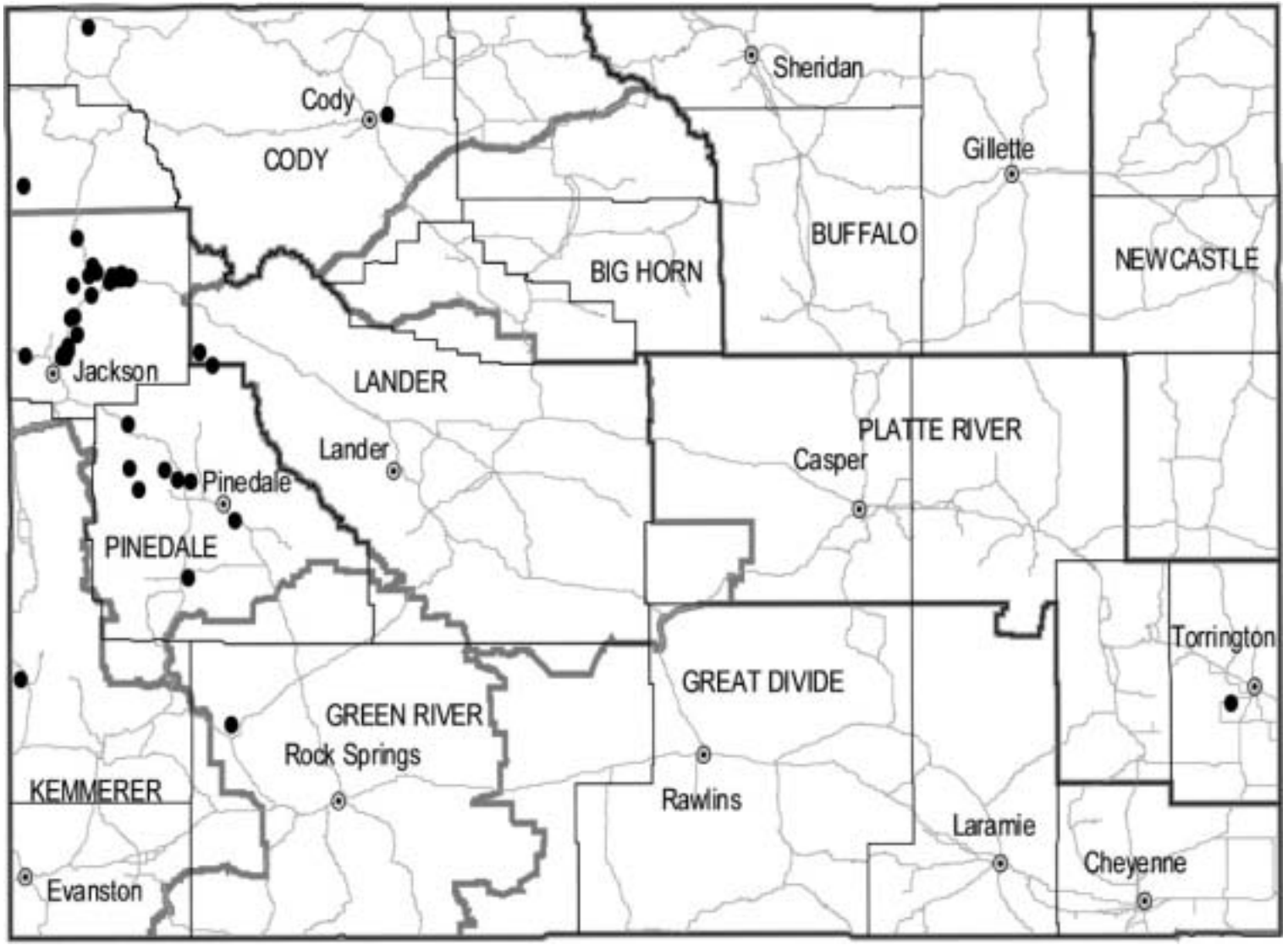


Figure 5-1. Whooping Crane Observations in Wyoming reported on the Wyoming Natural Diversity Database.

5.2 Critical Habitat in Wyoming

There are no designated critical whooping crane habitats in Wyoming or in the Rocky Mountain corridor. Birds introduced into the area as part of the cross-fostering experiment are designated as an experimental non-essential population. Due to that designation, there is no provision for critical habitat designations.

5.3 Wyoming's Role in the Whooping Crane Recovery Plan

The original Whooping Crane Recovery Plan was approved in January 1980. The plan was revised and updated in 1986 and again in 1994. The plan is designed to provide decision makers with an orderly set of events, which, if carried to a successful completion, would result in recovery of the whooping crane and a change in the status from endangered to threatened status.

The Grays Lake cross-fostering program was included in the 1986 Recovery Plan (USFWS 1986). The goal, as stated in the plan, was to establish at least 25 nesting pairs at the lake with wintering grounds in New Mexico. The progress of the program was scheduled for review in 1989.

In the 1990 completion report by the Wyoming Game and Fish Department (WGFD 1990), it was stated that the Whooping Crane recovery Team decided to discontinue the cross-fostering experiment at Grays Lake NWR. From that point on, experimentation continued to further the knowledge of whooping crane recovery efforts but no additional whooping crane eggs were brought into the area.

In 1994, the Whooping Crane Recovery Plan was revised and renewed (Edwards, R. et al., 1994). This new plan contains the following strategies for the recovery of the species:

1. Protect whooping cranes and their habitat in and near Wood Buffalo National Park (WBNP), and maximize the productivity of this population.
2. Protect whooping cranes and their habitat at areas other than WBNP, including the migration corridor and stopover and staging areas.
3. Establish additional wild populations as per the Canada-U.S. Memorandum of Understanding.
4. Establish a captive breeding population in Canada.
5. Continue a comprehensive public relations program to increase awareness and support for the goals and objectives as stated in this recovery plan.

Wyoming is not included in this updated recovery plan. While it is possible that whooping cranes from the wild population migrating from Canada to Texas could get blown off course and roost along Wyoming rivers, streams, and wetlands, the occurrence is unlikely.

5.4 BLM Management of Whooping Crane Habitat

Sandhill cranes are common on wetlands, riverbanks, and along streams in western Wyoming. Lands administered by the BLM provide nesting, roosting, and staging habitats for this species. In characterizing potential whooping crane habitat, considerable overlap occurs with sandhill crane habitat. Due to this overlap, those habitats that attract sandhill cranes generally also have the potential to attract whooping cranes.

While the only whooping cranes reported in Wyoming since the 1980s were associated with the Grays Lake cross-fostering program, the habitat potential exists. While current plans for the recovery of the whooping crane do not include the Grays Lake area or migration corridors through Wyoming, the potential for future whooping crane populations remains as long at the habitat remains intact.

5.5 Habitat Preservation Measures

While naturally occurring whooping cranes have not been reported in Wyoming since 1950, potential habitat is present should the opportunity occur to establish a Rocky Mountain flock. The following measures would help ensure continued existence of suitable whooping crane habitat:

1. Preserve and enhance wetland habitat.
2. In areas where powerlines go over wetland habitat, enhance the observability of the lines to avian species, including whooping cranes, through the addition of “flappers” or other devices attached to the lines.
3. Do not allow new powerline construction or communication towers with guylines over or adjacent to wetland habitats.
4. Alert hunters via public media announcements to identify whooping cranes to avoid accidental mortality.

6.0 DETERMINATION OF EFFECT

Management direction, as described in the various BLM Resource Management Plans, lists protection of threatened and endangered species as a priority. The following excerpt is from the Pinedale RMP but is repeated, in similar format, in all the RMPs reviewed for this document.

> "Threatened and endangered (T&E) species and their habitats will be protected. Actions, which would degrade habitat to a point of jeopardizing the continued existence of a T&E species, will not be allowed.

While the RMPs make an allowance for protecting T&E species and their habitats, special measures targeting whooping crane habitat would not be required. Based on the information provided in this report, implementation of the BLM Resource Management Plans administered by the Pinedale, Kemmerer, Rock Springs, Rawlins and Lander Field Offices are not likely to adversely affect the endangered whooping crane.

7.0 SUMMARY

This Biological Assessment was conducted to assess effects on the endangered whooping crane of the BLM Resource Management Plans administered by the Pinedale, Kemmerer, Rock Springs, Lander and Rawlins Field Offices. The RMPs provide direction for management of lands administered by the BLM.

Whooping cranes have been reported in Wyoming through the 1980s and into the mid 1990s. These birds are likely part of the cross-fostering experimental population at Grays Lake National Wildlife Refuge. Due to the lack of reproduction with the whooping cranes fostered by sandhill cranes, the experiment was discontinued in 1989. Since then, the number of whooping crane observations in Wyoming has declined and no confirmed sightings have been reported since 1992.

Only two whooping crane observations were reported prior to the Grays Lake population introduction. One was in Yellowstone National Park in 1930. The second was near Torrington, in far eastern Wyoming, in 1950. Due to the evident lack of “wild” whooping cranes occurring in Wyoming, no impacts are expected to this species.

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