Conceptual Management Plan

Baca
National Wildlife Refuge

May 2005

U.S. Fish and Wildlife Service
Baca National Wildlife Refuge
Alamosa / Monte Vista National Wildlife Refuge Complex
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Alamosa, Colorado 81101-9003

U.S. Fish and Wildlife Service
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Cover photograph by Wendy Shattil/Bob Rozinski 2005 © *Grassland and shrubland habitats interspersed with playa wetlands are common on the Baca National Wildlife Refuge.*

Summary

Executive Summary

BACA NATIONAL WILDLIFE REFUGE

Authorized in 2000, the Baca National Wildlife Refuge is one of the largest and most recent additions to the National Wildlife Refuge System. The refuge, at 92,500 acres, is located in Saguache and Alamosa counties in the San Luis Valley of south-central Colorado (figure 1). Congress authorized acquisition of land within the refuge with passage of Public Law 106-530, also known as the "Great Sand Dunes National Park and Preserve Act of 2000." This legislation, which received widespread support, focused not only on protecting the region's hydrology, which the incredibly unique sand dunes ecosystem depends upon, but also at protecting the exceptional ecological, cultural, and wildlife resources of the area.

Situated in the San Luis Valley, a high mountain desert surrounded by two 14,000 foot mountain ranges, the refuge contains a highly diverse suite of habitats including desert shrublands, grasslands, wet meadows, playa wetlands, and riparian areas. Fed largely by melting mountain snow, numerous streams crisscross the refuge providing an abundance of life in an otherwise arid landscape. The refuge is home to a multitude of wildlife and plant species, some of which only occur in the San Luis Valley.

Adding to the uniqueness and importance of the refuge is its juxaposition to other conservation lands in the area. The refuge abuts lands owned or controlled by other conservation entities including The Nature Conservancy (TNC), the National Park Service (NPS), the USDA Forest Service (USFS), and the Colorado State Land Board (SLB). This complex of lands, totaling more than 500,000 acres, contains one of the largest and most diverse assemblages of wetland habitats remaining in Colorado.

In addition to the incredible plant and animal resources contained on the refuge, the area is also tremendously rich in cultural resource sites, some of which date over 12,000 years ago. Many of these sites have been added to the National Register of Historic Places.

SCOPE OF THIS DOCUMENT

This conceptual management plan (CMP) will provide local landowners, neighboring governmental agencies, and the interested public with a general understanding of the anticipated management approaches for the refuge over the next 3 to 5 years. The purpose of this CMP is to provide a broad overview of the Service's proposed management approach to wildlife and their relative habitats, public uses, facilities, interagency coordination, and other operational needs. The comprehensive conservation plan (CCP) planning process, which is similar to the current NPS general management plan planning process, is scheduled to start in 2008. The CCP will provide a thorough, in-depth analysis of all facets of current and future refuge management

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Shrubland habitat on the Baca National Wildlife Refuge

activities. Management actions described in this CMP apply only to those lands under the jurisdiction of the Service.

REFUGE PURPOSE

The legislation creating the refuge did not specify a refuge purpose. By default, the purpose of the refuge is the mission of the National Wildlife Refuge System until a new purpose is approved. Based on analysis of the intent of the enabling legislation, the following purpose is proposed and some form of it will likely be approved in the near future.

- The purpose of the Baca National Wildlife Refuge is to restore, enhance and maintain wetland, upland, riparian and other habitats for wildlife, plants and fish species that are native to the San Luis Valley, Colorado. Management of the refuge will emphasize migratory bird conservation and will consider the refuge's role in broader landscape conservation efforts.

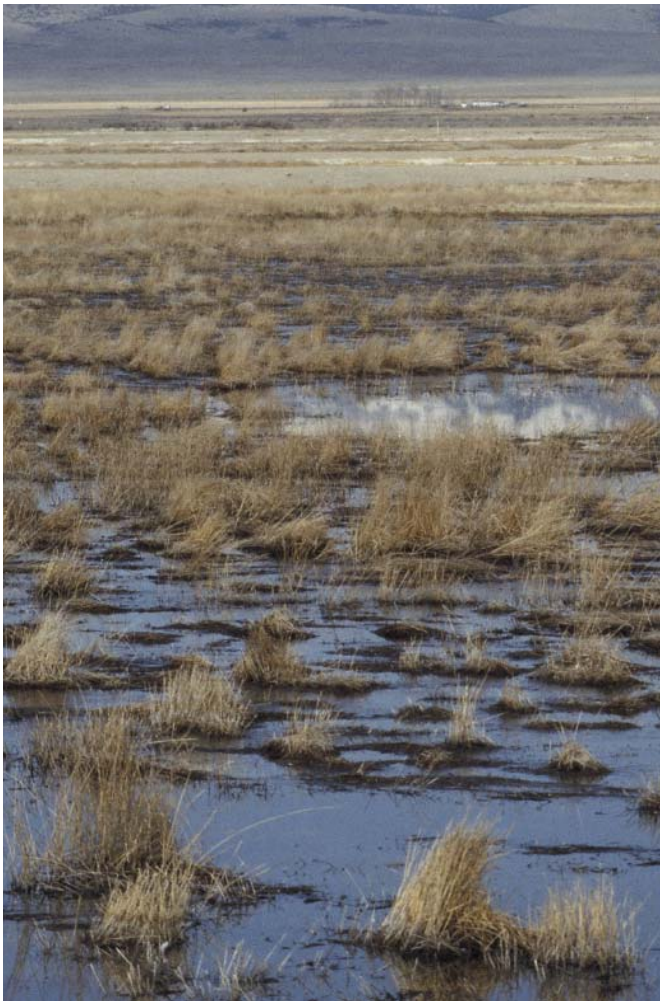
INTERIM REFUGE GOALS

Within the next 3 to 5 years, refuge staff, (given sufficient resources) will strive to achieve the following goals at the refuge and in doing so, protect and foster a better understanding of the ecological processes that have shaped and will continue to shape this unique landscape.

- Evaluate pre-acquisition management strategies in relation to wetland, upland, and riparian habitats.
- Assemble resource information including wildlife and biological, hydrological, and cultural resources.
- Assemble visitor services information and needs for the development of the visitor services program.
- Assemble operational and funding needs including staff requirements and inventorying real property assets such as fences, windmills, buildings, water control structures, and roads.
- Maintain and evaluate pre-acquisition irrigation strategies.
- Ensure law enforcement protection including but not limited to facilities, boundaries, cultural resources, and refuge-specific regulations.
- Respond to public concerns and provide information in a timely manner.

MANAGEMENT DIRECTION

The mission of the National Wildlife Refuge System is to administer a national network of lands and waters for the conservation, management and, where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans. The underlying foundation of the Refuge System is that "wildlife comes first" (Fulfilling the Promise, USFWS 1999). The refuge will be managed with this underlying principle at the forefront. Table 1 provides a summary of the major action items related to habitats, operations, public use, partnerships, and cultural resources for the Baca National Wildlife Refuge that can be expected, given sufficient resources, during the first 3 to 5 years of refuge activities. The level of assessment for any one action



Bob Sanders/Ducks Unlimited

Wetlands in the San Luis Valley are critical for migratory birds.

Table 1. Management Actions

Management Direction	*Component*	*Actions*
Habitat Type	Shrublands/Grasslands	▪ Assess habitat conditions. ▪ Evaluate grazing and haying activities to improve vegetation health and wildlife habitat. ▪ Evaluate prescribed fire to improve habitat for wildlife. ▪ Assess wildlife use.
	Wetlands – Wet Meadows	▪ Assess habitat conditions. ▪ Continue and evaluate current irrigation practices. ▪ Evaluate grazing and haying activities to improve vegetation health and wildlife habitat. ▪ Evaluate prescribed fire to improve habitat for wildlife. ▪ Assess wildlife use. ▪ Assemble existing hydrology data, develop research needs.
	Wetlands - Playas	▪ Assess habitat conditions. ▪ Assemble hydrology data, develop research needs. ▪ Evaluate water management options. ▪ Assess wildlife use.
	Riparian Areas	▪ Assess habitat conditions. ▪ Evaluate grazing activities to improve vegetation health and wildlife habitat. ▪ Evaluate prescribed fire to improve habitat for wildlife. ▪ Assess wildlife use.
Operations, Maintenance, Law Enforcement	Operations	▪ Assess and maintain real property inventory. ▪ Secure funding and staff. ▪ Establish headquarters.
	Maintenance	▪ Maintain boundary signs. ▪ Evaluate and maintain infrastructure including roads, water control structures, and buildings. ▪ Evaluate existing fencing and future needs.

Table 1. Management Actions Continued

Management Direction	*Component*	*Actions*
Operations, Maintenance, Law Enforcement	Law Enforcement	▪ Assess habitat conditions. ▪ Evaluate grazing and haying activities to improve vegetation health and wildlife habitat. ▪ Evaluate prescribed fire to improve habitat for wildlife. ▪ Assess wildlife use.
Public Use	Public Use	▪ Assemble information required for development of a public use plan.
Partnerships	Partnerships	▪ Continue to develop partner ships and cooperation between neighboring government agen cies, local governments, non-governmental organizations, and the members of the public.
Cultural Resources	Cultural Resources	▪ Coordinate with partners to ensure the protection of known culturally significant sites. ▪ Survey areas where human-caused disturbance may occur (such as any area proposed for prescribed fire activities).

item will depend upon sufficient funding and staffing.

FUTURE DIRECTION

The Baca National Wildlife Refuge will be managed following the direction provided in this document. As outlined in this document, a large percentage staff time will be devoted to acquiring baseline information and knowledge about the resources contained on the refuge and how those resources intact within the larger landscape of the area. In 2008, the refuge is scheduled to begin a comprehensive conservation planning process which will outline refuge activities for the next 15 years. All interested individuals and groups will be asked to participate throughout this process. For more information on the content provided in this document or for additional clarification, please contact:

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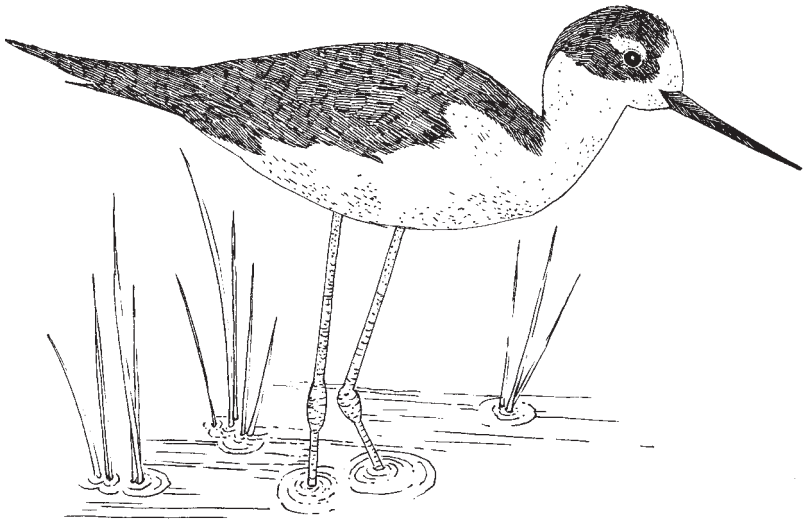
chapter 1



INTRODUCTION, PURPOSE OF AND NEED FOR PLAN

Chapter 1. Introduction, Purpose of and Need for Plan

1.1 BACKGROUND

The Baca National Wildlife Refuge is located in Saguache and Alamosa counties in the San Luis Valley of south-central Colorado (figure 1). Congress authorized acquisition of land within the boundary of the refuge with passage of Public Law 106-530, also known as the "Great Sand Dunes National Park and Preserve Act of 2000." In addition to the refuge, the Act authorized the federal acquisition of lands adjacent to the Great Sand Dunes National Monument for the Great Sand Dunes National Park and Preserve (hereafter "Park"). This legislation focused on protecting the region's hydrology, which the entire sand dunes ecosystem depends upon, and at protecting the region's exceptional ecological, cultural, and wildlife resources.

With an approved acquisition boundary of approximately 92,500 acres, the refuge joins two existing national wildlife refuges (Alamosa and Monte Vista) in the San Luis Valley managed by the U.S. Fish and Wildlife Service (figure 1). Although the authority has been granted to acquire land within this boundary, this does not guarantee that all of this area will ever be acquired by the Service. The refuge abuts lands owned or controlled by other conservation entities including The Nature Conservancy (TNC), the National Park Service (NPS), the USDA Forest Service (USFS), and the Colorado State Land Board (SLB). This complex of lands, totaling more than 500,000 acres, contains one of the largest and most diverse assemblages of wetland habitats remaining in Colorado. In addition to the tremendous biological and ecological resources in this part of the San Luis Valley, there are significant cultural resources.

The San Luis Valley, a high mountain desert averaging only 7 inches of precipitation annually, is surrounded by towering 14,000 foot peaks of the Sangre de Cristo Mountains on the east and the San Juan Mountains to the west. In contrast to the valley floor, higher elevations of the mountains receive more than 30 inches of precipitation annually, mostly as winter snow. Nearly everything and everyone in the valley depends upon these mountain snow packs. The refuge contains a diversity of habitat types including desert shrublands, grasslands, wet meadows, playa wetlands, and riparian areas, and is home to a multitude of wildlife and plant species, some of which only occur in the San Luis Valley.

1.2 PURPOSE OF THE PLAN

The Service is formulating this conceptual management plan (CMP) during the acquisition planning process to provide local landowners, neighboring governmental agencies, and the interested public with a general understanding of the anticipated management approaches for the refuge over the next 3 to 5 years. The purpose of this CMP is to provide a broad overview of the Service's proposed management approach to wildlife and their relative habitats, public uses, facilities, interagency coordination, and other operational needs. This CMP is not intended to provide substantive detail regarding issues such as where new facilities (if any) would be developed or how approved visitor services would be implemented. Answers to these types of questions and many others will be addressed with significant input from the public and others, as required by Service policy and the National Environmental Policy Act, during the Comprehensive Conservation Plan (CCP) planning process.

The CCP planning process, which is scheduled to start in 2008, will provide a thorough, in-depth analysis of all facets of current and future refuge management activities. Management actions described in this CMP only apply to those lands under the jurisdiction of the Service.

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Great blue heron

1.3 NATIONAL WILDLIFE REFUGE MISSION, GOALS, AND GUIDING PRINCIPLES

The National Wildlife Refuge System is a national network of lands set aside specifically for wildlife and their respective habitats. This priority-use mandate for wildlife is unique when compared to the mandates of other federal land management agencies such as the USFS and Bureau of Land Management (BLM), which have multiple-use mandates. Since the first national wildlife refuge was established by President Theodore Roosevelt in 1903 (3-acre Pelican Island in Florida), the Refuge System has grown to 545 refuges encompassing over 95 million acres of land. The Refuge System is national in scope in that every state hosts at least one national wildlife refuge.

With the passage of the National Wildlife Refuge System Improvement Act of 1997 (Refuge Improvement Act), the mission of the Refuge System was, for the first time, clearly defined and articulated. The Refuge Improvement Act can be regarded as the organic act for the Refuge System. The mission of the Refuge System originating from the Refuge Improvement Act is to:

> *"Administer a national network of lands and waters for the conservation, management and where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans."*
>
> (National Wildlife Refuge System Improvement Act of 1997.)

Not surprisingly, the Refuge System mission is quite similar to the overall mission of the Service:

> *"Working with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people."*

Specific goals of the Refuge System include:

- To fulfill the Service's statutory duty to achieve refuge purpose(s) and further the System mission
- To conserve, restore where appropriate, and enhance all species of fish, wildlife and plants that are endangered or threatened with becoming endangered
- To perpetuate migratory bird, interjurisdictional fish, and marine mammal populations
- To conserve a diversity of fish, wildlife and plants
- To conserve and restore as appropriate representative ecosystems of the United States, including the ecological processes characteristic of those ecosystems
- To foster understanding and instill appreciation of fish, wildlife, and plants, and their conservation, by providing the public with safe, high-quality, and compatible wildlife-dependent public use. Such use includes hunting, fishing, wildlife observation, wildlife photography, environmental education, and interpretation.

In addition to the goals outlined above, four guiding principles for the management and general public use of the Refuge System have been established:

- **Habitat** - Fish and wildlife will not prosper without high quality habitat, and without fish and wildlife, traditional uses of refuges cannot be sustained. The Refuge System will continue to conserve and enhance the quality and diversity of fish and wildlife habitat within refuges.
- **Public Use** - The Refuge System provides important opportunities for compatible wildlife-dependent recreational activities involving hunting, fishing, wildlife observation, wildlife photography, environmental education, and interpretation.
- **Partnerships** - America's sportsmen and women were the first partners who insisted on protecting valuable wildlife habitat within wildlife refuges. Conservation partnerships with other federal agencies, state agencies, tribes, organizations, industry, and the general public can make significant contributions to the growth and management of the Refuge System.
- **Public Involvement** - The public should be given a full and open opportunity to participate in decisions regarding acquisition and management of our national wildlife refuges.

1.4 HISTORY OF REFUGE ESTABLISHMENT

Baca National Wildlife Refuge was authorized by

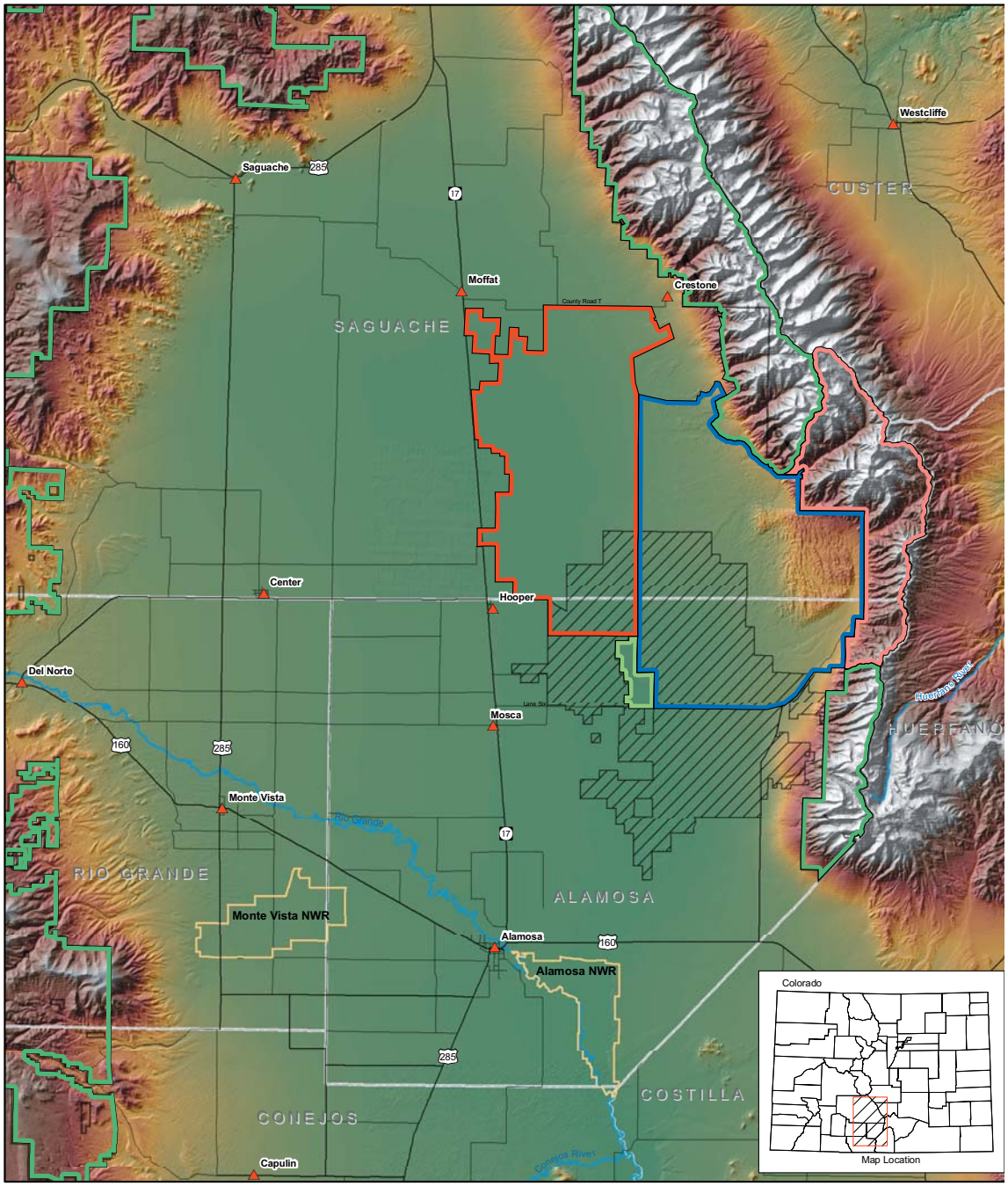
Figure 1. Vicinity Map – San Luis Valley

U.S. Fish & Wildlife Service

Baca National Wildlife Refuge

Saguache and Alamosa Counties, Colorado

Vicinity Map -- San Luis Valley



Elevation

14,330 ft

7,450 ft.

0 2 4 8 Miles

0 2 4 8 Kilometers

Legend

- Baca NWR Acquisition Boundary
- Great Sand Dunes NP Acquistion Boundary
- Great Sand Dunes National Preserve
- Rio Grande National Forest*
- Medano Zapata Ranch (TNC)
- San Luis State Park and Wildlife Area

* Inholdings not depicted

UTM ZONE 13
NAD 27

Congress on November 22, 2000, with the signing of Great Sand Dunes National Park and Preserve Act. In addition to establishing the refuge, the Act authorized the federal acquisition of lands adjacent to the Great Sand Dunes National Monument for the Great Sand Dunes National Park and Preserve. The legislation was sponsored by Colorado Senator Wayne Allard and Congressman Scott McInnis and received widespread bi-partisan support within Congress, as well as overwhelming state and local support in the San Luis Valley. This legislation was the successful culmination of federal, state and local attempts over the previous 15 years to protect the region's vast water resources from trans-basin water exportation efforts originating from the 97,000 acre Baca Ranch. The legislation establishing the refuge and the Park mandates protection of the region's hydrology which the Great Sand Dunes ecosystem depends upon, and exceptional biological, ecological, and cultural resources of the area.

The approved acquisition boundary for the refuge is approximately 92,500 acres (figure 2). In April 2003, the Service obtained the first unit of the refuge when the 3,315-acre White Ranch property was transferred from the Bureau of Reclamation (BOR) to the Service. The Notice to establish the refuge appeared in the Federal Register on March 11, 2003 (Vol. 68 No. 47). BOR purchased the White Ranch as part of a mitigation settlement for wetland losses resulting from the construction and operation of the Closed Basin Project, a division of the San Luis Valley Project. The Closed Basin Project was authorized by Congress in 1972 to assist Colorado in meeting its delivery requirements to New Mexico and Texas under the Rio Grande Compact (1938). The Closed Basin Project consists of numerous shallow wells and canals that deliver water to the Rio Grande via the 42-mile Franklin Eddy canal.

The Baca Ranch is approximately 97,000 acres, of which approximately 53,500 acres are within the refuge acquisition boundary. TNC, along with the U.S. Department of the Interior (NPS and the Service) officially purchased the Baca Ranch in September 2004. The federal buyout of TNC by the Department occurred on March 8, 2005. Prior to the buyout, there existed a considerable amount of uncertainty as to when the federal buyout would actually occur. To deal with this uncertainty and ease transition to the Department, the Service along with the NPS and the USFS, entered into an agreement with TNC to co-manage the Baca Ranch until the buyout occurred. A general agreement was signed September 2004 and later amended in February 2005. The current amended general agreement between the Service and TNC outlines management and procedural details for the refuge through 2005. A copy of the September 2004 and February 2005 general agreement documents can be found in Appendix A. With acquisition of the Baca Ranch, Service ownership within the refuge is approximately 57,000 acres (62 percent). For more information on future land acquisition for the refuge, see Chapter 5.

1.5 REFUGE PURPOSE

A refuge purpose may be derived from federal law, proclamation, executive order, agreement, public land order, donation document, or administrative memorandum. The purposes for which a refuge is established carry special importance. Not only does the purpose help provide a vision or mission for

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Sandhill cranes

the refuge, it serves as the basis for compatibility determinations. Each refuge use must be determined to be compatible with, and not materially detract from, the purpose for which the refuge was established. The legislation creating the refuge did not specify a refuge purpose. By default, the purpose of the refuge is the mission of the National Wildlife Refuge System until a new purpose is approved. Based on analysis of the intent of the enabling legislation, the following purpose is proposed and some form of it will likely be approved in the near future.

- The purpose of the Baca National Wildlife Refuge is to restore, enhance and maintain wetland, upland, riparian and other habitats for wildlife, plants and fish species that are native to the San Luis Valley, Colorado. Management of the refuge will emphasize migratory bird conservation and will consider the refuge's role in broader landscape conservation efforts.

1.6 INTERIM REFUGE GOALS

Within the next 3 to 5 years, refuge staff, (given sufficient resources) will strive to achieve the following goals at the refuge and, in doing so, protect and foster a better understanding of the ecological processes that have shaped and will continue to shape this unique landscape.

- Evaluate pre-acquisition management strategies in relation to wetland, upland, and riparian habitats.
- Assemble resource information including wildlife and biological, hydrological, and cultural resources.
- Assemble visitor services information and needs for the development of the visitor services program.
- Assemble operational and funding needs including staff requirements and inventorying real property assets such as fences, buildings, irrigation facilities, and roads.
- Maintain and evaluate pre-acquisition irrigation strategies.
- Ensure law enforcement protection including but not limited to facilities, boundaries, cultural resources, and refuge-specific regulations.
- Respond to public concerns and provide information in a timely manner.

1.7 LEGAL POLICY AND GUIDANCE

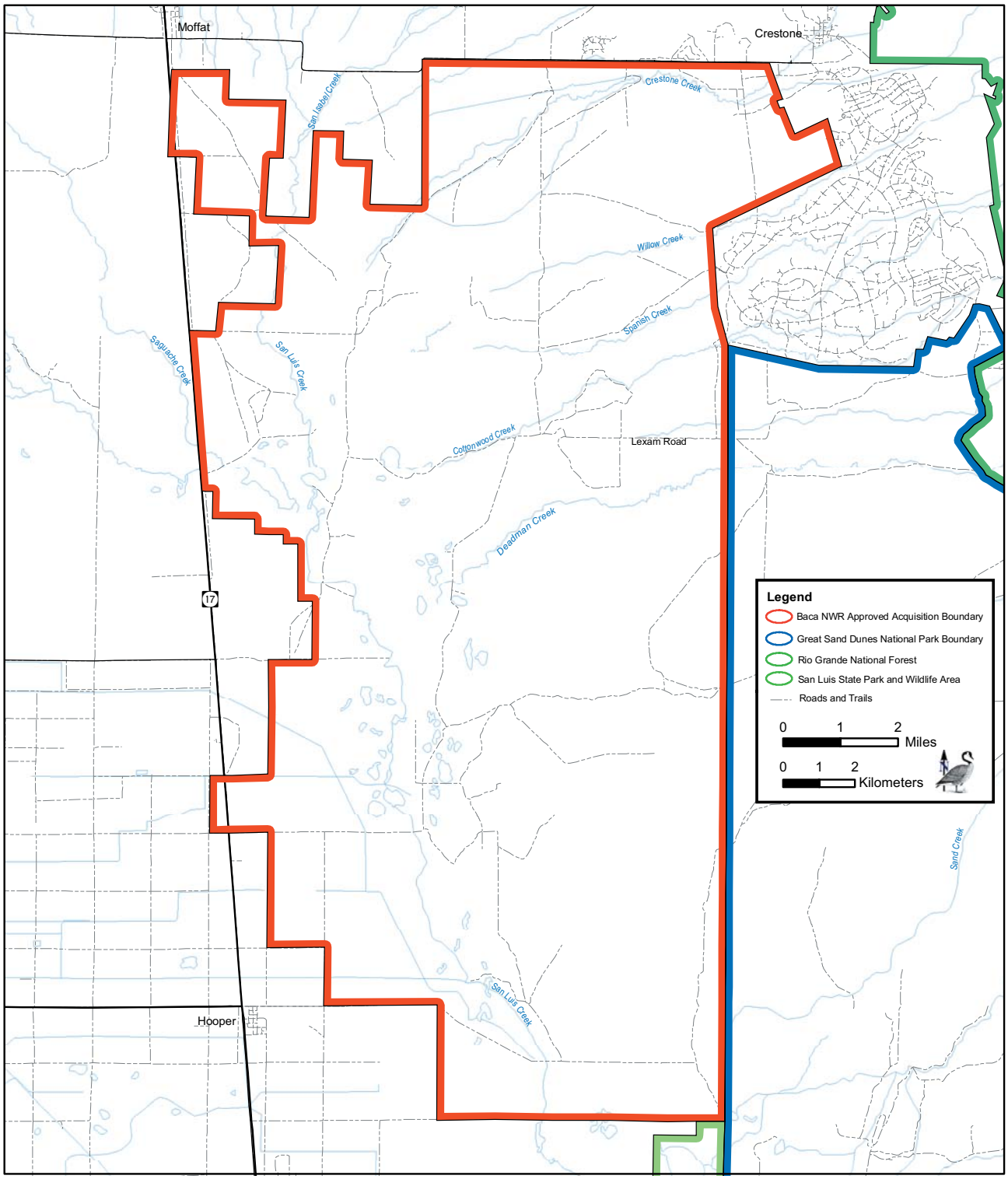
Baca National Wildlife Refuge will be managed as a part of the Refuge System in accordance with the National Wildlife Refuge System Administration Act of 1966 as amended with the National Wildlife Refuge Improvement Act of 1997, Executive Order 12996, and other applicable Service and federal land management policies.

Figure 2. Approved Acquisition Boundary

U.S. Fish & Wildlife Service

Baca National Wildlife Refuge
Saguache and Alamosa Counties, Colorado

Approved Acquisition Boundary
Figure 2



chapter 2

PLANNING PROCESS AND KEY ISSUES

Chapter 2. Planning Process and Key Issues

2.1 DESCRIPTION OF PLANNING PROCESS

The planning process for this CMP began in earnest in early February 2004 with an internal meeting between local field staff, Denver regional office management, and planning staff at Alamosa National Wildlife Refuge. The purpose of this meeting was to discuss the new refuge, identify the core team to develop the CMP, outline planning objectives, strategies, and time lines, and identify known issues and data needs. Main issues generated during this meeting fell into two general categories: (1) lack of funding and staff to manage the refuge; and (2) lack of information about resources on the refuge.

On March 17, 2004, a news release was submitted to local and regional newspapers and other venues to notify the public of the Service's intent to host two open-house public meetings. The purpose of these meetings was two-fold: (1) to disseminate information pertaining to the planning process for the refuge to the public; and (2) to gather public comments and concerns about future refuge management. Seven people attended the first meeting held at the Alamosa County courthouse on April 4, 2004. The second meeting was held on April 5, 2004, at the Baca Grande Property Owners Association Hall in Crestone; six people attended this meeting. The main concerns were the expanding elk population, spread of invasive plants, general public access to the refuge, differing regulations between the Park and the refuge, and access to the Park from the north, perhaps through the refuge.

Additional meetings were held by refuge staff with the Saguache and Alamosa County commissioners throughout the summer to update the local governments on the refuge planning efforts and to address questions and concerns. Refuge staff also have participated in Great Sand Dunes Advisory Council meetings, local water conservation district meetings, and San Luis Valley Focus Area Committee meetings throughout 2004. Additional public meetings will be held in the future as new planning efforts are initiated. A discussion of the primary issues raised during the planning process are listed below.

2.2 PRIMARY PLANNING ISSUES

LACK OF FUNDING AND PERSONNEL

With the addition of the Baca National Wildlife Refuge to the refuge complex (Alamosa, Monte Vista, and Baca National Wildlife Refuges), Congress significantly expanded the Service's acquisition authority and subsequent management responsibilities in the San Luis Valley, without expanding its operating budget and personnel base. No additional funding or personnel are dedicated to the administration and operation of the refuge, therefore, the refuge will be managed initially with existing staff from Monte Vista and Alamosa refuges.

Personnel required to effectively administer operations and management at the refuge include a refuge manager, biologist, administrative assistant, two maintenance workers, a full-time law enforcement officer, and two biological technicians. Initial costs for setup, administration, operations, maintenance, and developments are estimated at $2.7 million. This includes costs associated with staffing, law enforcement activities, fence maintenance, signing refuge boundaries, water distribution system repairs, and road and structure repair and removal if needed. Annual operating costs for the same items are estimated at $857,000. Without sufficient personnel and funding, most if not all of the goals and action items described in this CMP will be difficult, if not impossible, to attain.

ELK POPULATION

Based on annual surveys conducted by the Colorado Division of Wildlife (CDOW), estimates of the elk population in the vicinity of the refuge total approximately 5,000 animals (Rivale, pers. comm. 2003). Generally, the elk travel between the refuge, neighboring NPS and TNC lands, and surrounding private lands. From an ecological standpoint, it is unclear how elk are affecting vegetative communities, and to what extent biological carrying capacities are being reached or exceeded. In October 2004, researchers from U.S. Geological Survey (USGS) and CDOW initiated a 3-year research effort within the Great Sand Dunes ecosystem to assess the condition of plant communities, and to assess the effects of large ungulate (elk, bison, and cattle) grazing on these communities. Although chronic wasting disease (CWD) has not been detected in wild ungulate populations within the San Luis Valley, CWD is a concern due to relatively high animal densities.

From an economic standpoint, area farmers and ranchers have expressed concerns about damage to crops and haystacks, and competition for available grass for cattle. Numerous comments were received during public scoping meetings such as

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Rocky Mountain elk

"there are too many elk," and "keep the elk off my land." CDOW has received similar comments for several years in relation to elk; as a result CDOW implemented special dispersal hunts on the entire Medano-Zapata Ranch (TNC) and on the leased state lands on the Baca Ranch (13,105 acres) in an attempt to reduce elk conflicts. These hunts are intended to keep elk east of State Highway 17.

General hunting has had limited success at reducing overall herd size due primarily to the inaccessibility of elk to hunters. Most of the areas where elk spend a large amount of time during the hunting season, like the Baca Ranch lands and the NPS lands, are not open to public hunting. Over the last 5 years, an average of 355 animals have been killed during the hunting season within game management unit #82 (CDOW 2004b). This number reflects combined hunter success and animals harvested during the dispersal hunts.

This research may provide important biological information needed to assist with the development and implementation of an elk management program on the refuge. Hunting will be considered as part of an elk and habitat management program. The refuge will have an approved hunting plan in place prior to establishing a hunting program. Hunting is recognized as a priority use on national wildlife refuges. A hunting plan will be developed as part of the visitor services planning process. Public comment will be encouraged during the development of a visitor services plan and hunting plan (see public use section for additional information.)

INVASIVE PLANTS

Identification and control of invasive plants are considered a priority for the Service. Invasive plants are one of the greatest threats to intact landscapes and a major cause of reduced biodiversity. Plants of primary concern include Canada thistle (*Cirsium arvense*), tall whitetop (*Lepidium latifolium*), Russian knapweed (*Acroptilon repens*) and salt cedar (*Tamarisk* spp.) especially in the wetland and riparian habitats. In addition to ground surveys, the Service will assess the extent of weed infestations on the refuge through discussions with previous owners, TNC, and other knowledgeable individuals. Concurrent with an assessment, strategies will be developed to address known infestations given the reality of funding and staffing constraints.

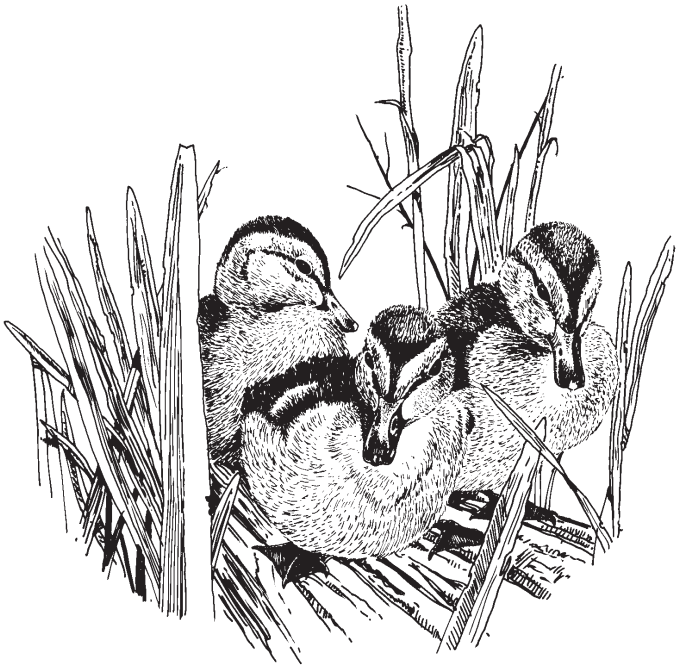
Building on a knowledge base assembled by Service personnel at Monte Vista and Alamosa Refuges, a variety of tools including herbicide applications, mechanical control including mowing and haying, biological control, grazing, and prescribed fire may be used to help combat the spread of invasive plants. In the short term, haying and grazing will be used as the primary means to combat existing infestations, especially in the wet meadows. Once the severity and locations of infestations are better understood, the role of haying and grazing for invasive control will be re-evaluated. Because invasive plants do not obey property boundaries, the Service is committed to active participation with neighboring agencies, TNC, and other property owners to collectively and efficiently combat infestations.

NORTHERN ACCESS TO THE NATIONAL PARK

The National Park Service is currently undergoing their general management plan (GMP) planning effort for the Park, which will guide management activities for the next 15-20 years. One of the biggest issues facing NPS involves public assess to new lands included in the northern portion of the Park. The process and details of developing additional public access has received considerable attention from the public. Currently, the primary access to the Park is available from the south via State Highway 150. Expansion of the Park adjacent to the Baca Grande Subdivision has created a defacto

point of access to new Park lands. The Baca Grande Subdivision has a network of public, county roads, some of which end at the boundary between the Park and subdivision. Although residents of the property owners association are concerned with potential large increases in traffic and parking issues associated with visitors using these roads to access the Park, their ability to restrict traffic is very limited. Several alternatives are being considered for development by the NPS and their advisory council. None of these alternatives promote access via existing county roads in the Baca Grande community subdivision to specific trail head locations on the Park. However, one may be developed that accommodates parking inside the park boundary adjacent to the subdivision.

chapter 3



MANAGEMENT DIRECTION

Chapter 3. Management Direction

The mission of the National Wildlife Refuge System is to administer a national network of lands and waters for the conservation, management and, where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans. The underlying foundation of the Refuge System is that "wildlife comes first" (Fulfilling the Promise, USFWS 1999). The refuge will be managed with this underlying principle at the forefront.

3.1 HABITATS

UPLAND HABITATS

Semi-desert Shrublands and Grasslands

Semi-desert shrublands and grasslands are typical of arid continental interior basins and is widespread in areas affected by rain shadows in western North America where mean annual precipitation is less than 10 inches. This habitat type is widespread on the valley floor, where only 7 inches of precipitation falls annually. Approximately 77 percent of the refuge, or over 71,700 acres, fall into this habitat type (figure 3) (CDOW 2004a). The dominate shrubs include rubber rabbitbrush (*Ericameria nauseosa*), greasewood (*Sacrobatus vermiculatus*), fourwing saltbush (*Atriplex canescens*), shadscale (*Atriplex confertifolia*), and winterfat (*Krascheninnikovia lanata*). Native grasses occurring in association with these and other shrubs typically include Indian ricegrass (*Oryzopsis hymenoides*), Alkali sacaton (*Sporobolus airoides*), western wheat grass (*Pascopyrum smithii*), and blue grama (*Bouleloua gracilis*). Annual plants tend to be more abundant in this habitat type; however, many of these are exotic species including cheat grass (*Bromus tectorum*). Crested wheatgrass (*Agropyron desertorum*), an exotic perennial grass, also may be common. Many of the plants within this habitat type are drought resistant and tolerant to a range of soil salinity, conditions common on the valley floor.

Blue grama

Bird diversity and densities tend to be relatively low in semi-desert shrublands due to structural and floristic simplicity (Wiens and Rotenberry 1981). Species common to this habitat include the horned lark (*Eremophilo alpestris*), mourning dove (Zenaida macroura), western meadowlark (*Surnella neglecta*), and loggerhead shrike (*Lanius ludovicianus*). Upland grassland habitats, depending on the amount and type of vegetation, have the potential to support rare grassland-

Table 2. Summary of Major Vegetation Classes within Baca National Wildlife Refuge.

Vegetation Class Name	*Grid Code*	*Acres*	*%*
Rabbitbrush Grass Mix	34	43,916	47.6
Greasewood	24	24,646	26.7
Herbaceous Riparian	112	9,009	9.8
Sedge	113	4,025	4.4
Grass Dominated	11	3,898	4.2
Shrub/Grass/Forb Mix	32	3,220	3.5
Cottonwood	106	1,703	1.8
Soil	93	794	0.9
Irrigated Agriculture	6	452	0.5
Sand Dune Complex	17	332	0.4
Total		91,995	99.5%

Note: Six other vegetation classes occur within Baca NWR with acreages (<100).

** Data from Colorado Vegetation Classification Project (www.ndis.nrel.colostate.edu).*

dependent species such as the burrowing owl (*Athene cunicularia*), mountain plover (*Charadrius montanus*), long-billed curlew (*Numenius americanus*) and several sparrow species. Another habitat type found in association with the playa wetlands portion of the shrublands are salt grass pans. These areas depending on the hydrologic conditions and juxtaposition to other habitat types, can support a range of invertebrate, mammal, and bird species including nesting American avocets (*Recurvirostra americana*). Two globally vulnerable subspecies of small mammals, the silky pocket mouse (*Perognathus flavus sanluisi*), and the thirteen-lined ground squirrel (*Spermophilus tridecemlineatus blanca*); and one globally vulnerable subspecies of butterfly (sandhills skipper; *Polites sabuleti ministigma*) were found in greasewood/salt grass dominated areas of the White Ranch (Rondeau et al. 1998). This subspecies of sandhill skipper is endemic to the San Luis Valley. Also, the globally rare slender spiderflower (*Cleome multicaulis*) can be found in the transition zone between the shrubland and salt grass pans.

Management of Shrublands and Grasslands

During the interim period, the Service will assess the condition of the shrublands and grasslands habitat on the refuge. Obvious signs of degradation, whether in vegetative condition or the presence of large infestations of invasive plants, will be addressed with corrective actions.

Following an assessment, strategies will be developed and implemented to improve this habitat type for wildlife. Lands within the refuge have a long history of domestic cattle grazing, some of which recently, at least on the Baca Ranch, has been a season-long grazing scheme with high stocking rates. The Service considers domestic grazing as a management tool to improve habitat quality for wildlife. As more information is gathered about this habitat type and its condition, specific habitat-based goals and objectives will be developed. Domestic grazing activities within the shrublands and grasslands habitat on the refuge will be reduced over time; the degree and timeliness of changes will be dependent on, at least initially, the condition of the habitat, and later based on specific habitat-based goals and objectives for this habitat type.

The Service will consider the use of prescribed fire in this habitat type, especially in areas with a larger grassland component, to improve or provide a matrix of various habitat types for wildlife. The Service has been an active partner in the development of a joint Greater Sand Dunes Fire Management Plan planning effort with the NPS and TNC, and will use this effort as the basis for further fire management planning for the refuge. This interagency effort will provide a general framework for fire-related actions to enhance and maintain wildlife habitat, biological diversity, healthy ecosystems, and cultural resources, while reducing the chance of a catastrophic wildfire. Prior to the use of prescribed fire on the refuge, fire management specialists will write site-specific burn plans tied to habitat management objectives. These site-specific plans will encompass all aspects of the prescribed fire planning process and must receive approval from regional fire management staff in Denver prior to implementation.

USFWS/John and Karen Hollingsworth

Western meadowlark

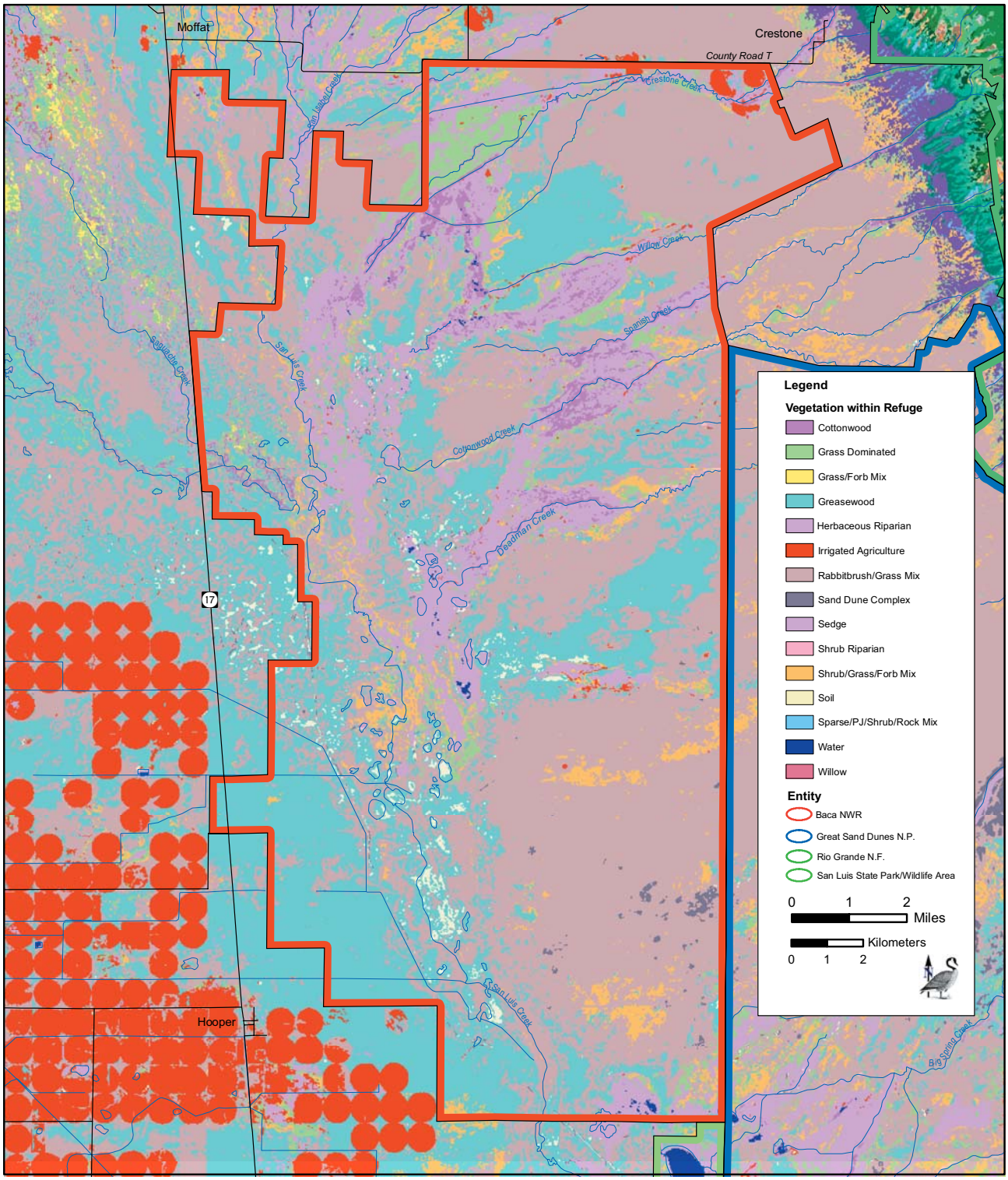
Figure 3. Vegetation Map

U.S. Fish & Wildlife Service

Baca National Wildlife Refuge

Saguache and Alamosa Counties, Colorado

Vegetation Map
Figure 3



WETLAND HABITATS

Protection of water resources in the Great Sand Dunes ecosystem was one of the primary driving forces behind the legislation establishing the refuge. The refuge contains a diversity of wetland types, each possessing unique hydrologic characteristics and each supporting a diversity of plant and animal species, some of which are very rare (e.g., slender spiderflower). According to the National Wetland Inventory (NWI), approximately 14 percent (13,112 acres) of the refuge has been classified as wetlands (table 3; figure 4). Wetland type, which is directly affected by water permanence and other abiotic factors, varies greatly within the refuge. Intermittent wetlands (or "playa wetlands") can experience weeks, months, or even years between periods of inundation (see appendix B for NWI definitions). Temporary wetlands tend to have surface water for brief periods early in the growing season, while seasonal wetlands typically have surface water for most of the growing season. The vast majority of temporary and seasonal wetlands are referred to locally as "wet meadows."

Semipermanent wetlands and lakes usually have surface water that persists throughout the growing season and often beyond during most years. These wetlands are far less common on the refuge, yet, where they do occur, they provide important habitat for water birds such as the white-faced ibis (*Plegadis chihi*), eared grebe (*Podiceps nigricollis*), pied-billed grebe (*Podilymbus podiceps*), and sandhill crane (*Grus canadensis*).

This range of water permanence contributes greatly to the biological value of the refuge. Many of the wetland and riparian habitats on the refuge have been identified as conservation sites by the Colorado Natural Heritage Program (CNHP) because they provide "significant" or "very significant" contributions to global biological diversity (Rondeau et al. 1998). For example, creeks and wetlands on the Baca Ranch support the globally rare Rio Grande chub (*Gila pandora*) (Blenden, pers. comm. 2004; Rondeau et al. 1998). Wet meadows and playa wetlands, which comprise the largest component of wetland habitats on the refuge, are discussed in-depth in the following sections.

Wet Meadows

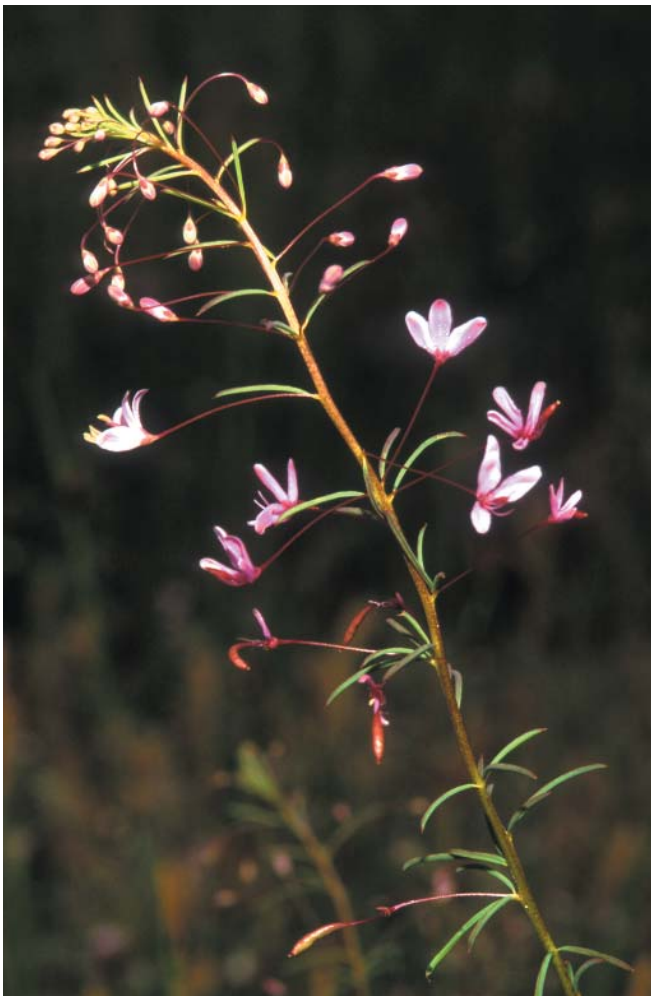
Wet meadows (the majority being temporary and seasonal wetlands) comprise the largest wetland type on the refuge covering over 10,000 acres (table 3). The wet meadows on the refuge tend to be dominated by sedges (*Carex* spp.), baltic rush (*Juncus balticus*), and hairgrass (*Deschampsia cespitosa*) plant communities. These communities are common in the northern portion of the San Luis Valley and occupy more area than all other wetland types in the valley (Cooper and Severn 1992). These communities tend to occur where the water table just reaches the soil surface during the early part of the growing season or inundates the surface for short periods. Wet meadows occur predominately in the central and northeast portion of the refuge along all of the creeks, and to a lesser extent in the southeast portion of the refuge along Sand Creek and Big Spring Creek.

Depending on plant structure and density, and water depth and duration, wet meadows offer tremendous foraging and nesting opportunities for a variety of wetland avian species including numerous species of waterfowl, the sora (*Porzana carolina*) and Virginia rail (*Rallus limicola*), white-faced ibis, American avocet, Wilson's snipe (*Gallinago delicata*), and Wilson's phalarope (*Phalaropus tricolor*). Wet meadows also provide critical roosting and foraging areas for a segment of the Rocky Mountain population of greater sandhill cranes, which migrate through the valley in the spring and fall. Wet meadows provide habitat for a variety of rare or unique amphibian species such as northern leopard frog (*Rana pipiens*) and Plains spadefoot toad (*Scaphiopus bombifrons*).

Table 3. Summary of Wetlands on the Baca National Wildlife Refuge

Wetland Type	*Total Wetland Acres*	*% of Refuge Area*
Intermittent	2,067	2.2
Temporary	8,426	8.7
Seasonal	2,253	2.4
Semi-permanent	172	<1.0
Lake	183	<1.0
Total	13,112	14.1

[1]*See Appendix B for NWI code definitions*



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Slender spiderflower

In the transition areas between the wet meadows and the adjacent salt grass/greasewood uplands, the globally rare slender spiderflower thrives in the moist, slightly saline conditions (Rondeau et al. 1998). Although once widespread in the southern Rocky Mountains, this species now occur almost exclusively in the San Luis Valley. Significant populations of this rare plant are known to occur on the refuge.

Management of Wet Meadows

The extent of the wet meadows is largely tied to how water has been managed on the refuge over the last 100 years. Historical irrigation practices have created, to a large extent, these wetland plant communities. Wet meadows on the refuge are irrigated using a relatively simple set of diversion structures and ditches diverting from all of the creeks crossing the refuge. In addition to the creeks, several wells are also used for irrigation. Irrigation generally begins in late spring with the onset of increased flows from melting snow and continues into the summer. Flow into individual wet meadows is manipulated at specific times allowing the meadows to dry for hay harvest in late summer. At the completion of the irrigation season, excess water is typically diverted into pastures. West of the meadows, surface flows are greatly reduced or nonexistent as water percolates into the ground or is lost to evaporation. During the last 10 years, drought and the deterioration of irrigation infrastructure has decreased the quantity of water reaching the wetlands located along Saguache Creek and San Luis Creek, west of the wet meadows.

Management of the wet meadows is of great interest to water users of the San Luis Valley. The Great Sand Dunes Park and Preserve Act requires the Secretary of Interior, in administering water resources for the national wildlife refuge, to "minimize, to the extent consistent with the protection of national wildlife refuge resources, adverse impacts on other water users." Current understanding of hydrology on the refuge considers these wet meadows and the historic irrigation practices that have maintained them, as important sources of recharge for the Closed Basin Project and its associated water right. Although restoration of natural hydrologic conditions to the playa wetlands down stream of the wet meadows potentially has significant biological value, this objective has to be pursued with considerable caution and collaboration with other water users. The Service intends to work with all interested parties in the development of a comprehensive analysis of the hydrological characteristics in the vicinity of the Great Sand Dunes. One goal of this analysis will be to determine how alteration of the wet meadow irrigation regime impacts down stream users. This information will be useful in determining how, if at all, water can deliberately be used to irrigate other habitats that have historically been irrigated such as playa wetlands and their associated vegetation.

Traditionally, the wet meadows on the refuge have been hayed and grazed as part of the ranching operation. The Service views activities such as haying and grazing as tools used as part of an overall habitat management scheme to improve habitat quality for wildlife. The Service is concerned about the spread of invasive plants especially Canada thistle and tall whitetop, which are present in the wet meadows. These concerns will factor directly into decisions about current and future haying and grazing within the wet meadows. As knowledge increases related to overall condition of the wet meadows and wildlife use of these areas, and the location and severity of infestations, haying and grazing activities will be altered accordingly. The Service will also

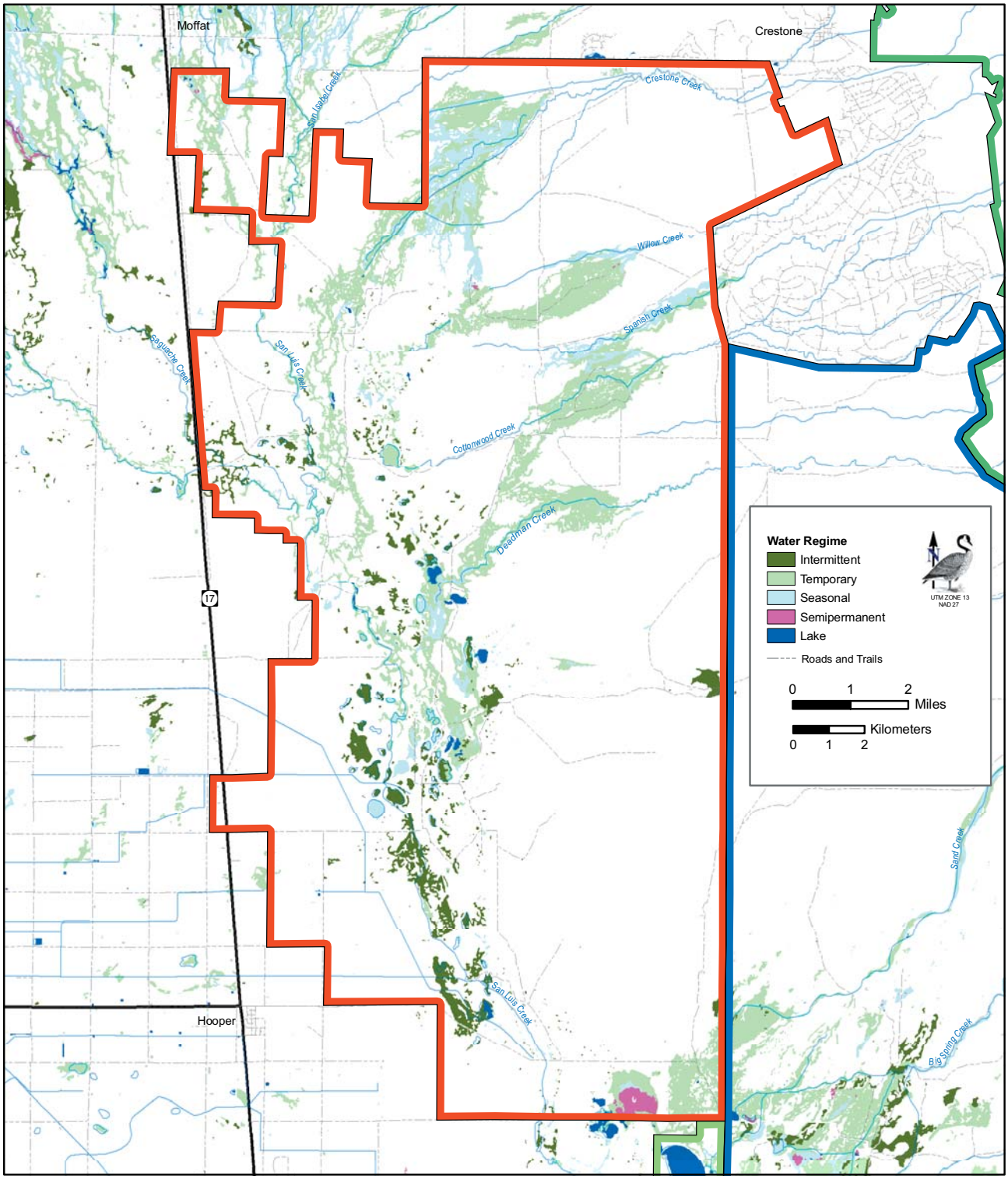
Figure 4. National Wetland Inventory Map

U.S. Fish & Wildlife Service

Baca National Wildlife Refuge

Saguache and Alamosa Counties, Colorado

National Wetland Inventory
Figure 4



consider the use of prescribed fire in this habitat type to improve or provide a matrix of various habitat types for wildlife (see management activities under "Semi-desert Shrublands and Grasslands" for more information on prescribe fire). As the refuge develops specific habitat goals and objectives for the wet meadows, the role of haying, grazing, and fire, will be more clearly defined.

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Wet meadows and playa wetlands

Playa Wetlands

Playa wetlands on the refuge generally occur to the west of the wet meadows along Saguache and San Luis Creeks (figure 4). These wetlands have an intermittent or ephemeral water regime. In some cases, especially during years of below average precipitation, many of these wetlands remain dry. The ephemeral nature of these wetlands adds to their uniqueness and high productivity when water does return. During wet years, playas will fill during spring runoff and thunderstorms, and slowly dry up over summer. This drying and wetting cycle provides for the nutrient cycling conditions ideal for the production of invertebrates, a valuable food resource for numerous vertebrate species. During times of above average precipitation, these wetlands are some of the most productive wetlands in the valley (Cooper and Severn 1992). Greasewood and rabbitbrush with an understory of saltgrass (*Distichlis stricta*) and western wheat grass typically surround playa wetlands. As mentioned earlier, salt grass pans are an important habitat for several rare species of small mammals and a rare butterfly. Barren salt flats are also a component of playa wetland systems and can be important to foraging and nesting shorebirds.

Management of Playa Wetlands

Except in years of exceptional snow pack conditions in the Sangre de Cristo Mountains when water literally pours uncontrollably onto the valley floor, water management in the wet meadows directly affects how much, if any, surface water enters the playa wetlands. In recent history, very little surface water enters the playa wetlands. The Service recognizes the valuable contribution of functioning playa wetlands to the overall biological productivity and ecological richness of the region. At some point in the future, the Service, in coordination with partners, intends to evaluate different water management options within the wet meadows and measure their resultant effect on the playa wetlands. These options may include managing waters so there are at least some surface flows back to portions of playa wetlands. Please refer to the previous discussion of management activities, under "wet meadows" for more information.

RIPARIAN HABITATS

The refuge contains a variety of woody and non-woody riparian habitats along seven main creeks flowing from the Sangre de Cristo Mountains. These creeks (from north to south) are North Crestone, South Crestone, Willow, Spanish, Cottonwood, Deadman, and Sand Creeks. Riparian zones are the transition areas between aquatic and terrestrial habitats. In arid climates like that in the San Luis Valley, riparian zones typically compose a very small percentage of the overall landscape. However, they can contain some of the richest species diversity of any habitat type.

Riparian habitats with a tree and shrub component are located primarily along North Crestone and South Crestone Creeks (and associated irrigation ditches) in the north and northeastern portion of the refuge. Narrowleaf cottonwood (*Populus angustifolia*) is the dominant tree species with understory vegetation of willows (*Salix* spp.), red-oiser dogwood (*Cornus stolonifera*), and greasewood (figure 3) (CDOW 2004a). Healthy riparian vegetation plays a major role to stabilize and shade stream banks, thereby reducing sedimentation and providing quality habitat for aquatic species including the Rio Grande chub. Riparian vegetation along these creeks may provide habitat for the endangered southwestern willow flycatcher (*Empidonax trailii extimus*). This small songbird migrates and nests in dense willow and cottonwood areas throughout the San

Luis Valley, primarily at elevations below 8,500 feet, and may use similar habitat on the refuge.

Another riparian-obligate species, the yellow-billed cuckoo, which is a candidate species for federal listing under the Endangered Species Act, has been documented in dense, old-growth cottonwood forests on McIntire Springs (BLM) in the valley (Lucero, pers. comm. 2004). This species may also occur on the refuge, if the appropriate habitat type and structure exists. Riparian habitats also host a large number of migrating and nesting neotropical songbirds and raptors. In addition, several plant communities associated with riparian habitats of global importance have been identified by CNHP in close proximity to the refuge including rare examples of narrowleaf cottonwood/rocky mountain juniper (Populus angustifolia/*Juniperus scopulorum*) and aspen/rocky mountain maple (*Populus tremuloides*/*Acer glabrum*) (Rondeau et al. 1998).

The remainder of the riparian habitats along Willow, Spanish, Cottonwood, Deadman, and Sand Creeks are dominated by sedges and other herbaceous plant species. Historically, these creeks may have contained a larger component of woody species, such as willows, especially in the upper reaches within the refuge.

Management of Riparian Habitats

Similar to the other habitat types, the initial focus of management activities within the riparian habitats will be to evaluate the condition of the vegetation and identify areas of degradation and invasive species. Obvious signs of degradation, such as actively cutting or denuded streambanks, will be addressed as promptly as possible. Corrective actions may include realigning or adding additional fences, or removing cattle altogether from these riparian habitats. The Service will evaluate the riparian areas for presence of invasive plants such as salt cedar, Canada thistle, and tall whitetop and develop strategies to reduce their impact to native plants and wildlife. In addition, the process of gathering baseline wildlife-use information will be undertaken, especially related to possible use by southwestern willow flycatchers and yellow-billed cuckoos.

3.2 OPERATIONS, MAINTENANCE, AND LAW ENFORCEMENT

The refuge will be managed using existing staff based at Alamosa and Monte Vista refuges and any additional staff that are added to the refuge complex. Personnel needed to effectively administer operations and management include a refuge manager, biologist, administrative assistant, two maintenance workers, law enforcement officer, and two biological technicians.

The Service anticipates the interim refuge headquarters will be located at the Baca Ranch house on the north end of the refuge near the town of Crestone. This site will be evaluated as potential permanent headquarters location. From this location, daily activities and management operations will be conducted. If deemed necessary at a later date, location and construction of new buildings will be evaluated with input from the public. Inventory and maintenance of existing real property (e.g., buildings and infrastructure) will be conducted as personnel and funding allow. As lands are added to the refuge, appropriate boundary signs will be erected and maintained

Law enforcement is a critical component of the interim management of the refuge. The Service views protection of facilities, cultural and biological resources, and enforcement of refuge specific regulations as the highest priorities related to law enforcement activities. The Service has estimated that a minimum of 1.5 full time employees (FTE's) will be required to adequately address law enforcement issues on the refuge during the interim period. Indications gathered from public meetings, as well as from conversations with partners and the public, are that there is a widespread interest in general access onto the property, which has never been open to the public. The desire for access is primarily targeted toward cultural resources, hunting opportunities, and a general curiosity to what lies beyond fences that have essentially been off-limits for several generations.

The current law enforcement staff for the Refuge Complex consists of three dual-function officers. These officers currently spend 30 percent of their time addressing issues on Alamosa and Monte Vista refuges (approximately 0.7 to 0.9 FTEs). Law enforcement needs for Alamosa and Monte Vista refuges are approximately 1.25 to 1.5 FTEs (USFWS 2003). Partnerships with the Park, the CDOW, and the Saguache and Alamosa County Sheriffs Office are being pursued to address the shortfall. Given the lack of law enforcement resources within the Refuge Complex, the Service's ability to provide any kind of access or public use on the refuge as well as the ability to maintain current levels of public use and access on the Monte Vista and Alamosa refuges, likely will be impacted

3.3 PUBLIC USE

National wildlife refuges can provide a tremendous boost in revenue to local economies. A recent analysis of the economic impact of refuges estimated that 35.5 million people visited a national wildlife refuge in 2002 and spent over $800 million in regional

economies (Caudill and Henderson 2003). Within the San Luis Valley, Monte Vista and Alamosa National Wildlife Refuges continue to play a major role in the success of the Monte Vista Crane Festival, held annually during the sandhill crane spring migration (approximately 18,000 cranes). This event, held in March, attracts an estimated 10,000 visitors from all over Colorado and the nation to the San Luis Valley.

Providing wildlife-dependent opportunities to the public is one of the four guiding principles for the Refuge System. The Refuge Improvement Act of 1997 identified six priority public uses that receive special consideration above others on refuge lands. The six priority wildlife-dependent public uses are:

- Hunting
- Fishing
- Wildlife Observation
- Wildlife Photography
- Environmental Education
- Interpretation

Although these public uses have priority over others, new refuge lands are not inherently open to the public following acquisition. Unlike new lands acquired by other federal land management agencies, which are generally open until closed, lands added to the Refuge System are closed until opened to the public for a particular use.

The Compatibility Standard

Before activities or uses can be allowed on a national wildlife refuge, federal law requires that the uses formally determined "...compatible with the major purposes for which such areas were established..." (National Wildlife Refuge Recreation Act of 1966, as amended in Refuge Improvement Act of 1997). A compatible use is an allowed use that will not materially interfere with or detract from the purposes for which the unit was established (U.S. Fish and Wildlife Service Manual, 603 FW2.6B).

Existing Public Uses

Service policy requires the identification of all existing public uses that occur on lands under consideration for acquisition prior to transfer to the Service (Service Manual 603 FW 2.17A). Once existing public uses have been identified, an interim compatibility determination is made by the onsite refuge manager. Interim compatibility determination outlines which public uses will be allowed to continue if land is acquired by the Service. The interim compatibility determination

applies to the period between land acquisition and the completion of a CCP, or appropriate step-down management plan, in this case, a visitor services plan.

A review of existing public uses has revealed very limited access to the lands within the refuge acquisition boundary (table 4). The Baca Ranch lands, which comprise approximately 58 percent of the refuge (see figure 5), are presently closed to all public access. The SLB annually leases 13,105 acres of their land to the CDOW from September 1– February 28 for a limited dispersal elk hunt (cow elk only). The dispersal hunt is open to the public in that anyone can get on a list of potential hunters (Rivale, pers. comm. 2004). This hunt is administered on a need-only basis (when animals are accessible) and all hunters are accompanied by a CDOW representative.

The Service has recognized the CDOW dispersal hunt as an existing public hunting opportunity and has prepared an interim compatibility determination for this activity (see appendix C). This activity will be allowed to continue during the interim period from the time of acquisition until a hunting plan is developed for the refuge. At this time, general public access to the CDOW leased lands and to the remaining state lands is not allowed by the SLB.

The Hooper Pool facility is a private business currently open to the public for pool/spa activities. At this time, the Service has no intention of pursuing any land acquisition activities involving the Hooper Pool. At some point in the future, if the owners of this facility

Table 4. Interim Compatibility Determination Matrix

Wildlife Dependent Recreational Activity	*Existing Public Activity*	*Funds and Staff Available to Manage*	*Caompatibility for Interim Period*	*Interim Use Allowed*
Wildlife Observation	No	No	No	No
Wildlife Photography	No	No	No	No
Interpretation	No	No	No	No
Environmental Education	No	No	No	No
Hunting	Yes[1]	No[2]	Yes	Yes
Fishing	No	No	No	No

[1] *Occurs only on State-owned lands.*
[2] *Currently, no funds or staff have been dedicated to refuge operations or management. Activity will be conducted with CDOW cooperation and assistance. See interim compatibility determination for details.*

express interest in selling to the Service, the Service will review the feasibility of this parcel. If the parcel is feasible for inclusion into the refuge, a compatibility determination will be completed detailing how the facility would be or would not be operated. The remaining private lands within the refuge are not open to the public, including a portion of the Medano-Zapata Ranch, except by special arrangement (i.e., nature tour or workshop).

Future Public Use

Under the Refuge Recreation Act of 1962 (10 U.S.C. 460k), the Service may permit a public use on a national wildlife refuge only if that use is: (1) determined to be compatible with the purpose of the refuge; and (2) if sufficient resources are available for the development, operation, and maintenance of the permitted public use. It is the policy of the Service that when a proposed wildlife-dependent public use, especially a priority public use, is compatible with the refuge purpose, the activity should be facilitated. Whether sufficient resources are available to undertake a public use is determined based on sound professional judgment, with input from the affected public. The refuge manager must consider all aspects including financial, personnel, law enforcement, and infrastructure, among others, which currently exists or can be provided in some manner by the Service or its partners to properly manage a public use in a safe and effective manner.

The Service will consider all six priority uses for implementation on the Baca National Wildlife Refuge, and other uses as requested by the public. The Service intends to develop a visitor services plan that will address issues related to public access and wildlife-dependent activities on the refuge. This planning process will follow guidelines of the National Environmental Policy Act (NEPA) allowing for significant public input. Prior to an approved visitor services plan, public access to the refuge will likely be limited with greater access over time as resources and staff are increased, and as more information is assembled.

3.4 CULTURAL RESOURCES

The land within the refuge boundary and surrounding areas have long been regarded as important areas from a cultural and historic perspective. Some cultural sites date to almost 12,000 years ago. The protection of known culturally significant structures and sites will be a priority for refuge staff. The Service intends to coordinate with the NPS, TNC, and local law enforcement authorities to develop strategies to coordinate law enforcement activities to protect cultural resources.

Over time, the Service will evaluate and inventory additional areas within the Baca Refuge that have not been surveyed. The only area surveyed within the refuge has been the White Ranch property, which was surveyed in 1995 (Mabry et al. 1997). As a result of this effort, 64 new sites, two previously known sites, and 83 isolated occurrence sites were documented, many of which may be eligible for the National Register of Historic Places (Mabry et al. 1997). The Service will survey areas where disturbance to cultural sites, e.g., prescribed fire, may occur.

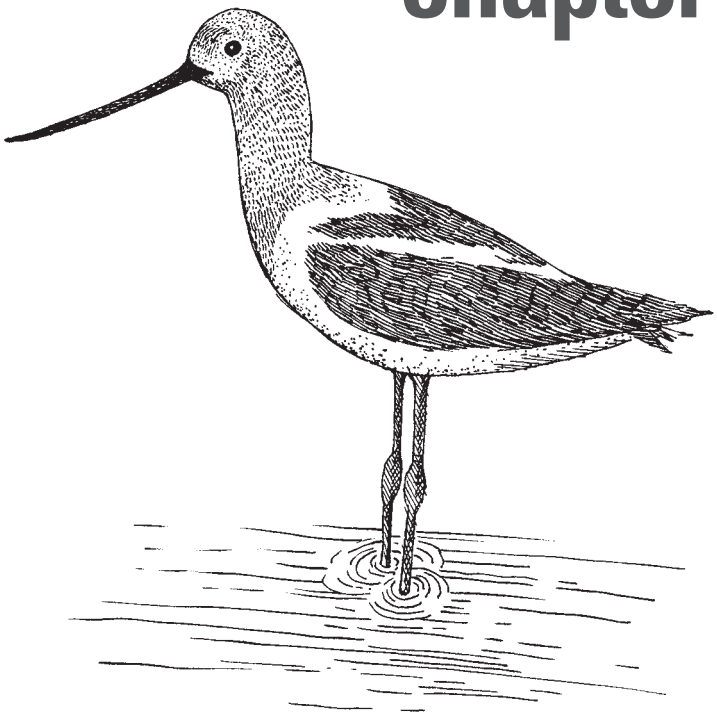
3.5 PARTNERSHIPS

Due to its sheer size and juxtaposition to other conservation entities, the refuge will play an important role in the protection and stability of the entire Great Sand Dunes ecosystem. The Service is committed to working with neighboring agencies, local groups, and individuals on issues related to the refuge and surrounding lands. The Service is excited about the opportunity to partner with others to better leverage scarce resources. Coordination and initial partnership efforts currently underway by Service representatives include:

- Participation in Great Sand Dunes Advisory Council meetings for NPS general management plan.
- Briefings with Alamosa and Saguache County commissioners.
- Interagency fire management plan (NPS, TNC, and the Service).
- State land exchange project (SLB, BLM, NPS, and the Service).
- Blanca Habitat Partnership Program.
- Joint vegetation mapping project (NPS, TNC, CNHP, USFS, the Service, and others).
- Interagency law enforcement activities.
- Baca National Wildlife Refuge conceptual management plan.

The Service will continue to keep members of other agencies and the public informed about issues at the refuge.

chapter 4



LAND ACQUISITION

Chapter 4. Land Acquisition

4.1 PROCESS

With the passage of the Great Sand Dunes National Park and Preserve Act of 2000, Congress granted the Service the authority to acquire land within the approved acquisition boundary of the refuge. Although the authority has been granted, this does not guarantee that all of this area will ever be acquired.

It is the policy of the Service to acquire the minimum interest in land that will achieve necessary habitat protection. The Service utilizes various methods to add units into the Refuge System including purchasing conservation easements, land exchanges, transfers, donations, and fee-title purchase. If land is purchased, it is the long-standing policy of the Service to purchase land on a willing seller-willing buyer premise. The Service will pay fair market value for all property purchased based on current real estate appraisals. Landowners who sell property may be eligible for relocation assistance under the Uniform Relocation Assistance and Real Property Acquisition Policies Act (1970).

In the case of the Baca National Wildlife Refuge, the enabling legislation clearly stipulated that lands owned by SLB, which total approximately 27,000 acres or 29 percent of the refuge, can only be acquired through donation or exchange. Given that SLB lands must generate revenue for the state, donation to the Service is not realistic or expected.

A joint effort between the SLB, BLM, NPS, and the Service is currently underway to exchange approximately 51,000 acres of surface and mineral rights within the refuge and Park acquisition boundaries for approximately 23,000 to 40,000 acres of BLM lands (acreage dependent on land valuations). BLM lands proposed for transfer to the SLB are located in Fremont, Saguache, and Conejos Counties adjacent to existing SLB properties. This multi-agency exchange project is well underway and is anticipated to be completed in 2006.

4.2 LAND ACQUISITION PRIORITIES

The Service has the primary responsibility to provide protection for a suite of trust resources including migratory birds, threatened and endangered species, inter-jurisdictional fish species, and certain marine mammals, and their respective habitats. With these responsibilities in mind, the Service has conducted a preliminary evaluation of the resources within the refuge to determine which lands comprise the highest priority for land acquisition. The result of this preliminary evaluation was the creation of three priority zones for land acquisition – Zones 1, 2, and 3 (figure 5).

Priority zones were developed based on the availability of wetland/riparian habitats as delineated by the NWI. The Service regards wetlands and riparian areas as the most important habitats requiring protection and preservation in the San Luis Valley. These habitat types generally

USFWS/Tupper Ansel Blake

Black-necked stilts

support a high diversity of plant and animal species. Because Colorado has lost nearly 50 percent of its wetlands (Dahl 1990, 2000) and because the San Luis Valley contains the highest remaining concentration of wetlands within Colorado, the protection of every additional wetland acre is considered a high priority.

Another criteria for determining priority zones for land acquisition addresses landowner parcel boundaries. It is the policy of the Service not to intentionally divide ownership parcels. Doing this could create an uneconomic remnant for the landowner. An uneconomic remnant is defined as "a parcel of real property in which the owner is left with an interest after the partial acquisition of the owner's property....which has been determined to have little or no value or utility to the owner" (Sec. 301, (9) Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970.) Therefore, the priority zone boundaries were adjusted with this in mind.

4.3 OWNERSHIP WITHIN PRIORITY ZONES

Priority zone 1 includes approximately 44,500 acres of the 100,000-acre Luis Maria Cabeza de Baca Grant #4 (figure 6) plus the remainder of the Baca Ranch and smaller tracts of private land, BLM, and state lands. The Baca Grant #4 is one of five replacement land grants issued to settle a land grant dispute around Las Vegas, New Mexico. In 1860, Congress allowed the owners of the original Luis Maria Cabeza de Baca Grant, which was issued in 1823, to select five alternative parcels within the territory of New Mexico. The fourth of these parcels was located in the San Luis Valley, which later became part of Colorado. This particular parcel persisted through the years essentially intact as it was passed through numerous owners.

Priority zone 2 includes approximately 27,100 acres (30 percent of the refuge) and comprises land east of the Franklin Eddy Canal to the priority zone 1 boundary (figure 5). This canal is the primary conveyance channel for water collected from the Closed Basin Project. The SLB is the largest landowner within this zone owning approximately 19,000 acres (66 percent) followed by TNC's Medano Ranch (6,525 acres). Small tracts of BLM and private land comprise the remaining tracts. Currently, the state leases its lands for cattle grazing to local ranchers. As stated above, the Service is currently working with the state and other federal agencies on a land exchange project involving these state-owned lands.

Priority zone 3 includes the remaining lands (6,640 acres) within the refuge (figure 5). The SLB is the largest landowner owning approximately 6,320 acres (95 percent). The remaining 320 acres is in private ownership, mostly in agricultural production. One functional center pivot irrigation system is present in this zone. In addition, the Hooper Pool, a privately owned pool/spa facility, is located within this zone (figure 6).

4.4 REFUGE REVENUE SHARING ACT

Lands owned by the Service are not subject to taxation. However, under provisions of the Refuge Revenue Sharing Act of 1935, as amended (Public Law 95-469), the Service annually reimburses counties to offset revenue lost as a result of land acquisition. This law states that the Secretary of the Interior shall pay to each county in which any area acquired in fee-title is situated, the greater of the following amounts:

- An amount equal to the product of 75 cents multiplied by the total acreage of that portion of the fee area which is located within such county.
- An amount equal to 3/4 of 1 percent of the fair market value, as determined by the Secretary, for that portion of the fee area which is located within such county.
- An amount equal to 25 percent of the net receipts collected by the Secretary in connection with the operation and management of such fee area during the fiscal year. However, if a fee area is located in two or more counties, the amount for each county shall be apportioned in relationship to the acreage in that county.

Payments under the Refuge Revenue Sharing Act are subject to Congressional appropriations to fully fund the amount paid to counties. In the past, Congress has appropriated only 50-60 percent of the necessary funding needed to fulfill the Refuge Revenue Sharing Act requirements. As a result, payments received by counties are usually less than what is outlined following the three criteria above. The Refuge Revenue Sharing Act also requires that Service lands be reappraised every five years to ensure that payments to local governments remain equitable. The first revenue sharing payment to Saguache County in the amount of $2,261.00 for the White Ranch (3,315 acres) occurred in July 2004.

Figure 5. Land Acquisition Priority Zones

U.S. Fish & Wildlife Service

Baca National Wildlife Refuge
Saguache and Alamosa Counties, Colorado

Land Acquisition Priority Zones
Figure 5

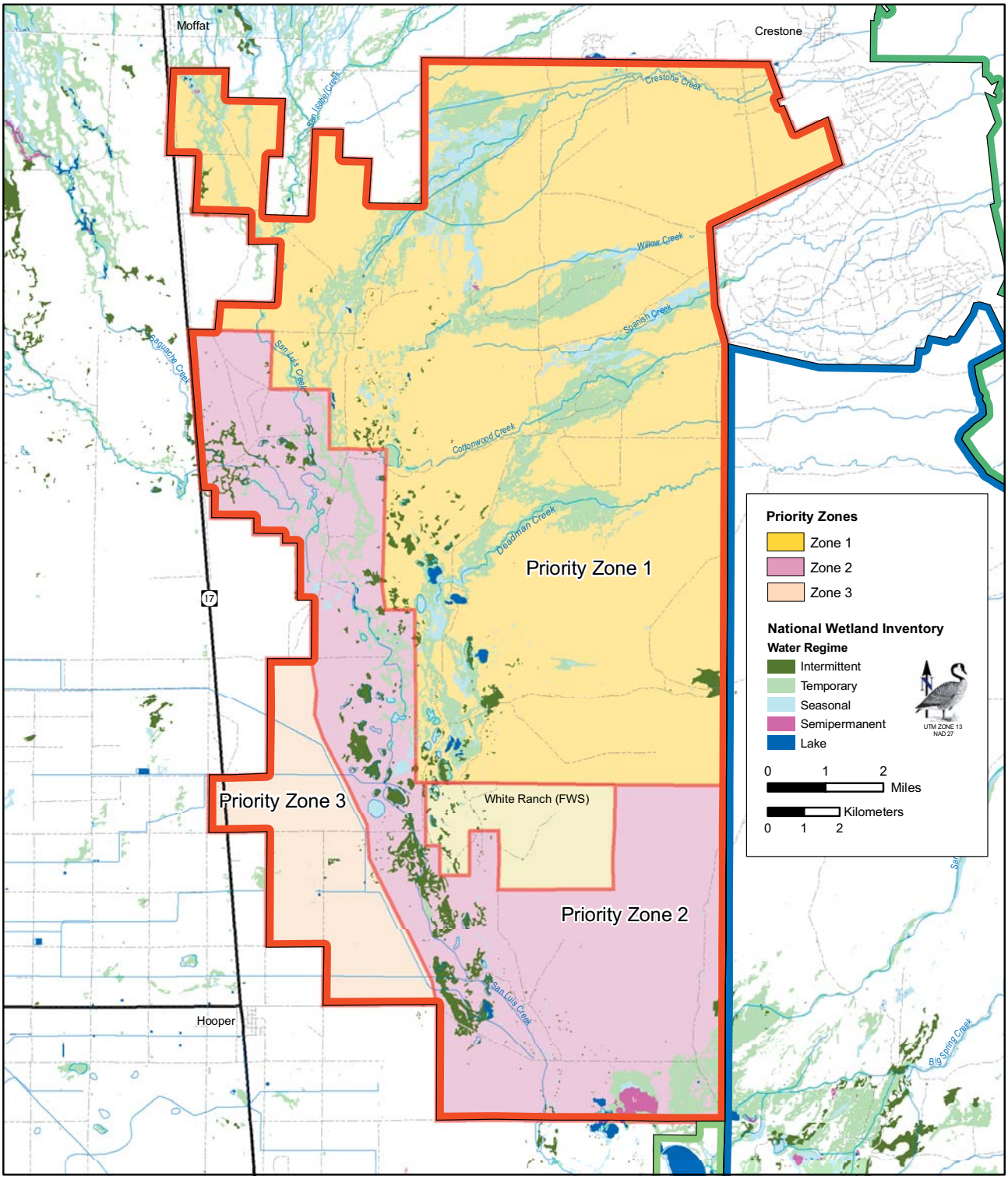


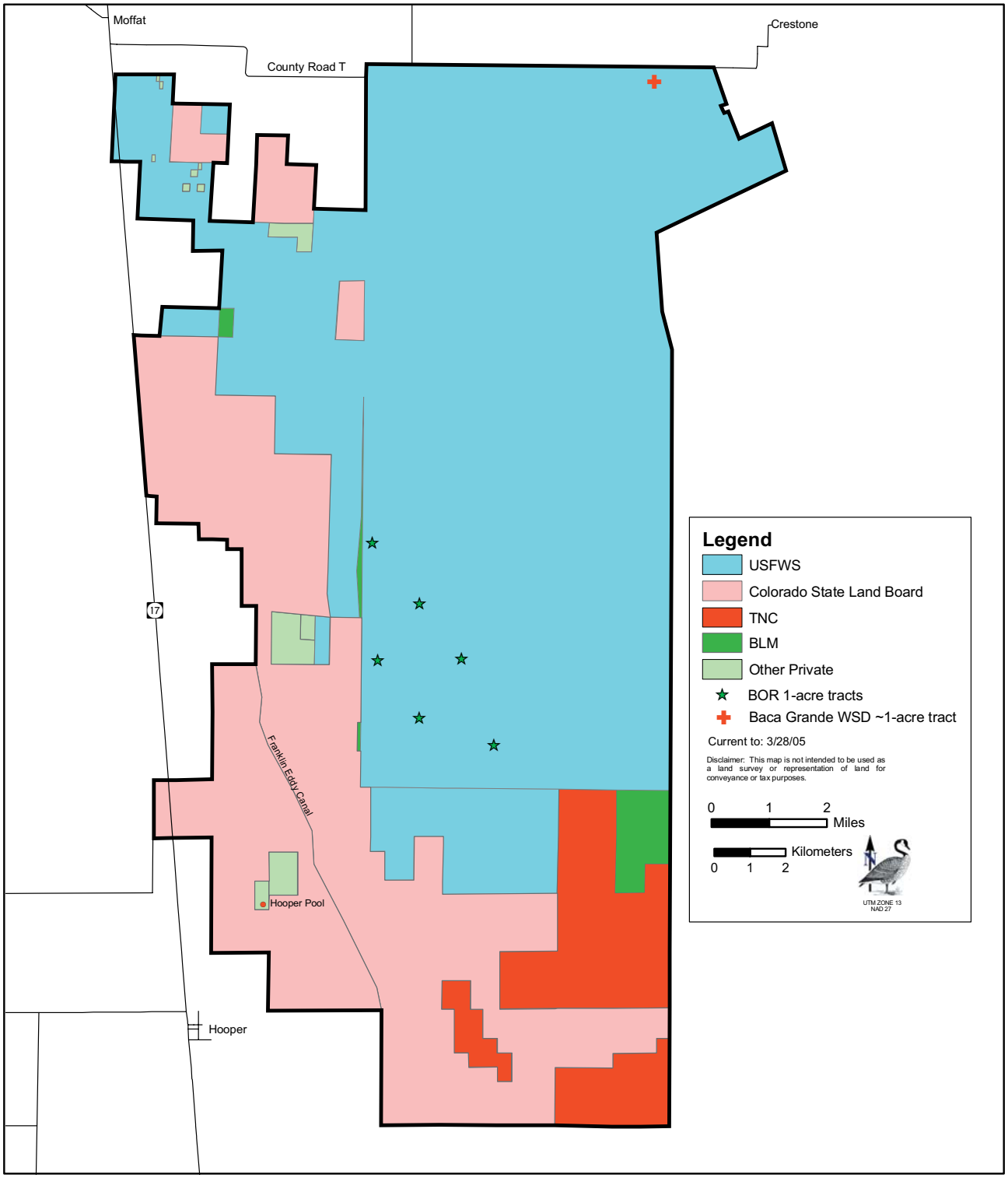
Figure 6. Land Ownership Map

U.S. Fish & Wildlife Service

Baca National Wildlife Refuge

Saguache and Alamosa Counties, Colorado

Land Ownership Map
Figure 6



chapter 5

RESOURCE MONITORING

Chapter 5. Resource Monitoring

5.1 ECOLOGICAL AND BIOLOGICAL RESOURCES

The refuge occurs in a unique and complex hydrological and geomorphological setting. For example, five significant drainages spill off the adjacent Sangre de Cristo Range and disappear into the ground on the refuge, feeding both the shallow, unconfined and underlying, confined aquifers. This, along with wind and other natural forces, supports one of the most unique systems in the North America, the Great Sand Dunes. Combined with adjacent lands managed by NPS, USFS, and TNC, a tremendous opportunity for resource management exists on a large landscape scale (more than 500,000 acres).

The complexity, uniqueness, and value of these new refuge lands demand that refuge managers begin to better understanding the geomorphological setting, as well as other important abiotic characteristics such as soils, in order effectively manage the unique habitats found on the refuge. Complicating effective management and monitoring of this system is the reality of a relatively small refuge staff with very limited resources. Much research will have to be conducted through partnerships with other organizations, but even this approach will require significant staff time for coordination, fund raising, and administration.

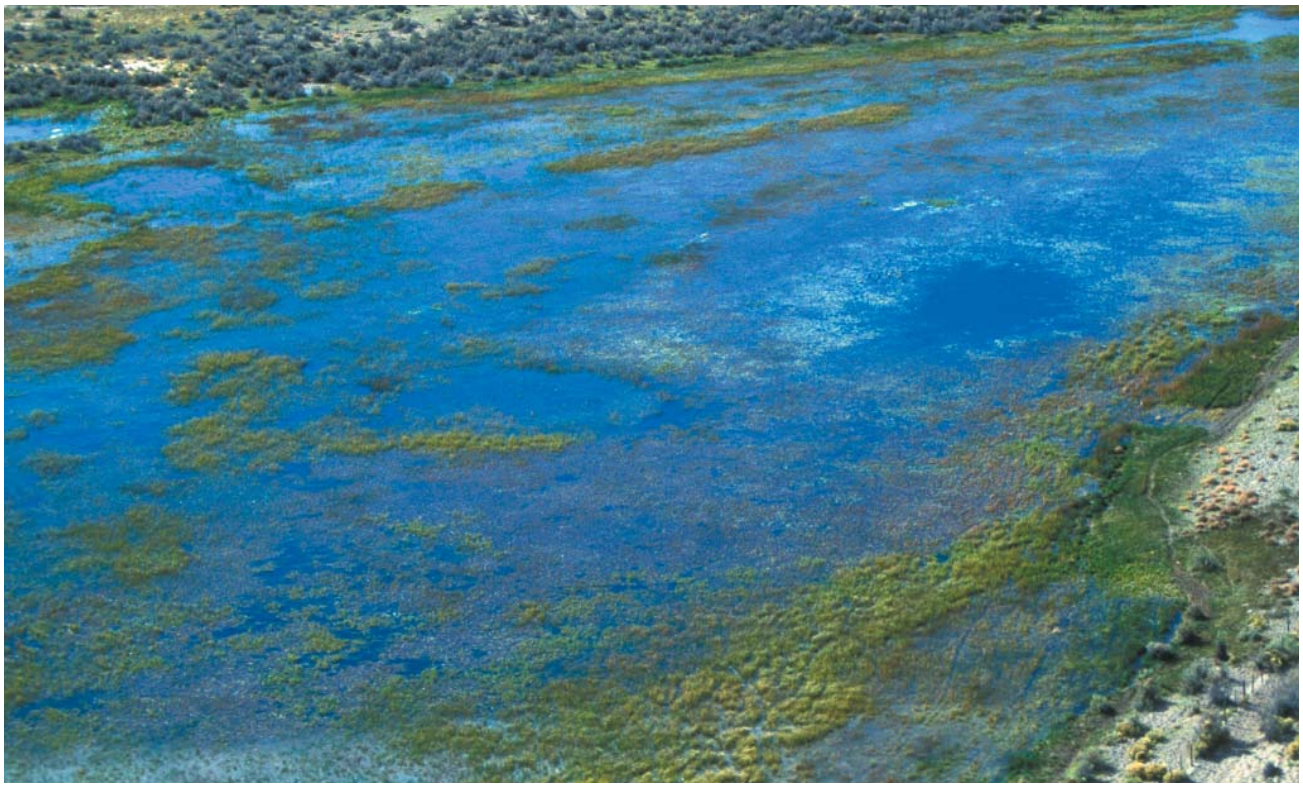
Refuge staff have identified geomorphology, hydrology, and other abiotic factors influencing habitat as the most critical research and monitoring needs. Monitoring fish and wildlife, albeit critical to the success of refuge management, will be secondary until a better understanding of the physical setting those animals depend upon is obtained. Specific research and monitoring needs have not been identified yet. However, it is clear that the specific research and monitoring studies must be designed to provide information to assist refuge managers in making well-informed on-the-ground decisions.

The biological significance and condition of the resources is not fully understood at this time due to limited access and lack of widespread biological inventories. However, given what is known from inventories conducted by the CNHP within the Closed Basin region, the refuge clearly represents a vital component in a large complex of relatively unaltered and intact lands with high biological diversity and ecological richness. CNHP identified 116 “elements” (rare plant or animal species or significant plant communities tracked by CHNP) within the Closed Basin region (Rondeau et al. 1998). Several proposed conservation sites (i.e., areas with high element occurrences) occur on the Baca National Wildlife Refuge including the Weisman Lakes area and the Cottonwood Creek drainage. Ecologically rich lands surrounding the refuge include the Great Sand Dunes National Park and Preserve, Mishak Lakes Preserve and Medano-Zapata Ranch (TNC), and San Luis Lakes State Park and Wildlife Area. These areas are known to contain highly diverse plant and animal communities, some of which only occur in the San Luis Valley.

Assessing the ecological and biological integrity of the refuge and understanding how it fits into the larger Great Sand Dunes and other valley ecosystems will help lay the groundwork from which habitat-based goals and objectives will be developed. These goals and objectives will help guide on-the-ground management activities, such as water management, and other habitat improvement activities. The Service anticipates that TNC will initiate a preliminary ecological assessment prior to transfer to the Service. If this occurs, the Service will use this information to develop a working knowledge of the biological resources of the refuge, and assist further development of inventory and monitoring protocols. The Service will actively develop partnerships with the research community to assist with the continued inventory of biological resources at the refuge. The Service also will work with the staff from TNC and NPS to develop ecosystem-wide monitoring protocols.

5.2 CULTURAL RESOURCES

The refuge and neighboring lands are known to contain a tremendous amount of cultural resources dating to at least 11,500 years ago. The earliest known inhabitants of the San Luis Valley were the Clovis people who occupied the area around 11,500 to 10,900 years before present (BP) (Jodry 1999). Ancient mammoth sites and tools used by Clovis have been discovered in the region. The Folsom people followed the Clovis around 10,900 to 10,200 years BP. Some prominent Folsom sites in the vicinity include the Linger Folsom site, Zapata Folsom site, and Stewart’s Cattle Guard site (Jodry 1999). A succession of other groups utilized the San Luis Valley from 10,000 to 1,450 years BP, at least seasonally to hunt big game and gather food items like pinon nuts and Indian ricegrass (Jodry 1999; Hoefer 1999). The abundance of water in this region is believed to have attracted a multitude of wildlife, which were in turn used extensively by these early peoples (Jodry 1999).



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Emergent wetland

The Late Prehistoric period, which is typically characterized by the development of some form of agricultural activities in addition to hunting and gathering, occurred between 1,450 to 400 years BP (Martorona 1999). Many sites discovered from this time period occurred near wetlands, streams, and springs, further signifying the importance of water to the survival of early peoples. Remains including projectile points, ceramics, ground stone, fire-cracked rock, and other lithic items are common in these sites (Martorano 1999).

The Protohistoric period began around the mid-1600s to the late-1800s and included the first contact between existing cultural groups and Spanish and Euro-American groups (Martorano 1999). These existing cultural groups included the Ute, Comanche, Apache, Navajo, Arapaho, Cheyenne, and northern Pueblo including the Taos, Tewa, and Tesuque (Martorano 1999). The Ute are considered the primary inhabitants during this period.

The influence of Mexican and Spanish peoples in the area is also quite evident during this time period. Mexican and Spanish settlers established San Luis, the oldest town in Colorado, in 1851. The Trujillo Homestead, which was built in 1879 near the refuge, was recently added to the National Register of Historic Places. The Trujillo Homestead was representative of typical small-scale ranches in the area.

The protection of known culturally significant structures and sites will be a priority for refuge staff. The Service intends to coordinate with the NPS, TNC, and local law enforcement authorities to develop strategies to coordinate law enforcement activities to protect cultural resources.

Over time, the Service will evaluate and inventory additional areas within the Baca Refuge that have not been surveyed. The only area surveyed within the refuge has been the White Ranch property, which was surveyed in 1995 (Mabry et al. 1997). As a result of this effort, 64 new sites, two previously known sites, and 83 isolated occurrence sites were documented, many of which may be eligible for the National Register of Historic Places (Mabry et al. 1997). The Service will survey areas where disturbance to cultural sites, e.g., prescribed fire, may occur.

5.3 HYDROLOGIC RESOURCES

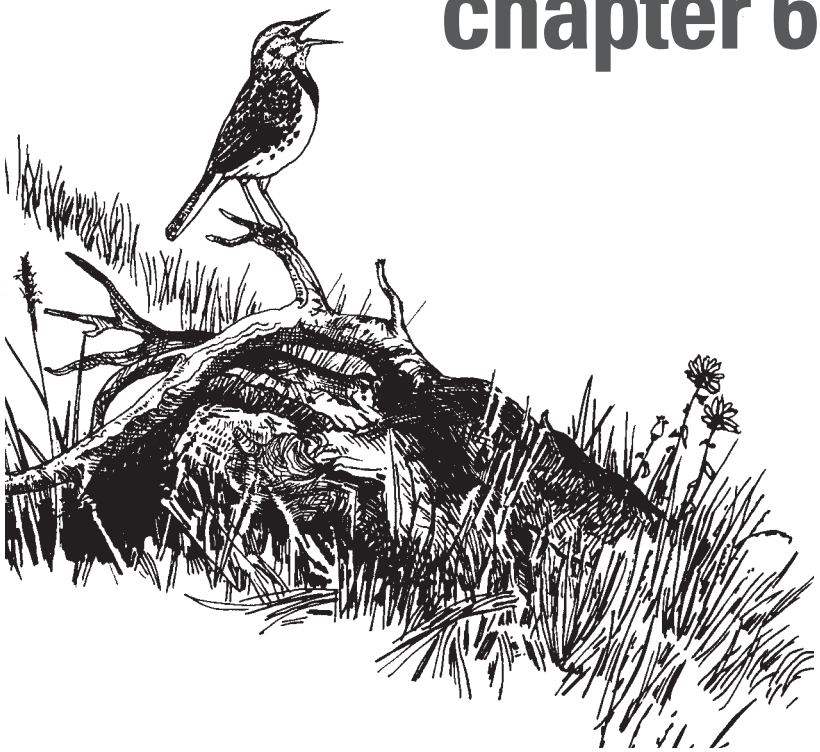
The refuge lies within a topographic basin referred to as the "Closed Basin." The lowest portion of the Closed Basin is known locally as the "sump," which

occurs on part of the refuge. Historically, the sump area was described by early explorers as "a vast swamp or bog with a few small lakes, one of which is said to be three miles in length" (Hayden 1869). Hayden went on to note that "although entirely disconnected from any other water system the little streams are full of trout," referring to the unusual isolation of the Closed Basin in relation to the Rio Grande drainage. Maps generated during the Wheeler Survey in 1871 described the same area of the valley as the "San Luis Valley Marshes." Presently, the Closed Basin covers approximately 2,940 square miles in the northern part of the valley and is separated from the rest of the valley by a low alluvial fan. Water enters the closed basin through precipitation and snowmelt, and exits primarily through evapotranspiration.

The refuge is underlain by two relatively distinct aquifers, the unconfined or shallow aquifer, and the confined or deep aquifer. In most areas, the unconfined aquifer ranges to a depth of about 100 feet. Where the unconfined aquifer comes to the surface, natural seeps, wet meadows, and interdunal wetlands typically result. Below the unconfined aquifer are a number of clay-based layers that serve to separate, although not disconnect entirely, the unconfined aquifer from the deeper layers of sands and gravels containing water in the confined aquifer. The clay layers reduce upward movement of water from the deeper layers creating water pressure. In areas where water from the deep aquifer can access the surface through either fractures in the clay layers or wells, artesian water pressure is common. The aquifers are recharged by infiltration of irrigation waters, canal leakage, seepage from mountain streams that flow across permeable alluvial fans, and infiltration from precipitation.

From a water resources standpoint, one of the first priorities will be to assemble all available hydrological information and data. Assembling this information will enable refuge staff to identify any major data gaps, which if obtained, could significantly improve our understanding of the critical hydrological processes. Key information will be sought from agencies, non-governmental organizations, and private consultants collecting hydrological data in and around the refuge. This information will form the basis of the eventual development of a water management plan for the refuge. The hydrology of this region is the glue that holds the Great Sand Dunes ecosystem together and the refuge will play a major role in maintaining and protecting the stability of this resource and the wildlife resources it supports.

chapter 6



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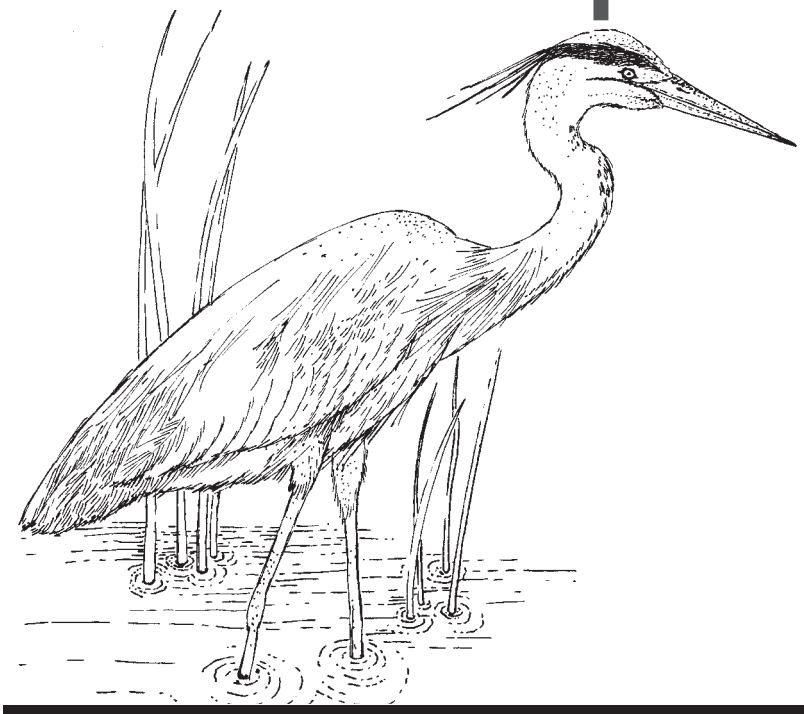
chapter 7



LIST OF PREPARERS AND REVIEWERS

Chapter 7. List of Preparers and Reviewers

Table 5. List of Preparers and Reviewers.

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Reviewer's name	*Position*	*Work Unit*
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Michael Spratt	chief	USFWS, Region 6, Division of Refuge Planning, Lakewood, CO
Cheryl Williss	chief	USFWS, Region 6, Division of Water Resources, Lakewood, CO
Dave Wiseman	refuge supervisor	USFWS, Region 6, Lakewood, CO

The document was assembled by Josh Mehlem and Tom Gibney, Shapins and Associates, Boulder, CO.

Appendices

Appendix A. Signed copy of General Agreement between The Nature Conservancy, the National Park Service, the U.S. Fish and Wildlife Service and the Forest Service

GENERAL AGREEMENT

between

The Nature Conservancy

and

the United States of America
(through its U.S. National Park Service
U.S. Fish and Wildlife Service
U.S. Forest Service agencies)

I. Definitions

a. Agreement - this General Agreement between the TNC and U.S.

b. Amended Offer - Agreement titled "United States Department of the Interior Amended Offer to Purchase Real Property", dated January 31,2002.

c. FWS - the U.S. Fish and Wildlife Service

d. NPS - the U.S. National Park Service

e. Owners - the joint undivided interest owners of the Remainder, namely The Nature Conservancy, and the United States of America.

f. Remainder - the jointly owned portion of the Baca Ranch, excluding those lands lying southeast of Sand Creek, that property known as the "Sand Creek Annex" as described in Item 2(c), Attachment A, and that 10 acres conveyed to the Baca Grande Water and Sanitation district, consisting of 93,210 acres more or less.

g. TNC - The Nature Conservancy represented herein by its Colorado field office.

h. U.S. - the United States of America as represented by the FWS, consisting of the federal agencies which are designated within the Great Sand Dunes Park and Preserve Act of 2000, to be allocated lands within the Baca Ranch following its purchase by the federal government, namely the USFS, FWS, and the NPS.

i. USFS - the U.S. Forest Service

II. Purpose

The purpose of this Agreement is to provide a framework for management of the Remainder while under joint undivided interest ownership on the part of the entities which are party to this Agreement. This Agreement is pursuant to and in fulfillment of section 8., Attachment A of the Amended Offer. The interim management goals of the Owners are to develop sustainable range management, explore cross boundary collaborative wildlife, fire and weed management, and review the water rights' uses and appropriations, in order to conserve the ecological resources of the Great Sand Dunes area through sound stewardship.

III. Application

This Agreement applies to the lands described as the Remainder in the Amended Offer, consisting of approximately 93,210 acres (see attached map). TNC will manage the Remainder and any Colorado State Land Board (SLB) lands leased for agriculture by Vaca Partners prior to sale of the Baca Ranch and assigned at closing, as a single unit.

IV. Management Structure

a. TNC will serve as the manager of the Remainder, as long as it is held in undivided interest ownership by the Owners. Upon approval of this Agreement and transfer of land ownership to the Owners, TNC is authorized to implement management actions. TNC will schedule meetings of the Owners <u>at least</u> semiannually, to discuss management issues and to address any concerns.

1

TNC will also conduct additional meetings within 14 days of any such request, when called for by TNC or the U.S.

b. The FWS, NPS and USFS will be invited to attend and participate in semiannual and specially called meetings. However, for the purposes of business that must be conducted by telephone, email, and other means outside of such meetings, and in the case where consensus cannot be reached among the agencies and TNC, the FWS will serve as the official representative for the U.S.

V. Rules of Order

Management decisions that vary from or are not addressed in the Agreement, proposals by the U.S. or TNC for management actions, and resolution of conflicts that may arise, will be reviewed at ownership meetings. Approval for such actions will be by consensus. If consensus cannot be reached, the parties agree to submit such decision or conflict for mediation by a mutually-acceptable trained neutral third-party mediator in a good faith effort to reach consensus on such decision or conflict. If such mediation fails, resolution by the U.S. shall control.

VI. Uses

a. Leases – General

i. As Manager, TNC may issue leases for agricultural use, and for recreational uses that may include hunting, fishing, and/or hiking. Other additional uses may be approved by the Owners. TNC will also administer the existing contract for supply of domestic water with the Baca Grande Water and Sanitation District.

ii. TNC will provide the Owners with a proposed draft process for selection of a lessee(s). Following approval and implementation of this process, TNC will provide the Owners with a short list of prospective lessees for each lease. This list will be developed by TNC in consultation with the Owners prior to TNC granting final approval of a lessee(s).

iii. TNC will develop a draft lease containing all requirements, limits, restrictions, and provisions of operation. This draft lease will be reviewed and approved by the Owners prior to implementation.

iv. All leases will contain language providing for the termination of such lease, to occur no later than December 31 of the calendar year in which the Agreement expires (as defined in section IX below) or 120 days following the expiration of this Agreement (as defined in section IX below), whichever comes later.

v. Any proposed revocation, reassignment, subletting, or transfer of a lease must first be approved by the Owners.

vi. TNC will require a sufficient bond and/or insurance from all lessees, to provide reasonable funding for mitigation of any damage and/or default on the part of a lessee.

vii. TNC will develop and implement a monitoring plan to ensure that long-term ecological goals are met.

b. Agricultural lease(s)

i. It is the intention of TNC to assess the current ecological condition and develop a long-term grazing management program that best supports both the ecological features of the property and its agricultural uses.

ii. Following issuance of any lease, TNC will work with the lessee and the Natural Resource Conservation Service (or other agricultural planning entity), in consultation with the Owners, to develop a site specific agricultural management (including grazing) plan for the Remainder based on the management goals stated in section II above, and will provide sufficient resources and on-site coordination to assure compliance with the provisions of the plan.

iii. The agricultural lessee(s) will be required to provide adequate fencing to prevent livestock trespass onto adjoining federal and private lands.

c. Recreational lease(s)

i. All permitted hunters will be accompanied by a representative of the lessee.

ii. Any limited access bull elk hunting leases permitted by TNC must provide at no charge, at least 10% of the available permits and/or opportunities, to the general public through a lottery system.

d. Dispersal (cow) elk hunts

i. A "Hunt Coordinated" program may be used, conducted by the Colorado Division of Wildlife, to control the elk population through harvest of cow elk. Such hunts will be reviewed and approved by the owners and coordinated with the recreational lessee.

VII. Oil, Gas, and Mineral Activities

a. TNC will within 5 business days of receipt, notify and forward copies to the Owners, of any notifications, requests, and/or proposals received from private owners of oil, gas, or mineral interests underlying the Remainder, to explore, develop, or otherwise take any action related to such interests.

b. During the pendency of this Agreement, nothing herein is intended to preclude the application of the respective regulations of the NPS, FWS or USFS to those lands to be administered by such agency in accordance with P.L-106-530, except to the extent that the application of such regulations is otherwise inconsistent with the terms of this Agreement. For example, the Parties hereto confirm their intention that the regulations set forth at 36 C.F.R. Part 9B shall apply to non-federal oil and gas operations taking place within the portion of those lands for which the United States holds an undivided interest and which are designated by Congress to be administered as a part of either Great Sand Dunes National Park or Preserve.

VIII. Access

a. Owners

Owners and their employees, invitees, and assigns, will be permitted reasonable access to the property for purposes of, research, monitoring, inventory, administrative use, and other legitimate, non-public purposes. With the exception of law enforcement and life/health/safety emergencies, the U.S. will coordinate its access to the Remainder with TNC at least 1 day in advance, providing information regarding the purpose, location, and intended duration of such visit. TNC may specify certain locations for certain periods of time, when no access will be allowed to prevent undue interference with lessee's activities (i.e. during and prior to elk hunting seasons). In addition to providing such 1-day advance notice regarding entry, the U.S. agrees that the U.S. use of any road on the Remainder that has been constructed by surface lessee Challenger Gold or Lexam (or their successors in interest) shall be restricted to administrative use only and only used when alternative access is impractical. For the purposes of this provision, administrative use shall include research, monitoring, inventory and other legitimate, non-public purposes.

b. Inholders

TNC will provide reasonable access to inholders who have no other reasonable alternative access, provided in no event shall use of any road on the Remainder that has been constructed by surface lessee Challenger Gold or Lexam (or their successors in interest) be required.

IX. Commencement/Expiration

a. This Agreement shall commence upon the acquisition of the Remainder by the Owners.

b. This Agreement shall expire upon the earlier to occur of:

i. the final real estate closing wherein the U.S. completes payment of the total property value as specified in the Amended Offer, or

ii. completion of a partitioning process as outlined in the Amended Offer, or

iii. mutual agreement of the Owners.

X. Key Officials

a. Local/Coordinating

i. For the NPS:

Steve W. Chaney
Superintendent,
Great Sand Dunes National Monument and Preserve

ii. For the USFS:

Tom Goodwin
District Ranger
Saguache District, Rio Grande National Forest

iii. For the FWS:

Mike Blenden
Manager
Baca National Wildlife Refuge

iv. For TNC

Brian McPeek
Southeast Colorado Program Manager

XI. Standard Clauses

a. Civil Rights

During the performance of this Agreement, the participants will not discriminate against any person because of race, color, religion, sex, or national origin. The participants will take affirmative action to ensure that applicants are employed without regard to their race, color, sexual orientation, national origin, disabilities, religion, age, or sex.

b. Anti-Deficiency Act - 31 U.S.C. §1341

Nothing contained in this Agreement shall be construed as binding the NPS to expend in any one fiscal year any sum in excess of appropriations made by Congress for the purposes of this Agreement for that fiscal year, or other obligation for the further expenditure of money in excess of such appropriations.

c. Officials Not to Benefit

No member of, or delegate to Congress or Resident Commissioner shall be admitted to any share of any benefit that may arise from this Agreement.

Approved:

Mark Burget, Director,
The Nature Conservancy of Colorado

5/18/04
Date

Mike Blenden, Manager
Baca National Wildlife Refuge
U.S. Fish and Wildlife Service

6/7/2004
Date

for Peter Clark, Supervisor
Rio Grande National Forest
U.S. Forest Service

6/14/04
Date

Steve W. Chaney, Superintendent
Great Sand Dunes National Monument and Preserve
U.S. National Park Service

6/21/04
Date

5

FIRST AMENDMENT

TO

GENERAL AGREEMENT

between

The Nature Conservancy

and

the United States of America
(through its U.S. National Park Service
U.S. Fish and Wildlife Service
U.S. Forest Service agencies)

I. Definitions

Except as expressly defined herein, all capitalized terms shall have the meanings defined in that certain General Agreement between the TNC and U.S. dated September 10, 2004.

a. Amendment – This First Amendment to General Agreement.

II. Purpose

The purpose of this Amendment is to amend certain provisions and extend the term of the Agreement for management of the FWS Lands after 100% of the interest therein has been conveyed from TNC to the U.S. This Amendment will survive the Amended Offer. The continuing management goals of the Owners are to develop sustainable range management, explore cross boundary collaborative wildlife, fire and weed management, and review the water rights' uses and appropriations, in order to conserve the ecological resources of the Great Sand Dunes area through sound stewardship. Further, this Amendment is intended to ensure a smooth transition in the management activities on the FWS Lands.

III. Application

This Amendment applies to a portion of the lands described as the Remainder in the Amended Offer defined herein as the FWS Lands and the Colorado State Land Board leases appurtenant thereto. The U.S. will manage the NPS Lands and the USFS Lands, and TNC will manage the FWS Lands, including the Colorado State Land Board leases. Some of the Colorado State Land Board leases are currently held by FWS, and therefore, TNC's management under this Amendment shall include the express authority to manage such lands under the Colorado State Land Board leases. TNC management of Colorado State Land Board leases will be extended to individual leases as the leases are acquired by FWS for the duration of this agreement.

IV. Management Structure

a. The U.S. will manage the NPS Lands and the USFS Lands for the term of this Amendment per the terms of the Agreement.

b. TNC will remain the manager of the FWS Lands for the term of this Amendment per the terms of the Agreement, including the scheduling of meetings with FWS regarding the FWS Lands, as described therein.

V. Rules of Order

Management decisions that vary from or are not addressed in the Agreement or Amendment, proposals by the U.S. (or through NPS, FWS or USFS) or TNC for management actions, and resolution of conflicts that may arise, will be reviewed at ownership meetings. Approval for such actions will be by consensus. If consensus cannot be reached, the parties agree to submit such decision or conflict for mediation by a mutually-acceptable trained neutral third-party mediator in a good faith effort to reach consensus on such decision or conflict. If such mediation fails, resolution by the U.S. shall control; provided, however, that TNC's right to take any and all legal actions necessary to terminate any hold-over occupancy, as described in Section VI(II)a below, shall not be affected.

VI. Uses

(I) TNC Management of FWS Lands.

TNC management of FWS Lands shall continue per the terms of the Agreement.

(II) U.S. Management of NPS Lands and USFS Lands.

U.S. management of the NPS Lands and USFS Lands shall continue per the terms of the Agreement.

VII. Access

a. Owners

Irrespective of the identity of the Manager, Owners and their employees, invitees, and assigns, will be permitted reasonable access to the property for purposes of, research, monitoring, inventory, administrative use, and other legitimate, non-public purposes. With the exception of law enforcement and life/health/safety emergencies, FWS will coordinate

its access to the FWS Lands with TNC at least 1 day in advance, providing information regarding the purpose, location, and intended duration of such visit. TNC may specify certain locations for certain periods of time, when no access will be allowed to prevent undue interference with lessee's activities (i.e. during and prior to elk hunting seasons). In addition to providing such 1-day advance notice regarding entry, and in accordance with the terms of that certain Indemnification Agreement dated March 10, 2004, the U.S. agrees that any use by the U.S. of the road depicted on the map attached hereto as Exhibit B or any other road over the Remainder that has been constructed by surface lessee Challenger Gold or Lexam (or their successors in interest) shall be restricted to administrative use only and only used when alternative access is impractical. For the purposes of this provision, administrative use shall include research, monitoring, inventory and other legitimate, non-public purposes.

b. Inholders

TNC will provide reasonable access to inholders who have no other reasonable alternative access, provided in no event shall use of any road on the Remainder that has been constructed by surface lessee Challenger Gold or Lexam (or their successors in interest) be required.

VIII. Term/ Effect.

a. This Amendment is effective as of the 15th day of February, 2005 and shall continue through December 31, 2005, unless mutually extended in writing by the parties hereto.

b. Except as expressly amended herein, the provisions of the Agreement shall remain in full force and effect.

IX. Standard Clauses

a. **Civil Rights.** During the performance of this Agreement, the participants will not discriminate against any person because of race, color, religion, sex, or national origin. The participants will take affirmative action to ensure that applicants are employed without regard to their race, color, sexual orientation, national origin, disabilities, religion, age, or sex.

b. **Anti-Deficiency Act - 31 U.S.C. §1341.** Nothing contained in this Agreement shall be construed as binding the NPS, FWS or USFS to expend in any one fiscal year any sum in excess of appropriations made by Congress for the purposes of this Agreement for that fiscal year, or other obligation for the further expenditure of money in excess of such appropriations.

c. **Officials Not to Benefit.** No member of, or delegate to Congress or Resident Commissioner shall be admitted to any share of any benefit that may arise from this Agreement.

Approved:

_____

Charles Bedford, State Dirctor — Date
The Nature Conservancy, Colorado
Field Office

_____

Mike Blenden, Manager — Date
Baca National Wildlife Refuge
U.S. Fish and Wildlife Service

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Peter Clark, Supervisor — Date

Rio Grande National Forest
U.S. Forest Service

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Steve W. Chaney, Superintendent — Date
Great Sand Dunes National Park
U.S. National Park Service

Appendix B. Definitions of National Wetland Inventory Codes

NATIONAL WETLAND INVENTORY WETLAND TYPES AND CODES

PEMJ; Intermittently Flooded

PEMA; Temporarily Flooded

PEMC; Seasonally Flooded

PEMF; Semi-Permanently Flooded

PABF; Lake; Semi-Permanently Flooded

Descriptions for each segment of the Code

[P] Palustrine - The Palustrine System includes all nontidal wetlands dominated by trees, shrubs, emergents, mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean derived salts is below 0.5 ppt. Wetlands lacking such vegetation are also included if they exhibit all of the following characteristics:

1. are less than 8 hectares (20 acres)
2. do not have an active wave-formed or bedrock shoreline feature;
3. have at low water a depth less than 2 meters (6.6 feet) in the deepest part of the basin;
4. have a salinity due to ocean-derived salts of less than 0.5 ppt.

All water bodies visible on the aerial photography that are less than 8 hectares (20 acres) in size are considered to be in the Palustrine System unless depth information is available, or unless an active wave-formed or bedrock shoreline feature is visible.

Limits. The Palustrine System is bounded by upland or by any of the other four systems.

Description. The Palustrine System was developed to group the vegetated wetlands traditionally called by such names as marsh,swamp, bog, fen, and prairie, which are found throughout the United States. It also includes the small, shallow, permanent or intermittent water bodies often called ponds. Palustrine wetlands may be situated shoreward of lakes, river channels, or estuaries; on river floodplains; in isolated catchments; or on slopes. They may also occur as islands in lakes or rivers.

Class. Class describes the general appearance of the habitat in terms of either the dominant fife form of the vegetation or the physiography and composition of the substrate. Life forms (e.g. trees, shrubs, emergents) are used to defineclasses because they are easily recognizable, do not change distribution rapidly, and have traditionally been used to classify wetlands. Other forms of vegetation such as submerged or floating-leaved vascular plants are more difficult to detect. Substrates reflect regional and local variations in geology and the influence of wind, waves, and currents on erosion and deposition of substrate materials.

[EM] Emergent - Characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. These wetlands are usually dominated by perennial plants. All water regimes are included except subtidal and irregularly exposed.

Water Regime. Freshwater Non-Tidal areas (L, P, and R systems) Though not influenced by oceanic tides, nontidal water regimes may be affected by wind or seiches in lakes. Water regimes are defined in terms of the growing season, which we equate to the frost free period. The rest of the year is defined as the dormant season, a time when even extended periods of flooding may have little influence on the development of plant communities.

[J] Intermittently Flooded - Substrate is usually exposed, but surface water is present for variable periods without detectable seasonal periodicity. Weeks or months or even years may intervene between periods of inundation. The dominant plant communities under this regime may change as soil moisture conditions change. Some areas exhibiting this regime do not fall within our definition of wetland because they do not have hydric soils or support hydrophytes. In areas mapped as intermittently flooded, refer to regional guidelines for specific applications.

[A] Temporarily Flooded - Surface water is present for brief periods during growing season, but the water table usually lies well below the soil surface. Plants that grow both in uplands and wetlands may be characteristic of this water regime.

[C] Seasonally Flooded - Surface water is present for extended periods especially early in the growing season, but is absent by the end of the growing

season in most years. The water table after flooding ceases is variable, extending from saturated to the surface to a water table well below the ground surface.

[F] Semipermanently Flooded - Surface water persists throughout the growing season in most years. When surface water is absent, the water table is usually at or very near the land's surface.

[AB] Aquatic Bed - Includes wetlands and deepwater habitats dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Aquatic beds generally occur in water less than 2 meters (6.6 feet) deep and are placed in the Littoral Subsystem (if in Lacustrine System). Water regimes include the following: subtidal, permanent-tidal, semipermanent-tidal, irregularly exposed, regularly flooded, permanently flooded, intermittently flooded, semipermanently flooded, and seasonally flooded.

From:

Cowardin, L.M., V. Carter, F. Golet, and E. LaRoe. 1979.
Classification of Wetlands and Deepwater Habitats of the United States. U.S. Fish and Wildlife Service. 103 pp.

Appendix C. Interim Compatibility Determination, Colorado Division of Wildlife Dispersal Hunt Activities

COMPATIBILITY DETERMINATION

Dispersal Elk Hunt on

Lands Formerly Leased by Colorado Division of Wildlife for Hunting

Baca National Wildlife Refuge

Use: Elk Hunting

Refuge Name: Baca National Wildlife Refuge

Establishing and Acquisition Authority:
Great Sand Dunes Park and Preserve Act of 2000, Public Law 106-530.

Purpose for which Established:
The purpose of the Baca National Wildlife Refuge is to restore, enhance, and maintain wetland, upland, riparian and other habitats for native wildlife, plants and fish species in the San Luis Valley. Management of the refuge will emphasize migratory bird conservation and will consider the refuge's role in broader landscape conservation efforts.

National Wildlife Refuge System Mission: The mission of the National Wildlife Refuge System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

Description of Use:
This Compatibility Determination only applies to lands currently owned by the Colorado State Land Board on the west side of Baca National Wildlife Refuge and will only come in to effect when ownership of these lands are transferred to the United States and managed by the U.S. Fish and Wildlife Service as part of Baca National Wildlife Refuge. See attached map.

This use is an elk hunting program conducted under the guidelines and authorities of the Colorado Division of Wildlife (CDOW). Section #271 "Big Game Animals Causing Damage and Big Game Populations Over Objective" is part of Article XII, of the Colorado Wildlife Commission Regulations entitled "Special Hunting Seasons for Big Game Ungulates." This regulation authorizes the Director of Colorado Division of Wildlife to establish special hunting seasons for big game ungulates between August 15 and February 28 when necessary to control damage to property. Such a hunting season has been established for elk and is being conducted on state lands within the boundary of the Baca NWR.

The hunting covered by this Compatibility Determination will be designed to primarily contain elk populations east of highway 17 as it passes through Baca National Wildlife Refuge and secondarily to reduce the size of an elk population substantially over its desired objective level.

CDOW estimates the elk population in this game management unit to be 5,000 to 6,000 animals while the population objective is 1500. There is discussion concerning the appropriateness of the current population objective. The CDOW feels the population has grown so dramatically due to the hunting history on several large ranches on the east side of the San Luis Valley and the negligible harvest that has occurred on these ranches over the past 20 years. Baca NWR was established with the acquisition of one of these ranches.

One of the driving concerns of the community and CDOW is the liability associated with these animals if they increase use of an area just west of the Baca NWR that is managed intensively as high value cropland. Specific concerns are the impact and resulting devaluation of certified seed potato crops if spread of disease organisms is linked to elk movement through these fields. Such devaluation can easily approach $250,000 per field per year.

As it is currently conducted the CDOW maintains a list of potential hunters that apply on a "first come first serve" basis. The agency also employs "hunt coordinators." These individuals are skilled in hunting practices and in supervising people to meet land and wildlife manager's needs. Their job is to coordinate with the landowner, neighboring landowners, the CDOW district wildlife manager, and potential hunters to achieve the distribution and population objectives of the specific hunt in a safe,

legal and orderly manner. When conditions warrant the hunt coordinator requests one or more hunters from the CDOW list to participate in a hunt, usually the next day. The hunt coordinator takes hunters out to the group of animals of concern and directs the hunter in his or her attempt to take one of the elk.

This is not a guiding service. The hunter is not assisted by the hunt coordinator but under his or her direction. The hunter is responsible for retrieval and must comply with the land owner's stipulations.

Anticipated Impacts of the Use:
There are beneficial and negative impacts of this use on the Baca NWR. Beneficial impacts include:

1) This is a practical and cost effective tool to strategically manage this elk population.

2) Although not a traditional hunt, it is a wildlife dependent public use that refuges are encouraged to facilitate.

Negative impacts include:
1) The normal disturbance to other species associated with any hunting activity.

2) Use of refuge roads and trails during wet periods will likely result in their deterioration.

3) This hunt is another activity that must be considered in day to day work on the refuge for the sake of not disrupting the hunt and to maintain safe operations.

Determination:
Use is compatible with the following stipulations.

Stipulations Necessary to Ensure Compatibility:
1) The hunt is coordinated by a CDOW contractor or employee.

2) The hunt coordinator is responsible for conducting hunts in a safe, professional manner while communicating to the refuge manager the timing of hunts, location of hunts, result of hunts, daily restrictions and problems encountered.

3) Annual (or more frequent as needed) planning takes place between refuge staff and the CDOW that outlines projected needs for the hunt based upon elk distribution and predicted movements.

4) Elk hunting will not conflict with ongoing or planned refuge operations.

5) It is clearly understood that the refuge manager can stop hunts at any time.

Justification:
Proper management of elk on the eastern side of the San Luis Valley is necessary to maintain sustainable population levels and control to some degree damage caused by elk on private lands. This kind of hunt is the best, viable alternative that can be immediately used to control elk movement while adding some level of mortality to this rapidly expanding population. This use will not materially interfere with or detract from fulfillment of the National Wildlife Refuge System mission and the purpose of the Baca National Wildlife Refuge.

Signature: Refuge Manager:_____

(Signature and Date)

Concurrence: Refuge Supervisor: _____

(Signature and Date)

Regional Chief:_____

(Signature and Date)

Mandatory 10- or 15- year Re-evaluation Date:_____